

H. A. Jackson

THE ELECTRIC AGE.

DEVOTED TO TELEGRAPHY, TELEPHONY, ELECTRIC LIGHTING AND ALL PHASES OF ELECTRICAL DEVELOPMENT.

VOL. VI—No. 5.

NEW YORK, AUGUST 1, 1888.

\$1.50 per annum.
Single copies 10 cents.

J. H. BUNNELL & CO.,

106 and 108 Liberty Street,

NEW YORK

Telegraph Instruments

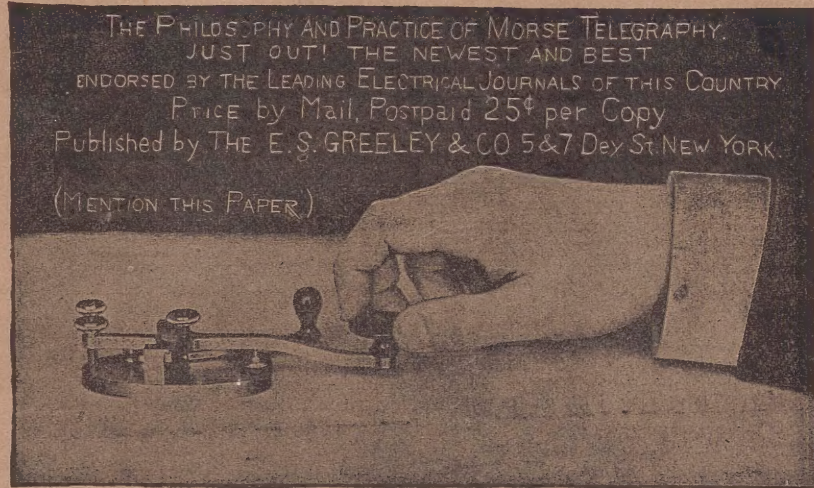
BATTERIES, BELLS & ELECTRICAL SUPPLIES.

The largest stock and best
variety of main line and
short line instruments in any
American establishment.

Send for our latest Illustrat-
ed price List and Catalogue
No. 9, of January, 1888.

containing over four hun-
dred cuts of Telegraph In-
struments, Batteries and
Electrical Appliances, FREE
also Manual of Telegraphy,
FREE to any Address.

HALF PRICE TO OPERATORS.



SPECIAL NOTICE.—To any TELEGRAPH OPERATOR in the UNITED STATES or CANADA, sending us his Office Address or other satisfactory evidence of his profession, together with 12 cents in postage stamps or otherwise, we will forward by mail, postpaid, a copy of the above book, entitled The Philosophy and Practice of Morse Telegraphy, just issued.

WHAT THE ELECTRICAL PRESS SAY :

"An excellent little work * * *

"A rational and practical guide for the young telegrapher, intended to make him acquainted early in his career with a few underlying facts and laws that usually, without specific study, only come to his knowledge after years of service and practical observation."—*The Electrical World, March 24th, '88.*

The truth (referring to the true position of the telegraphers' hand in the act of "sending") exposed by a lightning wink of the instantaneous camera, and permanently fixed for our deliberate inspection by the science of photography, dawns upon the craft intellect accompanied with something of the amazement that startled the artistic world when the elaborate anatomical studies by Rosa Bonheur of the horse in the act of running, were delivered over to universal ridicule by the subtleties of the same agent, instantaneous photography.

The Electrical Review, March 24th, '88.

THE E. S. GREELEY & CO.

Successors to L. G. TILLOTSON & CO.

5 and 7 DEY STREET, NEW YORK.

Manufacturers, Importers of, Dealers in and Headquarters for

TELEGRAPH, TELEPHONE, ELECTRIC LIGHT, DISTRICT.
BURGLAR ALARM, ELECTRIC BELL, EXPERIMENTAL
AND GENERAL ELECTRICAL SUPPLIES.

SOLE MANUFACTURERS OF THE

Victor Telegraph Instruments.

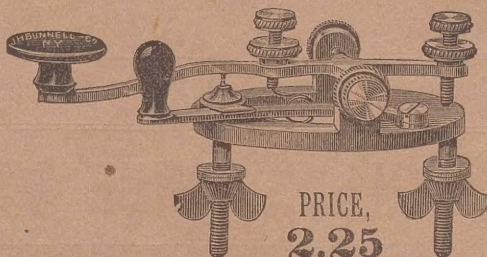
EFFECTIVE IN WORK! BEAUTIFUL IN APPEAR-
ANCE!! SCIENTIFIC IN CONSTRUCTION!!!

Authorized Agents for the Sale of EDISON INCANDESCENT MINIATURE
LAMPS and all other EDISON LAMPS for EXPERIMENTAL USES.

J. H. BUNNELL & CO'S STEEL LEVER SOLID TRUNNION KEY.

Telegraphers cannot fail to have noticed that upon the introduction of the BUNNELL STEEL LEVER KEY four years since, it at once achieved a vast popularity, such as never before attached to any specialty in Telegraph Instruments, and that this popularity has continually increased, and is still increasing.

It will also be noticed by Telegraphers, that since the STEEL LEVER KEY was introduced, a brood of "improved" keys has been hatched and put forward from various sources from time to time each one made to look as much like the



PRICE,
2.25

STEEL LEVER KEY as possible, or made with some kind of a "steel lever," or "patent lever," and in every case claiming all the merits possible and impossible that language could describe.

Most of these "improved keys" have become exterminated by the force of their own worthlessness. Years of practical test in the use of THOUSANDS of BUNNELL STEEL LEVER KEYS throughout America demonstrates their perfection and popularity. BE NOT DECEIVED BY THE ABSURD IMITATIONS.

THE BUNNELL STEEL LEVER KEY is *more durable*, and in every respect *better* than any other for rapid and perfect sending for the following reasons:

The Lever is *only one-half the weight* of the ordinary brass lever as generally made. The entire Lever and Trunnions together being made of *but one piece* of fine wrought steel, the common defect of loose trunnions is avoided, the strength of a heavy brass lever is obtained with much less weight of metal, and, by the perfect bearing which the solid trunnion gives, together with the use of *hardened platina points*, *sticking is absolutely prevented*.

The size and proportions are such as to make it the most perfect operating key possible to obtain, either for the hand of the skilled and rapid expert, or the beginner.

Price, \$2.25. Finely Finished, and Lever Nickel Plated.

LIBERAL DISCOUNT ON ORDERS FOR COMPANY SUPPLIES.

Steel Lever key sent by mail, post-paid to any part of the U. S. or Canada on receipt of the above price, by Registered Letter or Money Order. Until further notice we will exchange our New Steel Lever Keys for old keys for a cash difference of \$1.50 each. This price applies to any number of Keys, no matter in what condition the old ones may be. They must be delivered to us in packages plainly marked **KEYS** with all charges prepaid.

Where exchanges of not less than Six Keys at one time are desired for Keys which are already in use and which cannot be spared until the new ones arrive, we will, upon receipt of order, send on the new ones and the old ones may be sent to us afterwards. Cash should accompany all orders except from Superintendents and from Purchasing Agents of well known companies.

SEND FOR OUR 1888 ILLUSTRATED CATALOGUE.

J. H. BUNNELL & CO.,

106 and 108 Liberty Street,

NEW YORK.

IT STANDS AT THE HEAD

ONE touch of the finger should produce any character used in a Writing Machine. Instruments that fail to accomplish this are deficient and do not fully meet the necessity that brought them forth. These facts are self-evident.

The No. 2 Caligraph is the only writing machine that fully economizes time and labor, and economy of time and labor is the best ground we have for soliciting trade.

Granting that we are in the front in this, we can show that our late improved machines excel in mechanical merit, durability and beauty of work. 10,000 Caligraphs are in daily use.

We publish 400 letters from prominent men and firms which are convincing.

THE COMMERCIAL GAZETTE.

C. G. Muller, Agent Caligraph,
Cincinnati, O.

Cincinnati, October 5th, 1885.

Sir:—About three months since, I commenced to use the Caligraph with a view to receiving special despatches from the wires, instead of by the old method by the pen. In about three weeks I was able, by diligent practice, to write from thirty-five to forty words per minute. Since then I have been using the machine with success receiving from five to six thousand words per night upon it. We have found the machine of such value in the work as to be able to receive the despatches by code, or abbreviation, thus increasing this capacity of the wire, though the matter is written out in full upon the Caligraph. We make an average speed of fifty words per minute by this method, and expect to do still better work with it.

The machine is a No. 2 and must be a marvel of durability, as it has never been out of order under this continuous and heavy strain, and is always ready for use.

Very truly yours, Signed; Frank B. Ross, Opr. Commercial Gazette.
C. G. Muller, Esq., Agent Caligraph, Cincinnati, O. October 5th, 1885.

above statement of our operator.

Dear Sir:—I cheerfully certify to the correctness of the Signed; Chas. E. Thorp, Telegraph Editor C. G.

Guaranteed to be unequalled in Manifolding capacity.

THE AMERICAN WRITING MACHINE CO.,

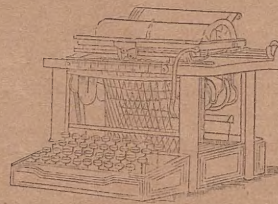
New York Office, 237 Broadway]

Hartford Conn

REMINGTON

Standard Typewriter.

30,000 IN DAILY USE.



THE STANDARD OF THE
WORLD.

Especially adapted for manifolding, and for rapid work.

Adopted by the New York Associated Press, Western Associated Press and New England Associated Press, and a large number of telegraphers throughout the country for receiving messages.

Send for handsome illustrated pamphlet.

Wyckoff, Seamans & Benedict,

327 Broadway, New York.

THE ELECTRIC AGE.

Published on the 1st and 16th of every month
by the Electric Age Association.

Entered as Second-class Mail Matter.

Registered Cable Address
"ELECTAGE" NEW YORK.

TERMS OF SUBSCRIPTION :

One Copy, one year,	\$1 50
One Copy, six months75
Great Britain and other Countries,	2.00

(INVARIABLY IN ADVANCE.)

CLUBS.—One extra copy of the ELECTRIC AGE, will be supplied gratis for every Club of five subscribers.

We invite correspondence from members of the profession and solicit articles from manufacturers for publication.

Subscribers should promptly notify us of any change in their addresses, giving the old as well as the new one, that they may receive all the papers they pay for.

ADVERTISING RATES: \$2.00 PER INCH.

Reading Notices, 25 cents per line.

Births, Marriages, Deaths and other Notices, 50 cents each.

Papers will be discontinued at the expiration of the time contracted for with due notice of same.

WALTER P. PHILLIPS, Editor.

J. B. TALTAVALL, Publisher,

C. H. BOGLE, Manager, Advertising Dept

No. 5 Dey St., New York.

NEW YORK, AUGUST 1, 1888.

A COMMENDABLE VIRTUE.

In pursuing the duty devolving upon the gentlemen controlling and directing the business of telegraphic communication in this country of determining the relative value of the various grades and classes of employes in the service, too little consideration, we are convinced, is given by them to the fidelity of the operator to the unwritten telegraphic law of the inviolability of the contents of messages confided to the company's care. To be sure, most of the States have enacted statutes imposing penalties more or less severe upon persons convicted of having divulged the text or even the purport of communications of the character mentioned, but we venture the assertion that not one in fifty, at least, of the operators of the present day, is aware of the existence of a law estopping him from informing whomsoever he may meet of anything of importance or interest that has chanced to pass through his hands in the round of his duties.

Why, then, when the newspapers are filled with vague rumors of happenings of vital interest to everybody, of the movements of politicians, capitalists and other public persons, it is that the operator keeps silence when in possession of absolutely correct information concerning the matters thus incorrectly reported and commented upon? Surely it is not because he fears that he will be dismissed, for the average operator gives abundant evidence of holding his situation in light estimation by his disregard of many of the commonest rules laid down for the government of offices. What operator has not time and time again, had at his mercy some statesman, financier, merchant or other prominent person through the knowledge he obtained of that person's affairs, speculations, peculations or acts more or less compromising, yet what operator has been known even to speak publicly of the information in his possession, to say nothing of utilizing it for purposes of gain?

The operator, probably more than any other craftsman, is addicted to the reprehensible practice of talking "shop" in public places. We, in our many years' connection in one way and another with the profession, have encountered him in the restaurant, the hotel, the cafe, the theatre and in

every conceivable place of public resort pursuing his self-assumed and seemingly interminable mission of imparting to the ignorant masses the mysteries of his craft; but we have never yet known him, even in the height of excitement produced by natural causes or impelled by alcoholic stimulation, to violate the confidence so peculiarly reposed in him by the exigencies of his profession.

When Maxwell, the murderer of Preller, was arrested at Auckland, the fact was immediately cabled by the United States consul at that place to the authorities at St. Louis. The operator who received the dispatch in New York in the course of its transmission, sat at a restaurant table with the correspondent of a Western paper, an intimate friend, within half an hour after the message passed through his hands. The New York morning papers were already on the street, so that the chances of the publication of the important fact here were infinitely small, and it would seem that the opportunity afforded the operator to put a "beat" in the way of a friend who had extended many favors to him was too great to be ignored. It was ignored, however, and the correspondent is probably not aware to this day that his companion of that morning was in possession of the important piece of news referred to.

Perhaps the most trite of all sayings is the one alleging that women cannot keep secrets, yet who ever heard a lady operator accused of divulging the contents of a message or of being any more likely to do so than her male colleague? The lady operator is an inveterate talker of "shop," but she is just as careful to confine her remarks to the platitudes in vogue in the profession as is the operator of the opposite sex. We shall not attempt to account for the remarkable reticence observed by the members of the telegraphic profession concerning the business passing through their hands. Indeed we do not believe that it can be accounted for in a manner that would be generally accepted as being correct. The fact remains, however, that a tacit understanding prevails throughout the profession that the business of the office shall not be talked about in public places, and its terms are religiously observed.

The Ottawa, Ont., *Journal* says that there will be a fight between the Thomson-Houston Electric-Light Company of Boston, with agencies in Canada, and the Royal Electric Company of Canada, and Edison, the inventor, before the Patent Commissioners in September next, regarding the infringement of Edison electric-light patents by the two companies.

The Senate has passed, with a few changes, the bill which Mr. Anderson of Kansas introduced and succeeded in getting through the House, compelling the Pacific Railroads to operate the telegraph lines along their tracks. The House will doubtless concur in the amendments, and the measure will become a law. Its effect will be to take the lines from the control of the Western Union Company and devote them to public business for all without discrimination.

The Pacific Ocean cable agitation has received during the past month a decided boom among British statesmen, and it is very probable that the government will take a more lively interest in the subject in the future than it has in the past. The cause of this sudden change was a total interruption of cable communication between England and India, Australia and China, which occurred about three weeks ago and lasted for several days. It is of vital importance to England to maintain constant communication with all quarters of the globe, particularly those points where her interests are at stake. A Pacific cable would prove an important Western outlet for England's Eastern business, which a possible war on the continent could not threaten.

Both Jay Gould and John W. Mackay deny the rumor that the former has bought the Commercial Cable.

BOOK REVIEW.

Mr. Elmer E. Vance, of Columbus, Ohio, has written a very agreeable story, which is published by Dillingham, entitled, "Nellie Harland; A Romance of Rail and Wire." In his preface Mr. Vance disclaims any literary skill, but it is fortunate for his readers, and possibly for Mr. Vance also, that very few people read prefaces, and no one is much influenced by them under any circumstances. Surely, the story which follows the rather deprecatory introduction is in every respect a very creditable production. A good deal of information about telegraphing and railroading is neatly interwoven with the narrative, and will be found most acceptable to the average telegrapher. It is, moreover, quite indispensable to the layman, if he would clearly understand the incidents of the story. But the great merit of Mr. Vance's work is his cleverness in making his characters seem like boys and girls, and like men and women. He is evidently a natural artist who studies life, and models his characters upon people he has met, exercising the artist's privilege of idealizing them to the extent demanded by literary considerations. They are a diversified company—a girl as bright and winning as any that can be found in real life; a smart, saucy boy, moved by good motives, however mischievous he may be at times; a good-natured, soft-hearted station agent, with a wife beside whom Xantippe was a bonny birdlet; a manly, straightforward young fellow, in love with Nellie Harland; a villain, with a precious retinue of cut-throats and train wreckers, etc., etc. These are the chief people, and they enact a little drama full of incident—moving along peacefully, at first, but gaining in interest as the tale proceeds; rising, anon, to a point of no inconsiderable dramatic power, and ending in a most satisfactory and natural manner. Besides being a sensible book, it is a wholesome one. There is no mock sentiment in it, and on every page it is apparent that the author holds fixed opinions on the subjects of right and wrong; and knowing which is which, he is polite enough to his readers to assume that they also know, and that there is no occasion, therefore, for him to go into hysterics, or to tear a passion to tatters. He puts his people on the stage, and, abetted by appropriate scenery and dramatic properties, they play their parts; and, when the piece is over, the curtain falls without any spectacular displays to harrow up the soul. There is another book, which is being much read just now, in which a smartish young Southern woman creates a strangely morbid heroine. Confronted with the problem of choosing between a living lover and a dead husband, this curious being describes a most remarkable series of sensations and experiences, using words, at times, as strange and meaningless to human ears as the sounds which were heard by the dwellers in the Rue Morgue when Poe sent thither his mysterious visitor on his cruel errand of death. This story, with its obsolete words, its solecisms, and its glaring and offensive sensuality, is what reviewers call "strong," and so it is, if by that is meant that it is gamey, and smells to heaven. What good end can be served by the writing of such stories is a mystery which common mortals may not hope to comprehend. Mr. Vance's story is also a strong one, but in an entirely different sense; because its tone is pure, its purpose worthy, its plot ingenious, and its conclusions logical and satisfactory. We commend the book to our readers as being worthy of their perusal, and we predict for it a much greater measure of success than is usually won by new authors, who, unheralded and unannounced, place a book before the public upon its merits. The world of fiction is peopled with many girls well worth remembering. Those who make the acquaintance of Nellie Harland, will cherish the memory of her long after the heroine of the usual modern novel has been forgotten, even by name. She is a lovable, as well as a brave, an interesting and a decidedly picturesque young person. The greater the number of Nellie Harlands the world is asked to interest itself in, and the smaller the

number of Nanas, Lena Despard, and Barbara Pomfrets that are obtruded upon its attention, the healthier it will be, morally and intellectually.

STANDARD TESTING.—As there is no provision in this country for the accurate comparison of electrical standards and apparatus, it has been decided, says the Baltimore *Sun*, to provide means for such measurements at the Johns Hopkins University. The importance of such provision for the comparison of standards has been for some time recognized. Such representative bodies as the American Association for the Advancement of Science, and the National Electrical Conference, held in 1884 at Philadelphia, have discussed the possibility of a bureau of standards, and have favored its establishment. It is not probable that the government will take any steps in the matter, at least for the present, and as time goes on the need becomes more pressing. Some laboratory is needed where instruments can be compared with standards of undoubted correctness, by accurate methods and careful observers, under uniform and determinate conditions. These requirements are filled by the standards and apparatus in the possession of the university, and by the facilities and experience that the laboratory offers. The work will be directed by Dr. Henry A. Rowland, and the comparisons will be made by Dr. G. A. Liebig, who has been appointed assistant in electricity.

Among the recent sales of electric motors recently made, are one 25 horse-power motor to run a grist mill in Scranton, Pa., and a 25 horse-power motor to run a shoe manufactory at Brockton, Mass. The electric motor is causing a revolution among the smaller engines, which they are displacing very rapidly. Electricity is destined to take the place of steam-power in every small factory and mill in a very few years. A careful comparison made of the cost to maintain street cars propelled by electricity and horses, favors the former, notwithstanding that the figures as to the actual cost of the motors were purposely placed very high. The figures are having a telling effect on the street car companies.

"Dead" and "Live" wires are causing the Commissioner of Public Works of New York City much worry of mind just now. In order to learn whether a wire is "dead" or not, says an employe, is to feel it. If you receive a shock, it is "alive." If you do not receive a shock, it is supposed to be "dead." It will be well for the various companies for the next three months to keep a strong current on their lines, if they desire them to remain intact. The "dead" wires must go, but those "alive" must not be disturbed.

The Long Distance Telephone will be in working order to Buffalo, a distance of over 500 miles, in a few weeks. This will be the longest telephone circuit in the world, and much speculation is made as to whether or not the scheme will prove successful. If the results fully meet the expectations, Chicago will soon be connected with New York by public telephone exchange.

Telephone infringers all over the United States are receiving set backs through the various courts. Almost every day the daily papers chronicle a victory or two for the Bell Company, which is vigorously pushing suits against every concern proposing to carry on a telephone business without its consent.

Kansas City, Mo., wants an electric club. We are of the opinion that she is worthy of one. With such jovial electrical celebrities as Geo. M. Myers, Thos. F. Clohesey, A. M. Barron, E. R. Weeks, and a hundred others, an electric club would "boom," as everything else has "boomed" with which these gentlemen have been connected.

**INCANDESCENT,
A SUCCESSFUL COMPETITOR AGAINST GAS**

AND GASOLINE FOR

Illuminating Streets, Stores and Dwellings.

Accomplished by our entirely new method of long-distance lighting in practical operation at St. Louis for the last two years

**HEISLER ELECTRIC LIGHT COMPANY,
809 to 817 S. SEVENTH ST., ST. LOUIS, MO.**

**The Telegraphers' Mutual Benefit Association.
A FRATERNAL LIFE INSURANCE SOCIETY.**

Twentieth Year.

For Particulars. Address **CHARLES P. BRUCH**, Secretary,
Box 3175, New York.

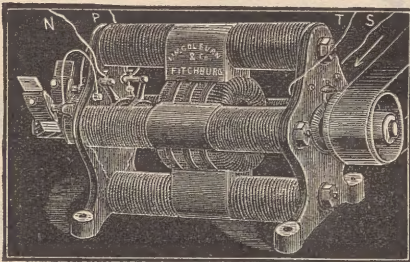
STYLUS

Agate, Steel, Bone, Porcelain & Gutta Percha
Mounted on
Ebony, Pearl and Cedar Handles.

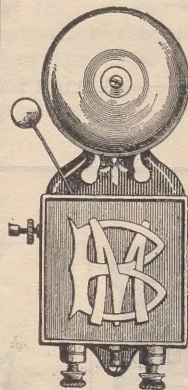
A great variety.
Send to the Manufacturer for Price List.
L. H. ROGERS, 75 Maiden Lane, N. Y.
Headquarters for Manifold Books,
Carbon Paper.

See cut of Styluses, page 11, Jan. 1, 1888.

I. W. COLBURN & CO.
130 MAIN ST., FITCHBURG, MASS.



Machines for Arc and Incandescent Electric
Lighting, Electro-Plating and
Experimental use.
Send for large Illustrated Catalogue, also "Hand-
Book of Ready Reference." Vest-pocket edition.



\$2.00

Bell Outfit.

Bell, \$1.00.

Battery, .80.

Push Button, 10.

50 ft. Wire, .15.

Electrical Supplies
of every description.
MOORE BROS.,
108 Liberty St., N. Y.

TYPE-WRITER SUPPLIES.

Carbon, Ribbons and Stock of Fine
Linen Papers.

Repairing of type-writers done by **Z. G. SHOLES**,
son of the inventor of the Remington Type-writer.

Z. G. SHOLES & CO.,
142 LaSalle St., Chicago, Ill.

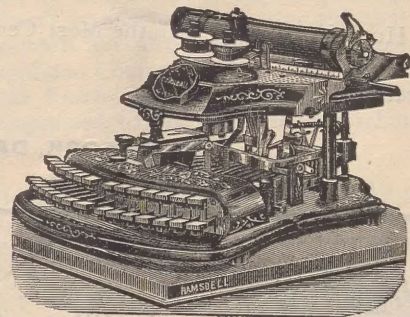
BOOKS.

- Bottone—Elec. Instrument Making..... \$1.20
- Du Moncel—Electro-magnets, trans. by
Wharton 75
- Fahie—History of Elec. Telegraphy..... 3.00
- Hedges—Elec. Light Precautions..... 1.00
- Holmes—Electric Lighting..... 1.00
- Hospitalier—Domestic Electricity..... 3.00
- Munro and Jamieson Pocket-book..... 2.50
- Solomons, Sir D.—Accumulators..... 1.25
- Stephens—Electric Lighting..... 1.00
- Walker—Dynamo Building..... .80

E. & F. N. SPON,
12 Cortlandt St., NEW YORK

The New Model Crandall

A PERFECT TYPE-WRITER.



PRICE, \$75.00.

BEST FOR TELEGRAPHERS!

This machine meets the requirements of Tele-
graph Operators better than any other Type
Writer on the market. It is speedy, almost
Noiseless, has perfect alignment and **writing
in plain sight**, even to the last letter, thus
allowing the operator to correct the "bulls" of a
"blind" sender without the delay of shifting the
carriage. **It is the cheapest** standard writ-
ing machine in the world. Send for circulars and
illustrated catalogues to the

IRELAND BENEDICT CO., (Limited),

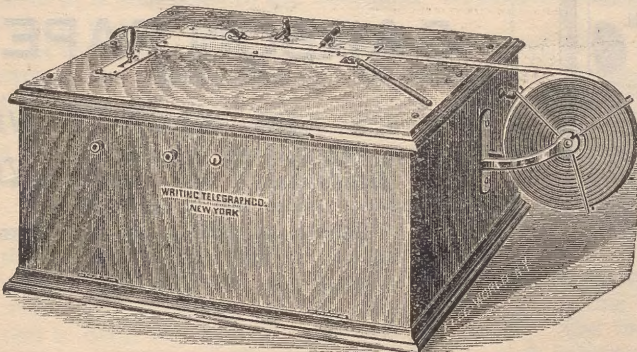
Sole Agents, Binghamton, N. Y.

NEW YORK OFFICE,

B. G. GRANVILLE, MANAGER.

157 BROADWAY,

WRITING TELEGRAPH CO.,
57 Murray Street, New York.



This company owns the Letters Patent which thor-
oughly control the transmission of written messages by
telegraph in the only known practical way, and are
prepared to establish Central Office Exchanges as a
means of communication between subscribers in cities
and surrounding towns.

Communications are written with pen and ink in the
handwriting of the person writing the message.

The pen in the office of the subscriber receiving a message
makes a fac-simile of every letter as fast as it is made with
the pen in the office of the person writing it.

All instruments are under the control of the Central
Office, and messages are recorded on the instrument of a
subscriber, whether he is present or absent.

All communications are secret, and the written record is
of great value in commercial use.

For particulars address

WRITING TELEGRAPH CO., P. O. Box 1322, New York.

The attention of the Delegates to the National Electric Light and the Telephone Conventions is called to the following Hotels which can comfortably accommodate them while in the city.

Fifth & Avenue & Hotel, VICTORIA HOTEL,

MADISON SQUARE, NEW YORK.

Fifth Avenue, Broadway & Twenty-Seventh St.,

NEW YORK.

The Largest, Best Appointed and most Liberally Conducted Hotel in the City, with the Most Central and Delightful Location.

H. L. HOYT & CO., PROPRIETORS.

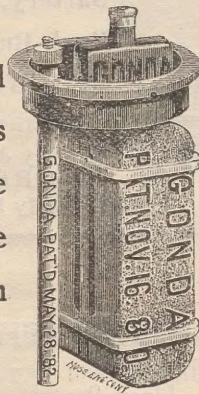
HITCHCOCK, DARLING & CO.

— American and European Plan. —



GONDA PRISM CELL.

The Standard open Circuit Batteries of the World, and the only ones that give perfect satisfaction to the consumer.



GONDA ZINC & COVER.

If you want to build up a successful business, use, in your work, only the Genuine Leclanche Batteries. It will pay in the end.

Leclanche,

TRADE

GONDA

MARK.

Do not be imposed upon by imitations.

This is the only Genuine Leclanche Porous Cell Battery.

THE

Leclanche Battery Co.,

149 West 18th St.,

NEW YORK.

If you wish satisfaction from your Electric Bells, Gas Lighters, &c., insist upon having the Genuine Gonda Leclanche Batteries.



GONDA "POROUS" CELL BATTERY.

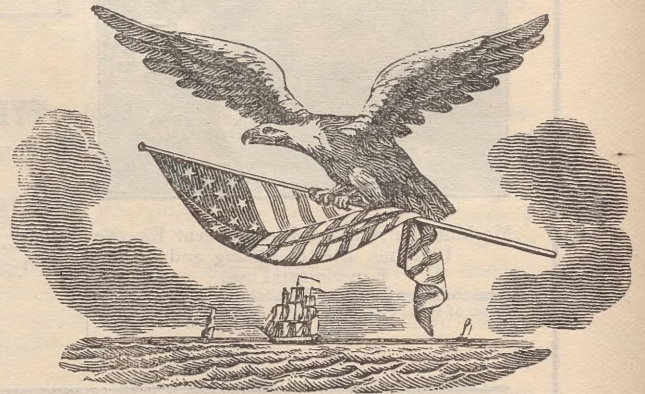


GONDA POROUS CELL.

ESTABLISHED 1823.

ALBERT H. DAKIN,

(SON OF THE INVENTOR,)



MANUFACTURER OF THE

EAGLE BRAND OF MANIFOLD

AND

CARBON PAPERS,

FOR

STYLUS AND MACHINE WRITING,

60 BARCLAY ST., NEW YORK.

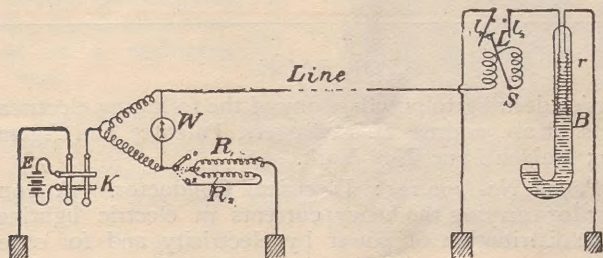
Prices on application

JOHNSON STEPHEN'S ELECTRICAL BAROMETER.

The object of this apparatus is to enable the height of the barometrical column to be ascertained when the instrument is placed at a distance from an observatory. The general idea of the invention is not, we believe, novel, but the means by which it is carried out is decidedly new and ingenious. The principle of the apparatus is as follows, and is shown by the figure :

B is the barometer tube placed at a distance from the observatory station, and connected to the latter by a single line wire. Through the upper end of this tube the wire, or carbon filament, resistances, r , are inserted ; these resistances dip down into the mercury, which short-circuits them, so that the actual portions of the wires or filaments offering resistance will obviously vary as the column of the mercury rises or falls. To determine, therefore, the height of the column, we have only to measure the resistances, r . In actual practice these resistances would measure about 5 ohms to the inch.

So far the arrangement does not possess any distinctive feature. To measure the exact value of the resistances, r , we must, of course, know accurately the value of the "line" resistance, as this must be deducted from the total measured resistance, in order to determine the value of r . Now if the line resistance were a constant quantity, there would



be no difficulty in determining r by a single measurement ; but of course, as is well known, the line resistance constantly varies, and it is the getting over of this point that constitutes the special feature of Mr. Stephen's invention. Connected in circuit with the line is a special form of automatic switch, S , a form which was described in the No. of the *Review* for July 30th, 1886, page 115, in connection with an automatic individual telephone call arrangement, also the invention of Mr. Stephen. This switch enables the line current to be diverted at the receiving end of the line from one circuit to another, as required, by causing the line current to pass in one direction or the other. The line current, it will be seen, passes through the magnet coils of the switch, and thence through a polarized armature, and then from the end of this armature to one or other of the two levers, l_1 , l_2 , according as the lever is over to the left or right ; to effect which result the arrangement is such that contact is not broken from one lever until it is made with the other, so that the continuity of the line remains unbroken. The lever l_2 is connected to the barometer resistances, and the lever l_1 to earth direct.

At the observatory station a Wheatstone bridge W , is arranged with a double key, K . The adjustable resistance of the bridge is in two parts, R_1 and R_2 . s is a three position switch ; in position 0 this switch is disconnected ; in position 2 it is connected to resistance R_1 , and in position 3 to resistance R_2 .

The working of the whole arrangement is as follows :—The switch, s , being in position 0, the left-hand pedal of the key, K , is depressed ; this sends a current from the battery, E , direct to line, and actuates the switch, S , so that its armature moves over to the lever, l_1 , putting the line direct to earth through the coils of the switch. The hand switch s is then moved over to position 1, and balance is obtained on the galvanometer by adjusting R_1 ; this resist-

ance then will be the resistance of the line wire and the coils of the switch, S_1 . Switch, s , is then moved back to 0, and the right hand pedal of the key, K , is depressed. This causes a current to be sent, which moves the armature of S over to l_2 , thus putting the resistances, r , in circuit. Switch s is now moved to 2, and balance is obtained by adjusting R_2 . Since R_1 is still in circuit it is obvious that the resistance, R_2 , must be the resistance of r , hence we get the value of r quite independent of the value of the line resistance.

It must be obvious that the whole arrangement is adaptable not only for the measurement of the height of a barometric column, but for thermometers as well, and indeed for several other purposes.—*London Electrical Review*.

SALE OF THE EDISON PHONOGRAPH PATENTS.

The Edison Phonograph Company, which owns and controls all of Edison's patents, has been sold to Jesse H. Lippincott, of New York, for something over a million dollars. He also, by the terms of the sale, has the right to all of Mr. Edison's improvements during the next fifteen years. Mr. Lippincott has also become the licensee of the American Graphophone Company, of Washington. A new company called the North American Phonograph Company, has just been organized to put both these machines into general use.

The Ohio Centennial Exposition, which will take place at Columbus, Ohio, in August, will devote some space and time to the electrical science. It is greatly desired that a worthy display be made in this growing branch of science, especially in its practical applications. The electric telegraph, the telephone, electric motors and electric lighting, constitute the most striking features of the new century upon which Ohio is now entering, and every effort will be made to meet the necessary demands of manufacturers or dealers who wish to provide adequate displays in this line at the exposition.

THE ELECTRIC MOTOR.

It would almost be impossible to catalogue the number and variety of purposes for which the electric motor is now in daily use. Some of the most usual applications are for printing presses, sewing machines, elevators, ventilating fans and machinists' lathes. At the present time every indication unmistakably points to the probability that within a very few years nearly all the mechanical work in large cities, especially in cases in which the power required does not exceed, say 50 horse-power, will be performed by the agency of the electric motor. It is an ideal motor, absolutely free from vibration or noise, perfectly manageable, entirely safe, and with the most ordinary care seldom, if ever, gets out of order. Indeed there is no reason to suppose that the limit of 50 horse-power will not be very largely exceeded within a comparatively short period, when it is remembered that scarcely five years ago the production of a successful 10 horse-power motor was considered quite a noteworthy achievement.—*Scribner's Magazine*.

WRINKLES IN ELECTRIC LIGHTING : By VINCENT STEPHEN. Price \$1. The ELECTRIC AGE, 5 Dey St., New York. This work contains a vast amount of valuable information which it is well for every student of electricity to possess. Paragraphs are devoted to the electric current, and its production by chemical means ; to the production of electric currents by mechanical means ; to the dynamic electric machines, electric lamps, leads, ship lighting, etc., etc. The book is profusely illustrated, and everything pertaining to electric lighting is explained in the plainest language possible.

It is reported that a young infantry officer of the French army has invented a kind of military microphone by means of which the approach or the movements of troops, as well their probable numbers, may be gauged.

HOW TO USE THE TELEPHONE ON SUBMARINE CABLE.

At a recent meeting of the Paris Academie des Sciences, a note of M. Ader on the use of the telephone as a receiving instrument for submarine cables was read. If a telephone is placed at the extremity of such a cable while signals are being transmitted, these signals cause absolutely no sound in the telephone, because, though the diaphragm is put in motion by each signal, the vibrations are too slow to be perceived by the ear, which only recognizes a sound when the vibrations exceed about twenty per second. If however, the telephone is connected to the cable through a vibrator, the number of vibrations may be increased to any extent and the signals through the line be easily distinguished. With the dot and dash system there is no difficulty in reading by the telephone, the differing durations of the sound being easily perceived; but for the rapid working of cables it is found advisable to work with alternating currents, and in this case some method of distinguishing in the telephone between positive and negative currents must be adopted. This is done by making use of two instruments, one applied to the left and the other to the right ear, the natural tones of the two telephones being different. Both these instruments are connected to the vibrator, and through it to the cable. Each separate telephone circuit is, however, traversed by another current from a local battery, which passes through one circuit in a positive direction and through the other in a negative, the vibration being included in both circuits. The strength of this current is adjusted to be equal to that from the cable, and hence when, say, positive currents are being sent, the local current in one telephone is annulled, while in the other it is increased, and that telephone alone sounds, and when negative currents are sent the reverse takes place, the other telephone sounding, and in this way the signals can easily be distinguished.

THE MILITARY MICROPHONE.

An adaptation of the microphone to military purposes is at present under essay at Montauban, and, so far, says the *Scientific American*, with satisfactory promise. At the conclusion of the yearly period of training in the 132d regiment of Territorial Infantry, trials were made with a microphonic apparatus, invented by Lieutenant Desbordieu of the same corps. Reconnaissance by automatic means was the object sought for, and the apparatus not only gave warning of the passage of troops from afar, and unseen by the operators, but also indicated the different branches of the arms in movement, and furnished an approximate idea of the numbers of men and horses on the advance. The contrivance, which is as simple as it is ingenious, consists of a sounding plate buried in the soil, across and along any route, and connected by a long wire to the conductor and receiving disk of the apparatus in position, which provides the electric current to vivify the sound. Generals Vincendon and De Sonis, accompanied by a numerous staff, watched the operations, and were sufficiently impressed by their utility and efficacy in giving warning, that a report was sent to the Ministry of War upon the subject. Orders have been sent to the inventor to continue his experiments under technical superintendence.

The underground discussion and danger of electric light wires are still subjects which consume more than their share of room in the public prints. Almost every day there appears severe and unjust articles aimed principally at the Brush Electric Light Company, because Lineman Murray, who was killed a few weeks ago, happened to be an employe of that concern. It is due this company to make public the fact that Lineman Murray was provided with a pair of rubber gloves. They were found in his pocket and not on his hands when killed. President Strong of the Brush Company says the company has suffered severely and unjustly from Murray's carelessness.

ELECTRICAL PATENTS GRANTED JULY 2nd, 1888.

385,388 Electric signal transmitter; William C. Thompson, Minneapolis, Minn.

385,482 Test signal circuit; Charles E. Scribner, Chicago, Ill., assignor to the Western Electric Company, same place.

385,493 Suspension arm for electric lamps; Jas. J. Woods, Brooklyn, N. Y.

385,539 Electric switch; Edward F. Bergman, Frankfort, N. Y.

Granted July 9, 1888.

385,760 Electric battery; William P. Kookogey, Brooklyn, N. Y., assignor to the Kookogey Electric Company.

385,770 Protector for electrical instruments; Geo. W. Mingle and William Mingle, Philadelphia, Pa.

385,774 Device for lighting and heating cars by electricity; De Witt C. Roberts, Chicago, Ill., assignor of five-ninths to Charles T. Yerkes, same place.

385,915 Electric conductor; Leo. Daft, Plainfield, N. J.

386,059 Telegraphic recording apparatus; Chas. Cuttriss, New York, N. Y.

386,066 Electric lock; Frank J. Gridley, Chicago, Ill., assignor to Frederick G. Wheeler, New York, N. Y.

386,090 Electric battery; Isaiah L. Roberts, Brooklyn, N. Y., assignor to the Roberts-Brevort Electric Company (Limited) of New York.

FOR SALE.

Parties desiring to purchase any of the following electrical patents, please address H. D. Rogers, Patentee and Agent, No. 75 Maiden Lane, New York.

1. Patent No. 290,121: Electrical Conductor. A conductor for carrying the heavy currents in electric lighting, and the distribution of power by electricity, and for other purposes.

2. Patent No. 290,122: Electrical Conductor or Cable for Lighting and other Systems. A conductor or cable for supplying electric lamps, motors and similar apparatus, designed to obviate or lessen the danger to life and property, liable to occur with ordinary conductors.

3. Patent No. 281,223: Electric Conductor. A conductor or cable having the insulating material between the several layers of wires, strips, or the like, electro-plated (when desired), so as to secure strength with economy of material and space, a valuable invention, new and novel.

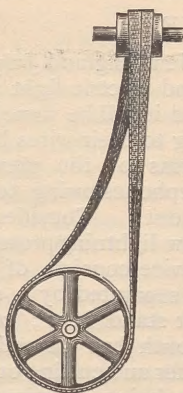
4. Patent No. 292,694: Insulated Conductor of Electricity. A fire-proof compound for bare or insulated wires.

5. Patent No. 139,690: Printing and Dial Telegraph and Circuits therefore. A combination of a dial or printing instrument in one main line circuit upon one base, a unique and valuable device.

6. Patent No. 305,022: Self-sustaining Electric Battery. A battery of large and constant electro-motive force, and to obviate polarization.

7. Patent No. 310,724: Secondary Battery and means for transporting the same. The object of this invention is to accumulate electric energy in suitable storage chambers at natural sources, add convey the same to desirable points, by land or water, in apartments adapted to the vehicles conveying the same, also for a device for running trains, etc., by dispensing with the third rail.

England and France after January 1st, 1889, will assume control of the cables connecting those countries, and the tariff will be reduced to about one-half the present rate. The governments will jointly lay a new cable between Liverpool, England and Havre, France.



AMERICAN LEATHER LINK BELT CO.

A new article in Belting, which is made of small leather links joined together with steel bolts. It has been tested for Dynamos with remarkable success.

Write for particulars and prices to

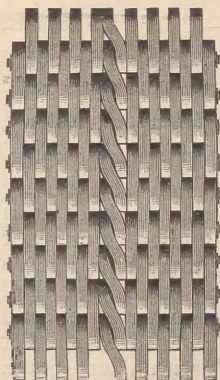
CHAS. A. SCHIEREN & CO.,

Manufacturers and Tanners of

LEATHER BELTING & LACE LEATHER

47 FERRY ST., NEW YORK.

BRANCHES: **Philadelphia, 416 Arch St.**
Boston, 86 Federal St.



ELECTRICAL ACCUMULATORS AND STORAGE BATTERIES,

Successfully applied to Central Station Lighting, Isolated Lighting, Trolley Lighting, Street Car Propulsions, etc., securing great economy and reliability. For full particulars address,

The Electrical Accumulator Co.,
44 BROADWAY, NEW YORK.

WIEDERSHEIM & KINTNER,
ELECTRICAL EXPERTS,
SOLICITORS OF PATENTS, TRADE-MARKS, ETC.

Office, No. 45 BROADWAY,
NEW YORK.

Record Building, 919 Chestnut St., Philadelphia, Penna.
CARL HERING, Consulting Electrician, No. 514 F St., Washington, D. C.

New Haven Clock Co.,

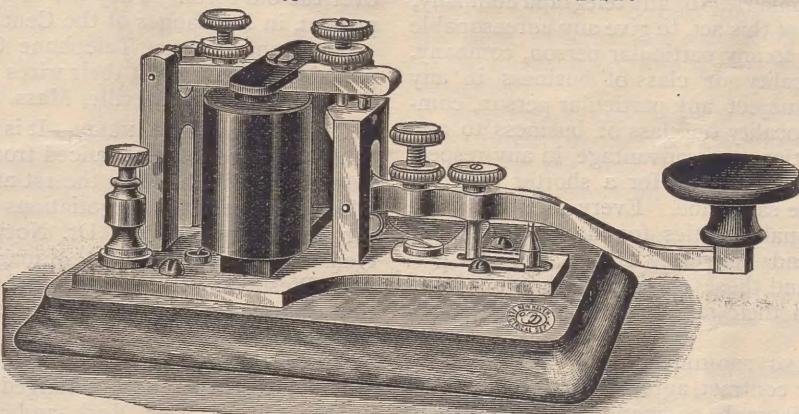
29 MURRAY STREET, NEW YORK.

Manufacturers of all Styles of Electrical Apparatus.

THE "UNIQUE" COMBINATION SET.

This Set is manufactured of Telegraph Metal, hand-finished. Magnets with Rubber Covers, Nickel-plated Key Lever, all mounted on a mahogany base.

The simplest and cheapest combination set ever placed on the market. Key and



sounder mounted on an ordinary size sounder base. Works well on one cell of battery.

The above Set, complete, with Cell of Gravity Battery and 50 feet of wire, \$3.75. Special prices made for quantities.

CUT ONE-HALF SIZE.

THE LAW BATTERY.

New Form.

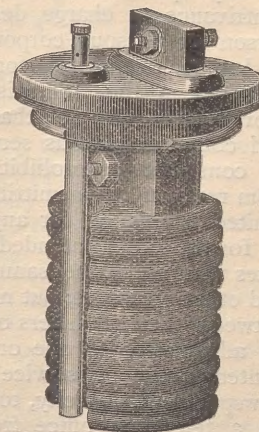
Quantity and Surface of Negative Element largely increased and shape improved. This Element is Guaranteed everlasting, and new ones given at any time for old without charge. Lock Tops that absolutely prevent evaporation and creeping of salts. No Grease. Binding Posts that cannot corrode. Price, \$1.00.

LAW TELEPHONE CO.,

112 Liberty Street,

NEW YORK.

Sole Agent for the Pacific Coast, Geo. L. Henzel, San Francisco, Cal.



"STAR" GOLD FOUNTAIN PEN.



PRICE, \$1.50 AND UPWARDS.

Best writing Pen ever offered to the public. Holds ink for a week's use. Unequalled for Business and General Writing. Every Pen Warranted and Satisfaction Guaranteed. The STAR Pen consists of a highly-finished hard rubber holder fitted with a superior 14 karat GOLD PEN, to suit any writer. In ordering specify style of Pen wanted. SOLICITING A TRIAL ORDER.—Sent by mail or express on receipt of price. Repairs to Pens of all kinds a specialty. A GOOD, RELIABLE STYLOGRAPHIC PEN for \$1 and upward. N. B.—All goods will be shipped promptly on receipt of order.

J. ULLRICH & CO., 106 and 108 Liberty Street, New York.

Manufacturers of the "Star" and "Independent" Fountain and Stylographic Pens. Liberal Discount to Agents. Send for Price List.

REGULATING THE TELEGRAPH—PLATT'S BILL.

The bill "to regulate commerce carried on by telegraph," reported to the Senate by Senator Platt, of Connecticut, includes in its provisions all persons or corporations engaged in the business of transmitting, for hire, by telegraph, messages from one State or Territory of the United States or the District of Columbia to any other State or Territory of the United States, or to the District of Columbia or from any place in the United States to any foreign country, or from any place in the United States through a foreign country to any other place in the United States, but shall not include, nor shall the provisions of this act apply to such transmission of messages from a point in a State to another point in the same State over wires entirely within such State.

Section 2 provides that all charges made for telegraph service in the receiving, transmission and delivery of messages shall be reasonable and just, and every unreasonable charge for any such service is prohibited and declared to be unlawful.

By section 3 it is made unlawful for any telegraph company, subject to the provisions of this act, to give any unreasonable preference or advantage to any particular person, company, firm, corporation or locality or class of business in any respect whatever, or to subject any particular person, company, firm, corporation, locality or class of business to any unreasonable discrimination or disadvantage in any respect whatsoever, or to charge any more for a shorter than for a longer distance over the same line. Every such telegraph company shall afford equal facilities for the receiving, forwarding, transmitting and delivering of messages to and from their several lines and those connecting therewith, and shall not discriminate in their rates and charges between such connecting lines.

POOLING PROHIBITED.

Section 4 prohibits any contract, agreement or combination with any competing telegraph company or companies to divide between them the aggregate or net proceeds of the earnings of such companies upon their respective lines, or any portions thereof.

And by section 5 it is unlawful, directly or indirectly, by any special rate, rebate, drawback or other device or contrivance, to charge, demand, collect or receive from any person or persons, corporation or corporations, a greater or less compensation for any service rendered, or to be rendered, in the transmission of messages subject to the provisions of this act, than it charges to others for a like and contemporaneous service, but nothing in this act shall be construed as prohibiting any such telegraph company from receiving, transmitting and delivering messages for the United States or for any State or municipal corporation, or for the press, intended for publication as news, at lower rates than are at the same time charged for social, business and other messages, but no such company shall discriminate between the publishers of newspapers by allowing terms or advantages to one or more newspapers for a like and contemporaneous service which are not allowed to other newspapers in any city, town or place where there is or may be a telegraph office from which such messages may be dropped.

Section 6 requires the publication of rates under the orders of a commission.

Sections 7, 8 and 9 prescribe penalties for violation of the act.

Section 10 provides that the Interstate Commerce Commission shall have jurisdiction over telegraph companies, and the several following sections prescribe the mode of dealing with offending companies by injunction, mandamus, fine, etc.

Professor Gray, of the Edinburgh University, has accepted the professorship of electricity at the Rose Polytechnic Institute at Terre Haute, Indiana.

THE TELEPHONE.

Another great storm swept over New England July 11, doing much damage to the telephone and electric light companies, and especially to the former, and it will be some time before they get straightened out, owing to their wires being down or crossed in all directions. Storms of the previous month did considerable damage to telephones owing to the high current protectors being burned out. Considerable trouble has been caused lately by the new lightning protectors placed in the magneto bells. The device consists of two springs placed opposite each other and separated by a small round ball of wax. This wax cannot stand heat; consequently the warm days of the past month has caused the wax to melt, bringing the springs together and cutting out the instrument. A new substance is now being experimented with.

Preparations are being made for the change of numbers in all Exchanges of the Suburban Division of the New England Telephone Company, which is a great improvement over the old form. They are to be, as most numbers are at present, in Exchanges of the Central Division.

The Long Distance Telephone Company have about completed the removing of their wires to the railroad bank from the highway at Somerville, Mass.

CABLE RATES ADVANCED.—It is now definitely settled that cable rates are to be advanced from 12 cents to 25 cents per word some time between the 1st and the 5th of this month. This is the result of negotiations that have been carried on for some time between Dr. Norvin Green, President, and Gen. T. T. Eckert, General Manager of the Western Union; Vice-President H. de Castro and General Manager Ward, of the Commercial Cable, and President A. B. Chandler, of the Postal Telegraph Company. The announcement of this advance has not yet been made officially, as there are still some details to be arranged. This rate, however, will apply only to New York, and all messages which are to be forwarded to other cities will have to pay an additional land rate—not the full local rate, but a new one under a schedule which is being prepared. Since the fight between the companies began, which carried the rate down to 12 cents, messages for inland points have not been subject to any charge beyond the original cable rate, and this new move will be felt most severely in places like Chicago and the big Western cities where a large amount of cabling is done. The low rates have made a great deal of business, and it is believed by both companies that sufficient of it can be retained to materially increase their income. How far this will affect the prices for cabling to the West Indies, Mexico and South America cannot be determined until the matter has been submitted to the congress of the cable companies, but it will probably result in an increase all around.

AN OPERATOR'S MISTAKE CAUSES A COLLISION.

Two passenger trains on the Pennsylvania railroad, traveling at the rate of 30 miles an hour, collided at Butzbach station, July 6th. By the mistake of an operator both trains, the one leaving Philadelphia and the other going there from Naticoke, were given the right of way on a single track. Just as both trains reached the curve overhanging the bank of the Susquehanna river the engineers saw their danger. The engines came together with a loud crash that could be heard miles away. Both went down the embankment into the Susquehanna. The baggage cars on both trains were crushed into the first passenger car, and the passengers in these cars were all injured. The total number of injured reached 22. Of this number three are believed to be fatally injured.

During the Chicago convention over 50,000 words each day was handled on the Washington quadruplex of the Associated Press.

MONTREAL NOTES.—The fire in the Canadian Pacific office, which has already been noted in these columns, caused considerable damage to the main and local switches, which were completely destroyed together with four or five tables containing quadruplex sets and repeaters. Fortunately the fire was confined to the operating room. Had it reached the battery room adjoining, the consequences would have been more serious. Some clever work was done by the local electricians, who succeeded in opening all circuits "singly" four hours after the fire. Aside from the inconvenience to the operators, no material delay to business was occasioned. Telephone circles are likely to be lively soon, the Federal Telephone Company having commenced planting poles. They are promised a fair share of the public patronage, and as the Bell Company are making strenuous efforts to keep all their customers by offering reduced rates for three-year contracts, lively times may be expected.

DALLAS NOTES.—Business is very dull in this section. A bouncing eight-pound girl arrived at the house of Mr. A. Lucas, of the W. U. Miss Irene Houghawout is off on a vacation, visiting her relatives in Ft. Scott, Kan. Manager Baker and Assistant Chief Wilson are sojourning along the Ozark Mountains of Arkansas. E. T. Hausam has resigned to accept a position at Big Springs, for the T. & P. R'y.

TORONTO NOTES.—Night Manager Wilson, of the C. P. R., has returned from his vacation. His office during his absence was efficiently executed by Mr. Ed. McSweeney. Mr. A. Renshaw who, during the last five years, has worked on the Montreal quad. of the G. N. W., has taken the telegraph and express agency at Berlin, Ontario. Miss Weaver has been bereaved in the death of her brother. Miss Henderson of Almonte has taken a position with the G. N. W. Donald Urquhart, our old and reliable friend and operator, is now employed by the G. N. W. Mr. Budge is relieving Miss Smith of the C. P. R., who is enjoying a six weeks' vacation. Geo. M. Clarke has gone to Detroit, Mich.

PORTLAND, Me., NOTES.—Mr. C. H. O'Brien has left the W. U. and accepted a position on the telegraph staff of the Boston *Globe*. Mr. G. T. Fogg, formerly press operator at Burlington, Vt., and Mr. E. C. Jackson, have been added to the force, the former to fill the vacancy caused by the departure of Mr. O'Brien, the latter as extra man. Miss Josie L. Bailey has taken charge of the summer office at Poland Springs, her place here being filled by Mr. Eddie J. Grace.

The reference in the last issue to the immense force on duty in the main office of the Western Union in New York city on July 4th has excited a curiosity in many quarters as to the total number of employes there are in this greatest of all operating rooms in America. The totals are as follows:

MALE DEPARTMENT.	
Manager.....	1
Assistant Manager.....	1
Chiefs.....	6
Assistant Chiefs.....	32
Operators, days.....	217
Clerks.....	22
Checks.....	54
Operators, split trick.....	46
Operators from branch offices.....	26
FEMALE DEPARTMENT.	
Chief Operators.....	7
Operators.....	192
Clerks.....	12
Checks.....	32
Night force, Chiefs.....	8
Operators.....	192
Wheatstone Department, Operators.....	47
C. N. D. Operators.....	58
Printers.....	8
Total.....	961

ORGANIZE! DANGER AHEAD!

"DE."

According to the latest advices from Mr. Thomas A. Edison's laboratory, the phonograph seems to be progressing toward perfection very rapidly, and it is not to be doubted that before long it will be in general use. This information should set every operator in the land to thinking. It is a serious question to the thousands of operators in this country, and an anti-Phonograph Brotherhood should be organized at once.

Mr. Edison being a practical operator himself, and endowed with extraordinary inventive faculties, will not be slow to recognize the multitudinous uses to which his little tell-tale machine can be put.

Every operating table in the country will be fitted up with a phonograph secretly attached, so that every word spoken or transmitted will be taken down and preserved for the benefit of the officials of the company.

Imagine a manager coming to his office at 9 A. M. He will instruct his phonograph clerk to bring the instruments properly labelled with the number of the desk and wire, and also the names of the operators who work that circuit during the night. Imagine him picking up the phonograph from one of the quads. and grinding out the following interesting conversation:

"Say, what do you think of the fourth race to-morrow?"

"I think Topeco is a sure winner if his jags is up. He's a dandy in the mud."

"Bk—Bk; say, hold that spl. a few minutes. I'm going out for a ball."

"Better hurry up, the chief's onto it."

"Oh; d-m the chf., Bk, Bk."

Or suppose he should come to a phonograph that has been receiving on one of the Jersey wires, and hear something like this:

"Hr ahr No. 3, qg, fm Bayrumtown 25 to John Smith, 75 Broadway, New York."

"Bk—say, there's no such number as 75 Broadway."

"Why ain't there?"

"Cos 75 Broadway is a graveyard."

"Well, maybe he lives there, how do you know?"

"Well, the gravestones in Trinity churchyard ain't numbered, that's all."

"O. K. mistake, bust it. I see it goes to Tombstone, Arizona."

Or how his heart would throb with ecstasy in reading a chapter of spooney talk from the city lines, like the following:

"Say, Julia, don't you think Mr. Jingle is awful nice?"

"Oh, yes; he has such a lovely moustache and such heavenly eyes; Ethel, ain't it a pity he is an operator?"

Operators! be up and ready to meet this latest and most dangerous enemy to the fraternity.

A Mr. Cheatham, operator and agent for the Raleigh & Gaston Railroad at Ridgeway, N. C., has a private line running from his office through the town connecting dwellings and storehouses with his office. He has quite a number of students and is said to derive a considerable amount of revenue from this source. He supplies ham-talent whenever needed, to the different railroads in this section. So anxious are the students in North Carolina to learn that a lineman reports as many as three trying to send with the same key at the same time, one day last week.

At the Torpedo Station the following gentlemen will deliver lectures during the summer on the subjects named:

Mr. William Maver, Jr.—"The Telegraph."

Mr. Frank J. Sprague—"The Electric Motor."

Professor Elihu Thompson—"The Development of the Dynamo."

Mr. J. W. Howell—"The Incandescent Lamp."

PAP STOVEY.

[BY EDGAR W. COLLINS.]

In the year 1888 I find that I am on the down grade telegraphically. I have passed the highest point. The figure 4 and the letter V are very often transposed by my awkward fist. I am obliged to take a sort of running jump at both. I am good for a figure 4 if I start in when the cramp is not looking; but the chances are that old paralysis catches me when three dots are rolled off, and then down I go with the letter V. I am everybody's victim—nobody's mine. This is in 1888. I go back to the sixties when my infant strides in the telegraphic art were, perhaps, more ludicrous and less pathetic. Its only a short voyage on the wings of memory, but it's a long and uneven road by the route I came. Many of those who started with me have fallen by the wayside, and old wrecks are thrown up here and there by the tide—the anticipated, but always, minus 25 cents brings them to the surface. But I am steering clear of the wrecks now. I'm going back to the sixties. I'm going to tell you about the little, old depot half buried under the hill. You have seen depots just like it. It is still there. It's at O—, on the banks of the Allegheny river. The little country store stands beside it on the hill. The girls still come there to buy their shoestrings, and the boys come for their jewsharps. Everything is the same, except the girls who come now are not the girls I knew. They are daughters of the girls of long ago. The boys are not the boys who hunted the frisky woodchuck in the days of "Auld Lang Syne," but they are boys, and that will answer. They come down the old steps—moss-grown steps—steps treacherous and shaky, that led from the depot platform to the store. The girls glance in the depot window as of yore. The instrument, the solitary instrument, sings the same old song. The all-important operator, with his thumbs in the armholes of his vest, wears a yard wide smile as of yore. The girls giggle and trot on as they did in the sixties—different girls and different giggles, but still girls and giggles. It was here in this old depot I used to sit and listen to the ebb and flow of Pap Stovey's eloquent Morse. Pap was stationed at Tionesta, and was a busy man in those days. He was my ideal of a man. I had learned to admire him. In my boyish way I studied him; I sought to pattern after him. His sending was firm, careful and characteristic. Everybody knew him; everybody saluted him each morning with "g'm, Pap," and in return received his "g'm, son." I had not yet had the honor of his personal acquaintance, though I used to fire a morning salute at him each day. I told him that I was the "kid"—the office boy. He was never too busy to say a kind word. The word "rats" was foreign to his vocabulary. From the cemetery of the past comes the ghost of a half-forgotten June morning, when nature was arrayed in all her glory and coquetting with the roguish beamings of the sun, when the roses were throwing out their odorous souls upon the air. How vivid the picture; and yet how sad I was withal! No straggling flower of joy cast its perfume around my heart; I was discouraged with my prospects. The once famous oil town of Pithole, which sprang up, like a mushroom in a night, from nothing to the third post office in the State of Pennsylvania, had reached its genesis. The buildings were being torn down and loaded on flat cars to be hauled away to some new mecca. The Pithole and Allegheny River Railroad was about to be torn up. Everything was going into a decline. I had received notice that my position of general roustabout and hustler for the depot was to be taken from me. It had been paying me enough to keep soul and body together, and my prayer had been that it would last until such time as I could master the telegraphic art, which I had strong hope of doing before everything dwindled into nebulosity. But

"The rock of my last hope was shivered!
And its fragments were sunk in the wave."

I was much cast down as I came into the old depot to dust

up the offices and put things to rights once more before going—I knew not whither. When I had finished my morning duties, Mr. S——, the grocer, handed in a message destined Tionesta. I checked it and laid it down beside the clicking sounder, sat me down and sent it over several times with closed key. Finally I ventured to call "J" (Tionesta) just once, at the same time hoping there would be no response; but "i i J" came back to me in the well-known fist of Pap Stovey. I was at a loss to know just what to do, but ventured to say "g m, Pap, I'm the office boy; will you take a message from me, as the operator is not here yet?" thinking, of course, that he, like the rest, would say "get out you plug," but he didn't. He said "g m, son; if you are sure that you can read the copy, go ahead." I sent the message correctly, received my "O.K." and a few compliments on my sending. I thanked Pap for his kind words, and told him of my poor prospects, and asked him if he thought me sufficiently competent to warrant me in applying for a position as operator, to which query he replied: "Mr. Rowley, conductor of No. 9, has spoken to me of you, and I in turn have applied for a position for you as extra operator on the line, and asked for a leave of absence for a month to sort of open up the chimney of your ambition. From what I have seen and heard of you I deem you quite competent to fill the bill, and in case my application for a vacation is granted and you are appointed extra operator, will you relieve me July 1st?" This was the first real encouragement I had received from any source, and although I had not that confidence in my ability born of experience, I felt that once started Pap would see me through, and I answered "yes; will be glad of the opportunity."

On June 25th I received official notice of my appointment as extra operator on the line, with instructions to report for duty at Tionesta July 1st.

June 27th I packed up my collar box and started to receive my instructions from Pap, and to familiarize myself with the work. As I before stated, I had never met Pap, and, very naturally, I was on the lookout for an elderly gentleman, with a fatherly air about him, and I asked the handsome man, perhaps 30 years of age, with the books under his arm, if he would kindly introduce me to Mr. Stovey (handing him my card), to which he replied: "My young friend, I am Pap Stovey, and you, doubtless, are the young aspirant for my shoes, which I most cheerfully relinquish, and may you find them comfortable." There was something so kind, so gentlemanly in his every word and action that I felt a little out of place, but before the mantle of night had settled down upon old Allegheny's peaks I had grown quite comfortable in his presence. After showing me through the depot and making me acquainted with the agent, the baggage master and the gang generally, he took me to tea, introduced me to nearly everybody in town (for Pap knew everybody), and after a pleasant evening he invited me to share his room and be its occupant during his absence, which I readily agreed to do. I got along fairly well and was improving rapidly under the pressure of business.

Pap had been absent a month, and on his return trip his train jumped the track and rolled down the embankment at Walnut Bend, killing 7 and wounding 14, Pap being one of the badly injured. My heart sank within me as the news came over the wire that Pap was, doubtless, fatally injured. I felt as though I must be near him to administer to his wants. I engaged the most comfortable riding conveyance I could find, to be at the depot on arrival of the train which was to bring him home, and there were many willing hands to render any assistance required. I felt, too, that I must inform his relatives of the accident, but I could find nobody conversant with his family history. His wife and babe, they said, were dead and they did not know whether he had any near relatives or not. I could only await his arrival, and then if he were not too badly injured he could dictate telegrams. The train pulled up to the depot at 10 p. m., bearing

its burden of dead and dying. Horror unspeakable! The air was fraught with sobs and groans. With violently palpitating heart I sought out Pap, whose head was badly cut and both legs broken. The life fluid had trickled down his handsome face and his hair was a clotted mass. He was unconscious. Tender hands bore him to the carriage. Tears came from older eyes than mine while beholding the spectacle. We took him to my room (his room). The physicians came. They set the limbs and bound the wounds. They said Pap would probably regain consciousness before he passed to the unknown land, but he could not survive the wounds. Kind companions and myself watched patiently at his bedside through the long, dreary night. The following morning, about 8 o'clock, day dawned in Pap's brain. The light peeped through the mental darkness. He looked around in a bewildered manner and requested me to remove the train from his legs. He said he was fastened in and couldn't move. I assured him that he was in his own room and requested him to be calm, as everything depended on quiet. Little by little the accident came to his mind. I asked him if he suffered much, to which he replied, "Not a bit, but how about the other poor fellows?—we all went down together." I assured him that all possible was being done for them, with a bright prospect of their recovery. When he was sufficiently calm I asked him if he had any parents, brothers or sisters to whom I should send word of the accident. He smiled, and pointed to a picture, saying, "There are my wife and baby who lie over here at the foot of the hill. The grass has grown and died three times since the mesmeric hand of death brought to them everlasting sleep. I was an only child; my parents are dead. My wife's people were never very kindly disposed towards me because of my humble position in life. So, you see, I am alone, my boy, and before the sun shall again cast its rays over the mountain tops I too shall have bid the world good night and will be listening for the cheery 'g m' from the boys on another circuit. I have lived as close to my Maker as I knew how, and have striven to make life pleasant for all, and like the great Cowper,

"Always wear a smiling face
Although so broken-hearted."

"Find out from the Sexton where my lot is, place me on the opposite side from where my wife rests, with our baby between us. Nature will soon have thrown over us her crazy-quilt of leaves. Place above my head a simple slab bearing these words: 'Pap Stovey, Wife and Child.'" With this his mind wandered. The physicians came again; they held a consultation, the result of which was "no hope." He muttered incoherently. Both hands would at times be raised to grasp something invisible to the watchers. Did his heavenly vision discern the other shore? In that mysterious depot on the boundary line between this world and the unknown land, do angels come to meet the expected souls of men? Were his arms outstretched to grasp his angel child while o'er the heavenly features of his wife there played the old familiar smile? Perhaps so. Pap soon joined the majority. The world lost a man. The angels gained a sweet companion. We laid him beside his wife and child. The silent slab bears the inscription, "Pap Stovey, Wife and Child."

Twenty years have come and gone since then. The gray hairs are in the majority in my head. I stand once more beside three graves. The month is June. Nature has on her seasonable mantle of green. The birds sing as gaily as of yore. No notes of pain are mingled with the song of the thrush. Not a ripple is discernable on the peaceful bosom of the stream. The old trees bend and bow in the breezes. All is peace and rest. Memory casts a flower on three mounds. Old recollections moisten the eye. I come away. Sacred spot! Sweet seems the rest of Pap Stovey.

CLEVELAND, O., July 3d, 1888.

RAILWAY TELEGRAPH SUPERINTENDENTS.

We briefly made mention of the progress made by this association up to the time of going to press with our last issue.

The next annual meeting of the association will take place at Atlanta, Ga., and the third Wednesday in October is the date. The officers elected for the ensuing year are:

President, G. C. Kinsman, of Decatur, Ill.; Vice-President, C. A. Darlton, Washington, D. C.; Secretary and Treasurer, (re-elected), P. W. Drew, Chicago, Ill. Those present were: Geo. L. Lang, Boston, N. Y. & N. E.; G. C. Kinsman, Decatur, Ill., Wabash; A. R. Swift, Chicago, C., R. I. & P.; P. W. Drew, Chicago, Chicago & E. Illinois; C. W. Hammond, St. Louis, Missouri Pacific; Chas. Selden, Baltimore, B. & O.; G. E. Simpson, Milwaukee, C., M. & St. P.; E. M. Herr, Chicago, C. B. & Q.; M. B. Leonard, Richmond, Va., N., N. & M. V.; C. S. Jones, Chicago, Illinois Central; Geo. T. Williams, Cleveland, N. Y., C. & St. L.; T. J. Higgins, Cleveland, C., C. & I.; H. C. Sprague, Kansas City, K. C., Ft. Scott & M.; C. E. Topping, Long Island City, Long Island; J. W. Lattig, Mauch Chunk, Pa., Lehigh Valley; J. D. Gibbs, Sedalia, Missouri Pacific; H. F. Houghton, Butler, Ind., Wabash; S. S. Bogart, Weehawken, N. J., West Shore; I. Cohen, Houston, Tex., H. & T. C.; W. J. Holmes, New York, Erie; C. A. Darlton, Washington, D. C., R. & D.; E. A. Smith, Boston, Fitchburg.

The new members admitted were:

N. B. Patterson, Mattoon, Ill., P. D. & E.; R. Stewart, Elizabeth, N. J., C. R. R. of N. J.; F. W. Wilson, Ft. Wayne, G. R. & I.; J. E. Duval, Ottawa, Ont., C. A.; W. B. Blanton, Dubuque, Ia., C., St. P. & K. C.; J. A. Lockard, Atlanta Ga., R. & D.; Horace Johnson, Chillicothe, C. W. & B.; J. Stenson, Long Island City, Long Island; F. P. Cummings, New York, N. Y., N. H. & H.; J. G. Pinkerton, Amoy, Miss., K. C., M. & B.; C. H. Hopkins, Norwich, N. Y., O. & W.

A good joke is told at the expense of the railway telegraph superintendents who recently held their annual convention in New York City. One day they were the guests of the Long Island Railroad Company, whose officials entertained the superintendents in a sumptuous manner at Manhattan Beach. The special train which was to have returned the party to New York jumped the track. This occurred at about 10 P. M. The officials made extraordinary efforts to convey their guests around the trouble. But it is alleged that an employe of the road failed to deliver his instructions to the conductor of the disabled train, and as a consequence it was allowed to remain where it was until 2 o'clock the next morning. President Corbin and General Superintendent Barton were very mad men the next morning when they learned how their guests had been treated. But nothing they could say tended to disprove the fact that some one had gotten even with about fifty superintendents of as many railroads by a simple little act of disobedience.

A very interesting subject of a telegraph school dropped into a prominent down town telegraph office the other afternoon, accompanied by her mother, and applied for a position. Her innocent look attracted the attention of the chief operator, who informed her that ladies were not employed in the office, but questioned her as to her experience, ability, etc. She then acknowledged being a student of some telegraph college, located in Brooklyn, and said she was able to receive from ten to eighteen words per minute, by sound. She further informed him that her mother had paid the Professor (?) \$90 in the hope of making an expert operator of her, but thus far she had not been successful in obtaining the position which was guaranteed by the Professor. And yet continuing to obstruct the horizon appears the Professor's shingle: "Learn Telegraphy; positions guaranteed."

CINCINNATI NOTES.—Messrs. Hill and Carmel, who are at present engaged with brokers, came among us. Messrs. Lattimer, from Atlanta, and Len Miller and Samuel Teter, late of New Orleans, were also here and helped out during the convention rush. Mr. Lattimer remained with us until a few days since. He then accepted a position in Dayton, O., on the pony report circuit, lately vacated by Mr. J. A. Broderick. Mr. Miller, after the St. Louis convention, moved on to Chicago, while Mr. Teter journeyed westward to Kansas City, where he takes service with the Western Union. Martin Duke, who spent the winter in New Orleans, and later worked for a short time in Cleveland, is again a resident of the Queen City, and a member of the W. U. night force. Martin has made rapid strides up from the bottom round. C. H. Chevee, who left the W. U. here some years ago to connect himself with the Nickel Plate Railroad, returned to his first love some three months since, but resigned his position here on June 6th to re-enter the railroad business, this time at Atchison, Kansas. Ed. Fullom, who has been on the W. U. extra list ever since the consolidation is now on the regular force. Mr. J. B. Martin has resigned his position with the United Press, and is sojourning for a few days with relatives and friends near Lexington, Ky., his old home. Mr. Martin is succeeded by H. C. Livingston, formerly with the Associated Press. Mr. C. J. Christie was transferred to the Associated Press office from Minneapolis, to which place he went from Cincinnati about a year ago. At the office of The United Lines everything is moving along smoothly; business is good and on the increase. G. L. Armstrong is on the sick list. J. A. Esslinger is off for a few weeks' vacation, his place being filled by Had Johnson. O. G. Farbach, late of the Western Union, is on regular extra, with J. J. O'Brien on a split trick. W. E. Dunham, of the W. U., Richmond, Va., is spending his vacation here, shaking hands with old friends. Robert Armstrong, of the W. U., St. Louis, is visiting his parents and numerous friends in this city. W. W. Wheatley, chief train dispatcher of the Buffalo Division of the West Shore Railroad, and his wife, spent a few days in the city during the early part of June, the guests of Mr. L. E. Moores. Mr. and Mrs. Wheatley, after leaving Cincinnati, made quite an extensive trip through the South, returning to their home at Syracuse, N. Y., July 2d. The Centennial Exposition of the Ohio Valley and Central States was formally opened here on July 4th with appropriate ceremonies and a grand parade. The machinery being set in motion at 12 o'clock noon on that day by Mrs. Ex-President Polk, at her home in Nashville. This was accomplished by means of a circuit run direct to her residence. There were quite a number of prominent Nashville citizens present with the venerable lady when she pressed the key. There were also quite a number of congratulatory telegrams exchanged between her and the Exposition Commissioners. The electric display at the Exposition bids fair to be among the finest ever seen in this country. The incandescent lighting in its various colored globes amid the flowers in the grand conservatory, and beneath the falling waters of the fountains and mimic cataract, make a scene long to be remembered, and one, it is safe to say, has never been excelled. Miss Gussie Lehr has charge of the Western Union office in the Exposition building, and has a clear field, as the W. U. have the exclusive privilege there.

MILWAUKEE NOTES.—A game of base ball was played here on July 15th between an aggregation of athletes from the different telegraph shops of Chicago and nine of Milwaukee's artists, resulting in a victory for the latter by a score of 14 to 6. There were about thirty in the party from Chicago. After the game, the guests were banqueted. The afternoon was spent in visiting the breweries. A return game will be played in Chicago in the course of a few weeks.

SAN DIEGO, CALA, NOTES.—Night Chief Otto has resigned and gone to Texas. His place is filled by J. F. Brigance,

late of Fort Worth, Texas. H. G. Miller, transferred to San Francisco. J. A. Welker, late of San Jose, is now on the San Francisco report circuit, which is one of the heaviest on the coast. J. H. Hill, late delivery clerk, is now manager of the San Diego District Telegraph Company, Miss C. E. Muth fills his place at the delivery desk. R. A. Wood, an old-timer, now looks to the booking. E. Somerville, another old war horse, is day chief. Though the business boom has quieted somewhat, there is still enough to keep Los Angeles quad. very "warm." T. W. Booth, our late manager, is now day chief at Ogden. W. F. Muth, recently of Philadelphia, is his successor. The Misses Reynolds and Adams, of the Los Angeles office, paid us a visit recently and expressed themselves much pleased with the Bay City and its inhabitants. Manager Broadwell, of San Bernardino, paid his respects on the 4th, and like the rest, was astonished at the rapid strides San Diego is making in substantial business progress.

RENO, NEVADA, NOTES.—The long contemplated removal of the repeaters from Virginia City to Reno is now an accomplished fact—four duplexes, three quadruplexes, six Morse sets and two Milliken repeaters form the operative machinery. In addition to these are a pair of Wheatstone repeaters working daily on the long Wheatstone circuit from Chicago to San Francisco. This, by the way, is a triumph of long distance telegraphy and makes the wire capacity 260 words per minute, 130 each way. The staff consists of Ben C. Shearer, manager and chief operator. He is well known on the coast as a genial, honest-going fellow. Mr. E. A. Kilbourne has charge nights. He has telegraphed in Canada and Australia. W. F. Allen, late of Mexico, all night. Mrs. Shearer, Miss Donoghue and E. Black, clerks. G. A. Wilson, who last May put up the Wheatstone repeaters in Ogden, is in charge of the same instruments here. We have a cozy office, and much of the comfort of it is due to Mr. J. R. Sloan, well known in Chicago and Southern California as a clever and indefatigable foreman of construction.

BUFFALO NOTES.—On July 1st the telegraphers of this city, with their friends and families, spent a very enjoyable evening, the occasion being a trip up the lake. The evening was spent in social chat and song. A quartette composed of the following well-known gentleman: Finn, first tenor; Stambach, second tenor; Louis Reynolds, baritone, and Charlton Bidwell, second bass, helped to enliven the party by their singing. To Mr. William Finn, of the W. U., is due much praise for the completeness of the arrangements. Among the prominent telegraphers and electricians present were George H. Usher, G. H. Burnett, Tracy W. Niles, president Electrical Aid Society; Secretary J. H. McNally, Cuyler C. Smith, Charles F. Towers, Harvey D. Reynolds, manager Postal Telegraph Company; "Jerry" Sullivan, L. Reynolds, J. M. Stambach, C. C. Ousterhout, C. W. Burhans with party of ten, D. P. Clohessy, J. V. Kinney, S. Leet and lady, of Brocton, D. H. Pittman, W. J. Quinn, Wm. Walker, C. M. Frost, W. Spice.

NASHVILLE NOTES.—Mr. R. C. Wilson of the day force recently led one of Nashville's belles to the hymeneal altar. We congratulate the happy couple, and hope this bright page of their career may never be sullied by a blot of sorrow. At the closing exercises of the law department of the Vanderbilt University, Mr. E. E. Barthell, one of Nashville's prominent telegraphers, graduated with high honors and was awarded a gold medal in the oratorical contest. He was the recipient of a handsome floral design from his fellow operators as a testimonial of their esteem. The local press spoke highly of his argument in the moot court debate. Mr. Barthell will remain at the key until October, when he will enter upon the practice of law, at which his many friends predict a rapid advancement to the front rank of the profession. In a baseball score a type-writer artist had it rendered: Sullivan had icicled but three hits.

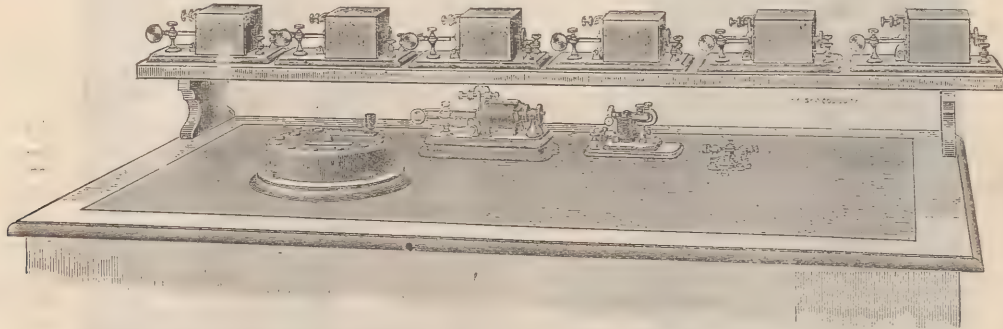
TELEGRAPH AND TELEPHONE SWITCH.

The Waters-Sweeny Telegraph and Telephone Switch Company, of Terre Haute, Ind., some time ago placed upon the market a very valuable and economic electrical device in shape of a switch which will, no doubt, sooner or later become popular at all railroad stations.

The following advantages are enumerated among others: Great economy in cost of instruments, saving of local battery, only one battery being required in any office, no matter what the number of lines may be, and even that one battery is not in use except when the operator himself is using some line. In space occupied by instruments, the operator requiring but one comparatively small table for any number of lines. In labor. He remains in one chair while operat-

market a new annunciator and factory help call which is a new departure in the line of electrical devices, and which recommend itself.

The factory help call is an apparatus to be placed in an office. From four to fifty single stroke bells, according to size of building, are distributed throughout the different rooms, and all rung simultaneously, whenever the box is operated. Each superintendent, foreman and errand boy, as well as office man, is provided with a number, which is sounded by the bells whenever the help call is operated. By placing the pointer on the button opposite the name of the person you wish to call and turning the rubber handle at the base, the bells throughout the building will strike this person's number distinctly four times with each turn of the



THE WATERS—SWEENEY TELEGRAPH AND TELEPHONE SWITCH.

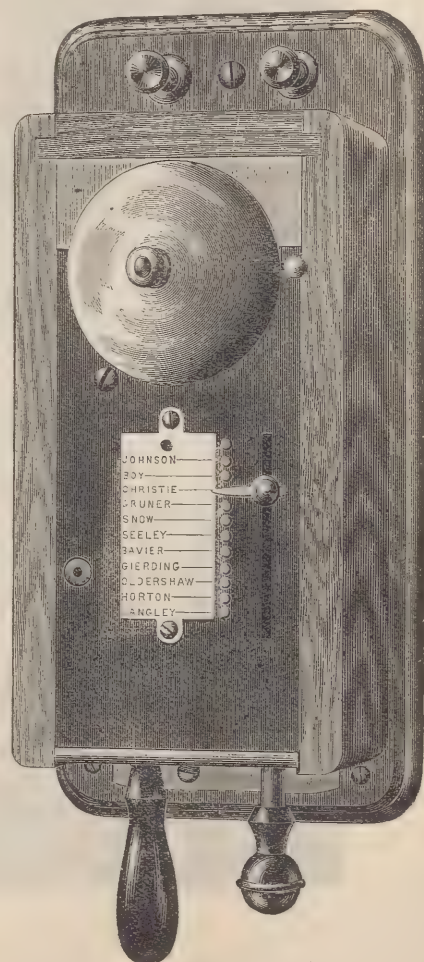
ing any number of lines. He can thus do his work more rapidly, and with much greater ease. Less damage from lightning. The box relays cost but two-thirds of the price paid for ordinary relays, hence, when damaged by lightning, are replaced at much less expense. No keys to get open. The key is entirely disconnected from the lines, except when in use by the operator. Its simplicity. Any telegraph repairer can put it in. Less noise. The box relays give sufficient sound for any case required. To use any line, the operator, by means of the Switch, puts his relay and sounder on the desired line, thus making the sound on that line louder than the others, by this means the operator is not compelled to stop one or two instruments before he can take his message.

Among the railroads which have tested this excellent system are the New York & New England, Chesapeake & Ohio, Central Vermont and Vandalia, and the superintendents of these roads speak in glowing terms of the merits of the Waters-Sweeny switch.

NEW ANNUNCIATOR AND CALL BELL.

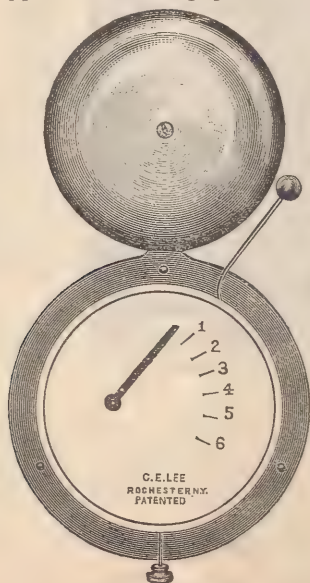
The New Haven Clock Co., of New York City, whose advertisement appears in this paper, are placing upon the

handle. The person called, immediately goes to the bell nearest him and presses a small button, which rings the gong



FACTORY HELP ANNUNCIATOR.

or help call, in this way notifying the office that he has heard his call and may be expected at once.



A Boston banking house declares that the long distance telephone is more reliable than the telegraph in bad weather

Copies of this picture, suitable for framing, printed on highly-calendered paper, can be procured at the office of THE ELECTRIC AGE,
5 Dey Street, New York, on receipt of 10 cents.



THE "VICTOR" KEY AND CATLIN "GRIP."

FROM

THE PHILOSOPHY AND PRACTICE OF MORSE TELEGRAPHY;

PUBLISHED BY

THE E. S. GREELEY & Co.,

New York,

PORTLAND, OGN., NOTES—Messrs. Kearney, Last and Gillespie have resigned, the latter to go to Walla Walla as manager. Mr. Davis transfers to the Postal, where business is very heavy. Arrivals at the W. U. are Messrs. Arnold, Rutledge and West. Mrs. Fannie Chapman has returned to the Dalles from an extended vacation. A telegraph school on a small scale has been started in East Portland office. A four-by-six enclosure hardly admits the teacher and students at the same time. Everything is progressing lovely, as one of the students says she came near rushing the teacher on 10 words a minute when the battery was new. A great game of base ball was played here a few days since, as follows :

DAY FORCE.	POSITION.	NIGHT FORCE.
Taylor.....	Catcher.....	Brady.....
Cummings.....	Pitcher.....	Simmons.....
Eller.....	Short-stop.....	Loomis.....
Gallagher.....	1st base.....	Overbeck.....
Bruce.....	2d base.....	West.....
Arnold.....	3d base.....	McDonald.....
Rutledge.....	Left field.....	Davis.....
P. Thomas.....	Centre field.....	Cook.....
Perry.....	Right field.....	Small.....

The day men won by a score of 9 to 5, but displayed commendable magnanimity over their victory; in fact the whole game was dominated by a kindly fraternal sentiment that overlooked all errors and accepted good luck as the unexpected. The night men attribute their defeat to lack of practice and are anxious to try conclusions with the day men again.

SAN BERNARDINO NOTES—Riverside, Cala., is the mecca of several Los Angeles operators at present. The completion of the electric street railroad to Riverside, will doubtless cause many of our people to visit that point on Sundays. Miss A. A. Overton is the manager of the telegraph office, with Miss Young days and Miss Empsy nights.

ST. LOUIS AID SOCIETY.—At the quarterly meeting of the St. Louis Telegraphers Aid Society, held July 22d, a membership of 62 was reported. Twenty-four dollars had been paid to sick members, and \$132 remained in the treasury. There has been some apathy shown by a large proportion of the employes, but they are gradually coming in and the society seems on the road to solid prosperity. W. H. Spencer is president, J. M. Maddox secretary, and Manager Bohl, of the W. U., treasurer. The society was organized in May last, and modelled after the New York Society, from which many favors were received in the way of advice, stationery, etc., which were greatly appreciated.

ASSOCIATED PRESS NOTES.—Mr. F. P. Blanks, who sent Western press days, has resigned, and is relieved by W. B. Upperman. Mr. W. D. Chandler relieves E. L. Boole, who has been transferred to the Chicago office. W. A. Griswold has been added to the night force.

A telegraph college in Oakland, Cala., advertises: Our telegraph department is in charge of Miss L. M. Whitmore, one of the finest operators in the present employ of the S. P. R. R. Co. Mr. Bert W. McKee fitted himself to take a position as operator for the Noyo Lumber Co., after only three weeks' practice under Miss Whitmore's tuition.

July 19th was the fifth anniversary of the great telegraphers' strike and not a few of the old "war horses" celebrated informally the event. Telegraphic greetings were numerous exchanged.

A number of prominent electricians met at Providence, R. I., a few days ago and participated in a Rhode Island clambake, which are celebrated particularly among the electricians.

OLD TIMERS AND MILITARY TELEGRAPHERS.

The eighth annual meeting of the United States Telegraph Corps and the Old Timers will take place at Chicago, Ills., on August 15th and 16th. The headquarters will be at Gore's Hotel, 270 Clark street. The programme is as follows: August 15, the business meetings of the U. S. Military Telegraph Corps and the Old Time Telegraphers' Association will be held in the parlors of Gore's Hotel. The meeting of the Military Society will be held at 10 A. M. The meeting of the Old Timers will be held at 2 P. M.

August 16 :—If the business meetings have not adjourned over from the 15th, the Committee on Arrangements will escort us to various places of interest until time for the starting of the magnificent steamer John A. Dix for an excursion on Lake Michigan,

The dinner at Kinsley's will be served at 8 P. M., and will be within the means of all. Its cost per member is indeterminate at this time, and will depend largely upon the number of plates to be set.

It is to be hoped that every member will make an effort to be present at this reunion.

Please notify A. H. Bliss, Chairman Committee on Arrangements, Room 14, Imperial Building, Chicago, as early as possible, whether you will be at the meeting.

Wm. R. Plum is president, Geo. C. Maynard vice-president, and Jas. E. Pettit secretary of the Military Telegraphers, while David Brooks is president, Irwin Dugan vice-president and Wm. J. Dealy secretary of the Old Timers.

Mr. W. G. Clark has been appointed superintendent of the Mexican National Ry.

A telegraph operator in England was killed by lightning recently while sending a telegram.

Mr. C. W. Butterworth of Petersburg, Va., is now agent and operator at Reams, Va., on Atlantic Coast Line.

Mr. W. B. Duke has been made agent and operator for the Norfolk and Western R. R. at Church Roads, Va.

Mr. J. S. Stevens has been appointed eastern superintendent of telegraph of the Wabash, vice C. C. Kinman, resigned on account of ill health.

Mr. M. T. Thomas having resigned, Mr. L. H. Clawson has been appointed train master of the third division of the Fort Worth & Denver City.

Mr. R. E. McIntyre, formerly with the Western Union at Petersburg, Va., is now working nights for the Atlantic Coast Line, at Stony Creek, Va.

Mr. C. J. Fitzgerald, New York correspondent of the Philadelphia Press, has resigned to accept a position on the reportorial staff of the New York Sun. Mr. Adams of the Times telegraph corps takes his place with the Press. Both are well-known operators and have made journalism a success.

FIFTH ANNUAL SUMMERNIGHTS FESTIVAL

TELEGRAPHERS OF NEW YORK,

AT EMPIRE CITY COLISEUM, 68th Street and East River,

FRIDAY EVENING, AUGUST 3d, 1888.

TICKETS, - Admitting Gent and Lady, - 50 CENTS.

To be had at the principal Telegraph Offices or of the following:

JAS. M. FOSTER,	FRANK ENGLISH,
EDW. W. MORRISON,	Head & Co., Mills Building,
WM. H. NEWMAN,	EDWIN A. QUICK,
JOHN J. SMOLLIN,	Public Grain & Stock Ex.
JAMES J. McSWYNY,	T. M. J. HANNON,
W. U., 195 Broadway,	16 Broad Street.
BURT J. WALSH,	WM. J. HANNIGAN,
Postal, 187 Broadway.	1369 Third Ave.
ELLIS FELLEMAN,	
B. & O. R. R., 415 Broadway	

WESTERN UNION NOTES.—Assistant Manager Brennan, who has been peculiarly unfortunate of late in losing near and dear relatives, is now called upon to mourn the loss of a sister to whom he was most devotedly attached. He has the sympathy of the entire force. Archie Walker and William Last are among the recent additions to the waiting list. Dr. Hatch is once more with us after an absence of several months spent at college. Miss Reiners and Mrs. Maar have accepted positions with brokers. Walter Prentice, a well-known operator, has been given a place on the waiting list. Harry Du Souchet, the popular operator, writer and successful playwright, has been transferred to the *World* office, relieving Dr. Mapp, who has taken the place at the *Times* made vacant by the promotion of Mr. Peter Adams to the position of correspondent of the *Philadelphia Press*. Miss Mamie Cassidy and Miss Emma Anderson have been appointed operators on the Western ways. Ed. Burrill, who has been absent a few days on account of a cataract in the eye, has entirely recovered and once more occupies his accustomed place on the St. Louis wires. It is a fact not generally known that Paul Haven, at the close of the war, joined the regular army, in which he served with credit in a regiment of cavalry on the far Western frontier. One of the scouts attached to the command was Buffalo Bill, and between the two a close friendship sprung up that was revived in the most hospitable manner a few days since, when the genial old-timer paid a visit to the Wild West show on Staten Island. Thieves a few days ago entered the residence of Western Traffic Chief Eastman and despoiled it of silver plate and jewelry to the amount of several hundred dollars. Mr. Kirby has left the night force for the split trick. Mr. Morrissey has left the latter trick to try the 6 to 3. "Though drawn from the wood it is Croton just the same," remarked a waiting-list man after sampling the contents of the barrel. A wag on the 1 to 8 A. M. force says it tastes like rain water strained through a sail. Samuel Morrison, late of the 6 to 3 trick, is giving the split a trial. Robert Morris, whose serious illness was announced in last issue, has so far recovered as to be out of doors, and contemplates a speedy return to business. Mr. Maxwell Green is the happy father of a girl, born July 12.

POSTAL NOTES.—Miss Lizzie Thompson is relieving Miss M. F. Keane for two months. Miss Kittie Casey leaves us on the first, to be married. The new names added to the extra list are those of A. C. Kuttner, J. J. Tierney, M. B. Knerr, J. M. Murphy and F. Mellon. Mr. Masterson would undoubtedly make a good correspondent, as the following item suggested by himself will show: "John Masterson, the well and favorably known first-class operator, of Union Hill, N. J., but more recently of the night force here, has exchanged tricks with W. H. Conn, who hails from the village of Philadelphia." The overhead railway is being given a trial and promises to be a big improvement in delivering the messages to various parts of the office.

TELEPHONE PERSONALS.—Mr. Geo. H. Dresser has been appointed assistant superintendent of the suburban division of the New England Telephone and Telegraph Company, with headquarters at Somerville, Mass. Wm. Gilbert, collector for the Cambridge Exchange, sailed July 24th for Europe for an extended tour through the continent. Miss Annie Somerville, operator for the Brattleboro, Vt., Exchange, is taking a few weeks' vacation. E. T. Timothy, inspector, made a flying trip to Northampton July 7th.

TRANSFERS.—J. G. Minniece, Nashville, Tenn., to Sheffield, Ala.; E. T. Cohoon, New York to Boston for the Commercial Cable Co.; Alick McVarish, New York to Canso, N. S., for the Commercial Co.; James O'Connor, Keokuk, Ia., to Prescott, Wis.; W. L. Simons, Fort Hancock, Tex., to Pittsburgh, Pa.; J. K. McCaskell, Chattahoochee, Fla., to

River Junction, Fla.; John Green, New York to Long Branch, N. J.; P. Van Allen, Boston to Bar Harbor, Me., as manager for the W. U.; W. A. Ennis, Fredericksburg to Petersburg, Va.; W. G. Elam, Petersburg, Va., to Greenbrier, White Sulphur Springs, W. Va.; G. S. Bleakney, Pittsburgh, Pa., to Cheyenne, Wyo.; A. H. Condra, Anniston, Ala., to Chattanooga Tenn.; W. Martin, Almonte, Ont., to Bulwer, Que.; D. L. Fry, Dresden Junction, to Newark, Ohio; P. H. Ryan, Syracuse to Troy N. Y.

E. Lackens, formerly manager, Newark, Ohio, has transferred to Lafayette, Ind. for the Postal, and Mr. E. H. Palmer of Coshocton takes his place.

The next performance of the New York telegraphers will occur October 15th, at Turn Hall. Mr. D. W. McAneeny will play the leading role.

Mr. J. R. Dennison, formerly of Newark, Ohio, has been appointed manager of the W. U. at Colton, Cal.

DIED.—W. W. Cummins aged 23, a well-known telegrapher, formerly connected with the Western Union staff at Dallas, Tex., died in that city June 30th of tubercular meningitis. He was kind and generous to a fault and made many friends. He leaves a widowed mother and two sisters to mourn his death. The heartfelt sympathy of a large circle of friends of deceased are extended to the bereaved ones in their great loss. Mr. Cummins was a member of the O. R. T.

DIED.—TOPPING.—At Worsham, Prince Edward County, Va., July 7th, Sadie Anderson, wife of N. B. Topping, of 195 Broadway, New York. Interment at Hampden Sydney, Va. Mrs. Topping was a native of Virginia, where she was widely known and greatly loved for her rare intellectual gifts, her beauty of person, and the noble qualities of her heart.

DIED.—James A. O'Connor, for eight years past a member of the 1 to 8 A. M. force of the Western Union, 195 Broadway, New York, died of consumption July 25. Deceased was a universal favorite and one of the brightest operators in the service.

DIED.—Hiram Sibley of Rochester, N. Y., the founder of the Western Union Telegraph Company, died July 11, at the above-named city. A biographical sketch of Mr. Sibley appeared in our last issue.

KILLED.—At Glamis, Cal., on July 16, A. S. Stevenson, operator for the Southern Pacific Railroad, was shot and killed. It is presumed robbery was the incentive.

Mr. S. T. Smith, of New York, whose advertisement appears on the last page of this paper, reports very heavy sales of type-writer ribbons and carbon and manifold paper.

An advertisement will be found in this issue representing the firm of Z. G. Sholes & Co., 142 LaSalle st., Chicago, Ill., where a good supply of carbon, ribbons and a stock of fine linen paper can be found constantly on hand. Repairing type-writers is made a specialty by Mr. Sholes, who ought to perform his work in an excellent manner, being a son of the inventor of the famous Remington Type-writer.

The well known firm of L. H. Rogers, of New York, established in 1869, manufacturers of manifold and carbon papers, besides having a large trade in this city and elsewhere, were recently awarded a medal for the first and highest prize, at the Adelaide Exhibition, Melbourne, Australia, their goods being superior to all others. They have since received a large order for manifold paper from Australia. This firm also furnishes paper in London, Liverpool and other large cities in England.

**GOLD AND STOCK
LIFE INSURANCE ASSOCIATION
ELEVENTH YEAR.**

For Telegraphers and Others in Electrical Service.

INITIATION FEE, \$1.00. DUES 50c. PER MONTH, INSURANCE \$600, in payments of \$50.00 per month for one year.

For further particulars, address
WM. J. DEALY, Secretary,
Room 58, 195 BROADWAY, New York.

TELEGRAPHERS' AID SOCIETY.—G. Irving, President, J. M. Moffatt, Secretary, address 195 Broadway. Dues 50 cents per month; pays \$8 per week, and \$100 at death. Qualifications: Good health, employment in electrical pursuits, and residence in vicinity of New York. Applications solicited.

SHORTHAND WRITING

Taught by Mail. Young men have only to learn shorthand to make it a sure source of profit. Send stamp for pamphlet and specimen.
W. W. Hulton, Pittsburg, Pa.

**A CHANCE IN A LIFETIME.
Any grade of Watch for \$1.00 per week. The Co-operative Watch Club.**

A new plan by which you can get a watch at spot cash wholesale price, on payment of a small weekly or monthly installment.
For example, 35 persons wish to buy a \$35.00 watch each. They each pay \$1.00 per week to us and every week we deliver them one watch (or we can send the watch O. O. D. (with privilege of examination) to some member chosen by the club who shall take it out with money subscribed.) At each subscription it is decided by a drawing which member is to receive the watch; and so on until all are supplied. When a member gets his watch he gives to the club satisfactory security for the balance. Number of members, amount and date of payment and price and description of goods bought, will be arranged to suit purchasers. We will supply them with forms of mutual agreement (which they can sign as a guarantee to each other where required.) This will be found a satisfactory investment by any one contemplating the purchase of a watch. Instead of spending the money in different ways for which you would have nothing to show, you will at the end of agreed time possess a good and lasting article, all paid for, without experiencing any strain on your purse. All intending members will receive our catalogue on application, and will be able to select from as complete an assortment as can be offered, a watch or any article or articles in it to the value, and be assured of exactly what they are receiving and of its reliability, as we warrant all our goods and as our own reputation will testify. Address all communications to J. S. Townsend, 1554 Wabash ave., Chicago, Ill. (Watch Club Department) For references apply to editor or the First National Bank of Chicago.
N. B. Special inducements to any one who will assist us in forming new clubs. Particulars furnished on application. In writing please mention this paper.

**WATCHES AT \$5.00 PER MONTH.
14 Karat STEM-WINDING GOLD WATCHES**

With Elgin or Waltham Movements. Price \$3 8.00.
Terms \$18 cash and balance in Monthly Instalments of \$5.00. These Watches are WARRANTED as accurate timekeepers and a full written guarantee given with each as to quality of gold and correctness of time. SEND FOR ILLUSTRATED CATALOGUE OF 100 DESIGNS.
THE MANHATTAN WATCH AND JEWELRY CO.,
Ludwig Hess, Manager.
64 John Street, New York.

AMERICAN AND FOREIGN BOOKS ON ELECTRICITY

Send your Orders for Electrical, Scientific or other Books to the "ELECTRIC AGE."

Abernethy's Commercial and Railway Telegraph..... Cloth	\$ 2 00	Mascart & Joubert's Electricity and Magnetism 2 vols., each..... Cloth	7 50
Anderson's Lightning Conductors..... "	5 00	Maver & Davis' Quadruplex..... "	1 50
Allison's Electrical Dictionary..... "	1 50	Maxwell's Electricity and Magnetism. 2 vols..... "	8 00
Cavendish's Electrical Researches..... "	5 00	Maxwell's Elementary Treatise on Electricity..... "	2 00
Clark & Sabine's Electrical Tables and Formule..... "	5 00	McGregor's Questions on Electricity and Magnetism..... Flexible	60
Cook's Magnetism and Electricity..... "	40	Monro's Electricity and its Uses..... Cloth	1 40
Culley's Handbook of Practical Telegraphy..... "	6 00	Murdock's Notes on Electricity and Magnetism.....	60
Cumming's Theory of Electricity..... "	3 00	Napier's Manual of Electro-Metallurgy.....	3 00
Davis & Rae's Electrical Diagrams and Connections..... "	2 00	Niaudet's Electric Batteries.....	2 50
Dolbear's Telephone..... "	50	Noad's Student Text-book of Electricity.....	4 00
Douglas' Telegraph Construction..... "	7 50	Parnell's Action of Lightning.....	3 00
Dredge's Electric Illuminations..... "	7 50	Pope's Modern Practice of the Electric Telegraph.....	1 50
Du Moncel's Telephone, Microphone and Phonograph..... "	1 25	Preece & Sivewright's Telegraphy.....	1 50
Du Moncel's Electricity as a Motive Power..... "	3 00	Prescott's Electricity and the Electric Telegraph. 2 vols.....	5 00
Du Moncel's Electric Lighting..... "	1 25	Prescott's Bell Telephone.....	4 00
Du Moncel's Electro Magnets. American Edition..... Boards	50	Prescott's Dynamo Electricity.....	5 00
Dyer's Induction Coils..... "	50	Report of Committee on Electrical Standards.....	3 75
Robert Luce, Electrical Railways..... Cloth	1 00	Sabine's History and Progress of the Electric Telegraph.....	1 25
Faraday's Researches in Electricity. 3 vols..... Cloth	20 00	Schwender's Testing. 2 vols.....	8 00
Ferguson's Electricity. New Edition.....	1 50	Shoolbred's Electric Lighting.....	2 00
Fiske's Electricity and Electrical Engineering.....	2 50	Sawyer's Electric Lighting by Incandescence.....	2 50
Gordon's Electricity and Magnetism. 2 vols.....	10 00	Smith's Manual of Telegraphy..... Paper	30
Gordon's Lectures on Induction.....	80	Spang's Lightning Protection..... Cloth	75
Gray's Absolute Measurements in Electricity and Magnetism.....	1 00	Schellen's Dynamo-Electric Machinery (complete).....	5 00
Hammond's Electric Light in Our Homes.....	1 25	Sprague's Electricity in Theory and Practice.....	6 00
Harris's Rudimentary Electricity..... Boards	60	Swinton's Electric Lighting.....	1 50
Harris's Rudimentary Magnetism.....	1 80	Swinburne's Electrical Units Popularly Explained..... Flexible	60
Harris's Rudimentary Galvanism.....	60	Terry & Finn's Description of Tel. Appliances Cloth	1 50
Haskin's Galvanometer..... M'roc	1 00	Thompson's Dynamo-Electric Machinery (complete).....	5 00
Holmes' Practical Electric Lighting.....	1 25	Tyndall's Lessons in Electricity.....	1 00
Hoskier's Laying and Repairing of Cables.....	1 50	Tyndall's Light and Electricity.....	1 25
Hoskier's Guide for Testing Telegraph Cables.....	1 50	Thompson's Elementary Lessons, Electricity and Magnetism.....	1 50
Hospitalier's Modern Applications of Electricity. 2 vols.....	8 00	Thompson's Dynamo-Electric Machinery..... Boards	50
Jenkin's Electricity and Magnetism..... Cloth	1 50	Urquhart's Electric Light..... Cloth	3 00
Kempe's Electrical Testing.....	5 00	Urquhart's Electro-Plating.....	2 00
Lardner's Natural Philosophy, Electricity, Magnetism and Acoustics.....	2 00	Urquhart's Electrotyping.....	2 00
Levander's Solutions of Questions in Magnetism and Electricity.....	1 00	Urquhart's Electro-Motors.....	3 00
Lockwood's Electrical Measurement and the Galvanometer.....	1 50	Watt's Electro-Metallurgy.....	1 00
Lockwood's Practical Information for Telegraphonists.....	1 00	Wahl's Galvano-plastic Manipulations.....	7 50
Lockwood's Electricity, Magnetism and Electro-Telegraphy.....	2 50	Woodbury's Protection and Construction of Mill Floors.....	2 50

Any Electrical Book costing \$1.50, sent free on receipt of \$6.00 worth of subscriptions.

" " " " 2.00 " " 8.00 " " "

Remit by Postal Note, Money or Express Order, Draft, Registered Letter, or Express to
J. B. TALTAVALL, 5 Dey Street, New York

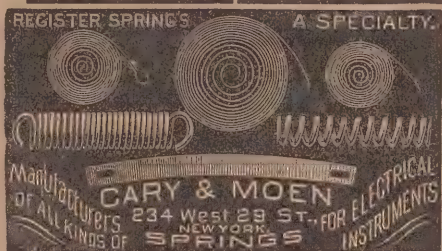
**AERIAL, SUBMARINE
and Underground
Wires and Cables**



TRADE MARK.

For Telegraph, Telephone and
Electric Uses.

THE OKONITE CO.,
No. 13 Park Row, New York.



CARBON PAPERS

Superior Qualities for use with
Type Writer and Stylus.
J. UNDERWOOD & CO.,
30 Vesey St., New York.
163 La Salle St., Chicago.
10 Johnston St., Toronto, Ont.

HENRY CONNETT,
PATENT SOLICITOR and EXPERT.
20 years' experience.
132 Nassau Street, New York.

**HEADQUARTERS FOR
TYPE-WRITER RIBBONS.**
MANUFACTURER OF
CARBON AND MANIFOLD PAPERS, STY-
LUSES, TINS, ETC.

S. T. SMITH,
14 Park Place, NEW YORK.

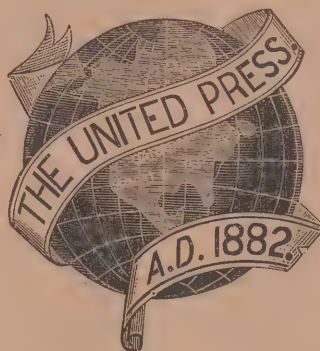
JOHN A. ROEBLING'S SONS CO.
Manufacturers of
Galvanized Iron and Copper Telegraph and
Telephone Wire.
Insulated **ELECTRIC WIRES** and Wire
For All Electrical Purposes.
WIRE ROPE.
H. L. SHIPPY, Manager N. Y. Office,
117 and 119 Liberty Street.

ELECTRICAL PATENTS

J. B. SABINE,
COUNSELOR AT LAW,
181 BROADWAY,
NEW YORK.

SPECIALTY -
ELECTRICAL PATENTS

G. W. Miatt, Counselor at Law.
SOLICITOR OF PATENTS.
20 years' experience in Patent Matters
178 Temple Court, N. Y. City



International in scope, repre-
senting leading Journals throughout
the United States, Canada, and
Europe, and operating a complete sys-
tem of leased wires to the principal
American cities.

BOARD OF DIRECTORS.

JAMES W. SCOTT, - - - - - Chicago Herald.	ROBERT S. DAVIS, - - - - - Philadelphia Call.
CHAS. H. TAYLOR, - - - - - Boston Globe.	JAMES E. SCRIPPS, - - - - - Detroit Evening News.
WILLIAM M. LAFFAN, - - - - - N. Y. Evening Sun.	SAMUEL D. LEE, - - - - - Rochester Herald.
WILLIAM L. BROWN, - - - - - New York Daily News.	E. H. BUTLER, - - - - - Buffalo Evening News.
ARTHUR JENKINS, - - - - - Syracuse Herald.	C. R. BALDWIN, - - - - - Waterbury American.
JOHN H. FARRELL, - - - - - Albany Press and Knickerbocker.	W. C. BRYANT, - - - - - Brooklyn Times.
	WALTER P. PHILLIPS, - - - - - New York.

EXECUTIVE OFFICERS.

JAMES W. SCOTT, President.
A. L. SUBSMAN, General Western Manager,
Chicago.
C. R. BALDWIN, Treasurer.
WALTER P. PHILLIPS, General Manager,
New York.

**DAY'S KERITE
Wires and Cables**

For Aerial, Underground and Submarine use
CLARK B. HOTCHKISS,
General Agent,
16 DEY ST., NEW YORK.

THE EDISON MACHINE WORKS

Wire Insulating Department.

JAS. F. KELLY,

GENERAL SALES AGENT,
New York.

**CALLENDER'S
BITITE AND TRINIDAD
Wires and Cables**

For all Purposes.
Callender Insulations and Waterproofing.
45 BROADWAY, NEW YORK.
London, Eng.; Brussels, Belgium; Boston, Chi-
cago, Kansas City, Denver, Philadelphia,
Minneapolis, Omaha.

ESTABLISHED 1867.

PARTRICK & CARTER,

MANUFACTURERS AND DEALERS IN

Electrical Supplies

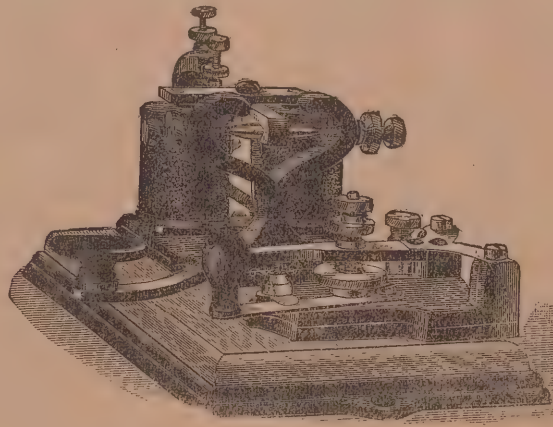
For the
Telegraph, Telephone, Electric Light, &c.
SOLE PROPRIETORS OF THE

Patent Needle Annunciators & Burglar Alarms,
Send for Catalogue, and Mention this Paper
114 SOUTH SECOND STREET,
PHILADELPHIA, PA.

40 Page illustrated Catalogue of
RUBBER STAMPS

Steel Stamps, Stencils, Seals, &c.
Sent Free on Application by Postal to
S. W. REESE & CO,
29 CHURCH ST., NEW YORK

Liberal Discount to Dealers, Send for Reduced Price List.



No. 2 O.K. Outfit

WITH SOUNDER AND KEY

on same base, or separate, as
ordered.

Complete Outfit, - \$3.75

Sounder, - - - 2.25

Key, - - - 1.00

Sounder and Key on
one Base, - - 3.25

The above Outfit consist of a beautiful Sounder wound to 20 ohms, and one of my unri-
valed Nickel Plated, Legless, Steel Lever Keys; One Cell 5x7 Battery (or 6x8 Battery, 10c. extra);
15 ft. Insulated Office Wire, 1 lb. Vitriol, 1 Instruction Book, all safely packed and will be ship-
ped on receipt of price, or sent C. O. D., subject to inspection, if you send me \$1.00 with order.
State whether you wish Key and Sounder on same Base or separate. Write your address plain
and full, also state by what Express Co. wish goods shipped. Address,

A. B. LYMAN, 34 and 36 South Water street, Cleveland, Ohio.

THE ELECTRIC AGE.

DEVOTED TO TELEGRAPHY, TELEPHONY, ELECTRIC LIGHTING AND ALL PHASES OF ELECTRICAL DEVELOPMENT.

VOL. VI--No. 6.

NEW YORK, AUGUST 16, 1888.

} \$1.50 per annum.
} Single copies 10 cents.

J. H. BUNNELL & CO.,

106 and 108 Liberty Street,

NEW YORK

**Telegraph
Instruments**

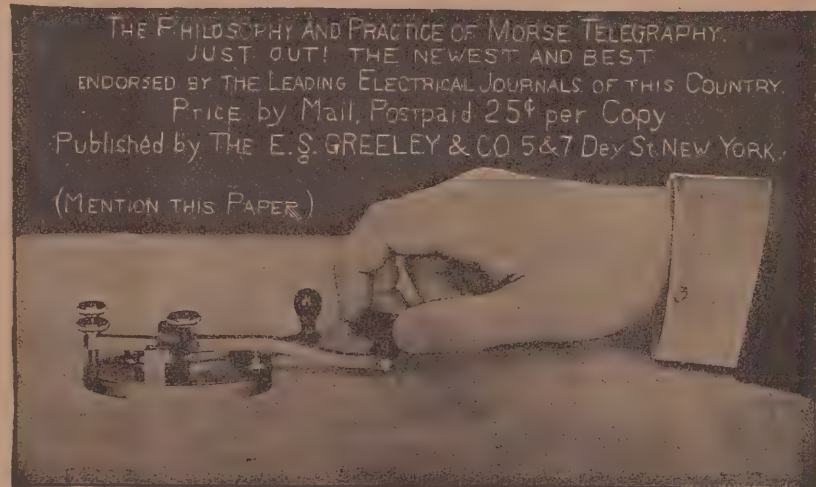
**BATTERIES, BELLS
& ELECTRICAL
SUPPLIES.**

**The largest stock and best
variety of main line and
short line instruments in any
American establishment.**

**Send for our latest Illustrat-
ed price List and Catalogue
No. 9, of January, 1888.**

**containing over four hun-
dred cuts of Telegraph In-
struments, Batteries and
Electrical Appliances, FREE
also Manual of Telegraphy,
FREE to any Address.**

HALF PRICE TO OPERATORS.



SPECIAL NOTICE.—To any TELEGRAPH OPERATOR in the UNITED STATES or CANADA, sending us his Office Address or other satisfactory evidence of his profession, together with 12 cents in postage stamps or otherwise, we will forward by mail, postpaid, a copy of the above book, entitled *The Philosophy and Practice of Morse Telegraphy*, just issued.

WHAT THE ELECTRICAL PRESS SAY :

“An excellent little work * * *
“A rational and practical guide for the young telegrapher, intended to make him acquainted early in his career with a few underlying facts and laws that usually, without specific study, only come to his knowledge after years of service and practical observation.”—*The Electrical World, March 24th, '88.*

The truth (referring to the true position of the telegraphers' hand in the act of “sending”) exposed by a lightning wink of the instantaneous camera, and permanently fixed for our deliberate inspection by the science of photography, dawns upon the craft intellect accompanied with something of the amazement that startled the artistic world when the elaborate anatomical studies by Rosa Bonheur of the horse in the act of running, were delivered over to universal ridicule by the subtleties of the same agent, instantaneous photography.
The Electrical Review, March 24th, '88.

THE E. S. GREELEY & CO.

Successors to L. G. TILLOTSON & CO.

5 and 7 DEY STREET, NEW YORK.

Manufacturers, Importers of, Dealers in and Headquarters for

**TELEGRAPH, TELEPHONE, ELECTRIC LIGHT, DISTRICT.
BURGLAR ALARM, ELECTRIC BELL, EXPERIMENTAL
AND GENERAL ELECTRICAL SUPPLIES.**

SOLE MANUFACTURERS OF THE

Victor Telegraph Instruments.

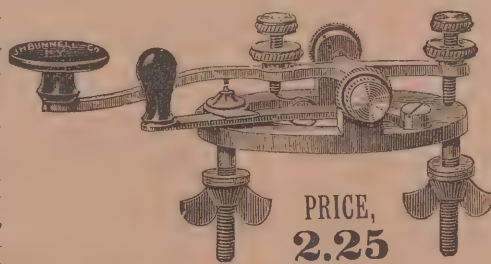
**EFFECTIVE IN WORK! BEAUTIFUL IN APPEAR-
ANCE!! SCIENTIFIC IN CONSTRUCTION!!!**

Authorized Agents for the Sale of EDISON INCANDESCENT MINIATURE LAMPS and all other EDISON LAMPS for EXPERIMENTAL USES.

J. H. BUNNELL & CO'S STEEL LEVER SOLID TRUNNION KEY.

Telegraphers cannot fail to have noticed that upon the introduction of the BUNNELL STEEL LEVER KEY four years since, it at once achieved a vast popularity, such as never before attached to any specialty in Telegraph Instruments, and that this popularity has continually increased, and is still increasing.

It will also be noticed by Telegraphers, that since the STEEL LEVER KEY was introduced, a brood of "improved" keys has been hatched and put forward from various sources from time to time each one made to look as much like the



STEEL LEVER KEY as possible, or made with some kind of a "steel lever," or "patent lever," and in every case claiming all the merits possible and impossible that language could describe.

Most of these "improved keys" have become exterminated by the force of their own worthlessness. Years of practical test in the use of THOUSANDS of BUNNELL STEEL LEVER KEYS throughout America demonstrates their perfection and popularity. BE NOT DECEIVED BY THE ABSURD IMITATIONS.

THE BUNNELL STEEL LEVER KEY is more durable, and in every respect better than any other for rapid and perfect sending for the following reasons:

The Lever is only one-half the weight of the ordinary brass lever as generally made. The entire Lever and Trunnions together being made of but one piece of fine wrought steel, the common defect of loose trunnions is avoided, the strength of a heavy brass lever is obtained with much less weight of metal, and, by the perfect bearing which the solid trunnion gives, together with the use of hardened platina points, sticking is absolutely prevented. The size and proportions are such as to make it the most perfect operating key possible to obtain, either for the hand of the skilled and rapid expert, or the beginner.

Price, \$2.25. Finely Finished, and Lever Nickel Plated.

LIBERAL DISCOUNT ON ORDERS FOR COMPANY SUPPLIES.

Steel Lever key sent by mail, post-paid to any part of the U. S. or Canada on receipt of the above price, by Registered Letter or Money Order. Until further notice we will exchange our New Steel Lever Keys for old keys for a cash difference of \$1.50 each. This price applies to any number of Keys, no matter in what condition the old ones may be. They must be delivered to us in packages plainly marked KEYS with all charges prepaid.

Where exchanges of not less than Six Keys at one time are desired for Keys which are already in use and which cannot be spared until the new ones arrive, we will, upon receipt of order, send on the new ones and the old ones may be sent to us afterwards. Cash should accompany all orders except from Superintendents and from Purchasing Agents of well known companies.

SEND FOR OUR 1888 ILLUSTRATED CATALOGUE. J. H. BUNNELL & CO., 106 and 108 Liberty Street, NEW YORK.

IT STANDS AT THE HEAD

ONE touch of the finger should produce any character used in a Writing Machine. Instruments that fail to accomplish this are deficient and do not fully meet the necessity that brought them forth. These facts are self-evident.

The No. 2 Caligraph is the only writing machine that fully economizes time and labor, and economy of time and labor is the best ground we have for soliciting trade.

Granting that we are in the front in this, we can show that our late improved machines excel in mechanical merit, durability and beauty of work.

10,000 Caligraphs are in daily use. We publish 400 letters from prominent men and firms which are convincing.

THE COMMERCIAL GAZETTE.

Cincinnati, October 5th, 1885.

C. G. Muller, Agent Caligraph, Cincinnati, O.

Sir:—About three months since, I commenced to use the Caligraph with a view to receiving special despatches from the wires, instead of by the old method by the pen. In about three weeks I was able, by diligent practice, to write from thirty-five to forty words per minute. Since then I have been using the machine with success receiving from five to six thousand words per night upon it. We have found the machine of such value in the work as to be able to receive the despatches by code, or abbreviation, thus increasing this capacity of the wire, though the matter is written out in full upon the Caligraph. We make an average speed of fifty words per minute by this method, and expect to do still better work with it.

The machine is a No. 2 and must be a marvel of durability, as it has never been out of order under this continuous and heavy strain, and is always ready for use.

Very truly yours, Signed; Frank B. Ross, Opr. Commercial Gazette. C. G. Muller, Esq., Agent Caligraph, Cincinnati, O. October 5th, 1885. Dear Sir:—I cheerfully certify to the correctness of the above statement of our operator. Signed; Chas. E. Thorp, Telegraph Editor C. G.

Guaranteed to be unequalled in Manifolding capacity.

THE AMERICAN WRITING MACHINE CO.,

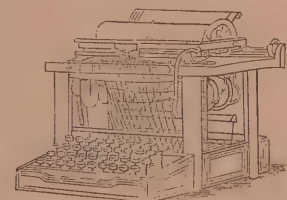
New York Office, 237 Broadway

Hartford Conn

REMINGTON

Standard Typewriter.

30,000 IN DAILY USE.



THE STANDARD OF THE WORLD.

Especially adapted for manifolding, and for rapid work.

Adopted by the New York Associated Press, Western Associated Press and New England Associated Press, and a large number of telegraphers throughout the country for receiving messages.

Send for handsome illustrated pamphlet.

Wyckoff, Seaman & Benedict,

327 Broadway, New York.

THE ELECTRIC AGE.

Published on the 1st and 16th of every month
by the Electric Age Association.

Entered as Second-class Mail Matter.

Registered Cable Address
"ELECTAGE" NEW YORK.

TERMS OF SUBSCRIPTION :

One Copy, one year, \$1 50
One Copy, six months75
Great Britain and other Countries, 2.00

(INVARIABLY IN ADVANCE.)

CLUBS.—One extra copy of the ELECTRIC AGE, will be supplied gratis for every Club of five subscribers.

We invite correspondence from members of the profession and solicit articles from manufacturers for publication. Subscribers should promptly notify us of any change in their addresses, giving the old as well as the new one, that they may receive all the papers they pay for.

ADVERTISING RATES: \$2.00 PER INCH.

Reading Notices, 25 cents per line.

Births, Marriages, Deaths and other Notices, 50 cents each.

Papers will be discontinued at the expiration of the time contracted for with due notice of same.

WALTER P. PHILLIPS, Editor.

J. B. TALTAVALL, Publisher,

C. H. BOGLE, Manager, Advertising Dept

No. 5 Dey St., New York.

NEW YORK, AUGUST 16, 1888.

EIGHTH MEETING OF THE ELECTRIC LIGHT CONVENTION.

The eighth meeting of the National Electric Light Association will take place in New York on August 29th. It is expected that a very large attendance will respond to the invitations sent out.

Much important business is to be disposed of and many interesting papers read.

The association has been a success from its inception, and the great industry represented by this body has developed into one of the largest and most important in the country. The association owes its birth to Mr. George S Bowen, of Elgin, Ills., who in January, 1885, conceived the idea of the necessity of such an institution and issued the call for the first convention, which was held at the Grand Pacific Hotel, Chicago, Ills., in February of 1885. Mr. J. F. Morrison was then elected president. He was presented with a gavel representing a dynamo commutator by Mr. C. A. Brown, of the Western Electric Light Company. The next meeting of the association was held in New York, the third meeting at Baltimore, the fourth at Detroit, Mich., the fifth at Philadelphia, the sixth at Boston and the seventh at Pittsburgh. Mr. Morrison served the association as presiding officer until the Pittsburgh meeting, when he insisted on being relieved of the great honor. Mr. S. A. Duncan, of Pittsburgh, was elected his successor.

At all of the meetings valuable papers on lighting, power, revision of patent laws, proper insulation of wires, etc., have been read and profitably discussed.

The eighth meeting will have placed before it for consideration many matters of the utmost importance to the association.

Some of the members express the belief that action will be taken looking to an improvement in the policy pursued by the electric light companies in the erection of their wires. They advance the argument that the loss of property by fire, the refusal of the insurance companies to accept electric light risks, the personal injuries and death that are on

the increase will assume formidable proportions, if the matter is not at once checked. Cheap wire work is responsible, no doubt, for many of the fires which have caused the insurance companies to take this decided stand against assuming further risks of the kind, and unless the coming convention succeeds in convincing the insurance companies that the defects in the wiring of buildings will be promptly remedied, inconvenience, loss of custom, disputes, etc., will naturally result.

It is currently reported in Wall street that Jay Gould is about to retire from his personal connection with the Western Union Telegraph Company, his interest in the property to be assumed by a syndicate with J. Pierpont Morgan at the head, backed by the Vanderbilts and English capital. This appears just in time to confirm a previous rumor that the health of Mr. Gould is very poor, and that he is preparing to put his capital into the very best possible shape, so that it will cause no further anxiety to himself or to his family in case his disease should terminate fatally. Another story of the retirement is to the effect that Jay Gould has formed a union with the telephone interests, and together with a cessation of the cable war, he will naturally receive a good price for his holdings.

THE CABLE WAR IS ALL OVER.

The cable war was finally settled a few days ago when the officials of the different companies signed the agreement raising the rate from 12½ cents to 25 cents a word, and making the press rate 10 cents a word instead of 6 cents. The companies interested were the Anglo-American and the Direct Cable companies in England, the first named being represented by Lord Monk and the second by Sir John Pender; the Transatlantique, in Paris, by Count de Belleville; the Commercial Cable Company, by H. de Castro, Vice-President, and G. G. Ward, General Manager; the Western Union Telegraph Company by Dr. Norvin Green, its President, and the Postal Telegraph and Cable Company by its President, A. B. Chandler.

The document was signed abroad at noon, and immediately upon the receipt of the news here the executive committees of the companies on this side met and ratified the action of their connecting cable and telegraph lines. The increased rate will go into effect September 1.

For New York State, outside of New York City and Brooklyn, three cents a word will be added for the land service, and this charge will apply to all cable messages to New Jersey, Pennsylvania, Delaware, Maryland and the District of Columbia.

During the past five years the Western Union system on the Pacific coast has been more than doubled, and Superintendent Jaynes says the next five years will doubtless see an increase fully as great. Thousands of dollars are being spent every week by the company to make the service equal to the growing demands. New lines are now being built from San Francisco to Portland, and from there to Los Angeles, by the coast route. There is now a two-wire line to Portland, but the system will be doubled, and three wires will be strung, it is thought, before the next winter season begins.

The ELECTRIC AGE will be represented at the annual meeting of the Old-timers and Military Telegraphers at Chicago, Ill., on August 16th and 17th, by J. B. Taltavall.

This journal will be represented at the Electric Light Convention, in parlor No. 2, Hotel Brunswick, New York city, on August 29th, 30th and 31st, by W. P. Phillips, J. B. Taltavall, C. H. Bogle and F. E. Dolbier.

The Westinghouse Electric Company has made a deal with Mr. Nikola Tesla, and will at once begin the building of motors according to this inventor's ideas, which were described in detail in our issue of June 16.

The North American Phonograph Company has been incorporated at Jersey City, N. J., with a capital of \$6,600,000, by Jesse H. Lippincott and others.

D. H. Craig, the founder of the Associated Press, has been granted the use of a corridor in the U. S. Senate galleries, to exhibit inventions by which, it is alleged, cheap telegraphy for the people can be had.

Mr. Wm. Maver delivered a few days ago a very interesting lecture on "Telegraphy," at the annual training at the Torpedo Station, Newport, R. I.

The attention of the Delegates to the National Electric Light and the Telephone Conventions is called to the following Hotels which can comfortably accommodate them while in the city.

Fifth Avenue Hotel,

MADISON SQUARE, NEW YORK.

The Largest, Best Appointed and most Liberally Conducted Hotel in the City, with the Most Central and Delightful Location.

HITCHCOCK, DARLING & CO.

VICTORIA HOTEL,

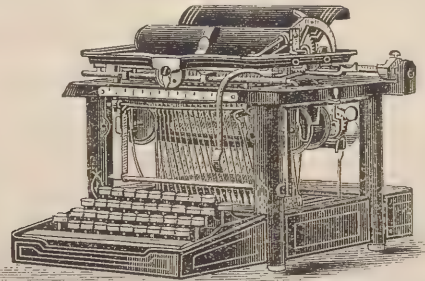
Fifth Avenue, Broadway & Twenty-Seventh St.,

NEW YORK.

H. L. HOYT & CO., PROPRIETORS.

— American and European Plan. —

TYPE-WRITING & TELEGRAPHY



Read what the foremost Telegraphers in New York say of the
REMINGTON STANDARD TYPE-WRITER

WORLD OFFICE, NEW YORK, SEPT. 14th, 1887.

GENTLEMEN: We have used the REMINGTON TYPE-WRITER for some time and are highly pleased with the rapidity and ease with which matter can be copied from the wires. Operators who are expert with the type-writer find no difficulty in copying the fastest sending. Its work is entirely satisfactory to the compositors and copy readers of the *World*, and we find it a great improvement over the pen.
Yours, truly, W. A. MCALLISTER and A. J. BOOTH, Telegraph Staff.

SUN OFFICE, NEW YORK, Sept. 19th, 1887.

GENTLEMEN: About two months ago I received a No. 2 REMINGTON machine to practice on. It wasn't in the office more than half an hour before all hands, from the editors down to the office devil, had written their names. and at the next meeting of the *Evening Sun* Association, the "REMINGTON" was unanimously voted a "dandy," and a valuable acquisition to the office. I am now able to write from 40 to 45 words per minute, and would rather miss my Sunday dinner than be without it.
Yours, O. S. KENNEDY, Operator, *Evening Sun*.

The REMINGTON TYPE-WRITER is, without a doubt, the best machine of its kind extant. A thorough test has convinced us of this fact, and it is only a matter of time when it will be used exclusively in connection with the telegraph. The "REMINGTON" is in use in the New York office of The United Press, as well as in other offices throughout the United States.

R. D. BLUMENFELD, F. J. KIHM, C. H. H. COTTRELL, JOSEPH T. HEENAN, M. H. CRANE, CHAS. H. DAVIS, J. G. MCCLOSKEY, J. P. GARDNER, R. SPILLANE.

The REMINGTON TYPE-WRITER is used exclusively in this office. Its usefulness in connection with telegraphy cannot be too highly praised. It is of much benefit to an operator, rendering "receiving" an easy task, when the machine is once mastered.
GEORGE H. SICKLES, New York Associated Press. P. T. BRADY, New York Associated Press.
F. P. BLANKS, Western Associated Press. EDW. L. BOOLE, Western Associated Press.

Send for pamphlet.

WYCKOFF, SEAMANS & BENEDICT, 327 Broadway, New York
BRANCH OFFICES.

- | | | |
|--|---|---------------------------------------|
| Boston.....306 Washington street | Washington.....LeDroit Building. | St. Louis..No. 308 North Sixth street |
| Philadelphia....No. 834 Chestnut street | Baltimore....No 9 North Charles street | Kansas City...322 West Ninth street |
| (Continental Hotel) | Chicago.....No. 196 La Salle street | St. Paul....No. 116 East Third street |
| Minneapolis. No. 12 Third street, South, | Indianapolis..No. 84 East Market street | London....No. 100 Gracechurch street |

KILLING DOGS BY ELECTRICITY.

At the School of Mines of Columbia College, a few days since, experiments were undertaken, at the request of Harold P. Brown, electrical engineer, to determine the danger of alternating currents, by Dr. Cyrus Edson and Dr. Charles F. Roberts of the New York Board of Health. The first dog operated upon was a mongrel weighing 61 pounds, strong and in good condition. His height was 24 inches, and resistance from the right front leg to the left hind leg 14,000 ohms. Connection was made by binding a piece of cotton waste saturated with water round the leg with No. 20 bare copper wire. The dog was placed in the cage and the alternating current applied by Dr. Roberts at 272.16 volts for five seconds, number of alternations 288 per second. The dog was silent and motionless during the continuance of the current. He gave a few spasmodic gasps 31 seconds after current was first applied, and heart ceased beating 90 seconds after current was applied. The dog was immediately dissected by Dr. Roberts and Dr. Peterson, and section of sciatic and pneumogastric nerves, muscular fibres of diaphragm and lungs placed under a microscope and no changes in structure were observed. The second dog was a full-blooded Newfoundland, strong and in good condition, weighing 91 pounds, height 25 inches, resistance 3,000 ohms. Connection was made in the same manner as above. Alternating current applied by Dr. Roberts at 340.5 volts electromotive force for five seconds. The dog was silent and motionless during continuance of current, howled and gasped for eight seconds after circuit was opened, but in the opinion of physicians present this was purely mechanical action, as the dog was unconscious from the instant the current first reached him. Heart stopped beating in two minutes and 50 seconds after current was first applied. The third dog was a half-breed setter and Newfoundland weighing 53 pounds, and 24 inches high. Resistance 30,000 ohms. Connections were made in the same way as before. Dr. Roberts applied the alternating current at 220 volts for five seconds, the result was not fatal at four minutes afterwards. Mr. Porter, Superintendent of Machinery of Columbia College, then suggested that as the dog was rigid and motionless during the continuance of the shock, it would be impossible for a man in the same condition to utter a sound or to break the contact in five seconds. Dr. Edson then determined to administer the current at the same number of volts for 30 seconds, on this account and on account of the high resistance of this subject. This was done, and during the period of the 30 seconds the voltage rose to 234 volts. The dog died instantly, without sound or struggle. The resistance after death was found to be 2,800 ohms. All the physicians present expressed the opinion that a dog had a higher vitality than a man, and that, therefore, a current which killed a dog would be fatal to a man under the same conditions. It was their opinion that all of these deaths were painless, as the nerves were probably destroyed in less time than that required to transmit the impression to the brain of the subject.

Dr. Edson invited Prof. Elihu Thomson of Boston and Dr. Otto A. Moses to be present with measuring instruments to check up the voltage, etc., but neither of these gentlemen put in an appearance or responded.

(Signed) DR. CYRUS EDSON,
Pres't Board of Health.
DR. CHARLES F. ROBERTS,
*Ass't Prof. Physiology, Bellevue
Hospital Medical College.*
DR. FREDERICK PETERSON,
DR. FRANK H. INGRAM,
DR. H. A. HAUBALD,
MR. SCHUYLER S. WHEELER,
Electrician, B'd of Elect'l Control.
HAROLD P. BROWN, *Electrical Eng'r,*
MR. JOHN MURRAY MITCHELL,

PROF. C. E. COLBY, *Columbia Col.*
CAPT. E. L. ZALINSKI, *U. S. A.,* and
PROF. L. H. LAUDY, *Columbia Col.*

ELECTRIC LIGHT LITIGATION—A cable from London to the *Evening Post* announces that the English courts have rendered a decision in an electric-light suit which is of great importance in this country, as practically the same point is involved in the litigation between rival companies here. The decision declares against the Edison patent of 1879, but sustains what is known as the Cheesebrough patent of 1878. The latter patent is on the invention of Sawyer & Mann for incandescent lighting and was issued in England in the name of their attorney. A patent was issued to Sawyer & Mann in this country simultaneously with their English patent, but subsequently Edward Weston satisfied the United States Commissioner of Patents that he and not Sawyer & Mann was the first inventor of the device for giving uniformity in sectional area of carbon filament and he was awarded the patent.

In England it is not allowable to go behind an issued patent and therefore no test could be made there, and the Cheesebrough patent, which is owned by the Edison-Swan United Companies, holds good, but in this country the Weston patent, which superseded the Sawyer-Mann patent, is owned by the United States Electric Lighting Company, with which the Edison Company has been in litigation for years.

Leonard E. Carter, attorney for the United States Electric Lighting Company, said that he was not at all surprised at the decision of the English court, as from the rulings of the Judge during the hearing he was satisfied that he held Edison's invention to be non-patentable, and he presumed the Court held that nobody was entitled to make so broad a claim as Edison had. President Hebard said he recently received letters from England stating that all of the electrical manufacturers over there were preparing to manufacture incandescent lamps in anticipation of the decision in this case. If a similar result follows in this country incandescent lighting will be much cheaper than it now is.

Mr. George G. Ward, secretary and general manager of the Commercial Cable Co., issued the following circular on August 1: "The tariff war has now been terminated, and a rate of twenty-five cents per word from New York City to Great Britain, Ireland, France and Germany, has been adopted by all companies, which takes effect on the 1st of September next. We cordially thank our friends for their support during the contest, and feel sure that the cabling public will appreciate the result of the efforts of the Commercial Cable Company to establish a permanent competing trans-Atlantic service, at reasonable rates and of the highest possible efficiency.

Mr. J. Brown, superintendent of the Direct Cable, has issued a circular to the effect that on and after the first of September, 1888, and until further notice, the charge for the transmission of cablegrams "Via Direct Cable" between New York city and Great Britain or Ireland, France and Germany, will be twenty-five cents per word. Special arrangements can be made at the general offices of the company for the transmission of press messages at ten cents per word.

W. Kohlrausch calculates that it would take 9,200 amperes to melt a copper rod of 2.5 centimeters diameter. Such a current concentrated in a flash of lightning, would contain from 52 to 270 coulombs, which would decompose from 5 to 25 milligrammes of water and from 9 to 47 cubic centimeters of explosive gas. If this energy were stored up and distributed for electric lighting, it would require from 7 to 35 such flashes to keep one incandescent lamp alight for an hour.

ROBERT GARRETT IS INSANE.

It has become clear to the friends of Robert Garrett during the past week that he is really insane and that there is but a faint hope of his ultimate recovery. They sadly concede that the sooner he is removed from New York and put under restraint the better it will be for himself and his family. He is now so far gone that he can sleep only by the persistent use of hypodermic injections of morphine. In his wakeful moments he is constantly guarded by trained men for fear he may do something dangerous. Even his wife and one or two immediate relatives who are with him are afraid to go near the patient when he is laboring under the wild hallucinations to which he is subject. These are frequently succeeded by periods of depression and melancholy.

When Mr. Garrett talks he quickly becomes excited, and then Jay Gould is the person who seems to appear before him as a menacing spectre. He talks to everybody near him about Jay Gould, who he says has robbed him of his telegraph and other properties and is planning to take away what is left. Mr. Garrett has accused the men who are guarding him of being paid by Jay Gould to dog his footsteps and murder him, and he has attempted to break away from their care and escape from the Brevoort House. Once he rushed to an open window and attempted to jump out, while calling loudly for help. There have been several occurrences like that during his recent illness, and as Mr. Garrett is a strong and powerfully built man it required all the strength and courage of his nurses to restrain him. To his doctors Mr. Garrett has spoken earnestly about Jay Gould, asking them to save him from the millionaire, and the same story has been repeated to the few friends who have been admitted behind the carefully guarded doors of his rooms.

"You are glad that Jay Gould has euchered me, and you are a friend of his," said Mr. Garrett, with a wild glare in his eye to one of these.

"Why, Mr. Garrett," was the reply, "I am your friend."

"No, you're not; I say you are a friend of Jay Gould and you came here for him," said Mr. Garrett.

This painful scene was only brought to a close by the retirement of the caller, who knew that Mr. Garrett was in a bad way mentally, but had hitherto had no idea that he was so far gone. When he speaks of Jay Gould it is generally in connection with the telegraph business and the absorption of the Baltimore and Ohio Telegraph system by the Western Union. This Mr. Garrett regards as the result of a carefully laid plot which Jay Gould conceived to ruin him, and the beginning of all his troubles.

At Richfield Springs, a few days ago, Mr. Garrett called a newsboy to him, and pulling out a roll of bills said: "Here, boy, I'll give you \$10 to go in front of the hotels and shout, 'Jay Gould ought to be in Sing Sing.'"

DIELECTRICAL PHENOMEMA.

"DE."

It is a well established fact that the quality and quantity of the food we eat controls to a great extent our moods and dispositions. A man is very seldom good natured when his stomach is empty, nor is he always in the most amiable mood when it is filled with food that does not digest properly. Milk, when drank in large quantities is productive of drowsiness and lassitude, while a cup of tea has entirely the opposite effect. So it is with the lower order of animals. In selecting their food they do not always discriminate between what is good and what is bad for their digestive organs, and peculiar results very often follow as a consequence of this indiscretion. There is a large cat that makes its headquarters in the office of the Associated Press. This feline has never been known to partake of animal or vegetable food, but has thrived and grown fat on common manifold paper.

I have this statement from the all-night office boy, who, by the way, is a keen observer of the peculiar traits of the

cat. He says that there is a certain amount of oil in the manifold paper that affords nutrition, and he has known the cat to turn away from a choice piece of meat while it would eat ravenously of a bunch of manifold paper. That the printed or written matter on the paper does have any effect on the cat's feelings is one of the remarkable discoveries the office boy has made. Speaking of this cat, he said: "During the last meeting of the Presbyterian Synod a great many sheets containing reports of the proceedings found their way into the waste baskets. The cat lived sumptuously on them, and during the whole time the Synod was in session the cat acted strangely. It would at times climb on a chair, place its fore feet on the back and, putting its head between its fore legs, assume all the appearance of a devout child saying its prayers. One night the cat devoured a number of sheets on which was written an elaborate description of a diplomatic ball given at Washington, and sir, for a night or two afterward it did nothing but waltz around the room.

The time Brodie jumped from the Brooklyn Bridge the cat ate two whole sheets giving an account of the awful jump, and it was with great difficulty that we prevented it from killing itself. He would jump from the window down to a telegraph pole, and then to the sidewalk. How he ever escaped death we never knew. He would have jumped from the roof if we had not watched him. "But," continued the office boy, "I thought our cat was doomed during the cholera epidemic in Europe two or three years ago. For several nights he lived on cholera news and then he began to show symptoms of the dread disease. He would roll on the floor in the greatest agony and double himself up in knots, but luckily we found two or three sheets of market reports in which Jamaica ginger and Santa Cruz rum were quoted, and we gave him a dose of it and it cured him."

The above statement has been confirmed by two of the operators in the Associated Press, and as the boy's reputation for truth and rectitude is good, there is no reason to doubt the fact that the food eaten by the cat has produced these wonderful results.

BRIDGEPORT AHEAD AS USUAL.

Miss Beda L. Arnold, the expert operator in the editorial rooms of the *Standard*, is the first lady telegrapher in the country to take messages on the type-writer instead of making manuscript copies. Miss Arnold takes the despatches of the Associated Press for the *Standard* and *Farmer* and is counted as one of the best female operators in the United States. During the past winter she purchased a Remington type-writer and quickly added a knowledge of its use to her other accomplishments. She now uses the writing machine in this office and produces a beautiful and correct copy, taking the same with much more ease than before when obliged to write out in full all the news of the day. Miss Arnold's home is at Deep River, but she has established a residence and a large circle of friends in Bridgeport.—*Evening Standard*.

Mr. W. H. Grant, another United Press operator, who was transferred to the New England Associated Press at the time Miss Arnold was, says in referring to the above: "The best part of it is that nobody knows when she changed from the stylus to the machine. There were no requests," he says, "to please take it easy, or anything of that sort, and she has not had a break charged to her in over a year." Mr. Grant is the sending operator at New York, and a great sender he is, too.

Mr. W. T. Hunt, of the *Electrical World*, because he recently happened to discover that one of Broadway sections of underground conduit was full of water, recommends that the subway had better be made a section of the new aqueduct system. Some electricians are hard to please.

ELECTRICAL ACCUMULATORS.

The engraving we present herewith to our readers exhibits an interior view of the works of the Electrical Accumulator Company, which are situated at Newark, N. J. It is an immense establishment, and the cut admirably illustrates the magnitude to which the accumulator business has recently grown.

The possibility of storing electricity was first suggested in 1801, by Gautherot's discovery that two plates of the same metal immersed in acid, after having been subjected to the action of an electric current in one direction, would produce a secondary current in the opposite direction. Since that time the progress in the development of this discovery has been gradual, until now the accumulator company are offering to the public the storage batteries combining the invention of Faure with improvements thereon.

The objectionable overhead wires are entirely dispensed with.

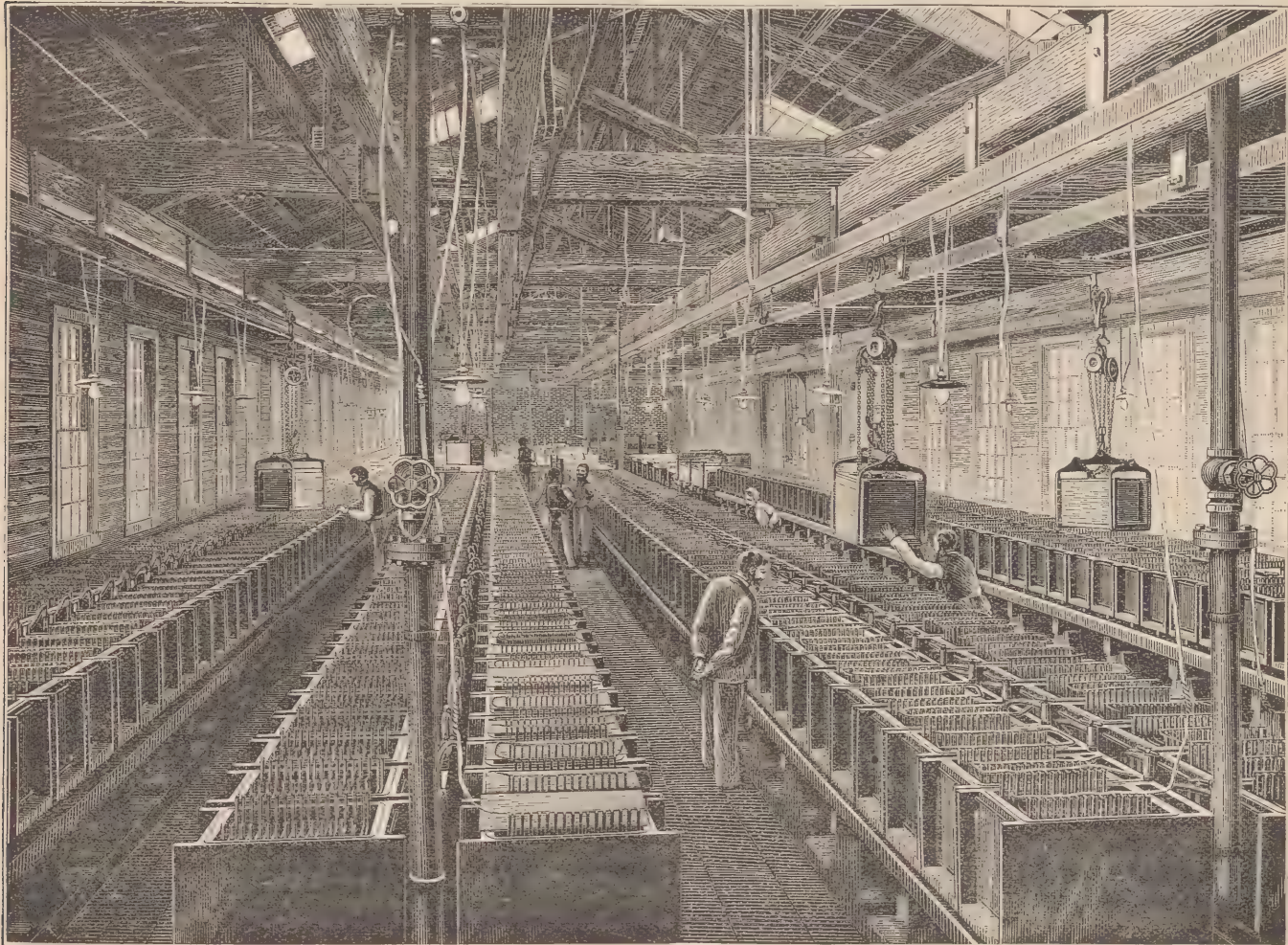
But the proof of the pudding is in the eating thereof.

Mr. J. A. Seely, electrician of the Metropolitan Telephone and Telegraph Co., says: "This company is well pleased with the efficiency of the accumulators and the great saving in maintenance expenses, and I am arranging for a second storage battery room to place 300 more cells for operating Morse and Printing Telegraph Instruments."

The Allentown, Pa., Electric Light and Power Co. have a successful plant for central station lighting.

Wm. Wharton, Jr., of Philadelphia, says with one charging, one of his electric cars ran a distance of 63 miles.

Among the numerous other flattering testimonials received are one each from Sir William Thomson and W. H. Preece of England.



WORKS OF THE ELECTRICAL ACCUMULATOR COMPANY—FORMING ROOM.

That the accumulator system has proven successful, it is only necessary to look into the plants that have already been established and in successful operation for many months. Those in charge of these plants are loud in their praise of the merits of the storage system.

In electric lighting this system insures absolute safety from fire, heat, smoke and gases.

For isolated lighting the system is thought to have an excellent field.

It also has many advantages for central station lighting; economy in every department being apparent.

In railway train lighting the storage system has scored a decided victory, and plants can be found on the various lines of palace and sleeping cars.

Propelling street cars is but another great field in which the storage system is already playing an important part.

The head office of the accumulator company is at 44 Broadway, New York.

The Leclanche Battery Company of this city, whose advertisement appeared in the last issue, needs no introduction at our hands. The establishment is an old one, but being wide-awake and abreast of the times, they are constantly calling the attention of their patrons to new devices in the line of batteries. The standard open circuit battery is the most satisfactory for electric bells, etc. The great length of time it stands without requiring the slightest attention whatever, is the best and strongest possible recommendation which could be bestowed upon it by any one. This battery has been tried time and time again, and has never been found wanting, and those desiring first class goods at low prices cannot do better.

ELECTRIC WELDING.

The process of electric welding, which was discovered by Prof. Thomson some eleven years ago, while lecturing at the Franklin Institute of Philadelphia, said Otis K. Stewart, in a lecture recently, has been developed in the past two years to a far greater extent than is generally supposed. We started in with the welding together of small wires of iron and copper, and have been so successful in the development of apparatus that we are now able to weld bars of a very large size and of almost any shape or metal.

The principle involved is that of forcing through a conductor an amount of current that the conductor will not carry without heating. Any conductors when placed in abutment have as their point of greatest resistance the point of abutment or contact, and consequently it is at this point that the heat is first generated; and, as is well known, this heat increases the resistance of the conductors at that point so greatly that more heat is developed at a remarkably rapid rate.

A consideration of the above facts will prove at once one of the advantages of electric welding as practiced by Prof. Thomson, namely, the localization of the heat to the points or point at which it is desired, thus saving an enormous amount of energy which is usually wasted in welding with the forge or flame. So absolutely is the heat localized, that pieces of iron 3 inches long and an inch in diameter can be welded together and then held in the hands for some time without any danger of burning, the only heat which is felt at all being that which is conducted along the metal to the hands after the welding is completed.

A further consideration of these facts will also demonstrate that it is possible by the Thomson process to weld any metal, including even those which melt at a very low temperature, such as lead, zinc and tin, and those which melt at enormously high temperature, as for instance, iridium, platinum, etc. Of course it goes without saying that we can weld any of the metals used in ordinary manufacture.

It is plain that if the heat is developed so rapidly a very delicate means of controlling it must be provided, and we are glad to say that we have been able to provide arrangements for this purpose which are almost absolutely perfect—I am inclined to say absolutely perfect for the reason that the control of the current can be made entirely automatic.

We are able to take a bar of inch iron, 4 inches in length, raise it to a dull red in 20 seconds, and hold it there for an indefinite period; to increase the heat to a bright red in a very few seconds and hold it there, then to still further raise the temperature to a welding or vaporizing point in a remarkably short space of time. This indicates the delicacy of this apparatus, and I would add that no very great skill is required to operate the machine, a boy learning to weld iron and steel with great facility in a week or two. The time required to weld metals depends, of course, upon the power of the apparatus and the skill of the operator. We have made strong and practically perfect welds in half inch round wrought iron in 6 seconds, in inch round wrought iron in 45 seconds, and so on. Experiments have proved to us that the power required to weld is proportional, or very nearly so, to the area of cross section of the pieces. This is true of nearly all the metals, though, of course, the relative resistance and welding temperature of the several metals may interfere with this ratio.

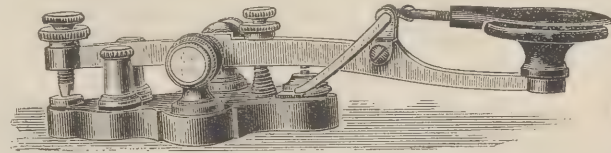
For welding small wires, such as telegraph or telephone, and the smaller sizes of electric light and power lines, the power required is very small indeed the momentum of heavy machinery being more than enough to effect the weld. In this connection I desire to say that we are now working to perfect an apparatus for welding telegraph, telephone and electric light wire, and lines of pipe on the line. Our experiments in this direction have been successful, and we now think it possible to construct an apparatus which

will be capable of being moved about by one or two men, which will make joints in wires correctly and durably, the energy used being supplied by storage battery or batteries, forming a part of the welding outfit. For repair work and in general construction it is our belief that this apparatus will be found very useful and effective. In fact, we hope to do away entirely with the ordinary solder and link joints used at present.

The policy of placing an apparatus on the market has been adopted for the reason that our patents cover not only the apparatus for electric welding, but the art or process as practiced by Prof. Thomson. It is hardly necessary to add that by the same process we can solder and braze, and anneal temper, and do other heating, local or otherwise, which cannot be done economically by present methods. All these operations can be formed with the same apparatus, though, of course, it is better to have machines especially constructed for particular work.

AUTOMATIC KEY CLOSER.

The South Bend Automatic Key Closer Company of South Bend, Ind., has placed upon the market an automatic key closer, a cut of which we furnish beneath. The switch key closer is entirely done away with. When an operator wishes to send a message he presses down on the disc until it reaches the button, and thereby raises the ring from the other end surrounding the contact point. The weight of the fingers keeps the disc down to the button, making disc and button



practically one button; but as soon as the fingers are removed from the disc, the force of the spring causes the disc to rise and the other end to fall until it reaches the ring surrounding the contact point, thus closing the circuit. It is claimed this arrangement has a tendency to prevent writer's paralysis, inasmuch as the key spring is adjusted at two points.

A DICTIONARY OF ELECTRICITY.

A Dictionary of Electricity, or the Electrician's Handbook of Reference, including recent electrical and technical terms and descriptions of late inventions in electricity and magnetism, with numerous illustrations of telegraphic instruments, telephones, electric clocks, bells, dynamos, batteries, lamps, etc., and their appliances. This invaluable book is a necessity to all successful electricians, as it furnishes the correct definitions to the multifarious technical terms, and places every person in possession of the very information which is needed daily in all departments of electricity. The price of the book is \$1.50 and will be mailed postage prepaid upon application to THE ELECTRIC AGE, 5 Dey street, New York.

The foundry of the Edison Machine Works, Schenectady N. Y., was destroyed by fire Friday of last week. Loss, \$32,000, covered by insurance. Very many valuable patterns were destroyed.

Mr. George M. Myers has transferred his services as a district manager from the Postal to the Western Union at Kansas City, Mo.

The Postal Telegraph Company has just placed an order with the Western Electric Company for some underground cable.

A company called the New Mexico & Texas Telegraph & Telephone Company has been organized.

THE OLD TIMERS AND MILITARY TELEGRAPHERS.—From present indications there will be a large gathering of members of these two societies at Chicago. A branch of the organization has been established at Kansas City, and it is proposed that all the members attend the next annual meeting. Quite a good large party, therefore, from Kansas City may be expected at Chicago on August 16 and 17. The New York contingent will comprise among others Mr. J. D. Reid, the oldest of the Old Timers; Secretary and Treasurer W. J. Dealy, John Brant, W. L. Ives, Thos. Finigan, T. P. Scully, J. B. Taltavall and others.

Many of the party were furnished transportation to Buffalo over the West Shore road by Superintendent S. S. Bogart, who is held in high esteem for his uniform courtesy. Mr. Bogart is an old timer himself and appreciates the value of extending a favor to his old associates. If he will but show himself at the coming meeting he will be well repaid for his generosity by the New Yorkers.

The Kansas City delegation will be headed by George M. Myers, E. R. Weeks and many others, whose very names assure one of much anticipated pleasure.

It is said Mr. J. D. Reid gave up a trip to Europe rather than miss attending the Chicago convention and mingling once more with old associates and admiring and warm friends. This is a great deal to say, but it fittingly betokens the enthusiastic regard in which the telegraph is held by the venerable friend of all those engaged in electrical pursuits. It is hoped the fatigue of the journey will have no bad effect on his present good health, and that he will for many years to come continue to annually view the splendid achievements and advancements of electricity, which he was one of the first to nurse some forty years ago.

Secretary Dealy is entitled to much credit for the able manner in which he conducts the vast correspondence appertaining to his thankless office, and many nights, we venture to assert, are spent in furthering the interests of the Old Timers' Association.

Mr. A. H. Bliss, chairman of the Committee on Arrangements is in receipt of many letters, informing him that the writers intend to be present.

This will be the eighth annual meeting of the United States Telegraph Corps and the Old Timers. The headquarters will be at Gore's Hotel, 270 Clark street. The programme is as follows: August 15, the business meetings of the U. S. Military Telegraph Corps and the Old Time Telegraphers' Association will be held in the parlors of Gore's Hotel. The meeting of the Military Society will be held at 10 A. M. The meeting of the Old Timers will be held at 2 P. M.

August 16.—If the business meetings have not adjourned over from the 15th, the Committee on Arrangements will escort us to various places of interest until time for the starting of the magnificent steamer John A. Dix for an excursion on Lake Michigan.

The dinner at Kinsley's will be served at 8 P. M., and will be within the means of all. Its cost per member is indeterminate at this time, and will depend largely upon the number of plates to be set.

It is to be hoped that every member will make an effort to be present at this reunion.

Wm. R. Plum is president, Geo. C. Maynard vice-president, and Jas. E. Pettit secretary of the Military Telegraphers, while David Brooks is president, Irwin Dugan vice-president, and Wm. J. Dealy secretary of the Old Timers.

A very valuable insulating material, described in the *Chronique Industrielle*, has just been produced. It is composed of one part Greek pitch and two parts burnt plaster, by weight, the latter being pure gypsum, raised to a high temperature and plunged in water. The mixture when hot is homogeneous, viscous paste, and can be applied by a brush or cast in moulds. It is amber-colored, and possesses the insulating properties of ebonite, and can be turned and polished. Its advantage is its endurance of great heat and moisture without injuring its insulating properties.

SAWYER-MAN ELECTRIC CO.,

COMMERCIAL AGENT OF THE

CONSOLIDATED ELECTRIC LIGHT COMPANY,

No. 510 West 23d Street, New York.

August 1st, 1888.

To all Users of Incandescent Lamps:

Experience has demonstrated that the life and utility of the Incandescent Electric Lamp is increased and the cost of its manufacture diminished by a decrease of the electromotive force. We have, therefore, decided to divide our commercial lamps into three classes, viz: HIGH, MEDIUM, AND LOW VOLTAGE LAMPS; of which classes, 100, 75 and 50 volts, respectively, shall stand as the types.

This Company, the first to give to the consumer the benefit of such classification, is enabled, by reason of increased manufacturing facilities, afforded by the enlargement of our New York and Pittsburgh Factories, and by reason of valuable improvements made in the lamp, to offer the following reduction in prices for lamps with our

STANDARD BASES

Subject to Discounts for Central Station use and to purchasers of original packages of 250 each.

C. P.	50 VOLT.	75 VOLT.	100 VOLT.
16, and under,	\$0.70	\$0.75	\$0.80
20,	.75	.80	.85
24,	.80	.85	.90
32,	.90	.95	1.00

Three cents will be paid for the return of every Lamp Base with the Platinum wire intact, delivered in good order at either of our factories.

For the purpose of obtaining uniformity of production, and of reducing the cost of manufacture, we offer to purchasers of our lamps our Standard Sockets, without charge, in exchange for any other socket in use by them.

CORRESPONDENCE SOLICITED.

SAWYER-MAN ELECTRIC COMPANY.

INCANDESCENT, A SUCCESSFUL COMPETITOR AGAINST GAS

AND GASOLINE FOR

Illuminating Streets, Stores and Dwellings.

Accomplished by our entirely new method of long distance lighting in practice operation at St. Louis for the last two years

**HEISLER ELECTRIC LIGHT COMPANY,
809 to 817 S. SEVENTH ST., ST. LOUIS, MO.**

The Telegraphers' Mutual Benefit Association. A FRATERNAL LIFE INSURANCE SOCIETY.

Twentieth Year.

For Particulars. Address CHARLES P. BRUCH, Secretary,
Box 3175. New York.

STYLUS

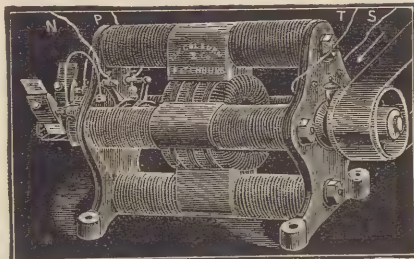
Agate, Steel, Bone, Porcelain & Gutta Percha
Mounted on
Ebony, Pearl and Cedar Handles.

A great variety.
Send to the Manufacturer for Price List.
L. H. ROGERS, 75 Maiden Lane, N. Y.
Headquarters for Manifold Books,
Carbon Paper.

See cut of Styluses, page 11, Jan. 1, 1888.

I. W. COLBURN & CO.

130 MAIN ST., FITCHBURG, MASS.



Machines for Arc and Incandescent Electric
Lighting Electro-Plating and
Experimental use.
Send for large Illustrated Catalogue, also "Hand-
Book of Ready Reference." Vest-pocket edition.

JUST PUBLISHED.

*Salomon's Management of
Accumulators,*

and Private Electric Light Installa-
tion. Third edition. Revised and
Enlarged. 12 mo, cloth, \$1.20

*Bottone Electrical Instru-
ment Making for
Amateurs.*

A Practical Hand-book, with 48
Illustrations. 12 mo, cloth, \$1.20

*Kennedy Electrical Distri-
bution by Alternating
Currents.*

and Transformers. 8vo, 80 cents.

*Bad' Dynamo Tender's
Hand Book,*

with 70 illustrations, \$1.00

D, VAN NOSTRAND, Publisher,
23 Murray and 27 Warren Streets, New York.

Copies sent by mail post-paid on receipt of
price.



\$2.00

Bell Outfit.

Bell, \$1.00.

Battery, .80.

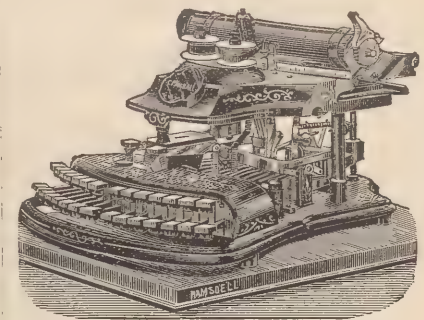
Push Button, 10.

50 ft. Wire, .15.

Electrical Supplies
of every description.
MOORE BROS.,
108 Liberty St., N. Y.

The New Model Crandall

A PERFECT TYPE-WRITER.



PRICE, \$75.00.

BEST FOR TELEGRAPHERS!

This machine meets the requirements of Tele-
graph Operators better than any other Type
Writer on the market. It is speedy, almost
Noiseless, has perfect alignment and **writing
in plain sight**, even to the last letter, thus
allowing the operator to correct the "bulls" of a
"blind" sender without the delay of shifting the
carriage. **It is the cheapest** standard writ-
ing machine in the world. Send for circulars and
illustrated catalogues to the

IRELAND BENEDICT CO., (Limited),

Sole Agents, Binghamton, N. Y.

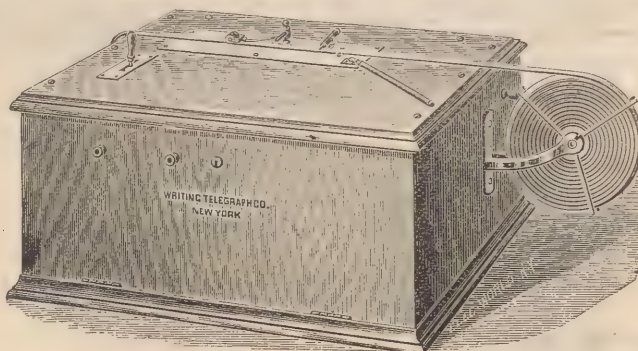
NEW YORK OFFICE,

B. G. GRANVILLE, MANAGER.

157 BROADWAY,

WRITING TELEGRAPH CO.,

57 Murray Street, New York.



This company owns the Letters Patent which thor-
oughly control the transmission of written messages by
telegraph in the only known practical way, and are
prepared to establish Central Office Exchanges as a
means of communication between subscribers in cities
and surrounding towns.

Communications are written with pen and ink in the
handwriting of the person writing the message.

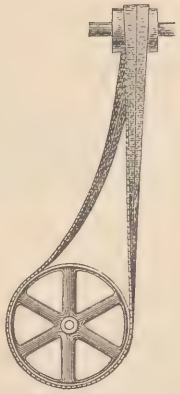
The pen in the office of the subscriber receiving a message
makes a fac-simile of every letter as fast as it is made with
the pen in the office of the person writing it.

All instruments are under the control of the Central
Office, and messages are recorded on the instrument of a
subscriber, whether he is present or absent.

All communications are secret, and the written record is
of great value in commercial use.

For particulars address

WRITING TELEGRAPH CO., P. O. Box 1322, New York.

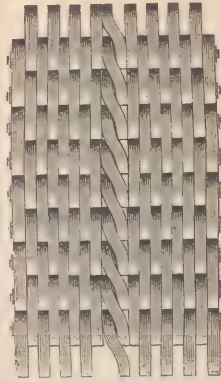


AMERICAN LEATHER LINK BELT CO.

A new article in Belting, which is made of small leather links joined together with steel bolts. It has been tested for Dynamos with remarkable success.

Write for particulars and prices to
CHAS. A. SCHIEREN & CO.,
 Manufacturers and Tanners of
LEATHER BELTING & LACE LEATHER
47 FERRY ST., NEW YORK.

BRANCHES: { Philadelphia, 416 Arch St.
 Boston, 86 Federal St.



ELECTRICAL ACCUMULATORS AND STORAGE BATTERIES,

Successfully applied to Central Station Lighting, Isolated Lighting, Trolley Lighting, Street Car Propulsions, etc., securing great economy and reliability. For full particulars address,

The Electrical Accumulator Co.,
 44 BROADWAY, NEW YORK.

WIEDERSHEIM & KINTNER, ELECTRICAL EXPERTS.

SOLICITORS OF PATENTS, TRADE-MARKS, ETC.

Office, No. 45 BROADWAY, NEW YORK.

Record Building, 919 Chestnut St., Philadelphia, Penna.

CARL HERING, Consulting Electrician, No. 514 F St., Washington, D. C.

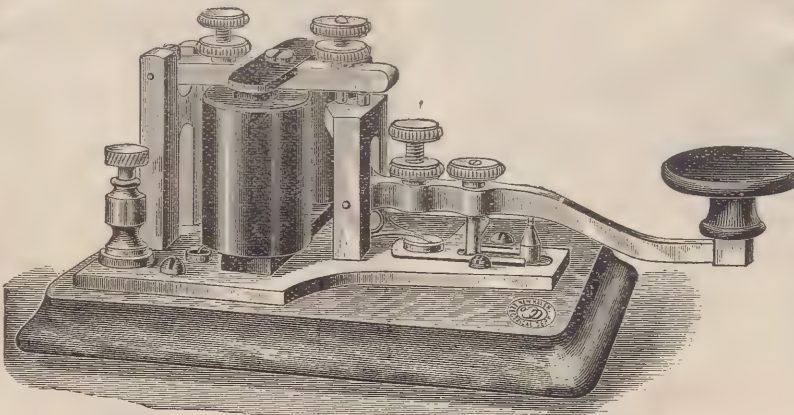
New Haven Clock Co.,

29 MURRAY STREET, NEW YORK.

Manufacturers of all Styles of Electrical Apparatus.
 THE "UNIQUE" COMBINATION SET.

This Set is manufactured of Telegraph Metal, hand-finished, Magnets with Rubber Covers, Nickel-plated Key Lever, all mounted on a mahogany base.

The simplest and cheapest combination set ever placed on the market. Key and



sounder mounted on an ordinary size sounder base. Works well on one cell of battery.

The above Set, complete, with Cell of Gravity Battery and 50 feet of wire, \$3.75. Special prices made for quantities.

CUT ONE-HALF SIZE.

THE LAW BATTERY.

New Form.

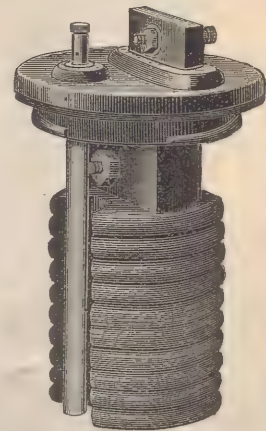
Quantity and Surface of Negative Element largely increased and shape improved. This Element is Guaranteed everlasting, and new ones given at any time for old without charge. Lock Tops that absolutely prevent evaporation and creeping of salts. No Grease. Binding Posts that cannot corrode. Price, \$1.00.

LAW TELEPHONE CO.,

112 Liberty Street,

NEW YORK.

Sole Agent for the Pacific Coast, Geo. L. Henzel, San Francisco, Cal.



"STAR" GOLD FOUNTAIN PEN.



PRICE, \$1.50 AND UPWARDS.

Best writing Pen ever offered to the public. Holds ink for a week's use. Unequaled for Business and General Writing. Every Pen Warranted and Satisfaction Guaranteed. The STAR Pen consists of a highly-finished hard rubber holder fitted with a superior 14 karat GOLD PEN, to suit any writer. In ordering specify style of Pen wanted. SOLICITING A TRIAL ORDER.—Sent by mail or express on receipt of price. Repairs to Pens of all kinds a specialty. A GOOD, RELIABLE STYLOGRAPHIC PEN for \$1 and upward. N. B.—All goods will be shipped promptly on receipt of order.

J. ULLRICH & CO., 106 and 108 Liberty Street, New York.

Manufacturers of the "Star" and "Independent" Fountain and Stylographic Pens. Liberal Discount to Agents. Send for Price List.

HOW OKONITE WIRES AND CABLES ARE MADE.

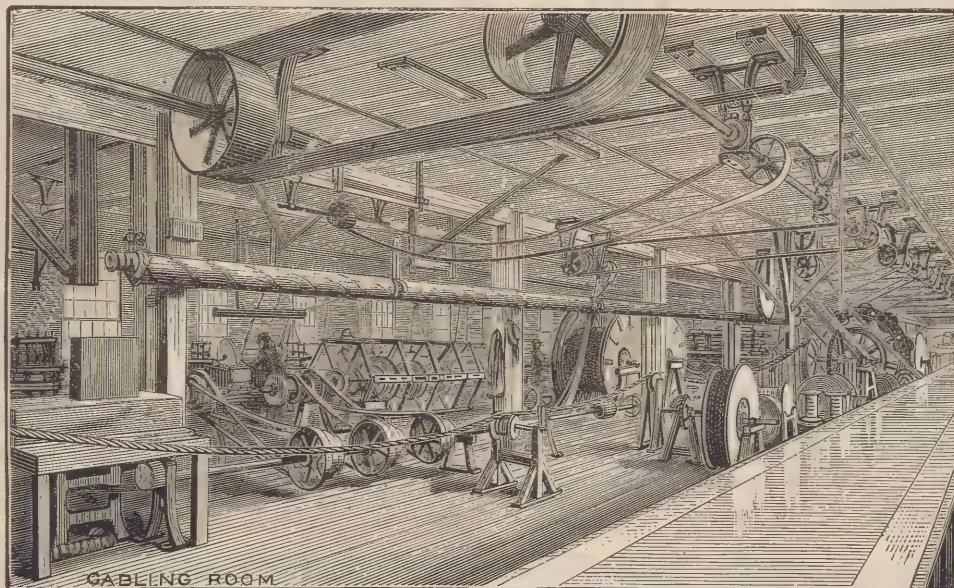
Okonite is a form of insulation which is being steadily brought before the electrical world of the United States. However much an insulator may be found on its introduction to possess all that is excellent, there is one point that the test of time can only supply—that is its durability or lasting qualities, and until some years have elapsed it is

fine, pure caoutchouc, the balance being pure, natural hydrocarbon oxides and silicates; it contains no oxidized oils, or other detrimental, artificially produced substitutes. The essential difference in this dielectric is in the mode of manufacture. The composition is not applied as in other manufactures, but in a manner special to itself, which consists in placing the conductor in long strips of the composition which are wrapped round the wire and closed with a longitudinal



quite certain that no new insulation can reasonably expect to have any support extended to it. Okonite has now been in use in the United States for some four years, and as the practical experience obtained of its durability and insulating qualities has been of a favorable character, we hear of its extended use in connection with insulated conductors for telegraph, telephone and electric light purposes. "Okonite"

seam. A plan somewhat similar to this was applied to gutta-percha in its earliest days, but with the present material it is carried out in a very different manner secured by patent. The composition is first rolled out upon sheets of stout tinfoil, by the pressure of the rollers of the machine, the two surfaces are made to adhere firmly. The sheets of composition with the metallic envelope are then cut into regular



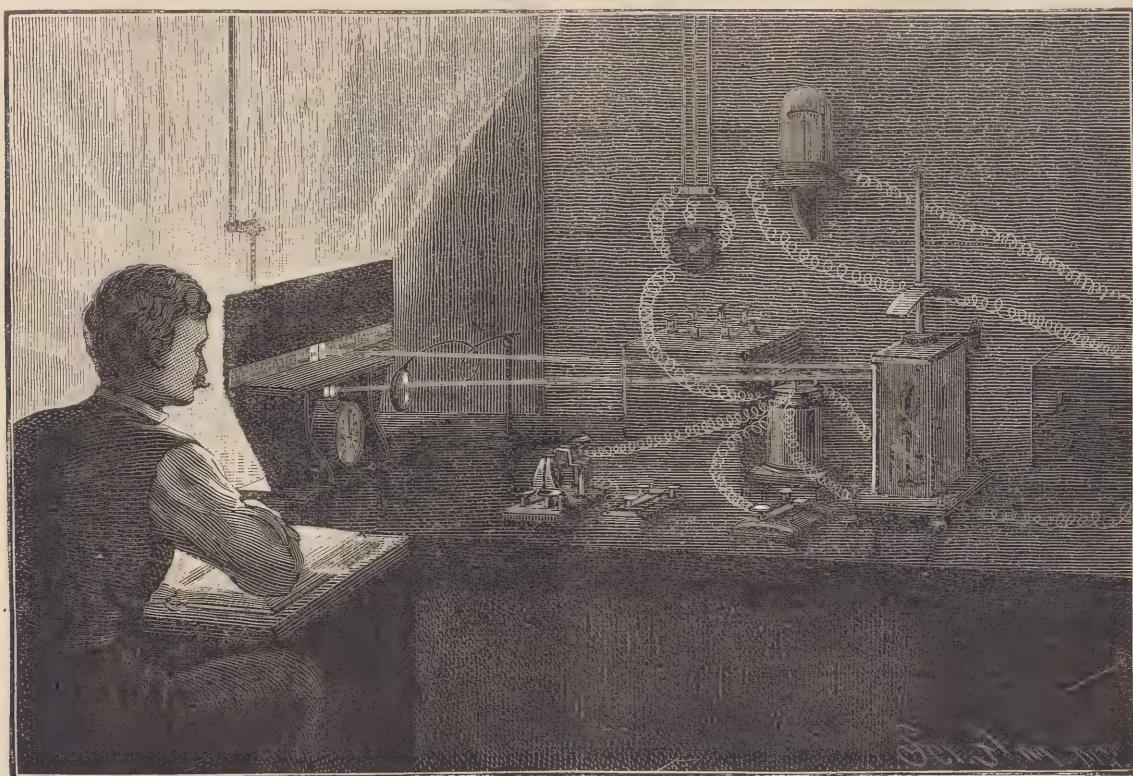
is the name given by J. J. Smith, of Passaic, New Jersey, to the rubber composition which he uses as an insulating covering to electric conductors manufactured under his system, in order to distinguish it from many other compositions used for the same purpose. The composition is a scientific product obtained by many years of practical experience in the manufacture of rubber; the process is, however, a secret; but it is stated that Okonite contains only 38 per cent. of

strips of a width slightly in excess of that required to wrap round the wire, with a longitudinal seam. The Okonite strips with the metallic covering are then joined end to end forming a long continuous band, which, as it is formed, is wound for convenience and for the operation of covering, on to a reel. The wire to be covered is also wound on to a reel, and a special machine (patented) is employed, through which the wire and the tape pass, by means of which the in-

ulator is laid on longitudinally and "seamed." The metallic envelope has the important advantage of protecting the insulation covering during the process of vulcanization, against contact with air, moisture or steam, and, according to the inventor, producing remarkable results, the insulation being higher than that by any other process, and increased strength, tenacity and durability being obtained with great uniformity in the quality of the product. The covered core previous to vulcanizing is wound on to a special large reel or drum to the amount of two or three miles. This reel, when so charged, is then rolled into a vulcanizing vessel in a horizontal position. During the process of vulcanization the reel with its charge is slowly rotated; this rotation has the effect of keeping the metallic conductor perfectly in the centre of the insulation covering, which becomes very soft when heat is applied before the actual vulcanization takes place. The rotation of the reel and charge continually changes the gravity of the conductor, thereby preventing the dislocation of the conductor from its central position in the insulated covering. The fact that a large quantity, amount-

ation from Mr. Hamilton of the Western Union Company, he remarks: "My experience with the okonite core, for something over two years, has been very satisfactory. I have yet to learn of the first case of deterioration of the core that has passed under my inspection, although in amount, it figures up several hundred miles, and is used in both aerial and underground cables."

It is claimed for this core that the "tenacity and toughness of the material renders it non-labile to destruction by reason of abrasion or rubbing of foreign substances." We have ourselves tested samples of this core mechanically, in a variety of ways, and also under the application of heat, and find that it fulfills all the conditions guaranteed by the makers. While resilient it is remarkably tenacious, and its strength and toughness are very great; the wires are uniformly well covered, and its durable qualities may be taken, from all the evidence we can obtain, to be very great. It is not attacked by acids, and greasy substances do not affect it. We have only noticed that paraffin oil has a remarkable action upon the material. In the samples we have tested,



TESTING OKONITE INSULATED WIRE.

ing to some hundreds of miles, has been used by the Western Union Company, is sufficient proof of the excellence of the material. As regards the electrical and mechanical properties of "Okonite," an exhaustive report by Dr. John Hopkinson, F. R. S., gives some information. The specific inductive capacity of the material is found to be 4.6, slightly higher than the usual value given for gutta percha. The insulation resistance of the several samples was uniformly high, and tests taken at varying temperatures showed that it was affected in a greater degree than ordinary rubber. For instance, the tests of one sample gave:

at 60 deg. F. 7,587 megohms per stat. mile.
 " 75 " F. 3,810 " " " "

figures which correspond nearly with the coefficients given in the company's own table for the effects of temperature. Numerous tests were also applied by Dr. John Hopkinson to see if mechanical distortion and distention had any effect on the insulation, but no deterioration ensued. In a communi-

the copper not being tinned shows the effect of vulcanizing, but in a much less degree than in ordinary vulcanized cores. For ordinary telephone work we think that the inductive capacity and the amount of covering required are rather against the adoption of okonite, but for general telegraph work, especially for "leading-in" at stations, signal boxes, etc., this core will be specially valuable. Its mechanical properties, high insulation, and indifference to heat, render it a very efficient core for electric light purposes, and we should not be surprised to see it used largely for such positions and places where most insulated wires have hitherto proved failures.

Dr. H. N. Allen, Secretary of the Korean Legation to the United States, has been in New York to make arrangements for direct telegraphic communication between the two countries.

Mr. A. A. Knudson, a well-known New York electrician, for some time past reorganizing the telephone interests in Nova Scotia, is in this city on a visit.

NEW YORK TELEGRAPHERS' FESTIVAL.

The telegraphers of New York City held their annual Summer-nights festival on the evening of the 3d inst., at the Empire City Colosseum, and not since the memorable demonstration at Madison Square Garden in August of 1883, has there been such a successful and enjoyable gathering among the members of the profession in this city. The weather was delightfully pleasant, the operators, both male and female, turned out in large numbers, and the music provided for the occasion was excellent. Much credit is due the members of the arrangement committee for the very satisfactory manner in which the affair was conducted. The committee comprised the names of Messrs. W. J. Hannigan, E. W. Morrison, James M. Foster, E. F. Kirby, E. L. Felleman, Edwin A. Quick, James McSwyny, T. M. J. Hannon, W. H. Newman, B. J. Walsh, John J. Smollin and Frank English. The dancers and musicians were kept busy with the twenty-four numbers of a carefully selected programme until the small hours of the morning, when the happy party broke up, and everyone returned home in good spirits and delighted with the night's diversion. Among the attractive group of ladies present were: Misses Fanny Morris, Mamie Newman, Mamie G. Flynn, Venie Ohlandt, Mamie Halpin, M. G. Newman, Emma Miller, Katie Casey, Sadie Fellgraff, Mary Frain, Emma Adams, Lizzie Casey, Ella Mullaney, Ida Obst, Emma Obst, Katie Murphy, Nellie Hart, Lizzie Low, Susie Hutchison, Emma Callwell, Nellie Hennick, Lizzie Hennessy, Nellie Hennessy, Aggie Bergen, Minnie Bergen, Mary Frances Baillie, Alice McCue, Mrs. Anna Hall, Mrs. Gotleib, Miss Van Cura, Miss O'Donnell, Marguerite Flynn, Alice J. Adair, Katie Murtha, Katie Farrell, Nellie Brennan, Mamie Barbour, Lulu Burdick, Maggie Callahan, Susie Williams, Frankie Kerns, Mamie Smith, Rosie Kane, Mollie Harrington, Ada Clifford, Mrs. E. T. Moore, etc. Among the gentlemen were:—Tom O'Reilly, W. H. Newman, A. A. Offutt, James McSwyny, John Morris, Martin J. Dixon, Frank E. McKiernan, James Doherty, James McGuire, W. H. Hannigan, Edward W. Morrison, E. F. Kirby, John J. McGinnis, M. J. Fitzpatrick, M. S. Polak, E. L. Felleman, J. Diamond, Edward Morris, J. C. Van Cura, J. W. Doherty, W. W. McCormack, J. Moran, James M. Foster, Frank English, John J. Carroll, D. S. Dunham, J. F. Bergen, B. J. Walsh, J. Higgins, J. E. Healy, W. E. Healy, Frank Rice, H. A. Hughes, J. B. Quinn, P. J. Soaden, E. Dowling, Charles Minier, John McGowan, A. J. Heldman, Frank Newman, Robert Gray, William Lee, Duke Smith, E. G. Wood, John Miller, Charles B. Obst, Joseph Kennedy, J. F. Sullivan, E. A. Jackson, M. F. Hardy, J. Vickers, John M. Doyle, R. L. Haggerty, A. Henning, Thos. J. Hannon, F. Fariot, W. Auld, J. O'Connor, Thomas Delahanty, J. Tompkins, E. T. Moore, P. F. Traynor, Thos. S. Murphy, George White, William F. Kelly, A. Van Bremen, F. W. Barlow, etc.

ALBANY NOTES.—G. P. Riley has resigned as manager of the Postal and will become the general agent of the American Accident Indemnity Association of New York. Mr. C. C. King, chief operator, succeeds him as manager. The Western Union have lately granted several well deserved increases of salary. Mr. McCabe is in Vermont for the summer and Mr. Fuller is subbing for him. Mr. Clarence Miller is at Lake George and Mr. Andrews is filling in his time. Mr. Fancher has left for the race track at Saratoga, Mr. Chambers relieving. Messrs. Welch and Burns are on the extra list. Miss Anderson has lately returned from a week's vacation and others will soon take a few days rest. Mr. Sasi Bhushan Sarbadhichary, of whom the AGE gave so interesting an account in its issue of February 1st, was on the extra list here for a short time. Mr. Harry Carpenter, who is now manager of a broker's office in Cohoes, gave us a call a few

days since. A message received from the telephone company lately for transmission addressed "— 91 Dutchess Co., N. Y., was referred back for correct address and was returned reading "— Matteawan, Dutchess Co., N. Y."

ST. LOUIS NOTES.—Mr. J. D. Gibbs, assistant superintendent of telegraph of the Missouri Pacific, at Sedalia, Mo., passed through this city on the 24th inst., returning home from the meeting of the Association of Railway Telegraph Superintendents at New York. Mr. Gibbs is an old-time commercial telegrapher, and his visit, although a flying one, was a pleasure to his numerous friends among the fraternity here. A number of resignations have been handed in during the past month, several of which have already gone into effect, while still others will go into effect during August. New arrivals fill the places of those resigning, as soon as vacant. The W. U. have eleven loops to the *Globe Democrat*, which are in constant use after 7 P. M. The personnel of the *Globe* office is as follows: F. J. Krumling, in charge; operators, Messrs. Black, Wells, Hunter, Smith, Miller, Lucking, Dye, Hogbin, Ragland and Beach.

LOUISVILLE NOTES.—W. W. Adkins, who has been with The United Press here a number of years, has resigned. Mr. Adkins was, in point of continuous service, one of the oldest employees of that company. He was succeeded by C. R. Mounce, of the W. U., this city. W. R. Wallis of the Western Press is spending his vacation at Waukesha, Wis., Mr. Mooney, of Washington, relieving him. P. F. McCarty, our all night chief, left August 1st to spend a few weeks among friends and relatives at Cleveland, Ohio. A. R. Thomas, of the W. U., Kansas City, is spending a few weeks in the city. Arrivals: Buchanan, Knoxville; White, Memphis.

WARREN, PA., NOTES.—Warren was the liveliest oil town in the field six years ago and did a rushing business, employing twenty-five operators. But the wells played out and the men fell off one by one until to-day but four commercial operators remain to tell the tale of the glorious summer of '82. They are J. K. Simpson and John Hawk of the W. U., and Fred. Lesser and A. W. Kratzer, of the Postal. Misses Cole and Masterson are at the P. & E. depot, Will Sparks at the Dunkirk, and Mr. Marsh at the Junction. J. P. King represents the United Pipe Lines.

WINNIPEG, MAN., NOTES.—On July 14th, the Telegraphers' Base Ball Club of this city defeated the Press Club by a score of 16 to 9, five innings being played. The following players defended the glory of the wire: Pennie, DeCow, Jenkins, Hearn, Nelson, McIntyre, Flagler, Peard and McLaren. On Saturday 21st, a return match was played. Six innings gave the telegraphers another victory; score 25 to 8. The team was the same as on the 14th, with one exception, Mowat playing instead of Pennie.

CINCINNATI NOTES.—Mr. Lattimer went to Detroit instead of Dayton as reported in our last letter. Mr. A. J. Broderick of Dayton is succeeded by A. J. Coates of The United Lines, same city. E. H. McGurk of the W. U., Cincinnati, has transferred to Nashville and his place is filled by Robert Armstrong from St. Louis.

Mr. A. G. Sibbald, a well-known New York telegrapher, now acting manager of the Twenty-third street and Fifth avenue W. U. office, has placed upon the market a letter and envelope file, which can be found for sale at the stationery establishments. It is a very useful article for office purposes.

T. M. B. A.—Assessment 220 has been levied to meet the claims arising from the deaths of W. F. Ferguson, S. B. Morse and John O'Connor, and should be paid before Sept. 1.

On August 29 the Electric Light Convention will take place in New York, and on September 3, the Telephone Convention will take place.

The *Daily American* of Nashville, Tenn., in its issue of July 24, comments severely upon the telegraphic profession. The writer of the article displays unusual ignorance as to the manner in which the telegraphic business of the country is conducted. It is not at all necessary to deny, or even argue the charges made, their absurdity being too manifest. The author cannot be held up to ridicule more than by reproducing his absurd statements, which are as follows:

"At present the telegraph operator has more chance to use his knowledge and swindling ability than any other class of men, and the large number who have made quick fortunes, to the mystification of the less-favored mortals, has attracted considerable attention and their schemes have been exposed.

Their favorite method is to rent some second-story room in an isolated part of town, near which a stock exchange wire runs, tap it and run it in their room, and as the reports go by, they catch the message before any one else, and buy if stock is low and takes a rise, or sell if stock is high and takes a tumble.

This scheme has been conducted for years by some operators without discovery, and even when detected the penalty is seldom severe, as it cannot be proven that they have injured any one. Such a plan, however, could not be operated in Nashville.

Another pet scheme is to have a confederate in a distant town, and keep him posted so he will know how to buy and sell, while false messages are being sent into the office. But the game most often worked, and without danger, is to receive a message, of course, before any one else, and knowing its purport, have a messenger ready to send to the broker with orders to buy or sell, as the contents of the message would justify, before the message is delivered at the exchange. The introduction of a wire into the exchange buildings lately, however, makes this mode of swindling impracticable, to the brokers' gratification."

ORDER OF RAILWAY TELEGRAPHERS.—A division of the Order of Railway Telegraphers was instituted at Wichita, Kans., July 22d, by C. J. Coombs, assistant grand chief. It was christened the "H. G. Adams Division," in honor of the grand secretary. It starts off with 34 charter members, among whom are some of the most expert telegraphers of Kansas. The C. J. Coombs' Division of Newton, Kans., was represented by delegates. All were very enthusiastic and looked forward to one of the largest divisions of the order. Below is a list of officers for the first year: A. J. Applegate, chief telegrapher; Ed. M. Wolff, assistant chief telegrapher; J. H. Hodnett, secretary and treasurer; G. W. Rourke, senior telegrapher; C. K. McKutchen, junior telegrapher; H. H. Hendershott, inside sentinel; B. F. Dunn, outside sentinel; C. R. Gray, past chief telegrapher. The division meets the 1st and 3d Tuesday of each month.

NASHVILLE NOTES.—Mr. T. F. Fisher, who has been at the head of the receiving department for the past twenty-three years, has resigned to engage in other business. J. B. Bruce, one of the three operators who was victimized by Superintendent Huger, of the E. T. V. & G. R. R. for affiliation with the O. R. T., has been added to the split trick. J. H. McGuire is again at his desk after a three weeks illness. Mr. E. H. McGurk has arrived from Cincinnati, O. C. H. Dewitt of the day force has accepted a more lucrative position with a broker at Louisville, Ky. Wm. Knoch and the Stevenson brothers have returned from a months' vacation. Messrs. Hopper and Webber are visiting relatives in Ohio.

The bill for the relief of the telegraph operators during the war was pigeon-holed by the Senate Committee on Military Affairs, and it will not be reported back to the Senate for the reason that there is no one paying the slightest attention to the measure.

Mr. E. T. Gilliland, accompanied by his wife, sailed for Europe a week ago on a two months' pleasure trip.

SARATOGA NOTES.—At the W. U. main office are the following: L. Waterbury, manager; Geo. H. Schmidt, chief operator; Joseph Ahern, Chas. Horan, Wallace Calkins and Fred. Waring, operators. Mr. C. H. Buckridge has charge of the receiving department and Mr. Cole is book-keeper. At the race track, Frank L. Fancher is in charge, with Wm. C. Leith as assistant. At the hotels the following are in charge: United States, R. B. Griffin; Congress Hall, Harry Becker; Windsor, Mrs. Becker; Grand Union, Mrs. I. Holmes; Clarendon, Miss Allen; Kensington, Miss Poncier.

Among the new advertisements in this issue will be found that of the Crandall typewriter, the manufacturers of which are now engaged in bringing their machine to the attention of the electrical profession. The machine is susceptible of attaining great speed and is admirably adapted for receiving from a telegraph wire. One of its strongest points is that each letter as it is struck upon the key-board is in sight, so that errors are at once discovered, and corrected without the trouble of a second reading, readjusting the sheet, etc. etc. See advertisement.

Lineman George Reid of the police department has been presented with a silver medal and \$20 cash by the New York Life Saving Benevolent Society, for his courageous action in saving John Reynolds from drowning. The lad fell overboard at the Battery on June 9th.

Members of the Telegraph profession who desire typewriters on the installment plan can procure machines of their own selection through the Electric Age Association. We are the only agents authorized to dispose of machines to the telegraphers in this manner. Address THE ELECTRIC AGE, 5 Dey St., New York.

NELLIE HARLAND.

A Romance of Rail and Wire.

Handsomely bound in cloth and gold, with an artistic design descriptive of the title on the cover. A beautiful and appropriate gift book for the Telegraph Operator to present to his sweetheart, wife, children or friends. Price \$1.00. Sold at all book stores, and sent by mail, *postage free*, on receipt of price, by

Elmer E. Vance,

304 N. High St., Columbus, Ohio.

Send for Circular of Press Comments.

ELECTRICAL PATENTS GRANTED JULY 16, 1888.

386,111 Electric wire insulator; Henry H. Cutler, Newton, Mass.

386,129 Automatic telegraph transmitter; Zeroy P. Hotchkiss, Oak Park, Ill.

386,184 Electric railway; Robert A. Chesebrough, New York, N. Y.

386,189 Electrical bulletin; Patrick B. Delany, New York, N. Y.

386,225 Electrical distribution by storage batteries; George W. Walker, Bethlehem, Pa.

386,282 Tunnel construction for electric railways; Granville T. Woods, Cincinnati, Ohio.

386,380 Telephone transmitter; Charles W. Brown, Montreal, Quebec, Canada, assignor to the American Bell Telephone Company, Boston, Mass.

Granted July 23.

386,541 Railway signal circuit breaker; Edward B. Ives, New York, N. Y.

386,597 Electrical call system; James C. McLaughlin, Kansas City, Mo.

386,646 Electrical typewriter; Jas. F. McLaughlin, Philadelphia, Pa.

386,729 Telegraph key; Louis Townsend and John E. Auten, Evansville, Ind.

386,767 Watchman's electric time recorder; George F. Bulen, Brooklyn, N. Y.

386,784 Overhead wire connection for electric railways; Walter H. Knight, New York, N. Y.

Granted July 30.

386,814 Art of telegraphy. 386,815 Telautograph; Elisha Gray, Highland Park, Ills.

386,919 Coin-operated electrical apparatus; Percival Everitt, London, England.

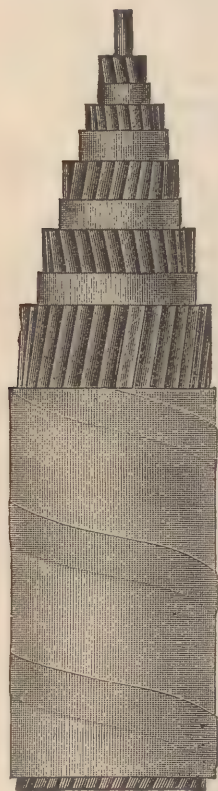
386,974 Phonograph; Thomas A. Edison, Llewellyn Park, N. J.

386,986 Electric insulator peg; William E. Joslin, South Scituate, R. I.

386,992 Galvanometer; Philip Lange, Pittsburgh, Pa., assignor to the Westinghouse Electric Company same place.

THE PHONOGRAPHIC CLOCK.—Edison is a great inventor. He has combined the phonograph with the clock in a most ingenious manner. Instead of striking the hour, the clock calls out in well modulated tones, "Dinner time," "1 o'clock," "2 o'clock," etc. Many variations to which this invention may be subjected at once suggest themselves. An alarm clock will doubtless be constructed which, at the appointed hour, will begin to deliver a gentle exhortation to "Get up; it's 6 o'clock already." If the sleeper does not rise and check the clock, it will continue with gradually increasing emphasis, until it speaks in thoroughly unmistakable tones, spiced, if need be, with appropriate quotations from Scripture. Then the clock will have other combinations adapted for other purposes. The fond parent, whose daughter is being sparked, will have a clock which, at about 10 P. M., will sing out: "Young man, it is about time you decamped." A lady who gives parties will have a clock which at the proper hour will say: "Good evening, ladies and gentlemen; it is bedtime." And so forth. The phonographic clock is destined to fill a long-felt want.—*Norwich Bulletin.*

It is thought the contemplated Pacific Cable will run from Vancouver, British Columbia, to the Hawaiian and the recently annexed Fanning and Fiji Islands, thence to New Zealand, and from there to Australia. The cable will be 6,800 miles long, but the longest stretch will not be over 2,000 miles.




No. 91 CONDUCTOR.

No. 16, B. W. G., $\frac{5}{32}$ Insulation.

OKONITE CABLE.

CHAS. A. CHEEVER,
President.

THE  Co.,

TRADE MARK.

13 Park Row, New York,

MANUFACTURERS OF SUPERIOR

Insulated Wires and Cables

FOR AERIAL, SUBMARINE AND UNDERGROUND USE.

Telegraph, Electric Light and Telephone Wires.

Those who have used OKONITE Wires and Cables are unanimous in their declarations that it is the best insulated medium in the market, and as for *durability* and *toughness* of compound, it is unsurpassed.

Sole Manufacturers of CANDEE AERIAL WIRES.

SOLE MANUFACTURERS OF THE } TO MAKE PERFECT
CELEBRATED OKONITE TAPE, } WATERPROOF JOINTS.

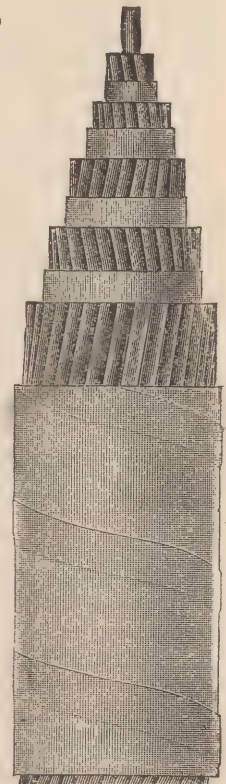
BRANCHES:

BOSTON, CHICAGO, PHILADELPHIA, KANSAS CITY, MINNEAPOLIS,
LOUISVILLE, CINCINNATI and OMAHA.

SOUTH AMERICAN BRANCH:

West Coast Telephone Co., Valparaiso; Chili; Guayaquil; Ecuador.

WILLARD L. CANDEE,
Treasurer.



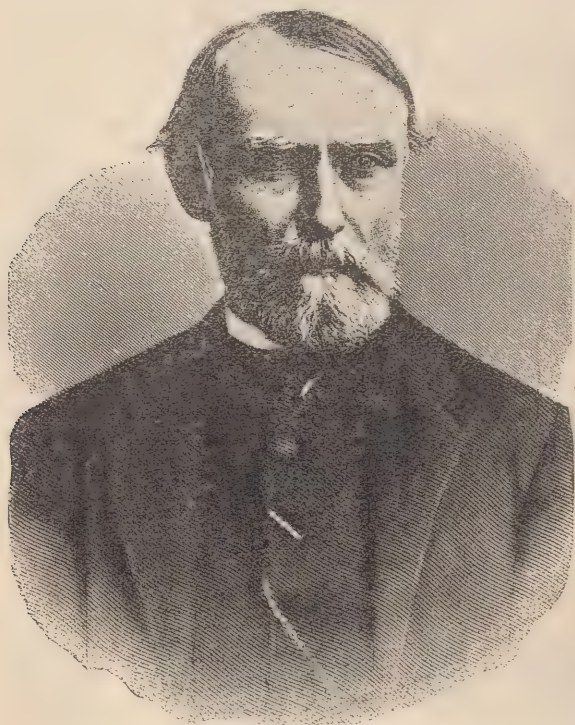
No. 91 CONDUCTOR.

No. 16, B. W. G., $\frac{5}{32}$ Insulation.

OKONITE CABLE.

GENERAL MANAGER H. P. DWIGHT.

Mr. H. P. Dwight was born at Belleville, Jefferson County, New York, on December 23, 1828, and was educated at a small country schoolhouse in Oswego County. He left school at fourteen years of age to seek his fortune, and was first employed in a small country store, where he remained for three years. He there had an opportunity to learn telegraphy, which was then in its infancy, and held out strong inducements to young men. He applied for and secured a position with the Montreal Telegraph Company, in 1847. He was first stationed at Belleville, Ontario, when that office was opened, and from there he was removed to Montreal, where he became chief operator, occupying this position for three years, until the spring of 1850, when he was sent to Toronto to take charge of the Toronto office.

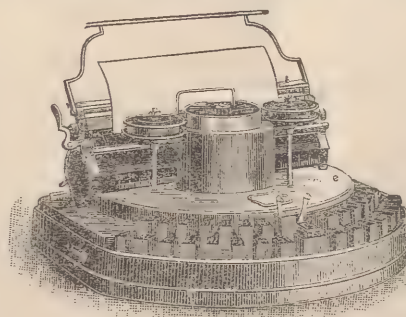


He is now general manager of the three telegraph companies combined, viz.: the Great North Western, The Montreal and the Dominion. Under his able direction lines have been laid in every portion of the country. At the present time Canada stands second to no country in the world with regard to efficiency in its telegraph system. This circumstance it may be claimed with all justice is due in a great measure to the excellent ability and judgment of Mr. Dwight. Mr. Erastus Wiman, president of the combined companies, is so well pleased with the administration of Mr. Dwight that he never interferes with the management from one year's end to another. He has absolute confidence in Mr. Dwight's ability. In addition to this Mr. Dwight is popular with his large staff of employees and they consider no word of eulogy too strong to bestow upon him.

Mr. J. O. Kerbey, the well-known Washington correspondent, recently drove from Parkersburg, Va., to Gettysburg, Pa., over the exact trail the army marched in 1863, accompanied by a bright young artist, Mr. W. O. Hazard, who sketched the prominent points of interest along the route. Mr. Kerbey took along with him a camera and twenty-three excellent photographs were secured, which will appear in a small book now being published descriptive of the trip—the title being "On the War Path." Mr. Kerbey is also publishing another book as a sequel to the "Boy Spy"—entitled "Geno" a romance of secret service and secret love. This Book will give an inside and true account of the telegraph service in the war, illustrating signals, secret com-

munications and ciphers and many interesting things that have not been told. It will be especially interesting to the telegraphic fraternity and can be procured from Mr. Kerbey, Press Gallery, Senate, Washington, D. C.

"HAMMOND"



TYPE-WRITER

LONDON AWARD, OCTOBER, 1887.

"The best type-writer for office work where speed is required."

MECHANICS' FAIR, BOSTON, DECEMBER, 1887.

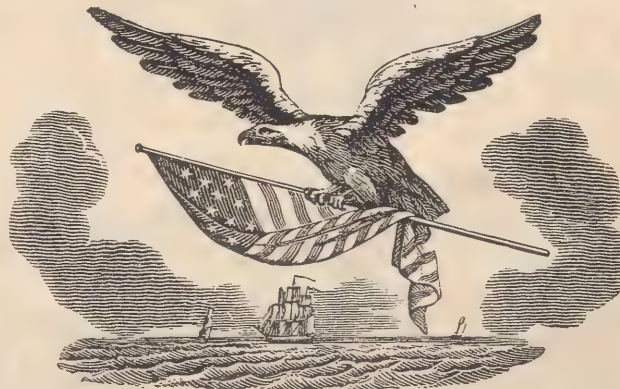
AWARDED THE ONLY GOLD MEDAL.

The Hammond Type-Writer Co.

75 & 77 NASSAU STREET, NEW YORK.

ESTABLISHED 1823.

ALBERT H. DAKIN,
(SON OF THE INVENTOR,)



MANUFACTURER OF THE

EAGLE BRAND OF MANIFOLD

AND

CARBON PAPERS,

FOR

STYLUS AND MACHINE WRITING,

60 BARCLAY ST., NEW YORK.

Prices on application

TELEGRAPH SIGNAL TOWER AT FIRE ISLAND.

(New York World.)

Comparatively few people of the thousands who visit Fire Island every summer think of the interest which attaches to the modest looking tower which stands alone midway between the Surf Hotel and the ocean beach. Beyond a question or two as to its uses the building is probably never referred to, yet there is no branch of the public service or feature of private enterprise so full of romance and incident as that which populates this tower.

The building was erected a few years ago by the Western Union Telegraph Company, and is known as the Western Union Signal Tower. It is from this point that the approach of all incoming steamers is first announced to waiting friends of her passengers in New York City and elsewhere. Signals of distress displayed by vessels within fifteen or twenty miles of this tower are sure to attract the attention of the gentleman in charge, and as soon as the large telescope which is called to his aid has brought the signals close enough so that they may be read aright, the little electric key is touched, and like a messenger speeding on its way, the giant first curbed by Ben Franklin warns the owners of the ship or their agents that succor is needed, and almost before a messenger could have covered a mile, a relief-boat has been despatched to aid those who had signalled in their distress.



THE TELEGRAPH SIGNAL STATION.

Previous to the erection of the present tower, Mr. Keegan's quarters were in one of the cupolas of the Surf Hotel, but the importance of this branch of the service so soon manifested itself that the company set about improving the facilities.

Mr. Keegan when he first took charge of the station was a bachelor, but his hermit life was not pleasant and so he married a courageous little woman, who has for the past half a dozen years stood watch with him on the dreary sandhills. Three genuine little Fire Islanders have come to bless their home in the tower.

Peter Keegan, an expert operator of fifteen years' experience, has been in charge of this service for the past ten years; in fact, ever since it was established. Winter and summer he has been at his post, with no assistant to relieve him in his tedious watches and with but one day in the whole year which he is enabled to call his own. He is in a peculiar position and is possessed of special knowledge acquired by his long service which renders him necessary to the company and his place hard to fill.

The tower is warm and the rooms are all very cozy and pretty. The room in which the operator spends most of his time is an interesting square, bower-like place in the extreme top of the tower, overlooking the bay, the ocean, the inlet and the beach. A library well stocked with interesting works occupies one corner, a reeling-chair, a cosy rocker and inviting seats here and there make up the furniture. In one corner the electric key keeps ticking a sort of tattoo, the only sound from the outer world which reaches the hermit in his dreary winter watches. "So long as the clicking keeps up," said Mr. Keegan, "I don't feel so lonely, for I know that by a few touches I can summon aid if needed, or talk with distant friends, but when the cable breaks and the sound stops, the stillness becomes unbearable, and the ceaseless pounding of the ocean, which suddenly seems to have redoubled its thunder, only adds to the dreariness. During the summer, of course, while the hotel is full, there is nothing to complain of, but in the winter our only visitors are men from the Life-Saving Station. They drop in upon us every day or so."

Nevertheless, with all the lonesomeness and occasional hardships, there is a spice of romance and adventure about it which makes the life in the tower specially interesting.

Surprise is often expressed that Mr. Keegan has no assistant in his watches, and people wonder how it is that no passenger steamer ever passes this point without being caught and reported, night or day. When asked to explain how he was enabled to do the work, he said:

"The powerful glass with which I am provided enables me to see a vessel from fifteen to twenty miles distant. This gives me a range of from thirty to forty miles before a vessel can get by me. Then I know when to expect the steamers. I have watched them so long that I have become



OPERATOR KEEGAN.

familiar with their speed. The time of their leaving is reported to me, and I keep a regular schedule. The vessels arriving give me some basis upon which to estimate a long or short passage, so I can tell within an hour or so when the vessel would be sighted off Fire Island, and I am consequently on the look-out for her."

"Have you ever made a mistake and reported the wrong vessel as passing?" asked the reporter.

"Yes, but only once, and that was three years ago. It happened in this way: I was looking for a certain steamer, a slow boat, which I thought might pass some time during the night. At night the steamers do not give any signal by which I can tell their names. They simply burn a signal indicating the line to which they belong. About midnight I saw a steamer burning the signals of the line to which the expected boat belonged. I had no doubt it was the steamer I was looking for, and so reported. Later I learned that the company had sent out a second steamer immediately after the one for which I was looking. I had no notice of the sailing of the second boat, and so was deceived."

"What would be the effect of such errors?" asked the writer.

"It would cause great confusion and expense. For instance, people in all parts of the country who are expecting friends by a certain steamer leave orders with the nearest telegraph office directing that they be notified when the steamer passes Fire Island. As soon as I report the steamer

passing, the messages ordered, often as many as 300 or 400, are sent out, giving the recipients several hours in which to prepare for the reception of the expected friends. Of course you can readily see that annoyance and expense would result all around if I had happened to make a mistake."

"But how can you be so positive?"

"In the daytime there is no trouble. There is the smoke of a steamer just flaking the horizon. I know by my schedule that certain steamers are due to pass me to-day. The color of the smoke-stacks give me the line, and without looking at her signals I can say positively just who she is."

With these words the gentlemanly operator stepped lightly on the little platform beneath the port through which he passed the large telescope. He had hardly applied his eye to the glass before he remarked:

"It's the Eutruria, and she has made a splendid run."

The steamer was still invisible to the naked eye, but an hour later her name could be read with the aid of the glass, as she ploughed her way towards the metropolis. The steamer had not showed her smoke-stacks above the horizon before it was known in New York that she had crossed the deep safely and was nearing her port.

A little later in the day a French steamer with great red funnels came up rapidly from out the eastern mists. The white foam was clearly visible about her bows. She was headed close in shore, and had already been reported before the signal giving her name had been sent to the mast-head. Suddenly her great screw seemed to stop, and the smoke which had been streaming out in a dark line above the wake of the vessel curled lazily over the ship.

"What is the matter with the Frenchman?" asked the reporter.

"Oh, he's made a remarkably quick passage, and as I have not answered his signal he is afraid I have not seen him. You will see how quickly he will go on after he knows that I have reported him."

"How far off can you recognize a steamer so as to be able to report her?" was asked.

"I reported two yesterday when only the tops of their masts were visible. They must have been at least twenty-three miles off shore."

"How can you tell them at that distance?"

"I have studied the different vessels for years and I know all the distinguishing features about the ships."

"How long does it take you to become familiar with a new boat?" was asked.

"It will take about a year. Now I am looking for the new steamer, City of New York. I presume the announcement of her having passed Fire Island will be the signal for great preparations for the reception of James G. Blaine, who is one of her passengers. I do not expect the steamer as soon as some do. I will begin to look for her on the afternoon of the sixth day after she leaves port. She is new and cannot be expected to make such a quick passage. When the new steamer is sighted I shall study her very carefully and make notes of specially noticeable features. It will take me a year to get her record down so that I can figure to a certainty on her. I must time her in heavy spring weather, in mild summer weather and in the hard weather which prevails during the winter. It is anticipated that she will be a very fast boat, and she may give me some trouble at first, but I don't believe she will be able to run by me."

(To be continued.)

The Postal Telegraph Company in New York has established an excellent dynamo system to supply all their circuits with the necessary electric current. Incandescent lamps are used for resistances very successfully. The new system was devised by Mr. Francis W. Jones, assistant-general manager and electrician of the company, and reports from all quarters are unanimous as to the perfect manner in which it has operated from the very moment it was set in operation on July 16.

Fort Wayne Jenney Electric Light Company,

FORT WAYNE, IND.

The Most carefully worked out and Complete Alternating System of Electric Lighting in existence. Armatures and Converters guaranteed. 12-16 candle-power Lamps to the mechanical horse power guaranteed.

MANUFACTURERS OF

The Slattery Induction System of Incandescent Lighting and the Original Jenney System of Arc Lighting.

CORRESPONDENCE SOLICITED.

MAIN OFFICE AND WORKS, FORT WAYNE, IND.

New York Office: 242 & 244 East 122d St., New York Electric Construction Co.

Chicago Office: 225 Dearborn St., Philadelphia Office: 26 N. Seventh St., San Francisco Office: 217 Sansome St.

W. J. BUCKLEY, Manager.

G. A. WILBUR, Manager.

F. ADAM SUC'S, CITY OF MEXICO.

WESTERN UNION NOTES.—Rumors of a change of such importance as to arouse within the breasts of all a regret that it is about to be consummated reaches us as we are about to go to press. Whether or not the report be true time alone can tell. Rumor has it that an employee second to none in the estimation of the company is to be called from his duties in the operating room to systematize and look after the work in the city department. That there is room for improvement in that direction is apparent to every worker in the office. We say this with all due respect to the ability of those who at present supervise the affairs of this department and whose duties are altogether too multifarious to give it the attention it so richly deserves. Within the office the work is all that could be desired; outside it is hardly what it should be. The name of the gentleman is withheld. The following named gentlemen from the night force report for extra days: Messrs. Bergen, Park, Pittman, Bloedon, Cross, Gray, Griffith, Les Miller, L. Kirshbaum, Buxton, Adlum, Miles and Stewart. Eddie Hodnett who has performed long and faithful service as chief router of traffic between the hours of 1 and 8 o'clock A. M., has been rewarded with the appointment of operator on that force, *vice* James O'Conner, deceased. Mr. C. H. Schram has been assigned to the First Chicago *vice* William Leith, transferred to Saratoga for the Summer. Jakey Tuck has returned from Long Branch. George Ensthouser, one of the night checks, after subbing two weeks for the New York, Lake Erie and Western Railroad, has been given charge of the Western Union office at the Hotel Netherwood. Miss Forson fills with credit the place of Miss Hawkes, who is enjoying a well-earned vacation. Thomas Toomey, one of the best known of the many first-class operators in this vicinity, has accepted a position as reporter of quotations on the floor of the Stock Exchange. Messrs. Grady and King have changed from day to night duty. Jno. Doyle has gone on the split trick. Mr. Newman, who for several months past has in company with Mr. Danforth worked the First Cincinnati wire nights has gone on days. J. W. Doyle and E. A. Jackson have been transferred to the split trick, *vice* J. J. Mahony, and J. H. Henry added to the regular day force. G. W. Skidmore succeeds on the split trick Garry W. Russell, who has been transferred to the night force to fill the vacancy caused by Mr. Powers, promotion to the *Tribune* office. Mr. Griswold of the Associated Press has changed places during the month of August with Geo. Hann of the regular night force. Messrs. John Rathbone, W. A. Pease, W. H. Gay Ruthrauff, W. H. Collins, C. D. Reed, Barrett, J. M. Topping, W. S. Smith, Quinn, Ben Bunce, H. I. Jolley, Charley Thom, C. Rogers, W. C. Ward and J. Ulrich have been assigned to regular extra duty three nights per week between the hours of 5.30 and 9 o'clock during the month of August. Among recent additions to the waiting list are the following named gentlemen: Foley, Kuttner, Nallin, O'Leary, Jenney, Shaughness, Boldrick, Wynne and M. Landy. Wire Chief John Sabine is about on the first vacation he has taken in a long time. Harvey Dutcher is the proud father of a little daughter who arrived at his home a few days ago. Miss Lillie Vion has taken charge of the office in the Argyle House, Babylon, L. I., for the summer. Mr. Bowtelle, whose ability to wiggle a key or wield a pen is surpassed by a few men in the Chicago Division, ran an engine for a number of years on one of the most prominent railroads in this State. Miss McGill has gone to the Manhasset House, Shelter Island, L. I., for the summer. Mr. C. Lambdin, brother of S. B. Lambdin, who recently had charge of the telephone office at Barranquilla, Columbia, South America, has been promoted as manager of the Kingston, Jamaica, office, salary \$100 a month. Lant S. Jones, R. G. Stephenson, Joseph Knittle, Thomas Follom, E. M. Tomlinson and J. H. Dwight have gone to the Old Timers Re-union at Chicago.

OBITUARY.

Henry L. Bailey, an old and well known electrician of New York, died in Brooklyn August 7th. He was formerly connected with the Metropolitan Telephone Co., the Time Telegraph Co., Law Telegraph Co., and lately with the Bell Telephone Co., of Missouri. His headquarters were at St. Louis, where he contracted malarial fever, which resulted in his death. His funeral was well attended by many prominent electricians.

Thomas Devlin, a lineman employed by the New York and New Jersey Telephone Company, fell from a telephone pole at the corner of South street and Atlantic avenue July 28, and broke his neck. He died instantly.

Cyrus P. Dakin, the inventor of the manifold and carbon paper now so widely used both by the press and commercial establishments, died August 5th, in Jersey City, in the eighty-eighth year of his age.

TRANSFERS.—F. C. Boutz, Fort Worth, Tex., to Vicksburg, Miss.; J. G. Lester, Portland, Ogn., to Virginia City, Nev.; P. F. Ryan, Wellsville, N. Y., to Ridgewood, N. J.; C. J. Ryan, Hotel Duquense to 925 Liberty st., Pittsburgh, Pa., for the W. U.; M. L. Smit, Reece, Ks., to St. Louis, Mo., for the W. U. J. N. Johnson, Augusta, Ga., to Chicago, Ill.; R. W. Perrin, Los Angeles, Cala., to Chicago, Ill.

UNITED PRESS NOTES.—Col. Finley Anderson, of the New York Bureau, is in Canada spending his vacation; A. L. Suesman, of Chicago, Assistant General Manager of The United Press, is in town; Mr. W. L. Waugh the well-known operator has been added to the day force.

JACKSONVILLE, FLA. NOTES.—Mr. F. W. Dunn has gone to Augusta, Ga.; F. W. Wiggs is off on a month's vacation to N. C.; Traffic Chief Wallace was presented with an heir on the 26th inst. in the shape of a fine boy.

Mr. A. T. Ellis, an old time operator, now one of New York's successful brokers, sailed for Europe August 3, to be absent about two months, which time will be spent in sight seeing.

Mr. Leona Lemon, for some time chief operator of the Postal, Indianapolis, Ind., has accepted the wire chiefship of the Northern Pacific Ry., at Glendive, Mont.

Mr. J. S. deEchagaray, for many years agent and operator at Maravatio, has been promoted and transferred to Patzcuaro, Mexico, for the National Mexican Ry.

During a large fire at Cambridge last week the telephone and electric light companies' wires were badly interfered with, the company losing a set of instruments.

Mr. J. P. Kohler, a well-known New York ex-telegrapher, is superintendent of the North Pacific Industrial Association, at Portland, Ogn.

Mr. J. M. Stroud has returned from the North Sydney, Cape Breton, Cable Station and is now at the Central Cable office, New York.

Mr. W. D. Thorne, manager of Postal, Lansing, has transferred to Muskegon, Mich., as manager for the same company.

Mr. T. Campbell, of the Suburban Telephone Co., is about to take a position with the Empire and Bay State Telegraph Co.

The Brattleboro Electric Light Co. are increasing their wires and increasing their business generally.

Mr. R.A. Lynch has transferred from the Produce Exchange to the main office of the W. U.

P. A. Rowe, a well-known Chicago operator, was in town last week.

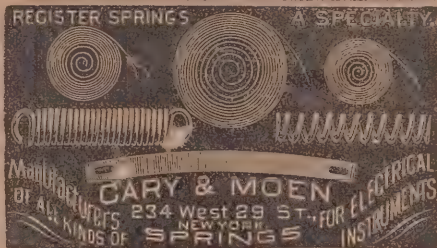
**AERIAL. SUBMARINE
and Underground
Wires and Cables**



TRADE MARK.

For Telegraph, Telephone and
Electric Uses.

THE OKONITE CO.,
No. 13 Park Row, New York.



CARBON PAPERS

Superior Qualities for use with
Type Writer and Stylus.

J. UNDERWOOD & CO.,
30 Vesey St., New York.
163 La Salle St., Chicago.
10 Johnston St., Toronto, Ont.

HENRY CONNETT,
PATENT SOLICITOR and EXPERT.
20 years' experience.
132 Nassau Street, New York.

**HEADQUARTERS FOR
TYPE-WRITER RIBBONS.**
MANUFACTURER OF
CARBON AND MANIFOLD PAPERS, STY-
LUSES, TINS, ETC.

S. T. SMITH,
14 Park Place, NEW YORK.

JOHN A. ROEBLING'S SONS CO.
Manufacturers of
Galvanized Iron and Copper Telegraph and
Telephone Wire.
Insulated **ELECTRIC WIRES** and Wire
For All Electrical Purposes.
WIRE ROPE.
E. L. SHIPPY, Manager N. Y. Office,
117 and 119 Liberty Street.

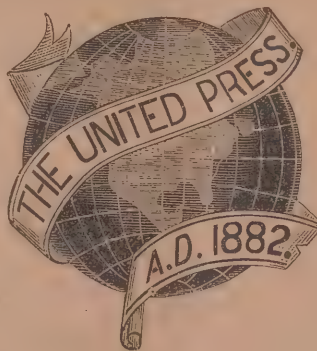
ELECTRICAL PATENTS

J. B. SABINE,
COUNSELOR AT LAW,
151 BROADWAY,
NEW YORK.

SPECIALTY

ELECTRICAL PATENTS

G. W. Miatt, Counselor at Law,
SOLICITOR OF PATENTS.
20 years' experience in Patent Matters
178 Temple Court, N. Y. City



International in scope, repre-
senting leading Journals throughout
the United States, Canada, and
Europe, and operating a complete sys-
tem of leased wires to the principal
American cities.

BOARD OF DIRECTORS.

JAMES W. SCOTT, - - - - - Chicago Herald.	ROBERT S. DAVIS, - - - - - Philadelphia Call.
CHAS. H. TAYLOR, - - - - - Boston Globe.	JAMES E. SCRIPPS, - - - - - Detroit Evening News.
WILLIAM M. LAFFAN, - - - - - N. Y. Evening Sun.	SAMUEL D. LEE, - - - - - Rochester Herald.
WILLIAM L. BROWN, - - - - - New York Daily News.	E. H. BUTLER, - - - - - Buffalo Evening News.
ARTHUR JENKINS, - - - - - Syracuse Herald.	C. R. BALDWIN, - - - - - Waterbury American.
JOHN H. FARRELL, - - - - - Albany Press and Knickerbocker.	W. C. BRYANT, - - - - - Brooklyn Times.
	WALTER P. PHILLIPS, - - - - - New York.

EXECUTIVE OFFICERS.

JAMES W. SCOTT, President.
A. L. SUESMAN, General Western Manager,
Chicago.

C. R. BALDWIN, Treasurer.
WALTER P. PHILLIPS, General Manager,
New York.

**DAY'S KERITE
Wires and Cables**

For Aerial, Underground and Submarine use
CLARK B. HOTCHKISS,
General Agent,
6 DEY ST., NEW YORK.

THE EDISON MACHINE WORKS

Wire Insulating Department.
JAS. F. KELLY,
GENERAL SALES AGENT,
19 Dey St., New York.

**CALLENDER'S
BITITE AND TRINIDAD
Wires and Cables**

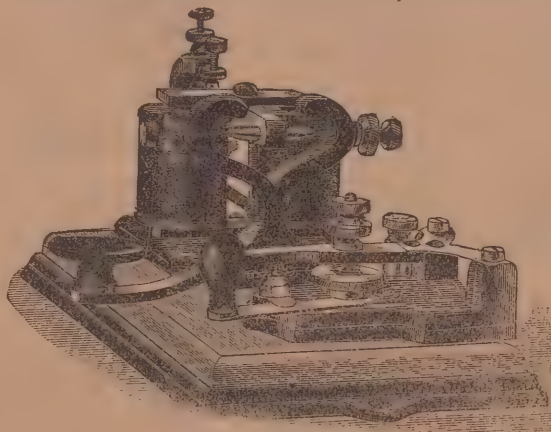
For all Purposes.
Callender Insulations and Waterproofing.
45 BROADWAY, NEW YORK.
London, Eng.; Brussels, Belgium; Boston, Chi-
cago, Kansas City, Denver, Philadelphia,
Minneapolis, Omaha.

ESTABLISHED 1867.
PARTRICK & CARTER,
MANUFACTURERS AND DEALERS IN
Electrical Supplies

For the
Telegraph, Telephone, Electric Light, &c.
SOLE PROPRIETORS OF THE
Patent Needle Annunciators & Burglar Alarms,
Send for Catalogue, and Mention this Paper
114 SOUTH SECOND STREET,
PHILADELPHIA, PA.

40 Page illustrated Catalogue of
RUBBER STAMPS
Steel Stamps, Stencils, Seals, &c.
Sent Free on Application by Postal to
S. W. REESE & CO,
29 CHURCH ST., NEW YORK

Liberal Discount to Dealers, Send for Reduced Price List.



No. 2 O.K. Outfit.

WITH SOUNDER AND KEY
on same base, or separate, as
ordered.

Complete Outfit, - \$3.75
Sounder, - - - 2.25
Key, - - - 1.00
Sounder and Key on
one Base, - - 3.25

The above Outfit consist of a beautiful Sounder wound to 20 ohms, and one of my unrivalled Nickel Plated, Legless, Steel Lever Keys; One Cell 5x7 Battery (or 6x8 Battery, 10c. extra); 15 ft. Insulated Office Wire, 1 lb. Vitriol, 1 Instruction Book, all safely packed and will be shipped on receipt of price, or sent C. O. D., subject to inspection, if you send me \$1.00 with order. State whether you wish Key and Sounder on same Base or separate. Write your address plain and full, also state by what Express Co. wish goods shipped. Address,

A. B. LYMAN, 34 and 36 South Water street, Cleveland, Ohio.

THE ELECTRIC AGE.

DEVOTED TO TELEGRAPHY, TELEPHONY, ELECTRIC LIGHTING AND ALL PHASES OF ELECTRICAL DEVELOPMENT.

VOL. VI—No. 7.

NEW YORK, SEPTEMBER 1, 1888.

\$1.50 per annum.
Single copies 10 cent.

J. H. BUNNELL & CO.,

106 and 108 Liberty Street,

NEW YORK

Telegraph

Instruments

BATTERIES, BELLS

& ELECTRICAL

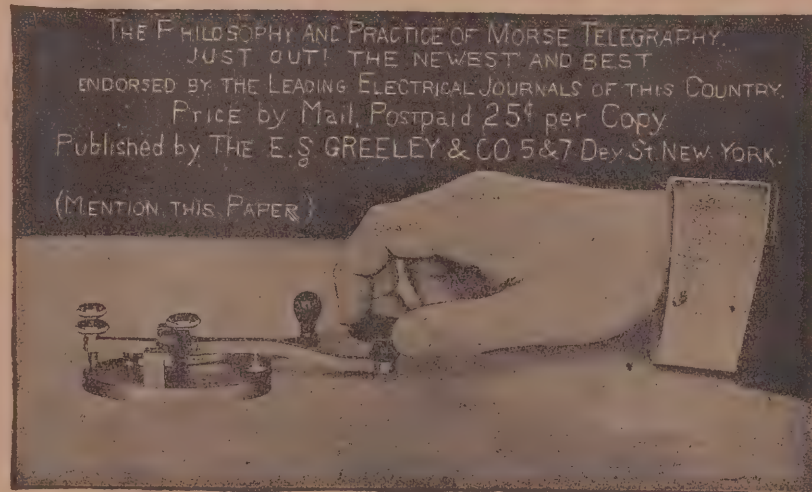
SUPPLIES.

The largest stock and best
variety of main line and
short line instruments in any
American establishment.

Send for our latest Illustrat-
ed price List and Catalogue
No. 9, of January, 1888.

containing over four hun-
dred cuts of Telegraph In-
struments, Batteries and
Electrical Appliances, FREE
also Manual of Telegraphy,
FREE to any Address.

HALF PRICE TO OPERATORS.



SPECIAL NOTICE.—To any TELEGRAPH OPERATOR in the UNITED STATES or CANADA, sending us his Office Address or other satisfactory evidence of his profession, together with 12 cents in postage stamps or otherwise, we will forward by mail, postpaid, a copy of the above book, entitled *The Philosophy and Practice of Morse Telegraphy*, just issued.

WHAT THE ELECTRICAL PRESS SAY :

“An excellent little work * * *

“A rational and practical guide for the young telegrapher, intended to make him acquainted early in his career with a few underlying facts and laws that usually, without specific study, only come to his knowledge after years of service and practical observation.”—*The Electrical World*, March 24th, '88.

The truth (referring to the true position of the telegraphers' hand in the act of “sending”) exposed by a lightning wink of the instantaneous camera, and permanently fixed for our deliberate inspection by the science of photography, dawns upon the craft intellect accompanied with something of the amazement that startled the artistic world when the elaborate anatomical studies by Rosa Bonheur of the horse in the act of running, were delivered over to universal ridicule by the subtleties of the same agent, instantaneous photography.

The Electrical Review, March 24th, '88.

THE E. S. GREELEY & CO.

Successors to L. G. TILLOTSON & CO.

5 and 7 DEY STREET, NEW YORK.

Manufacturers, Importers of, Dealers in and Headquarters for

TELEGRAPH, TELEPHONE, ELECTRIC LIGHT, DISTRICT.
BURGLAR ALARM, ELECTRIC BELL, EXPERIMENTAL
AND GENERAL ELECTRICAL SUPPLIES.

SOLE MANUFACTURERS OF THE

Victor Telegraph Instruments.

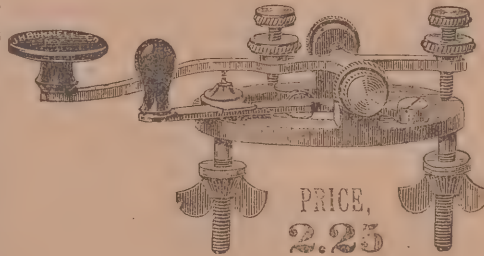
EFFECTIVE IN WORK! BEAUTIFUL IN APPEAR-
ANCE!! SCIENTIFIC IN CONSTRUCTION!!!

Authorized Agents for the Sale of EDISON INCANDESCENT MINIATURE
LAMPS and all other EDISON LAMPS for EXPERIMENTAL USES.

J. H. BUNNELL & CO'S STEEL LEVER SOLID TRUNNION KEY.

Telegraphers cannot fail to have noticed that upon the introduction of the BUNNELL STEEL LEVER KEY four years since, it at once achieved a vast popularity, such as never before attached to any specialty in Telegraph Instruments, and that this popularity has continually increased, and is still increasing.

It will also be noticed by Telegraphers, that since the STEEL LEVER KEY was introduced, a brood of "improved" keys has been hatched and put forward from various sources from time to time each one made to look as much like the



STEEL LEVER KEY as possible, or made with some kind of a "steel lever," or "patent lever," and in every case claiming all the merits possible and impossible that language could describe.

Most of these "improved keys" have become exterminated by the force of their own worthlessness. Years of practical test in the use of THOUSANDS of BUNNELL STEEL LEVER KEYS throughout America demonstrates their perfection and popularity. BE NOT DECEIVED BY THE ABSURD IMITATIONS.

THE BUNNELL STEEL LEVER KEY is more durable, and in every respect better than any other for rapid and perfect sending for the following reasons:

The Lever is only one-half the weight of the ordinary brass lever as generally made. The entire Lever and Trunnions together being made of but one piece of fine wrought steel, the common defect of loose trunnions is avoided, the strength of a heavy brass lever is obtained with much less weight of metal, and, by the perfect bearing which the solid trunnion gives, together with the use of hardened platinum points, sticking is absolutely prevented.

The size and proportions are such as to make it the most perfect operating key possible to obtain, either for the hand of the skilled and rapid expert, or the beginner.

Price, \$2.25. Finely Finished, and Lever Nickel Plated.

LIBERAL DISCOUNT ON ORDERS FOR COMPANY SUPPLIES.

Steel Lever key sent by mail, post-paid to any part of the U. S. or Canada on receipt of the above price, by Registered Letter or Money Order.

Until further notice we will exchange our New Steel Lever Keys for old keys for a cash difference of \$1.50 each. This price applies to any number of Keys, no matter in what condition the old ones may be. They must be delivered to us in packages plainly marked KEYS with all charges prepaid.

Where exchanges of not less than Six Keys at one time are desired for Keys which are already in use and which cannot be spared until the new ones arrive, we will, upon receipt of order, send on the new ones and the old ones may be sent to us afterwards. Cash should accompany all orders except from Superintendents and from Purchasing Agents of well known companies.

SEND FOR OUR 1888 ILLUSTRATED CATALOGUE.

J. H. BUNNELL & CO.,

106 and 108 Liberty Street,

NEW YORK.

IT STANDS AT THE HEAD

ONE touch of the finger should produce any character used in a Writing Machine. Instruments that fail to accomplish this are deficient and do not fully meet the necessity that brought them forth. These facts are self-evident.

The No. 2 Caligraph is the only writing machine that fully economizes time and labor, and economy of time and labor is the best ground we have for soliciting trade.

Granting that we are in the front in this, we can show that our late improved machines excel in mechanical merit, durability and beauty of work. 10,000 Caligraphs are in daily use.

We publish 400 letters from prominent men and firms which are convincing.

THE COMMERCIAL GAZETTE.

C. G. Muller, Agent Caligraph, Cincinnati, O.

Cincinnati, October 5th, 1885.

Sir:—About three months since, I commenced to use the Caligraph with a view to receiving special despatches from the wires, instead of by the old method by the pen. In about three weeks I was able, by diligent practice, to write from thirty-five to forty words per minute. Since then I have been using the machine with success receiving from five to six thousand words per night upon it. We have found the machine of such value in the work as to be able to receive the despatches by code, or abbreviation, thus increasing this capacity of the wire, though the matter is written out in full upon the Caligraph. We make an average speed of fifty words per minute by this method, and expect to do still better work with it.

The machine is a No. 2 and must be a marvel of durability, as it has never been out of order under this continuous and heavy strain, and is always ready for use.

Very truly yours, Signed; Frank B. Ross, Opr. Commercial Gazette.

C. G. Muller, Esq., Agent Caligraph, Cincinnati, O.

October 5th, 1885.

above statement of our operator.

Dear Sir;—I cheerfully certify to the correctness of the Signed; Chas. E. Thorp, Telegraph Editor C. G.

Guaranteed to be unequalled in Manifolding capacity.

THE AMERICAN WRITING MACHINE CO.,

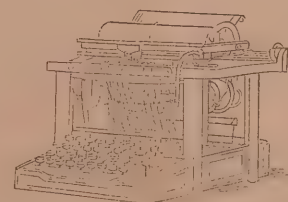
New York Office, 237 Broadway,

Hartford Conn

REMINGTON

Standard Typewriter.

30,000 IN DAILY USE.



THE STANDARD OF THE WORLD.

Especially adapted for manifolding, and for rapid work.

Adopted by the New York Associated Press, Western Associated Press and New England Associated Press, and a large number of telegraphers throughout the country for receiving messages.

Send for handsome illustrated pamphlet.

Wyckoff, Seamans & Benedict,

327 Broadway, New York.

THE ELECTRIC AGE.

Published on the 1st and 16th of every month
by the Electric Age Association.

Entered as Second-class Mail Matter.

Registered Cable Address
"ELECTAGE" NEW YORK.

TERMS OF SUBSCRIPTION:

One Copy, one year, \$1 50
One Copy, six months75
Great Britain and other Countries, 2.00
(INVARIABLY IN ADVANCE.)

CLUBS.—One extra copy of the ELECTRIC AGE, will be supplied gratis for every Club of five subscribers.

We invite correspondence from members of the profession and solicit articles from manufacturers for publication. Subscribers should promptly notify us of any change in their addresses, giving the old as well as the new one, that they may receive all the papers they pay for.

ADVERTISING RATES: \$2.00 PER INCH.

Reading Notices, 25 cents per line.
Births, Marriages, Deaths and other Notices, 50 cents each.

Papers will be discontinued at the expiration of the time contracted for with due notice of same.

WALTER P. PHILLIPS, Editor.
J. B. TALTAVALL, Publisher,
C. H. BOGLE, Manager, Advertising Dept
No. 5 Day St., New York.

NEW YORK, SEPTEMBER 1, 1888.

THE NATIONAL ELECTRIC LIGHT ASSOCIATION.

To appreciate the great importance of the present gathering of representatives of the electric light and power industry, one must fall back on comparisons. The telegraphs and the cables with their thirty years of growth represent something like \$100,000,000, while in the electric light alone there has been invested upwards of \$500,000,000, and all during the past ten years. The lapse of time and experience have given the National Electric Light Association a substantial footing, and the semi-annual gatherings afford an opportunity for comparisons and the settlement of differences.

The following will read papers during the convention; Prof. E. L. Nichols, of Cornell; Dr. Louis Duncan, of Johns Hopkins; Dr. Leonard Waldo, formerly of Yale, Wm. Lee Church, on "Electrical Steam Engineering;" C. C. Haskins, on "Some Practical Pointers;" S. S. Wheeler, on "Electrical Conductors in New York City;" O. B. Shellenberger, on "Measurements of Alternating Currents for Commercial Purposes;" F. B. Crocker, on the Ideal Motor;" E. G. Acheson, on "Disruptive Discharges of Underground Conductors."

The Societies of the "Old Timers" and the Military Telegraphers, which recently held their annual meetings in Chicago, were represented by members from all sections of the country. The renewal of old acquaintances is one of the most pleasing features of these annual gatherings. At the recent meeting men who had not met since the war, in which the telegraph played so important a part, were brought face to face with each other, and the hearty hand shaking which ensued spoke volumes for old friendship. Two gentlemen met for the first time in twenty-seven years. Both were in the confederate service and were captured together during a fierce battle. They were sent to different prisons. The meeting of these veterans in Chicago was sublime. These organizations will meet next year at Louisville, Ky., in September, where it is anticipated a great gathering will take place.

THE FIRST TELEGRAPH INSTRUMENT.—Mr. William Walter Phelps has introduced into Congress a bill to purchase from Stephen Vail, of Morristown, N. J., the original telegraphic instrument, or recording receiver, made by his father, Alfred Vail, and used upon the first telegraphic line ever constructed—that between Washington and Baltimore—and to transmit the first message ever sent: "What hath God Wrought?" The purchase of this instrument is strongly recommended by the officers of the Smithsonian Institution. The price is \$10,000.

The recent semi-annual meeting of the association of Edison electric light companies at Nantasket Beach, Mass., was fully attended. The subject of using electricity for heating, motive power and lighting purposes was discussed by a number of prominent electricians. The evening session was given to the reading of a paper, illustrated by the stereopticon, on "Protecting Electric Light Circuits from Lightning," by W. L. Jenks, of New York City.

Electric street railways have been or are about to be contracted for at Davenport, Ia.; Seward, Neb.; Adrian, Mich.; Madras, India; Keene, N. H.; Newport, R. I.; Streeter, Ills.; Bloomington, Ills. and Marion, Ohio.

It is stated that Drexel, Morgan & Co. have bought 120,000 shares of Western Union in the last six months for European account.

Mr. Eugene F. Phillips' celebrated old fashioned Rhode Island Clam Bake will take place September 1, at the Vue de l'eau Club.

Six hundred telephones were destroyed at Dayton, Ohio, a few days since, by the wires becoming crossed with dynamo circuits.

The Heisler system of lighting is to be used in illuminating the building of the St. Louis Exposition and Music Hall.

The Fort Wayne "Jenny" arc light system of Parkersburg, W. Va., gives general satisfaction.

The new ocean steamer "City of New York" is illuminated by over 1,000 incandescent lamps.

In London, experiments are now being made to purify sewage by electricity.

WHERE THE ELECTRIC LIGHT CONVENTION IS ASSEMBLED.

The National Electric Light Association for the proper conduct of its business, engaged some two hundred rooms in the Hotel Brunswick, Fifth avenue, including the large banquet hall, in which the deliberations will take place.



HOTEL BRUNSWICK.

The attendance is large and it is by far the most important meeting ever held by the Association.

ELECTRICAL BOOKS.

Ready September 1, 1888. The Elements of Electric Lighting, including Electric Generation, Measurement, Storage and distribution. By PHILIP ATKINSON, A. M., PH. D., Author of Elements of Static Electricity. 260 pages, 12 mo, 104 Illustrations. Price \$1.50.

The most complete and comprehensive treatise on electric lighting ever published: giving the latest practical facts, with the least amount of technicality and mathematical formulæ: with full treatment of the Dynamo, the Storage Battery and the principles of Direct and Alternate Current lighting. Contents. ELECTRICITY A MODE OF MOLECULAR MOTION.

PRINCIPLES OF THE DYNAMOS.—The Dynamo. The Armature. The Commutator. Closed Circuit and Open Circuit Armatures. The Brushes. The Field Magnets. The Dynamo's Mode of Action. Difference of Potential. Reversed Currents. Commutation. The Armature's Mode of Action. Shunt and Series Dynamos compared.

ALTERNATE CURRENT DYNAMOS.—Principles of the Alternate Current Dynamo. The Siemens-Halske Dynamo. The Lontin Dynamo. The Gordon Dynamo. The Westinghouse Dynamo. The Converter.

DIRECT CURRENT DYNAMOS.—The Edison Dynamo. The Weston Dynamo. The Sperry Dynamo. The Brush Dynamo. The Thompson-Houston Dynamo. The Western Electric Dynamo. The Ball Dynamo. The Mather Dynamo. The Van Depoele Dynamo. The Hockhausen Dynamo. The Wood Dynamo.

ELECTRIC TERMS AND UNITS.—Electric Potential. Electromotive Force. Resistance. Current. Electric Induction. Magnetic Induction. Conductivity and Insulation. Quantity and Intensity. Electric Units. The Volt. The Ohm. The Ampere. The Ampere Hour, The Coulomb. The Farad. The Microfarad. The Watt. The Electric Horse-Power. The Joule.

ELECTRIC MEASUREMENT.—The Potential Indicator. The Deprez-Carpentier Voltmeter. The Deprez-Carpentier Ammeter. The Ayrton and Perry's Ammeter. Ayrton and Perry's Voltmeter. Ayrton and Perry's Spring Voltmeter and Ammeters. The United States Electric Lighting Co's Ammeter. The Western Electric Co's Ammeter. The Cardew Voltmeter. Ayrton and Perry's Ohm Meter. The Forbes Coulomb Meter. The Edison Current Meter. The Standard Light Unit. The Bunsen Photometer.

THE ARC LAMP.—Principles of the Arc Lamp. Arc Light Carbons. The Jablochhoff Electric Candle. The Jamin Electric Candle. The Sun Lamp. Automatic Adjustment of Arc Light Carbons. The Foucault-Duboscq Lamp. The Serrin Lontin Lamp. The Brush Arc Light Lamp.

THE INCANDESCENT LAMP.—Reynier's Lamp. Early Experiments. Incandescent Light Carbons. The Edison Carbons. The Lane-Fox Carbons. The Cruto Carbons. Swan Carbons. The Weston Carbons. The Bernstein Carbons. General Details of Filament Construction. Construction of the Incandescent Lamp. Position of Lamps. Renewal of Lamps.

THE STORAGE BATTERY.—Electric Storage. Plante's Secondary Cell. Chemical Reaction in the Plante Cell. The Plante Battery. Faure's Secondary Cell. Chemical Reaction in the Faure Cell. Faults of the Faure Cell. The Improved Faure Secondary Cell. The Fluid. Electric Formation of the Plates. Electro Motive Force. Resistance and Current of Cell. Weight of Cell and Thickness of Plates. Cause of Buckling. Variable Resistance of Electrolyte. Inspection. Formation of The Faure Battery. The Julien Accumulator.

ELECTRIC DISTRIBUTION.—Arc Light Distribution. Series Installation. Hefner von Alteneck's Regulator. Incandes-

cent Light Distribution. The Direct Current System. Parallel Installation. Multiple Series Installation. Series Multiple Installation. Combined Arc and Incandescent Installation. The Edison Three Wire System. The Storage Battery System. The Induced Alternating Current System. The Primary Alternating Current System. Meters, Fuses, Switch Boards, Lighting Mines. Installation Rules.

Sent postage prepaid to any address. THE ELECTRIC AGE, 5 Dey street, New York.

ELECTRICAL PATENTS GRANTED AUG. 6, 1888

387,310 Electro-mechanical movement; Richard H. Mather, Windsor, Ct.

387,316 Railway signaling system; Edward L. Orcutt, Somerville, Mass.

387,382 and 387,383 Electric railway system; David G. Weems, Baltimore, Md., assignor to the Electro-Automatic Transit Company of Baltimore City, same place.

387,505 Method of measuring electricity; George Forbes, London, England.

387,526 Electric switch; James F. McElroy, Lansing, Mich., assignor of one-half to Lewis C. Butler, same place.

387,585 Auxiliary fire alarm apparatus; Walter J. Dudley, Everett, Mass., assignor, by mesne assignments, to Walter J. Dudley, same place.

387,610 Electrically driven car; Joseph Weis, Jersey City, N. J.

387,615 System of combined arc and incandescent electric lights; Harold P. Brown, Chicago, Ill.

GRANTED AUGUST 12.

387,645 Multiple switchboard; Milo G. Kellogg, Hyde Park, Ill.

387,714 Electric motor; Bradley A. Fiske, U. S. Navy.

387,718 Telephone support; Newton W. Hartwell, Louisville, Ky.

387,732 Electric cut out; Joseph A. Powers, Lansingburgh, N. Y.

387,839 Galvanic battery; Granville T. Woods, Cincinnati, Ohio.

387,932 Flash light signal; William H. Thompson, Richmond, Va.

388,003 Meter for alternating electric currents.

388,004 Method of measuring alternating electric currents; Oliver B. Shallenberger, Rochester, Pa.

THE TELAUTOGRAPH COMPANY FORMED.

The Gray National Telautograph Company has been chartered by the Circuit Court, at Richmond, Va., with a capital not to exceed \$15,000,000. The principal office will be located in Richmond. The officers are: President, Thomas M. Logan; Vice-President, Charles E. Coon, of New York; Secretary, David I. Carson, of New York. Among the incorporators are United States Senators Plumb and Hale, John H. Inman, George S. Scott, C. S. Brice, J. B. Pace and James H. Dooley. The company will engage in the general telegraph and telephone business under the system invented by Prof. Elisha Gray. This system is receiving considerable attention in the daily prints, and reports which reach us are assuring as to the practicability.

THE AMERICAN INSTITUTE FAIR, NEW YORK.

Large numbers of inventors and manufacturers have for many years found it of interest, and profitable as well, to attend and take part in the annual exhibitions of the American Institute, held in the fall of each year. The fifty-seventh annual exhibition will open October 3, at the hall of the Institute, on Third avenue, New York City, and promises to be in no way behind any of its predecessors in attractive features. Intending exhibitors should make early applications to secure good locations and the space needed.

A SYNTHETIC STUDY OF DYNAMO MACHINES.

I. INDUCTION.*

The facts of induction brought to light by the researches of Michael Faraday half a century ago form the basis on which all dynamo machines are constructed. Briefly let us set in order these facts.

1. *Currents induced by currents.*—In fig. 1 a coil, A, is placed in circuit with a battery, B, and a key, K, the two faces of the coil designated *a* and *b* respectively. The connections to the battery are such that when the circuit is completed a current will flow in the direction of the arrow. Let a second coil, C, be placed parallel to the first, the faces of which are called *c* and *d*. The ends of this coil are connected by flexible wires to the terminals of a galvanometer, G, the direction of the current through the latter being known from the direction in which its needle deflects. When the coils are in the position shown, let K be depressed and kept down. On closing the circuit the galvanometer needle will be observed to deflect. But it will not take up a permanent position of deflection. It will immediately return, showing that the current producing the deflection is but momentary. After a few swings the needle will return to zero. The deflection of the needle is due, we say, to an *induced current* in C, arising from an E. M. F. created in it which has for its obvious cause the starting of the current in A. From the direction in which the needle deflects, we know that the current in C is in the *opposite* direction to that of the current in A.

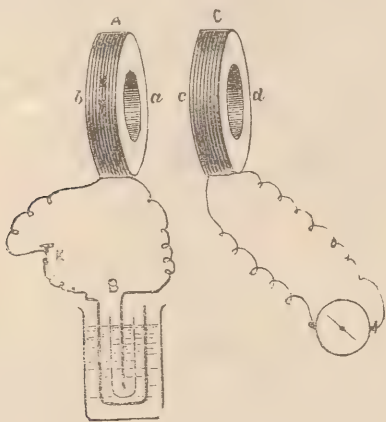


FIG. 1.

But the needle has come to rest though the current still flows in A. Break the circuit, and again there is a deflection of the same momentary character, but this time in an opposite direction. The current in C now flows in the same direction in which it has been flowing in A. From these experiments we learn that the induced E. M. F. is not due to a steady current in A but to a *change in the magnitude of the current*. So long as the current flowed steadily, the needle remained at rest; it was only when the circuit was broken that it deflected. Here the current was reduced to 0, but a partial diminution would have had a similar effect though in a less degree.

Turn the coil, A, round so that its faces, *a* and *b*, are reversed and repeat the experiments. The current in A now flows in a direction opposite to its former direction, considered relatively to C, and the starting and stopping of the current will give rise to momentary currents in C also in directions opposed to their former directions. But note that the current in C still flows in an opposite direction to the current in A when the latter is started and in the same direction when it is stopped. The direction of the induced current depends then upon the direction of the inducing current, and if the latter is reversed all the observed effects are of an opposite character.

* *Electrical Review*, London.

Suppose A to be placed so that its face *a* is towards the reader (fig. 2). Let it remain in that position with the current from the battery flowing through it. Place C immediately in front of A, faces *a* and *c* being adjacent, and when the galvanometer needle comes to zero, move to the left, 1, again to the right, 2, next up 3, and lastly down 4. In each case we get a deflection in the same direction as the current in A. From each of the four positions bring C up to its position in front of A, the deflection in each case is in an opposite direction. We conclude that the movement of the coil from A produces the same result as stopping the current while the movement towards A is equivalent to starting the current. Turn A round with face *b* towards the reader and repeat the experiment. In every case the momentary current will flow in an opposite direction though in the same direction relatively to A.

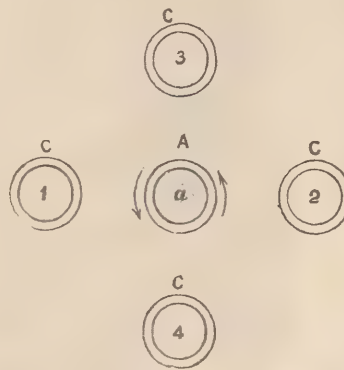


FIG. 2.

2. *Currents induced by magnets.*—Let an ordinary bar magnet (fig. 3) be substituted for the coil A, its north and south poles being marked N and S respectively. By north pole is here meant the end which would point to the north if the magnet were free to adjust itself directionally according to the earth's magnetism. The coil, C, is situated immediately in front of the N pole in position (1) and the needle is at rest. We move it to the left (2) and we get a momentary current. Again we move it to the right (3), now up (4), now down (5), lastly to position (6), which is still in front of the magnet, but at a considerable distance from it. In each case the current flows in coil C in the same direction, as shown

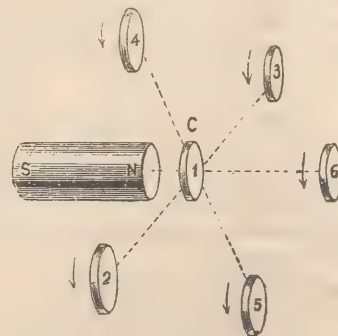


FIG. 3.

by the arrows. Let us reverse the magnet, turning its N and S poles end for end. The current in C will now flow in a direction opposite to their first path. No matter whether C is near to or far from the magnet, it is only when relative motion of magnet and coil occurs that a current is produced. It is quite immaterial whether the coil or the magnet makes the actual movement, but relative motion must take place before an E. M. F. is induced in C.

3. *Coils and magnets are interchangeable.*—We can now with these experimental data to hand generalize a little. First, we found when a steady current was flowing in A that bringing C up to it produced in the latter a similar result to starting the current in A when both coils were at rest, or, in other

words, starting a current in A is the same as bringing c up with great rapidity. Similarly we found that stopping the current was equivalent to removing c very rapidly. Next comparing the results illustrated by figs. 2 and 3, we find that the magnet, S, N, acts exactly like the coil, A, when a current flows in the latter in the direction of the arrow, fig. 1. If we have a coil in which looking at one of its faces the current flows in the direction of the hands of a watch, that face behaves exactly like the S pole of a bar magnet, while if the current flows in a direction opposite to that of the hands of a watch the face behaves like an N pole. As a matter of fact, had we been so minded we might have thrust through the coil, A, a bar of soft iron, fig. 4, which would have been converted into a magnet by the current flowing round it. All the experiments might then have been repeated, producing effects similar in character though greater in degree. We should then have had an electric-magnet with

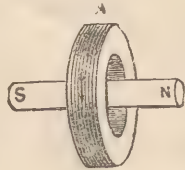


FIG. 4.

its poles as shown in fig. 4, instead of the bar magnet in fig. 3. Throughout these experiments there has been no actual contact of c and A. The E. M. F. induced in c has been caused by some influence in the vicinity of the coil, A, or the bar magnet, S, N, or the soft iron thrust through A. Call it action at a distance, or what we please, it is to some cause outside the coils or magnet that the phenomena are due, and our next business will be to explore the space in which the induction takes place.

4. *Lines of Force.*—It is well known that a magnetised needle is deflected by a current in its neighborhood, and a small needle forms a convenient instrument for investigating the condition of the space in which the coil, c, moves. Let us take, therefore, a nicely balanced needle pivotted in jewels, and commence exploring by its aid the vicinity of the coil, A. The current in the latter flows in the direction of the arrow (fig. 5), and the N and S poles of the little needle are known. In moving it about near A the first thing that strikes the observer is that the needle, when located in the same position, always assumes the same direction as regards its magnetic axis. If deflected by the finger, when held in any position it will, when released, assume its former direction, nor will it assume any other until its position with reference to the coil has been changed. If in fig. 5 the shaded end of the needle represents the N pole, we shall find that the needle

will take up with reference to coil A the axial directions represented. At every point in the vicinity of the coil there are certain forces acting, and lines (fig. 6) can be drawn to represent their direction, since our exploring needle always sets its axis parallel to the direction of the force exerted at the place where it happens to be situated. Circling outside the

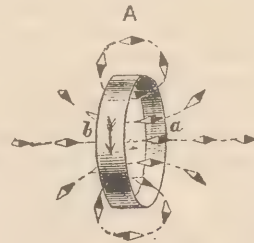


FIG. 5.

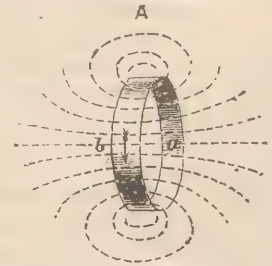


FIG. 6.

coil, entering its centre, passing through it and emerging again, these lines of force curve through space expanding into still larger and larger circles, until we get too far from the coil for the forces to be appreciable. The S pole of the needle it will be noticed points to the face, a, of the coil, and the N pole to b. In the first part we observed that the coil, A, behaved like a magnet having its N pole at a, and its S pole at b. Note then that an N pole attracts a S pole, and that an S pole attracts an N pole, or that poles of opposite name attract each other, while poles of similar name are



FIG. 7.

repellant. If for the coil, A, we substitute a straight wire w (fig. 7), in which a current is flowing in a downward direction, say perpendicular to this paper, we shall find the lines of force form a series of circles as shown, with the needle lying always in a definite direction for each position in the vicinity of the wire.

Let us now explore the vicinity of the bar magnet which did us such excellent service in our former experiments. Here, again, we find that the needle takes up for each position a definite direction, and we get, representing the direc-

(To be continued.)

SUBSCRIBE NOW
FOR THE
ELECTRIC AGE.

TERMS, \$1.50 PER ANNUM.

An Advertising Medium through which the consumers of electrical goods all over the globe can be reached. Send for terms.

THE ELECTRIC AGE,
5 Day St., New York.

The United Press.

International in scope, representing leading Journals throughout the United States, Canada, and Europe, and operating a complete system of leased wires to the principal American cities.

BOARD OF DIRECTORS.

JAMES W. SCOTT, - - - - - Chicago Herald.	ROBERT S. DAVIS, - - - - - Philadelphia Call.
CHAS. H. TAYLOR, - - - - - Boston Globe.	JAMES E. SCRIPPS, - - - - - Detroit Evening News.
WILLIAM M. LAYFAN, - - - - - N. Y. Evening Sun.	SAMUEL D. LEE, - - - - - Rochester Herald.
WILLIAM L. BROWN, - - - - - New York Daily News.	E. H. BUTLER, - - - - - Buffalo Evening News.
ARTHUR JENKINS, - - - - - Syracuse Herald.	C. R. BALDWIN, - - - - - Waterbury American.
JOHN H. FARRELL, - - - - - Albany Press and Knickerbocker.	W. C. BRYANT, - - - - - Brooklyn Times.
	WALTER P. PHILLIPS, - - - - - New York.

EXECUTIVE OFFICERS.

JAMES W. SCOTT, President.	C. R. BALDWIN, Treasurer.
A. L. SUBSMAN, General Western Manager, Chicago.	WALTER P. PHILLIPS, General Manager, New York.

TO KILL BY ELECTRICITY.

Expert electricians entertain grave doubts as to the expediency of killing murderers by electricity. Unless science progresses very fast and develops some more reliable data to work upon than at present exists, the State authorities are likely to find it difficult to secure the services of an electrician capable of intelligently superintending the arrangements when the law goes into effect on January 1, 1889.

Experiments with dogs recently made showed that in nine animals the difference in resistance varied all of the way from 3,600 ohms to 27,500. Nor did the size of the dog apparently have anything to do with it, as a ten-pound dog measured 7,500 ohms resistance, a fifty-nine pound one only 5,000 and a fifty-six-pound one went as high as 27,500 ohms, while the 3,600 ohms resistance was found in one weighing fifty-five pounds. That there are other conditions entering into the capacity of the dogs to receive electric shocks than the resistance was also demonstrated by the tests, as one dog of 6,000 ohms resistance was killed with a 1,000 volt and $\frac{1}{4}$ ampere current. Another of equal resistance stood seven shocks of from 1,000 volts and 1-10 ampere measurement up to 1,400 volts and 2-5 ampere and 1,420 volts and 1-5 ampere respectively without apparent effect, and was as playful after as before the experiments. These experiments were with the continuous current.

There were also experiments made with the alternating current which apparently demonstrated that one dog of 27,500 ohms resistance was killed with 181 volts and another of 3,600 ohms resistance successfully withstood 300, 400 and 500 volts, and was finally killed with 570. These latter tests are disputed, however, and it is evident that they should not be accepted as conclusive, as the proper measurements of amperes or current strength were not made, and this is an essential element in conjunction with the voltage or current pressure. A very high voltage may be obtained with one-hundredth part of an ampere of current strength and be harmless, and a low voltage with an ampere of strength may prove fatal.

It is easily ascertained what amount and quality of current may be fatal, but more difficult to tell what will be so and not produce sickening mutilations of the human body. Experiments in killing dogs under the supervision of so able an electrician as Thomas A. Edison resulted in the hides of some of the animals being split open, and a human being might be similarly served, say expert electricians.

Harold P. Brown, the champion of the continuous dynamo current, claims that all currents of 500 volts or over are dangerous to human life, yet in numerous instances he has given dogs 1,000 volts or over without injurious results. A number of men have testified under oath that they have received shocks from alternating currents of 1,000 volts force; many more men are known to have lost their lives through much less pressure, and Mr. Brown killed dogs with 181 to 800 volts of alternating current. Men who are interested in the electric light companies, as a rule, claim that the particular current they use is practically harmless, while the one their opponents use is deadly, but, outside of these experts, electricians generally seem to be in doubt.

TO AVOID MUTILATION.

Ralph W. Pope, Secretary of the American Society of Electrical Engineers and a practical electrical expert, said to a reporter: "It is a question as to whether in using electrical currents the executioner can be sure of producing death without mutilation. Some men are much more susceptible to the influences of electricity than others, and there are not sufficient reliable data to base calculations upon. There is no doubt of the ability of electricity to kill, but it may overdo it and be accompanied by some horrifying consequences. Then there is some question as to whether a man apparently dead from an electric shock may not be

brought back to life again by applying proper and prompt treatment. Science has not as yet determined the exact action, from an electrical standpoint, of the current on the human heart. I am not prepared to give an opinion on that subject, as experiments and researches thus far have not determined the exact nature. Some scientists believe it is something similar to polarization or magnetization, which can be counteracted in ordinary electrical bodies if not in human bodies."

F. W. Jones, Chief Electrician and Assistant General Manager of the United Lines Telegraph Company, said: "It is a matter that should be more definitely determined before attempting to kill even criminals with it. The current may burn through the skin of the object and make a shocking mutilation, as the electrical resistance of the skin is much greater than that of the internal body. If the State would select a really competent electrician, capable of collecting and utilizing all known facts and experiments, and then provide him with proper apparatus, there is no doubt that he could produce death, and I do not believe the subject could be revived; but even then they might not escape mutilation. My idea of the best way to execute criminals by electricity would be to place a belt around the body below the arms and attach the two electrodes to plates, one on each side of the body, thus reaching the heart by the most direct route. This I consider preferable to sending a current through the brain, as advised by some of the scientists. I am afraid, however, it may prove somewhat barbarous at the outset."

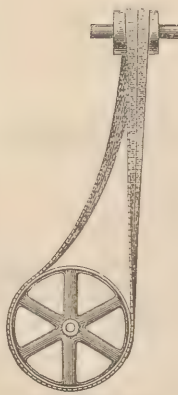
NO BASIS FOR AGREEMENT.

Half a dozen other experts, independent of those interested directly in electric-light companies, were seen, and not one was found who would undertake to fix the amount of current that would prove positively and promptly fatal and yet not be liable to cause mutilation. A current, which owing to the low electrical resistance of one man's skin, might easily reach his heart, in another man was acknowledged to be liable to find so much resistance in the skin as to necessitate literally burning through it before reaching a vital organ in sufficient force to produce a deadly shock.

Schuyler L. Wheeler, of the Board of Electrical Control, some time ago recommended using a hopper with sides composed of two electrodes for killing dogs in the pound, but the experiments made with those animals in private at Columbia College and elsewhere were so unsatisfactory that up to date the suggestion, for humane reasons, has not been adopted.

WESTERN UNION RECEIPTS.—The receipts of Western Union test offices for the week ending August 6 were \$224,159, against \$182,371 for the corresponding week last year, an increase of \$41,788. As these test offices represent about three-fifths of the business done, the total increase is about \$70,000 as compared with the last previous week. The *New York Indicator* has a long bullish article on this stock, and says that within the next two years it will sell for three figures instead of two.

DIRECTORS ELECTED.—The annual election of the Pacific Postal Telegraph Cable Company was held in New York August 7. Four thousand shares were voted unanimously for the following directors: John W. Mackay, of California; William C. Van Horne, Charles R. Hosmer and Sir George Stephen, Montreal; Henry Rosener, Albert B. Chandler, Hector de Castro, Edward C. Platt and George G. Ward, New York. The resignation of Mr. Levi P. Morton as a director was accepted before the election. The board organized by electing officers as follows: President, John W. Mackay; Vice-President, Hector de Castro; Secretary, John O. Stevens.



AMERICAN LEATHER LINK BELT CO.

A new article in Belting, which is made of small leather links joined together with steel bolts. It has been tested for Dynamos with remarkable success.

Write for particulars and prices to

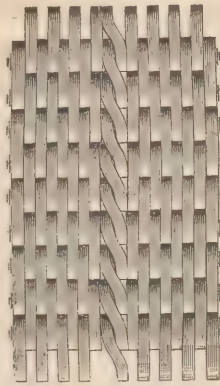
CHAS. A. SCHIEREN & CO.,

Manufacturers and Tanners of

LEATHER BELTING & LACE LEATHER

47 FERRY ST., NEW YORK.

BRANCHES: { **Philadelphia, 416 Arch St.**
Boston, 86 Federal St.



ELECTRICAL ACCUMULATORS AND STORAGE BATTERIES,

Successfully applied to
Central Station Lighting, Isolated Lighting, Trolley
Lighting, Street Car Propulsions, etc., securing
great economy and reliability. For full particulars
address.

The Electrical Accumulator Co.,
44 BROADWAY, NEW YORK.

WIEDERSHIM & KINTNER,
ELECTRICAL EXPERTS.
SOLICITORS OF PATENTS, TRADE-MARKS,
ETC.

Office, No. 45 BROADWAY,

NEW YORK.

Record Building, 919 Chestnut St., Philadelphia,
Penna.

CARL HERING, Consulting Electrician, No. 514 F
St., Washington, D. C.

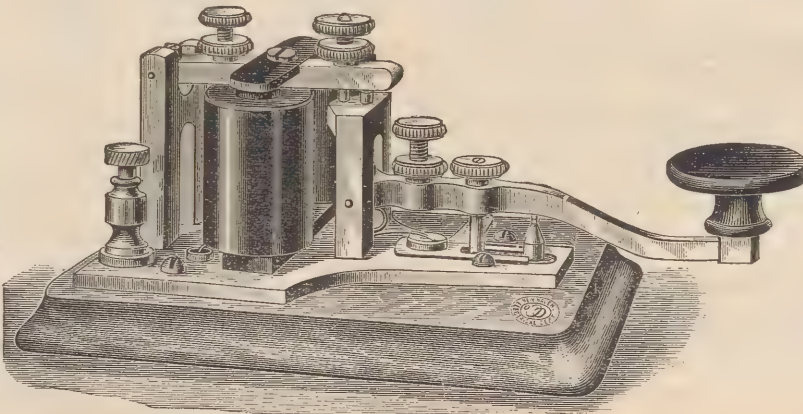
New Haven Clock Co.,

29 MURRAY STREET, NEW YORK.

Manufacturers of all Styles of Electrical Apparatus.
THE "UNIQUE" COMBINATION SET.

This Set is manufactured of Telegraph Metal, hand-finished, Magnets with Rubber Covers, Nickel-plated Key Lever, all mounted on a mahogany base.

The simplest and cheapest combination set ever placed on the market. Key and



sounder mounted on an ordinary size sounder base. Works well on one cell of battery.

The above Set, complete, with Cell of Gravity Battery and 50 feet of wire, \$3.75. Special prices made for quantities.

CUT ONE-HALF SIZE.

THE LAW BATTERY.

New Form.

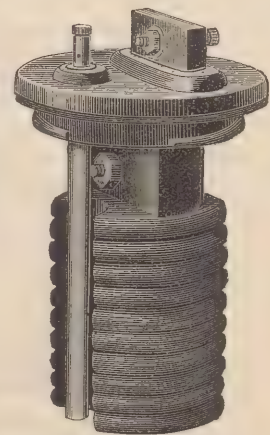
Quantity and Surface of Negative Element largely increased and shape improved. This Element is Guaranteed everlasting, and new ones given at any time for old without charge. Lock Tops that absolutely prevent evaporation and creeping of salts. No Grease. Binding Posts that cannot corrode. Price, \$1.00.

LAW TELEPHONE CO.,

112 Liberty Street,

NEW YORK.

Sole Agent for the Pacific Coast, Geo. L. Henzel, San Francisco, Cal.



"STAR" GOLD FOUNTAIN PEN.



PRICE, \$1.50 AND UPWARDS.

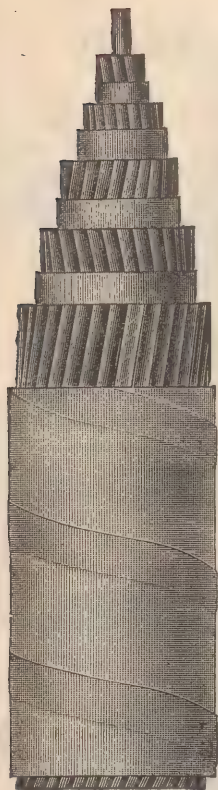
Best writing Pen ever offered to the public. Holds ink for a week's use. Unequalled for Business and General Writing. Every Pen Warranted and Satisfaction Guaranteed. The STAR Pen consists of a highly-finished hard rubber holder fitted with a superior 14 karat GOLD PEN, to suit any writer. In ordering specify style of Pen wanted. SOLICITING A TRIAL ORDER.—Sent by mail or express on receipt of price. Repairs to Pens of all kinds a specialty. A GOOD, RELIABLE STYLOGRAPHIC PEN for \$1 and upward. N. B.—All goods will be shipped promptly on receipt of order.

J. ULLRICH & CO., 106 and 108 Liberty Street, New York.

Manufacturers of the "Star" and "Independent" Fountain and Stylographic Pens. Liberal Discount to Agents. Send for Price List.

CHAS. A. CHEEVER,
President.

WILLARD L. CANDEE,
Treasurer.



No. 91 CONDUCTOR.
No. 16, B. W. G., $\frac{5}{8}$ Insulation.
OKONITE CABLE.

THE  **Co.,**

TRADE MARK.

13 Park Row, New York,

MANUFACTURERS OF SUPERIOR

Insulated Wires and Cables

FOR AERIAL, SUBMARINE AND UNDERGROUND USE.

Telegraph, Electric Light and Telephone Wires.

Those who have used OKONITE Wires and Cables are unanimous in their declarations that it is the best insulated medium in the market, and as for *durability* and *toughness* of compound, it is unsurpassed.

Sole Manufacturers of CANDEE AERIAL WIRES.

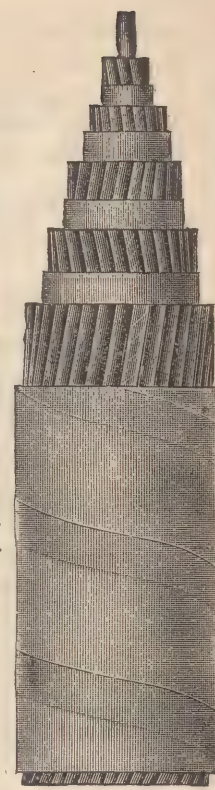
SOLE MANUFACTURERS OF THE } TO MAKE PERFECT
CELEBRATED OKONITE TAPE, } WATERPROOF JOINTS

BRANCHES:

BOSTON, CHICAGO, PHILADELPHIA, KANSAS CITY, MINNEAPOLIS,
LOUISVILLE, CINCINNATI and OMAHA.

SOUTH AMERICAN BRANCH:

West Coast Telephone Co., Valparaiso; Chili; Guayaquil; Ecuador.



No. 91 CONDUCTOR.
No. 16, B. W. G., $\frac{5}{8}$ Insulation.
OKONITE CABLE.

Fort Wayne Jenney Electric Light Company,

FORT WAYNE, IND.

The Most carefully worked out and Complete Alternating System of Electric Lighting in existence. Armatures and Converters guaranteed. 12-16 candle-power Lamps to the mechanical horse power guaranteed.

MANUFACTURERS OF

**The Slattery Induction System of Incandescent Lighting and the
Original Jenney System of Arc Lighting.**

CORRESPONDENCE SOLICITED.

MAIN OFFICE AND WORKS, FORT WAYNE, IND.

New York Office: 242 & 244 East 122d St., New York Electric Construction Co.

Chicago Office: 225 Dearborn St. Philadelphia Office: 26 N. Seventh St. San Francisco Office: 217 Sansome St.

W. J. BUCKLEY, Manager.

G. A. WILBUR, Manager.

F. ADAM SUC'S, CITY OF MEXICO.

INCANDESCENT, A SUCCESSFUL COMPETITOR AGAINST GAS

AND GASOLINE FOR

Illuminating Streets, Stores and Dwellings.

Accomplished by our entirely new method of long-distance lighting in practical operation at St. Louis for the last two years

HEISLER ELECTRIC LIGHT COMPANY,
809 to 817 S. SEVENTH ST., ST. LOUIS, MO.

The Telegraphers' Mutual Benefit Association. A FRATERNAL LIFE INSURANCE SOCIETY.

Twentieth Year.

For Particulars. Address CHARLES P. BRUCH, Secretary,
Box 3175, New York.

STYLUS

Agate, Steel, Bone, Porcelain & Gutta Percha
Mounted on

Ebony, Pearl and Cedar Handles.

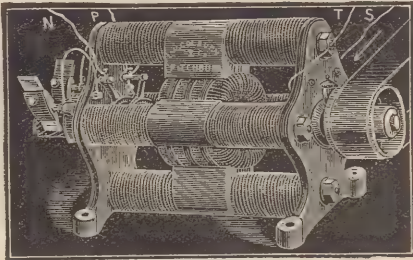
A great variety.

Send to the Manufacturer for Price List.

L. H. ROGERS, 75 Maiden Lane, N. Y.
Headquarters for Manifold Books,
Carbon Paper.

See cut of Styluses, page 11, Jan. 1, 1888.

I. W. COLBURN & CO.
130 MAIN ST., FITCHBURG, MASS.



Machines for Arc and Incandescent Electric
Lighting. Electro-Plating and
Experimental use.

Send for large Illustrated Catalogue, also "Hand-
Book of Ready Reference." Vest-pocket edition.

NELLIE HARLAND.

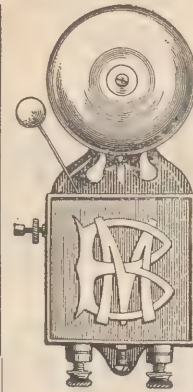
A Romance of Rail and Wire.

Handsomely bound in cloth and gold, with an artistic design descriptive of the title on the cover. A beautiful and appropriate gift book for the Telegraph Operator to present to his sweetheart, wife, children or friends. Price \$1.00. Sold at all book stores, and sent by mail, *postage free*, on receipt of price, by

Elmer E. Vance,

304 N. High St., Columbus, Ohio.

Send for Circular of Press Comments.



\$2.00

Bell Outfit.

Bell, \$1.00.

Battery, .80.

Push Button, 10.

50 ft. Wire, .15.

Electrical Supplies

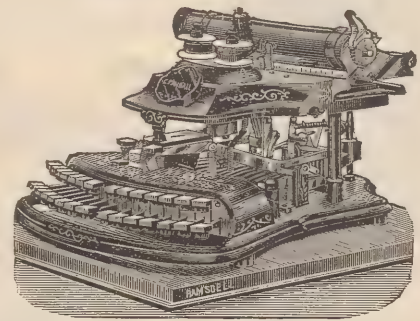
of every description.

MOORE BROS.,

108 Liberty St., N. Y.

The New Model Crandall

A PERFECT TYPE-WRITER.



PRICE, \$75.00.

BEST FOR TELEGRAPHERS!

This machine meets the requirements of Telegraph Operators better than any other Type Writer on the market. It is speedy, almost **Noiseless**, has perfect alignment and **writing in plain sight**, even to the last letter, thus allowing the operator to correct the "bulls" of a "blind" sender without the delay of shifting the carriage. **It is the cheapest** standard writing machine in the world. Send for circulars and illustrated catalogues to the

IRELAND BENEDICT CO., (Limited),

Sole Agents, Binghamton, N. Y.

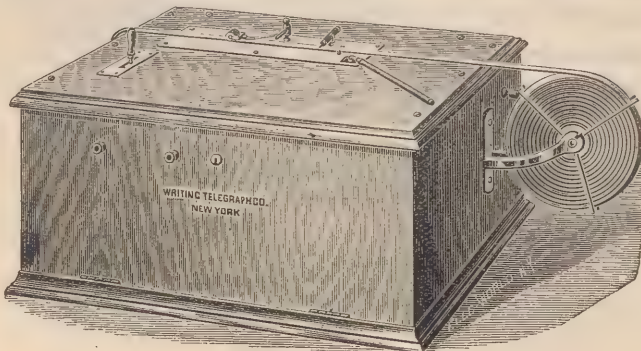
NEW YORK OFFICE,

B. G. GRANVILLE, MANAGER.

157 BROADWAY,

WRITING TELEGRAPH CO.,

57 Murray Street, New York.



This company owns the Letters Patent which thoroughly control the transmission of written messages by telegraph in the only known practical way, and are prepared to establish Central Office Exchanges as a means of communication between subscribers in cities and surrounding towns.

Communications are written with pen and ink in the handwriting of the person writing the message.

The pen in the office of the subscriber receiving a message makes a fac-simile of every letter as fast as it is made with the pen in the office of the person writing it.

All instruments are under the control of the Central Office, and messages are recorded on the instrument of a subscriber, whether he is present or absent.

All communications are secret, and the written record is of great value in commercial use.

For particulars address

WRITING TELEGRAPH CO., P. O. Box 1322, New York.

SAWYER-MAN ELECTRIC CO.,
 COMMERCIAL AGENT OF THE
CONSOLIDATED ELECTRIC LIGHT COMPANY,
 No. 510 West 23d Street, New York.

August 1st, 1888.

To all Users of Incandescent Lamps:

Experience has demonstrated that the life and utility of the Incandescent Electric Lamp is increased and the cost of its manufacture diminished by a decrease of the electromotive force. We have, therefore, decided to divide our commercial lamps into three classes, viz: HIGH, MEDIUM, AND LOW VOLTAGE LAMPS; of which classes, 100, 75 and 50 volts, respectively, shall stand as the types.

This Company, the first to give to the consumer the benefit of such classification, is enabled, by reason of increased manufacturing facilities, afforded by the enlargement of our New York and Pittsburgh Factories, and by reason of valuable improvements made in the lamp, to offer the following reduction in prices for lamps with our

~~~~~ STANDARD BASES ~~~~~

Subject to Discounts for Central Station use and to purchasers of original packages of 250 each.

| C. P.          | 50 VOLT. | 75 VOLT. | 100 VOLT. |
|----------------|----------|----------|-----------|
| 16, and under, | \$0.70   | \$0.75   | \$0.80    |
| 20,            | .75      | .80      | .85       |
| 24,            | .80      | .85      | .90       |
| 32,            | .90      | .95      | 1.00      |

Three cents will be paid for the return of every Lamp Base with the Platinum wire intact, delivered in good order at either of our factories.

For the purpose of obtaining uniformity of production, and of reducing the cost of manufacture, we offer to purchasers of our lamps our Standard Sockets, without charge, in exchange for any other socket in use by them.

**CORRESPONDENCE SOLICITED.**

**SAWYER-MAN ELECTRIC COMPANY.**

**THE MITCHELL VANCE COMPANY,**

SUCCESSOR TO MITCHELL, VANCE & CO.,

Designers and Makers of Electroliers and Combination Fixtures for any of  
 the Incandescent Light Systems now in use.

The reorganized company desire to inform electric light companies and the trade in electric light fixtures that it is now fully prepared to supply their wants promptly in goods of its manufacture, viz:

**ELECTROLIERS, REFLECTORS, FITTINGS, CUT-OUTS,**  
**LAMP SHADES, PENDANTS, BRACKETS, INSULATING JOINTS,**  
**GLOBE HOLDERS, GLOBES, ETC., ETC.**

This company being the successor to the business and complete manufactory of the late Mitchell, Vance & Co., would also call attention to the fact that the former company has supplied combination and electric light fixtures to some of the first electric light plants erected in this country.

It can point with pride to the many fine buildings, both public and private, throughout the United States in which the old company has furnished combination and electric light fixtures of artistic design, excellence and acknowledged utility.

It solicits correspondence, and supplies information promptly in answer to any inquiries for fixtures to carry incandescent lamps.

It makes a specialty of supplying correct designs in harmony with architecture and interior decorations at reasonable prices.

Architects' and decorators' designs and suggestions carried out with fidelity to the given motive.

All persons interested in the purchase of these goods are cordially invited to call and examine a large stock now on exhibition at the warerooms.

Gas and electric fixtures are shown lighted up. Novelties of practical use are being added daily to the show rooms to illustrate this growing method of lighting buildings.

MANUFACTORY:

24th & 25th Streets & 10th Avenue,

WAREROOMS:

836 & 838 Broadway & 13th Street,

NEW YORK CITY.



## OLD TIMERS AND MILITARY TELEGRAPHERS.

The Military Telegraphers met in annual session at Chicago, Ills., on Aug. 15, the following members responding to the roll call: W. R. Plum, P. Bruner, W. L. Ives, Jos. Knittle, J. E. Pettit, J. N. Crittenton, J. W. Atwell, H. W. Plum, S. B. Fairchild, W. H. Woodring, Day K. Smith, J. D. Cruise, Geo. C. Maynard and A. H. Bliss.

Mr. W. R. Plum was re-elected president and J. E. Pettit, secretary.

President Plum then delivered his address, from which we quote the following extracts:

I have mainly argued the services and sufferings of the United States Military Telegraph Corps of the late war, showing that without its aid the rebellion, if crushed at all, would have resisted much longer; that ours was the first practical demonstration of the telegraph for general and tactical war purposes; that in no former war was commanders so well advised of events and orders; that no corps were ever before so confided with army secrets; that its percentage of casualties in killed, wounded, captured and deaths was not much below that of other branches of the army; that for its service and sufferings the corps has been dismissed without thanks or honors. I strove to show that the 15,000 miles of telegraph connecting all of the armies with Washington, except those along the coast and below Memphis, connecting all the divisions of each army, even upon the battlefield itself, was the trusted courier of the Union forces in transmitting a yearly average of 1,300,000 military telegrams, largely in cipher, the keys to which were exclusively confided to telegraphers; I aimed to demonstrate our services in supplying and fighting an army, and in tapping the enemy's wires, as spies, and on raids, to prove that our armies have won victories and escaped defeat by our timely help, and raided the enemy's country with wonderful success owing to information stolen from rebel wires. In short, I assumed the burden of proof as to facts, and sought a verdict on the merits.

During the war efforts were put forward by telegraphers in the departments to organize the corps on the basis of the engineers or signal corps. But it was represented that the Secretary of War was opposed to it, lest every officer of higher rank would assume to command us, and there were not wanting those in authority who feared its influence upon private companies; that commissions in the telegraph service would tempt men from the wires in the free States, where they were greatly needed, and now, because they were not given, our service is still unrecognized, and not an operator of that corps has ever received a pension, an acre of land, any bounty, or a thank you. Only our officers, who were commissioned solely to command us, have been honored or recognized. Since our demonstration of the usefulness of our corps, our own and every European army has established its telegraph service on a strictly military basis.

It was seventeen years after the war before any effort looking to congressional recognition was made. In that time Congress and history were as silent as the graves of our fallen comrades, concerning this new art in war and its volunteer devotees. Our officers were geneared and coloneled while we were nothinged. That they deserved their honors only emphasizes the measure of ours unsung, and anomalizes our corps in the history of military affairs as the only one known where the officers were the sole recipients of a people's gratitude.

The services performed by the corps, which increased with the necessities of the Army, were of such importance and efficiency that every European nation, and our own Government, have since re-organized their army systems so as to include an electric telegraph corps to perform precisely the same telegraph duties that were required of the United States military telegraph corps in question.

In addition to their strictly military telegraph service the operators were, especially in the latter years of the war, the

custodians of all cipher keys, and required to put into cipher and translate all important dispatches, and thus they became and continued throughout the war, most confidential and trusted aids, engaged in the courier service, transmitting about 6,000,000 dispatches.

This corps, consisting of about 1,200 operators and a sufficient force of line men, built and operated 15,389 miles of telegraph lines for military purposes, including 1,000 miles field wires, which latter were oft-times worked on the field of battle and under a heavy fire.

Of this corps Secretary Stanton officially reported 'that the military telegraph has been of inestimable value to the service, and no corps has surpassed, few have equalled, the telegraph operator in diligence and devotion to duty.'

As the next is the short session of Congress, it was deemed advisable to allow the bill now pending before Congress to remain as it is until the next meeting of the Military Telegraphers, when it is proposed to raise a sufficient amount of money to defray the expenses of keeping a man in Washington to attend to the measure properly.

The following was ordered telegraphed to Washington, as expressing the sentiment of the Association.

CHICAGO, ILLS., Aug. 15, 1888.

MRS. P. H. SHERIDAN, Washington, D. C.—The Society of the Military Corps in annual reunion assembled, unanimously direct me to telegraph their sincere sympathy for yourself and children over the recent demise of our great commander, whose recognition and commendation of our services during the war, together with his own great achievements, has endeared him to our memories.

[Signed]

WM. R. PLUM, President,

THE OLD TIMERS.—The old timers met on August 16, Mr. Dugan, the vice president, occupying the chair in the absence of President Brooks, who was unavoidably detained in Philadelphia. The minutes of the previous meeting were adopted. The following were elected members. R. H. Morris, P. V. DeGraw E. P. Whitcomb, Anson Gordon, and three or four others. The treasurer's report showed that the expenses were \$168.59 leaving a balance of \$601.26 in the bank.

Secretary Dealy made a few remarks regarding the collection of old time reminiscence, stating that most of the members were relax in contributing their recollections.

Mr. J. D. Reid observed that the trouble was that many of the old timers could not furnish relics until they had passed away, which created much amusement. Louisville, Ky., was selected as the next place of meeting and the second Wednesday and Thursday of September as the time.

Messrs. Reid, Rosewater and Fairchild were appointed a committee to draft resolutions of sympathy on the death of several members which have occurred since the last meeting.

The following was then adopted:

*Resolved*, That the Secretary of the association is hereby directed to procure from each member of this society the date he respectively commenced telegraphing, also the place, together with individual reminiscence, photographs, relics, mementoes, manuscripts, etc., with a view of establishing at some permanent location a collection of interesting relics and mementoes of the early telegraphs in America, and publishing a historical memoir of pioneer telegraphers.

Regrets were then read from Superintendent J. F. Wallick, of Indianapolis, who invited the members to visit his city on their return.

Mr. Chas. E. Taylor was elected President for the ensuing year. Mr. Day K. Smith was elected Vice-President and W. J. Dealy re-elected Secretary and Treasurer. Executive Committee: R. J. Hutchinson, of New York; S. B. Fairchild, of St. Louis; J. M. Turner, of New Orleans; Uriah B. Wilson, Denver.

Colonel Taylor was called upon for a few remarks and he



responded in his usual happy manner, when he assumed the president's gavel.

Thanks were voted Mr. J. J. Gore and others for extended courtesies, and the following resolution was adopted:

*Resolved*, That we express to Comrade A. H. Bliss, chairman of the Committee of Arrangements, and his associates, our sincere and grateful thanks for the magnificent manner in which they have arranged for our comfort and made our visit to Chicago, the great railroad centre of the country, one that will remain bright in our memories until the last roll-call shall be made.

MILITARY TELEGRAPHERS.—A committee of three was appointed to revise the constitution by the Military Telegraphers. A committee of one on transportation was also appointed.

J. D. Voltz was elected a member of the corps, after which an adjournment was taken to afford the members an opportunity to participate in the excursion on Lake Michigan.

THE EXCURSION.—The excursion was a very enjoyable affair, lasting about three hours. Mr. Ed. Whitford, the well-known "old timer," of Chicago, used every endeavor to persuade the visitors that they were sea-sick. He was quite successful so far as W. L. Ives, of New York, and Chas. E. Taylor, of Kentucky, were concerned. Both gentlemen, by their pallid countenances, convinced all present that they seldom, if ever, look upon water with any degree of comfort. Mr. Whitford continued his jokes during the entire trip to the amusement of all present, who regarded "Ed." as a whole circus in himself. A good many stories got afloat in the course of the afternoon. Some one made E. P. Whitford blush by telling how when he got cornered down in Texas once he yelled lustily for Jeff Davis. Whitford is manager of the market reports on the Board of Trade. About the wind-up of the war he was sent to Orange, Texas. He was the only man in the state who had a white collar, and he also sported a pair of patent leathers. He went to all the hops in the neighborhood and that got him into trouble. He danced with the other fellows' girls. One night he was going home when a half dozen disgruntled Texans met him.

"See here, Whitford," said one, "we suspect you ain't quite straight."

"Oh, yes, I am. I come from Tennessee. There ain't any Yankees over there."

"Well, we'll hear you holler for Jeff a few times, anyway."

Whitford hallooed once, twice, three times.

"Try again," said the leader.

Whitford took off his hat and made the welkin ring with hosannas for "Jeff."

"Why shouldn't I," put in Whitford. "Every devil of them had two six-shooters, and I would not have been here if I hadn't."

A. H. Bliss escaped capture by the rebels by climbing a tree and hiding in the foliage till the rebel cohorts had disappeared. To this day Mr. Bliss is taunted with being up the tree.

Jas. E. Pettit, was captured on the Tennessee river and sent to Cahava prison in Alabama. It wasn't a nice place, and before he got away from it his skin dropped off in flakes. All of his companions but one died in the prison.

William J. Dealy was the first union operator captured during the war. He was corraled in Baltimore.

Charles E. Taylor is from Frankfort, Ky. He used to be a Johnny of the worst sort, but he's reformed now and is the most red-hot union man of the whole telegrapher's outfit.

E. C. Tomlinson is superintendent of excise, New York. He's another old, old Johnny who now wears the stars and stripes close to his heart. He and Taylor were both captured during the war and at the same time. They hadn't met for twenty-four years until they came to this reunion, and the hugging that ensued was sublime.

Mr. Jesse H. Bunnell is credited with saving Fitz John

Porter's army at Gaine's mill. Bunnell was driven from his station during the engagement, but he took his instrument along and getting behind a big tree for shelter tapped the wires and received reinforcements from McClelland. Several of his messengers were shot.

THE BANQUET.—In the evening the members of the two associations and their ladies were dined and wined in one of Kinsley's spacious banquet halls. The guests were seated about small tables in convenient groups here and there, with a long table at the left at which were seated the guests of honor, who occupied chairs facing the company. The tables were very tastily decorated with clusters of roses. The menu was one of Kinsley's choicest, and consisted of dishes rich and delicate, and wines rare and costly.

President Plum occupied the center seat, and on his right and left were such guests as Colonel R. C. Clowry, Charles E. Taylor, the new president of the "Old Timers" Association; D. K. Smith, George C. Maynard, Irwin Dugan, W. J. Dealy, J. E. Pettit, J. D. Reid, W. W. Smith, Philip Bruner, Anson Gorton, A. W. Nohe and Stephen Mason.

President Plum acted as toastmaster, and was assisted by Colonel Clowry. After the menu had received proper attention, Mr. Plum, in a few neat and complimentary remarks, introduced Mrs. Tomlinson, the wife of one of the veteran telegraph operators, who rendered "Sweet Roses," with charming effect. She sang, "O Happy Day," as an encore piece, and was highly applauded. The president then read a letter from Charles Smith, manager of the Western Union office at Louisville, promising the two associations a warm reception at Louisville next year. Letters of regret and congratulation were read from W. D. Willett, W. G. Fuller, R. D. Hoover, Clarence E. Stump, "Billie" Barr, and others. President Plum then proposed the first toast of the evening. He said, as the company arose with their glasses in their hands: "Here is to Professor Morse, the inventor of the telegraph. God gave him to us, and after fulfilling his noble mission God has taken him away."

He called upon Mr. James D. Reid, of New York to respond. Mr. Reid who has been closely identified with the telegraph business since the discovery of the use of electricity said: "If these unions had no other power than cementing the hearts of the members together they would have a grand purpose. He then turned to the subject of his toast, and said he could only mention Professor Morse's name with a peculiar reverence. He then spoke of the times when the man of history used to frequent his office, and said he regretted that much had been printed of late regarding Professor Morse not being the inventor of the telegraph instrument. Professor Henry in a letter, declared that Morse was the inventor. He also referred to the article in the *Century* relating to Alfred Vail's inventing the registering instrument, and said he claimed to be the maker of the first good-looking instrument. Vail deserved great credit for what he had done, but Morse was the discoverer. "I shall always defend my friend, Professor Morse. He was a great man and a kind hearted man." Having paid his friend, Charlie Taylor, a deserving compliment, he closed by reciting some appropriate verses.

The next toast was to the ladies, and was responded to by Mr. J. B. Taltavall.

Mrs. Tomlinson then rendered "A Treasure Divine," and A. H. Bliss responded to the toast the "Army Operators." The President made an appropriate allusion to the service of the men, and Colonel C. E. Taylor shouted, "God bless them." As a Confederate soldier, I say.

Mr. Bliss' response was a happy one and was well received. He referred in glowing terms to the veteran operators of the war, and said he defied any one to point a single instance when one of them failed to do his country service. "The Boys" was the next toast, and was responded to by W. L. Ives. Mr. Ives also sang "Bingen on the Rhine."



Those present were :

|                       |                       |                         |
|-----------------------|-----------------------|-------------------------|
| Anderson, D. S.,      | Farnsworth, Geo.,     | Pease, Mrs. H. L.,      |
| Anderson, Mrs. D. S., | Fullon, T. B.,        | Powers, E. L.,          |
| Atwell, J. W.,        | Finigan, T.,          | Plum, H. W.,            |
| Atwell, Mrs. J. W.,   | Gordon, Anson,        | Plum, Mrs. H. W.,       |
| Atwell, Miss Cora S., | Hutchinson, R. J.,    | Reid, J. D.,            |
| Bruner, P.,           | Huddleston, G. W.,    | Richardson, Miss Ida    |
| Bliss, A. H.,         | Hector, Eugene,       | Robinson, S. L.,        |
| Bliss, Mrs. A. H.,    | Ives, W. L.,          | Smith, D. K.,           |
| Bliss, Miss Rose,     | Jones, L. S.,         | Spencer, Miss Clara,    |
| Bain, Miss,           | Jones, C. S.,         | Stevely, Walter,        |
| Bressels, F.,         | Jones, Mrs. C. S.,    | Stephenson, R. G.,      |
| Booth, L. N.,         | Kelchner, W. W.,      | Smith, Dr. G. S.,       |
| Brant, J.,            | Knittle, J.,          | Taylor, Col. C. E.,     |
| Bennett, A. M.,       | Knight, Miss,         | Taylor, Mrs. Col. C. E. |
| Bennett, Miss G. A.,  | Lloyd, W. J.,         | Tomlinson, E. M.,       |
| Clowry, Col. R. C.,   | Lloyd, B. F.,         | Tomlinson, Mrs. E. M.   |
| Clowry, Mrs. R. C.,   | Maynard, Geo. C.,     | Taylor, R. A.,          |
| Cambridge, A. G.,     | Mason, S. C.,         | Taltavall, J. B.,       |
| Crittenton, J. N.,    | Mitchell, A. J.,      | Turner, J. M.,          |
| Cruise, J. D.,        | McKenzie, K.,         | Vincent, H. C.,         |
| Dealy, W. J.,         | McKenzie, Mrs. K.,    | Vincent, Mrs. H. C.,    |
| Dugan, Irwin,         | Norcross, E. L.,      | Voltz, J. D.,           |
| Dickerson, J. W.,     | Norcross, Mrs. E. L., | Wright, A. W.,          |
| Dugan, R. W.,         | Nohe, A. W.,          | Wright, Mrs. A. W.,     |
| Dugan, Mrs. R. W.,    | Newton, Chas.,        | Woolsey, R. B.,         |
| Dugan, R. W., Jr.,    | Pettit, J. E.,        | West, W. D.,            |
| Dugan, G. M.,         | Plum, W. R.,          | Woodring, W. H.,        |
| Dugan, Mrs. G. M.,    | Plum, Mrs. W. R.,     | Weller, A.,             |
| Elon, George,         | Pickard, W. W.,       | Whitford, E. P.,        |
| Fairchild, S. B.,     | Pease, Dr. H. L.,     | Whitford, Mrs. E. P.    |



In this cut we present to our many readers the portrait of Mr. Elmer E. Vance, the author of the new railroad and telegraph novel, *Nellie Harland*, a romance of rail and wire, which we reviewed in an article of some length in our issue of August 1st. The author of this popular romance was born in Newark, Ohio, March 1860, learned telegraphy in the office of Superintendent of Telegraph, J. D. Flynn, at that time with the Baltimore and Ohio Telegraph Company, at Newark, O. Mr. Vance for the privilege of learning the art, made himself generally useful as messenger boy for the office. His progress was so rapid that at the end of seven months he was placed in a position as night operator

at one of the junction points on the Chicago division of the B. & O. road near Chicago. In the following two years he worked at various places for that company between Chicago and the Ohio river. He was then stationed permanently at Columbus, where he has been located for the past eight years as night operator at the Union Depot in a joint office, doing alone the work for four railroads, working nine wires. Mr. Vance has but an ordinary, common school education, his writing qualities being natural and not acquired by years of hard study in a classic course, as is the case with a great many of our writers of to-day. He also is a natural musician, being a skilled performer on a number of instruments, the piano and banjo being the favorites. His unusual talent has been turned to good advantage financially, he having taught large classes of pupils for several years past and his services are in demand at present to such an extent that he is compelled to turn pupils away daily. Being a man of active mind he has not confined himself wholly to telegraphy and music, but has branched out in other directions. His speculations always being successful, he has become the owner of quite a respectable amount of valuable real estate in Columbus.

His latest venture (a novel) was a surprise to many of his friends, though they had somewhat ceased to be surprised at anything he might do. He is now engaged in perfecting an electrical appliance for the stage, which will when completed gain for him a universal reputation which he deserves as a genius. The above cut does not do justice to the subject of our sketch, as it makes him appear older than he actually is, while he really looks much younger in fact, almost boyish in appearance. The expression is also too severe, but in other respects it resembles him closely. The well-known publisher, G. W. Dillingham, of New York, has brought out his book in a handsome and attractive form. The press comments from all parts of the country are very flattering, and his book has already reached its second edition. Every telegraph operator and railroad man of the country will eventually be the owner of a copy of this pleasing and instructive novel.

#### THE FASTEST RAILROAD TRAIN IN THE WORLD.

Competition between two of the great English lines of railroad, says the *Scientific American*, has recently taken the form of cutting down the running time. The London and North-Western and the Great Northern, striving against each other for the traffic between London and Edinburgh, have reduced the running time between these points to eight hours. By the first named road the distance is 401 miles, by the other it is 397. For the entire distance the schedule is slightly exceeded by the short B. & O. run between Baltimore and Washington, 40 miles in 45 minutes. But the length of the trip removes it from the comparison. On the North-Western road one run without a halt of 158 miles in three hours is a part of the trip. This exceeds the run from Fort Wayne to Chicago by 12 miles. To realize what this speed means, it may be compared with the trip from New York to Chicago by the Pennsylvania Railroad. The same speed would reduce the time between these points to a little over eighteen and one-half hours. It has been suggested that an afternoon train should leave New York and should reach Chicago in time for business the next day. The above proves the practicability of such a project.

**RUMORED TELEGRAPH TRUST.**—A rumor is being circulated to the effect that Jay Gould proposes to sell his Western Union interests to a syndicate of leading financiers, including John Mackay. This syndicate will be composed of Drexel, Morgan & Co., Brown Bros. & Co., Kidder, Peabody & Co., and their English connections, together with the Vanderbilts, who formerly held the controlling interest in the Western Union and sold the same to Gould.



**LIGHTNING CURED HIM.**—Until a few days ago Jacob Miller, who lives in Cobb County, Georgia, had not walked in seven years on account of the contraction of the muscles of his leg. During a recent storm, while sitting under a tree, a stroke of lightning shattered the top of the trunk of the tree. Miller says he felt the current of electricity pass through his body, and he thought death was upon him. In attempting to get his crutch he found that his lame leg was almost straight, and he has walked without assistance ever since.

**THREE NEW CABLES.**—The *Toronto Mail* states that Mr. F. N. Gisborne, electrical engineer of the Public Works Department of Canada, will visit the North-West and British Columbia on official business this fall. Before doing so he will lay three Government cables, one between Kingston and Howe Island, the second from Howe Island to Wolf Island. The third cable will connect Pelee Island in Lake Erie with the mainland. The latter cable will weigh 21 tons.

H. A. Stares, engineer, representing the Western Electric Company of New York, has been engaged to lay a new telegraph cable between Astoria, Oregon, and Fort Canby, in place of the one broken two years ago by a vessel dragging her anchor. It has been found impossible to fish up the old cable, as it seems to be covered by the sand. The new cable will be laid at once.

A novel electric railroad is undergoing construction in a suburb of St. Paul, Minn. The railroad is an elevated structure, and the cars are hung below it close to the street level. They hang from sets of wheels, taking their power from the tracks, which are charged with electricity. A speed of from eight to ten miles an hour is claimed for the cars.

Messrs. Elihu Thompson, J. W. Howell, Wm. Maver, Jr., and Frank J. Sprague have been warmly thanked for their interesting and profitable addresses, by Commander Goodrich, on behalf of the Torpedo class at Newport, R. I. We learn that these gentlemen have also been tendered the thanks of the Navy Department for their services.

Colonel Gourand, representing Mr. Edison at London, Eng., gave an exhibition at his residence at Norwood August 14, of the inventor's loud-speaking phonograph. A number of journalists and many persons prominent in art and literary circles were present, and all were astonished at the results obtained.

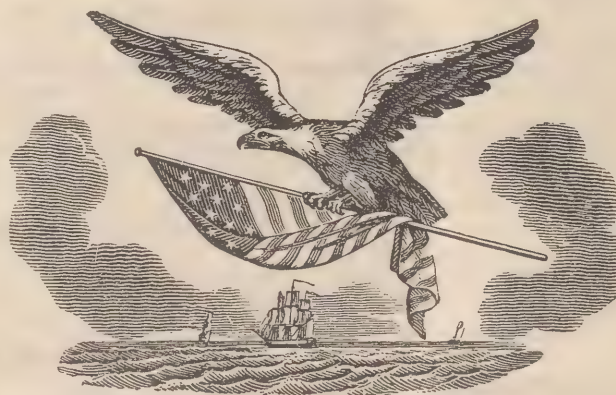
Mr. D. I. Carson, general manager of the Southern Bell Telephone Co., New York, has accepted the secretaryship of the Telautograph Company.

Milwaukee, Wis., desires to improve her street railway system. Nothing could be easier providing electricity is selected.

President S. A. Duncan, of the National Electric Light Association has fully recovered from his recent illness.

ESTABLISHED 1823.

**ALBERT H. DAKIN,**  
(SON OF THE INVENTOR.)



MANUFACTURER OF THE  
**EAGLE BRAND OF MANIFOLD**  
AND  
**CARBON PAPERS,**  
FOR  
**STYLUS AND MACHINE WRITING,**  
**60 BARCLAY ST., NEW YORK.**

Prices on application.

**BOOKS.**

- Bottone—Elec. Instrument Making..... \$1.20
- Du Moncel—Electro-magnets, trans. by Wharton..... 75
- Fahie—History of Elec. Telegraphy..... 3.00
- Hedges—Elec. Light Precautions..... 1.00
- Holmes—Electric Lighting..... 1.00
- Hospitalier—Domestic Electricity..... 3.00
- Munro and Jamieson Pocket-book..... 2.50
- Solomons, Sir D.—Accumulators..... 1.25
- Stephens—Electric Lighting..... 1.00
- Walker—Dynamo Building..... .80

Catalogue and circulars free on application

**E. & F. N. SPON,**

12 Cortlandt St., NEW YORK

40 Page illustrated Catalogue of

**RUBBER STAMPS**

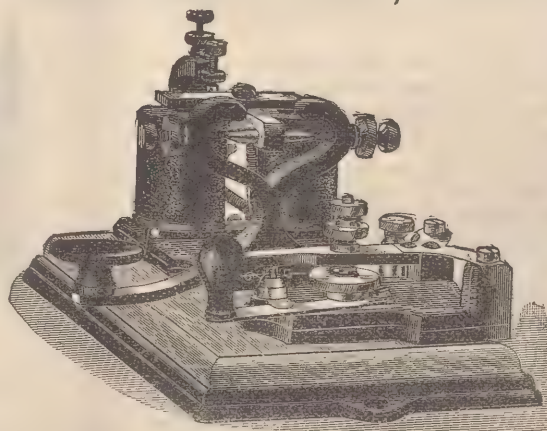
Steel Stamps, Stencils, Seals, &c.

Sent Free on Application by Postal to

**S. W. REESE & CO,**

29 CHURCH ST., NEW YORK

Liberal Discount to Dealers, Send for Reduced Price List.



No. 2 O.K. Outfit

WITH SOUNDER AND KEY

on same base, or separate, as ordered.

Complete Outfit, - \$3.75

Sounder, - - - - 2.25

Key, - - - - 1.00

Sounder and Key on one Base, - - - 3.25

The above Outfit consist of a beautiful Sounder wound to 20 ohms, and one of my unrivaled Nickel Plated, Legless, Steel Lever Keys; One Cell 5x7 Battery (or 6x8 Battery, 10c. extra); 15 ft. Insulated Office Wire, 1 lb. Vitriol, 1 Instruction Book, all safely packed and will be shipped on receipt of price, or sent C. O. D., subject to inspection, if you send me \$1.00 with order. State whether you wish Key and Sounder on same Base or separate. Write your address plain and full, also state by what Express Co. wish goods shipped. Address,

**A. B. LYMAN, 34 and 36 South Water street, Cleveland, Ohio.**



TELEGRAPH SIGNAL TOWER AT FIRE ISLAND  
(*New York World.*)

(Continued from page 16 of issue of August 16.)

"You have some interesting experiences during your lonesome watches," said the reporter.

"Yes. You know the disaster to the steamer Oregon was reported from here. The steamer sunk on Sunday morning, March 14, 1887. I had scheduled her to pass about sunrise, and so about 5:20 I swept the horizon with my glass and saw a thread of smoke rising above the line of the ocean. I was satisfied it was the Oregon coming up, but I waited and watched for the steamer to come nearer. When her smoke-stacks came above the horizon I saw there was something wrong, but what I could not make out, as the steamer showed no signals of distress. At 6:45 o'clock I sent the following telegram to the main office:

FIRE ISLAND BEACH, March 14, 1887.

*Western Union Telegraph Co.:*

Steamer Oregon, southeast, bound in, apparently in trouble. KEEGAN.

"An hour after I first sighted the steamer she changed her course and headed for the beach, showing the British ensign at her masthead, union down. This was the last resort, and I knew the steamer needed assistance at once. I looked around to see if there was anything I could signal to go to her assistance, and saw pilot-boat No. 11 and the schooner Fanny Goram and signalled them. The ocean was very smooth. The two vessels at once headed towards the steamer. They were so far down the horizon that I could not see the boats in which the passengers were transferred. They were all safely landed on the schooner. The Oregon was gradually sinking below the horizon, and I could not tell whether she was going down or drifting away. Later I saw the steamer Fulda come up and stop. She took the passengers off the schooner and proceeded on her way. As she passed me she signalled, 'Oregon sunk. Passengers all saved on board.' This message I reported to New York at once."

The pilot-boat No. 11, named the Phantom, referred to by Mr. Keegan, foundered at sea during the blizzard and all hands were lost. A ball of one of the Oregon's masts is still preserved by Mr. Keegan as a memento.

"The first information of the stranding of the Scotia was reported from this station," said Mr. Keegan. "She struck on the shelving bar about fifteen miles east of here. I first discovered her headed for the beach about 5 o'clock in the morning, with both masts gone. Later I was able to make out her name from her signal flag, which had been suspended from her smoke-stack."

"Did you see the Hilton Castle, which foundered off here somewhere?" asked the reporter.

"Yes; I saw her the night before. She made no signals, and, not being a passenger boat, I had no special object in watching her. She foundered during the night. I saw the boats which contained her crew in the morning, and saw the life-saving crew go out and bring in the boat containing eight men, and a little later saw a schooner pick up the other boat. These facts I reported at the time.

"I suppose I saw the last signal of the ill-fated pilot-boat Columbia," continued Mr. Keegan. "She disappeared and is supposed to have been run down by the Alaska off Fire Island. On the night in question I saw the Alaska and reported her as passing. In a few minutes I saw a pilot boat showing her signal. Later the lights of the pilot boat disappeared and only the lights of the Alaska were visible in the darkness. She appeared to be searching in the vicinity and did not leave until daylight. She reported the collision. All the men on the Columbia were lost."

The Western Union Telegraph Co., will place its wires underground in Buffalo, N. Y.

THE INTERSTATE TELEGRAPH BILL.

In the Senate on the 10th inst., the bill to regulate commerce carried on by telegraph, introduced by Mr. Spooner, in January last, was passed without discussion, objection or division. The bill is similar in its provision to that regulating railway traffic, and is fully as binding upon telegraph companies as the Interstate Commerce act is upon railroads. It provides against discrimination in all its forms, and compels just and reasonable rates. It makes it unlawful for any telegraph company to enter into any combination with any competing telegraph company, to divide the aggregate or net proceeds of the earnings of such companies upon their respective lines, or any portions thereof.

The Interstate Commerce Commission is to have authority to inquire into the management of the business of telegraph companies and to keep itself informed as to the manner and method in which the same is conducted, and shall have the right to obtain from such companies all information necessary to enable the commission to perform its duties.

The commission is authorized to require annual reports from all telegraph companies and to require specific answers to all questions upon which the commission may need information. Such annual reports shall show in detail the amount of capital stock issued, the amounts paid therefor and the manner of payment for the same; the dividends paid, the surplus fund, if any, and the number of stockholders; the funded and floating debts and interest paid thereon; the cost and value of the company's property, franchises and equipments; the number of employees and the salaries paid each class; the amounts expended for improvements each year; how much expended and the character of such improvements; the earnings and receipts from each branch of business and from all sources; the operating and other expenses; the balances of profit and loss, and a complete exhibit of the financial operations of the company each year, including an annual balance sheet. The act is to take effect November 1, 1888.

## The Equitable Life Assurance Society.

GEORGE F JOHNSON,

Manager, Metropolitan District, 120 Broadway, New York.



OFFICE HOUR: 3 UNTIL 4 P. M.

Telephone Call, 706 Law.

Especial attention to Investment, Semi-tontine Policies, Endowments, annuities, etc., etc.

ASSISTANTS—Phil. Stiner, Geo. S. Scott, H. M. Davis, F. E. Craig, Z. L. Hawkins, Chas. J. H. Child, Leo Greene, Chas. Barmore, F. H. Edgar and Joseph Byrnes.



CHICAGO NOTES.—Chicago during the past two weeks has been alive with old-time and military telegraphers. It is surprising how many ex-telegraphers there are who are now engaged in other business and who are extremely prosperous. During the recent Old Timers and Military reunions, the visitors called at the various telegraph offices and those from New York City were quite taken back at the enormous growth of the business in this city. Surprise was expressed at the great number of telegraphers required to work off the business on the floor of the Board of Trade, where fully one hundred and fifty operators are constantly employed. Under the direction of the efficient manager, William J. Lloyd, the immense volume of business handled by the Western Union is disposed of in short order. The writer was deeply impressed with the sincerity of the praise of the Lloyd management uttered by General Superintendent and Vice-President Clowry and District Superintendent Tubbs and Assistant Superintendent Uhrig, all of whom declared it to be the best management for the employer and the employes ever enjoyed by Chicago. This unanimity of feeling was manifest in all quarters of the large office.

Mr. Lloyd personally conducted the visitors around his department and pointed out the numerous objects of interest. He has around him an efficient staff of chiefs and operators who are thoroughly capable of coping with "rushes" of any magnitude. Among the visitors who highly complimented the Chicago management were Mr. W. J. Dealy, manager of the New York office, chiefs, Lant S. Jones and R. G. Stephenson, of New York; J. B. Taltavall, of the ELECTRIC AGE, New York, and many others.

Alderman Nohe, Walter Steveley, Frank Brassels, B. F. Lloyd, D. S. Anderson, E. P. Whitford and many other well-known Chicago gentlemen were constantly in attendance of the visitors for the purpose of escorting them to the various places of interest.

Mr. R. B. Woolsey, the veteran train dispatcher of Terre Haute, Ind., who was present at the reunion, possesses the box relay which General Anson Stager carried with him through the war. It bears Mr. Stager's name and is considered one of the most interesting relics among the old timers.

Dr. G. S. Smith, of this city, who was present at the banquet, was the first operator in the State of Illinois.

When the visiting members appeared in the gallery of the Board of Trade, escorted by Mr. A. H. Bliss, quite an ovation was tendered that gentleman, who is a prominent member on 'change. The cheering was a well deserved compliment to both Mr. Bliss and the delegates.

Mr. James D. Reid was the central figure wherever he happened to be.

Superintendent Tubbs and Assistant Superintendent Uhrig, of the Western Union, were extremely courteous in the extension of favors to the visitors.

Chicago's hospitality will ever be remembered by those who were fortunate enough to be present at this most successful reunion.

ATLANTA, GA., NOTES.—Manager Stephens and family have returned from the mountains of North Georgia, also Night Chief Murray from a two month's sojourn among the mountains of Virginia. During Mr. Murray's absence Ed. Wood held the position as night manager, while Joe Baldwin relieved Mr. Wood as traffic chief. Miss Cohen is visiting friends in Athens. Messrs. Curran, Dunn, York and others have recently returned from their usual summer vacations, much improved in health. Messrs. Jones, Giddens and Guy are rambling through the southwestern part of the State. Mr. B. Alston, of Washington fame is also taking his annual summer vacation. He is one of the oldest operators in this office. Messrs. Duval, Waldron and Harris are among the recent arrivals.

BANGOR, ME., NOTES.—A telegraph war has been commenced in Maine in which the Canadian Pacific Railroad,

the Maine Central Railroad, the Western Union and the courts of Maine are all taking a hand. E. S. Williams, acting under orders from the solicitor of the Canadian Pacific, began to build a telegraph line along the Maine Central, over which the Canadian Pacific is to run from Mattawamkeag to Vanceborough, a distance of 60 miles. Then the railroad applied for an injunction, and one has been granted, and an officer is on the way from the attorney-general's office to serve it. Meanwhile the Canadian people began also to build along the New Brunswick Railroad, which they own, and which is on Canadian soil, but here the Western Union came in with another injunction, but the erection of poles goes on just the same.

SYRACUSE NOTES.—Mr. S. W. Dunning has resigned his position with the Western Union and departed for Kansas City, Mo., for the same company. While in Syracuse Mr. Dunning made many friends who, although they regret his departure, extend to him their best wishes. E. T. Pardee is spending his vacation in the metropolis and at the sea shore. L. S. Haas is sojourning in Vermont. Miss Jessie Ecker is also absent on a vacation. Messrs. Green, Schermerhorn and Pond are subbing for the W. U. C. N. Stafford and Miss A. V. Wheatley are recent arrivals from Newark, N. Y. J. D. Daggett of Chicago is now with the Mutual Union, vice F. C. Gilbert, transferred to W. U. George H. Graves, superintendent of the Syracuse, Ontario and New York railroad, has resigned his position to accept the superintendency of a division of the Detroit, Lansing and Northern Railroad. Mr. Graves, departure from Syracuse will be generally regretted.

It is said that D. B. McCoy, division superintendent of the West Shore road, will succeed Mr. Graves, filling the new position in addition to that he already holds. T. J. Meaney, formerly of this city, is here from Chicago on a visit. W. J. Francis is subbing at the *Journal* office for Adam Bruce, while the latter is in search of recreation in the northern part of the state.

Referring to your statement, writes a correspondent, quoted from the Bridgeport *Standard* to the effect that "Miss Beda L. Arnold \* \* \* is the first lady telegrapher in the country to take messages on the type-writer, etc." the writer is probably in error. Miss Nellie M. Kelly, of Columbus, who had been taking the regular Western Associated Press report for eight years with a stylus, transferred to the machine soon after it was introduced on that circuit. For two years she has been taking the very heavy report of the wire upon it and *she never breaks*. The claim for Miss Arnold, therefore, would appear to be incorrect, and it may be said further, that the profession has not produced a more accomplished artist in either sex than Miss Kelly.

TELEGRAPH RATES.—The Postmaster General has issued the annual circular prescribing rates to be paid by the government for telegraphing for the year ending June 30, 1889. According to the circular there are ninety-one telegraph companies in different parts of the United States which have accepted the conditions of the act of Congress of July 24, 1866, and which are subject to the provisions of the order of the Postmaster General fixing government rates.

A Western Union party, consisting of General Superintendent Clowry, Superintendents Tubbs, Wright, McMichael, Corbett and Electrician C. H. Summers were in the upper peninsular, Michigan, recently, arranging for a great increase of telegraph mileage, which will bring the north country into much closer connection with the rest of the world.

MARRIED.—Kilbourne-Pettinger, at Virginia City, Nevada, June 30, 1888, by the Rev. Lawrence B. Ridgeley, Ernest A. Kilbourne of Reno, Nevada, to Miss Julia Pettinger of Virginia City, Nevada.



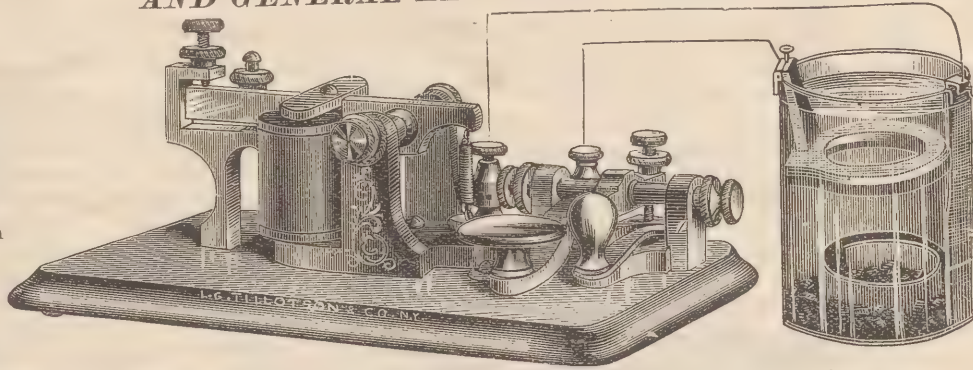
# THE E. S. GREELEY & CO.,

Nos. 5 & 7 Dey Street, New York,

MANUFACTURERS AND IMPORTERS OF AND DEALERS IN

Telegraph, Telephone, Electric Light, Burglar Alarm, Electric Bell  
AND GENERAL ELECTRICAL SUPPLIES.

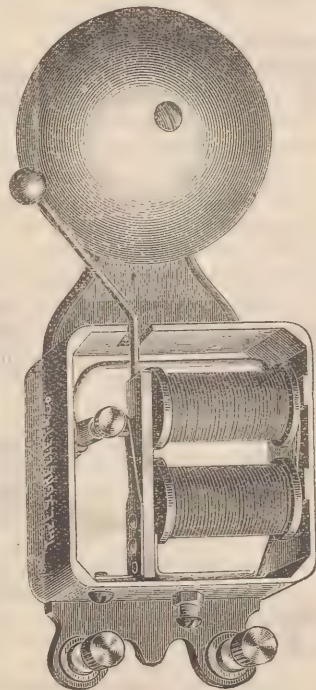
PRICE,  
**\$3.75**  
for the Outfit.  
Complete with  
Local  
Instruments.



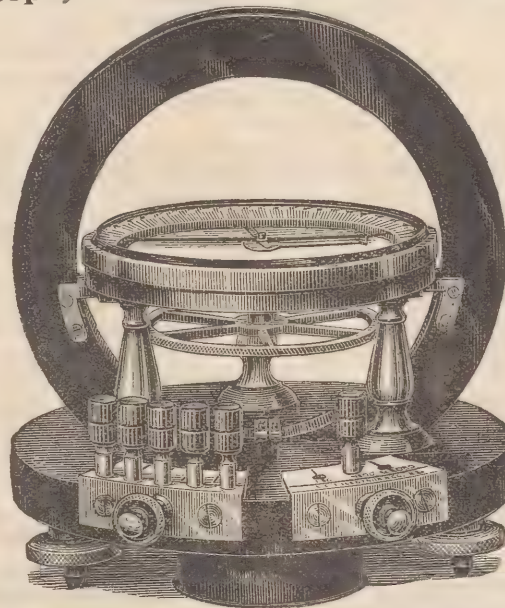
THE OUTFIT consists of Local Instrument, Battery, Wire, Chemicals and a copy of the new book entitled **Philosophy and Practice of Morse Telegraphy.**

**"TELEGRAPHERS" SHORT LINE OUTFIT.**

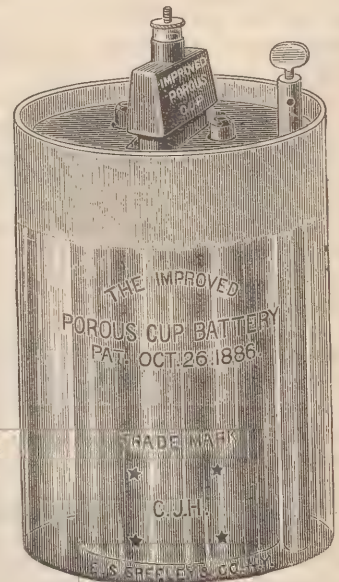
The Local Instruments are used for very short lines on "metallic" circuit, (two wires) for home use, &c.  
The 20 ohm Instruments are used for "grounded" circuits, (one wire) and for lines of greater length.  
Price of Local Instrument alone is \$3.00. Price of 20 ohm Instrument alone is \$3.75.  
One cell of battery is sufficient to operate a LOCAL INSTRUMENT. Two cells or more are required to work 20 OHM INSTRUMENTS according to the length of the line. For full information on all these points and the reasons why, read the **Philosophy and Practice of Morse Telegraphy.**



"Greeley" Iron Box Bell.  
2½ in. size, \$1.50, with removable base and cover.  
Order a Sample Lot.



Standard W. U. Tangent Galvanometer.  
Price complete with Rheostat in base, including Mahogany Traveling Case, \$150.00.



The Patented Improved Porous Cup Leclanche Battery.  
PRICE, PER CELL, - \$1.00.  
The Best in the World.



**POCKET GALVANOMETER.**  
In Hard Rubber Case, \$4.00. Very handy for determining direction of Currents.



## THE ELECTRIC LIGHT ASSOCIATION.

FIRST DAY'S PROCEEDINGS—AUGUST 29th.

The meeting was called to order at 12 o'clock P. M., by President S. A. Duncan, who addressed the association as follows :

Gentlemen of the National Electric Light Association in Convention assembled :

When this association, after six months of existence, last met in this great city of New York three years ago, but sixty gentlemen were present. To-day we are over three hundred, in other words, the attendance has increased five fold. I am, therefore, able to congratulate you upon the growth, prosperity and stability of this organization, in whose welfare we are all so deeply interested and in whose commercial influence we all take pride, for we have all had a hand in its making. And I am also able to congratulate you upon that which is more important than numbers, and that is the fact, that this association is rapidly becoming the centre of all matters pertaining to the arts, which depend on the application of powerful electric currents, and that its proceedings are watched with growing interest by not only the whole electrical public of this country, but also abroad. It is sometimes interesting to notice how we are regarded beyond these limits which properly come under our jurisdiction ; and I would call your attention to a fact—which is certainly not uncomplimentary—and it is this : Although, during the early days of our history, the technical papers abroad paid no further attention to our proceedings than to ridicule them, yet of late, and more noticeably for the last six months, almost every paper which has been read before this association has been copied by the leading electrical papers all over the world. And can there be a stronger indication of the growth of the industries which have been fostered by this association than the fact that they support in this country no less than eight journals devoted exclusively to electrical matters ? This prosperity, upon which we have been mutually congratulating ourselves, has been not only to the commendable efforts of the rank and file of our membership, but also in no small degree, to the good judgment, perseverance, untiring energy and marked ability of our honored past President, Mr. F. J. Morrison, and the able committees which have assisted him in administering the affairs of this association.

But it is of more importance to us to consider the present state of the industry. From time to time, statistics as to the amount of electric light apparatus in use in this country have been presented to this association. At Pittsburg, it was estimated that there were no less than 4,000 isolated plants and central stations operating 175,000 arc lights and 1,750,000 incandescent lights. To these figures we may now add that there are 1,351 new isolated plants and central stations operating 3,501 arc lights and 392,944 incandescent lights, of which I have a detailed record. By adding this increase to the figures of six months ago, we find that there are now 5,351 isolated plants and central stations, and there are burning every night in the United States, no less than 132,500 arc lights, and 1,925,000 incandescent lights. We may also add that there are 459,495 horse power of steam engines devoted to electric lighting. Figuring this in coal consumption, it can be demonstrated that, in the year of 1888, enough coal will be consumed in the United States for electric lighting purposes, to make a solid column 100 feet square and over a mile high. It may be here parenthetically remarked that there has been an increase in the capitalization of the electric light companies of the United States, in the last six months of not less than \$42,210,000.

But, we have not yet touched upon the great industry of the electrical distribution of power. There are, at the present time (of which we have a record) 34 electric railways completed and in operation in the United States, having an aggregate 138

miles of single track, and operating 223 motor cars and utilizing 4,180 horse power for stationary engines. There are, also, now in process of construction 49 other electric railways, aggregating 189½ miles of single track, which will operate 244 motor cars and at the present time there are constructed and being constructed 83 electric railroads aggregating 327½ miles of single track and operating 467 motor cars. In this connection, it must be remembered that there are 39 other electric railroads incorporated, which have not yet begun construction. It is also estimated that the electric cars now in operation in the United States, will carry, in 1888, no less than 17,045,500 people. It can be better imagined than estimated what will be the ultimate outcome of an industry which has arrived to such a degree of development in three years.

In view of the difficulty of compiling statistics on such small unities, it has been impossible to collect reliable information relative to the stationary motor business ; but we know that at the present time, it has stimulated capital to such an extent, that there are single factories employing no less than 1,500 hands each, in the manufacture of electric motors, and, at no far distant day, all large cities will have their power stations of several thousand of horse power each, distributing energy throughout every ramification of industry. So rapid a development of this new industry into gigantic commercial proportions should be an admonition to the electric light companies now in the field to reap the harvest which is white to their sickle and not to wait for competitors to come within their field of operation, in the shape of power stations ; for these people once established will reach out and take in a large portion of the electric lighting business.

The present meeting of this association gives promise of being one of the most interesting so far held. The report of the secretary and treasurer shows the association to be in a gratifying financial condition, there being a balance of a thousand dollars in the treasury after the payment of all bills, and the membership is steadily increasing. The proceedings of the last four conventions have been printed and furnished with a thorough cross index, and each member has been provided with a copy. The admirable way in which the proceedings have been printed reflects credit upon the executive committee, under whose direction it has been carried out, and the carefully compiled cross index, and the accurate technical proof reading of the publishers of "Modern Light and Heat" deserve creditable mention. The report of the executive committee through its chairman, Dr. Otto A. Moses, and the reports of the several committees, together with the following papers should command the closest attention of the entire convention.

The difficulty of obtaining reliable statistical information in regard to the various electrical industries, and, also, for the purpose of giving continuity to the whole association from one convention to another, warrants the President in urging upon the association the necessity of establishing a permanent office which shall be a repository of all information relative to the allied electrical industries and a means of intercommunication between its members and from which the officers and executive committee can administer the affairs of the association. This office should contain a good reference library of electrical works, complete files of all domestic and foreign electrical and other technical journals, and the repository of the archives of the association. It should be a place where every member of the association should feel at home, and where he would naturally go for any electrical or other information that it contained. A very slight increase in the running expenses of the association would maintain such an office, and when established, it would from its innate value, increase the membership of the association to such an extent that the running expenses of such an office would take care of themselves.

Does not this association having during its years of growth



spread its roots widely through the electrical industry of this country, stand upon the eve of becoming much more widely influential than ever before, by carrying out the suggestion of Mr. Frank Ridlon? At the convention in this city three years ago, which was further elaborated by a committee especially appointed for that purpose, which reported through its chairman, Dr. Otto A. Moses, at the Detroit convention, and was still further advocated by Mr. Arthur Stewart, Mr. E. R. Weeks, Mr. A. J. De Camp, at subsequent conventions—namely, the establishment of a permanent headquarters as already sketched out.

Gentlemen, in conclusion, I will say that in no way can you better assist the chair in the discharge of his duties, and in no way can you aid in making this convention a thoroughly successful one, than by constant attendance at its sessions. I know the more than generous hospitality in the shape of various entertainments as mapped out by our New York friends, may tend somewhat to distract your minds from the serious business for which you have assembled, but I also know that you can find ample time, not only to accept of their hospitality, but to give to this convention your entire time and attention during its sessions.

It affords me great pleasure to introduce to you a gentleman of national reputation, who has come here upon the invitation of your executive committee to welcome you to the empire city. I have the honor to present to you the Honorable Abram S. Hewitt, Mayor of New York.

The Mayor addressed the meeting as follows :

MR. PRESIDENT AND GENTLEMEN :

"My duty on this occasion is as easy as it is agreeable. I am here to bid you welcome to New York, and tender such hospitality as it is in my province to offer as Mayor of the city. To distinguished strangers, it is the custom to tender the freedom of the city in a gold box. What the freedom of the city is, I do not know; but if you accept it without the gold box, I tender it freely."

The Mayor added that when he was a boy he was told that the earth was a great magnet. That it was 25 000 miles in circumference and revolved on its axis once in 24 hours. This he thought made a mighty large dynamo, and he believes that sufficient electricity must thus be generated to supply all the motive power required by man, if it could be readily obtained. He added that he knew nothing about it and might be talking nonsense. He believed, however, that the development of civilization during the past century was due to the steam engine, and he looked to electricity for still greater triumphs in the future.

Of course, he said, we bid you welcome—because we are ignorant. We send messages by wires through our streets; we light them by conductors perched on poles; we talk through another network overhead which almost obscures the sun. They are, however, indispensable. The man who would discontinue them until some better system was found and proved to be better, would be a barbarian. But still like the Mayor, they have "got to go." The Mayor, however, is too old to go at a "2 40" gait, and likes to see his way clear before he takes a step.

This much has been found out. It is quite feasible to bury all telephone and telegraph wires, and in fact all wires using a low tension current, and I trust that in a short time this city will be relieved of this class of aerial conductors. The question as to the disposition of the high tension circuits still remains. I ask you to tell me whether a mode of cable transmission for high tension currents underground has been found. I understand that a cable for the Brush Company is about to be laid, and I suppose that will be tested. I have been censured for not coercing the companies. I am no longer young. I have had to deal with very difficult problems, and have found that the part of true wisdom is to go slow. Great knowledge is requisite before we undertake to reconstruct the world. If it was in my power to

do so, I would not compel companies to undertake what had not been proved satisfactory by actual test. Should I do so I should consider myself a fool or a fit subject for a mad house. I hope this experiment will succeed.

The Legislature, in its wisdom, selected four men to undertake the solution of this problem, who knew nothing about the subject. I speak frankly regarding this, because I was one of the men selected. But we shall all be wiser when we have a little more knowledge. When this cable has been placed underground and works well will you kindly inform me? It is however, one thing to get the current underground, and another to get it out. If you say there is a feasible method of doing this, I will accept your decision as final.

If you say there is such a system, then my mouth will be closed, and that is why I am here to-day to ask you to investigate this question, coolly, calmly and impassionately.

The newspapers have teemed with sensational articles regarding the dangers of the electric wires. No man should allow himself to be dragooned by the newspapers into what he believes is wrong. When it became my duty to look into the amount of work done as represented by such a column of coal as your president referred to, or such as is measured by your "ohms" and "volts," with my colleagues, I found that there were more accidents in proportion from the horses in the street. The building of houses causes more deaths than this great industry. The railroad is safer than the stage coach, and the stage coach is perhaps safer than walking.

The duty of lighting the streets of our city has been well performed. What is wanted is a thorough inspection of the work, first by the companies, and second in the interest of the public served by you. Any violation of reasonable rules established in the interest of the people should be punished.

These are questions of such paramount interest, that your presence here is most welcome, and when you find you are ignorant upon any topic, confess it like men.

Gentlemen you are welcome to New York (great applause).

President Duncan, in a most happy manner informed his Honor that heretofore the interpretation of the phrase, "freedom of the city," by the Electric Light Association, had been the actual capturing of such cities where their convention had been held, and in such case the ordinary functions of the Mayor and Board of Aldermen had been supported by the officers of the association.

"This whole question," added the President, "will be considered at the opening of Thursdays' session when we should be glad to have the Mayor present. Invitations had been extended to the Subway commissioners to attend."

The convention was then declared open for business :

The report of the Secretary and Treasurer was read and accepted.

Communications were read from the *Electrical Review*, tendering a visit to the "Fall of Rome" at Staten Island to the Broadway Theatre on behalf of the Okonite Company, to witness the Queen's Mate, and on behalf of Hon. Theodore Moss, to the newly refitted Star Theatre.

On motion of Mr. C. A. Brown, of Chicago, it was voted that a committee of five be appointed by the chair to designate the next meeting place. The President appointed Messrs. Brown, of Chicago, Weeks of Kansas City, Officer, of Council Bluffs, DeCamp, of Philadelphia and Stanley, of Bridgeport, Ct.

Mr. T. C. Martin, chairman of the committee appointed at the Pittsburgh convention to draft and present suitable resolutions of appreciation on behalf of the association for the retiring President, Mr. J. F. Morrison, announced that their duties had been performed, and Mr. Morrison being called from the audience, the beautifully engrossed and handsomely bound testimonials was presented. Mr. Morrison said that he had found this a very agreeable surprise party, but was puzzled to know how it had been kept so quiet when



so many knew about it. He accepted the gift thus tendered and thought it needless for him to say that he fully appreciated the spirit in which it was tendered. He thought it possible that during his first term he had made a very satisfactory President, but since that time he believed that a different kind of timber had been required. For the kindness and indulgence of the members, and their beautiful expression of consideration, he was very thankful, but he assured them he should remain in the harness although he was not the presiding officer.

Verbal reports were made by Dr. Otto A. Moses as president of the executive committee and as a member of the committee on insulation and installation.

A schedule comprising ninety-nine questions had been prepared to be submitted to various electric light superintendents to obtain the necessary data for preparing a report.

It was voted that the committee be continued in order that it might press the work.

Reports of the committee's on Patent Legislation, Transportation and Revision of the Constitution were deferred, and the president announced that the next business would be the presentation of a paper on Petroleum as Fuel by S. S. Leonard. In the absence of the author it was read by Dr. A. V. Garratt. (The paper appears on page 20).

After the reading was finished Mr. Morison stated that while the percentage saved was not large, it was important in many respects, and the facts given were of great interest. He stated that he first saw crude petroleum used as a fuel when he was a telegraph operator at Parkersburg years ago. Such oil was cheaper to-day than it was then. In Baltimore they paid 25 cents per load for carting ashes, which with the low grade of fuel used by them was a large item on account of the percentage not consumed. He thought that any members of the association who proposed to increase their plant should profit by the information given by Mr. Leonard.

In response to a question by Mr. DeCamp, the President stated that Mr. Leonard had been using petroleum for some months, when he visited his station on the 10th of July.

Mr. DeCamp then stated that several methods of using oil had been used in Philadelphia, but after some experience they had gone back to coal.

Prof. P. H. VanderWeyde stated that he has had an opportunity to make some comparative tests between anthracite coal and petroleum with a 20 h. p. boiler and that he had determined that unless oil was less than 40 cents per barrel, coal was the cheaper fuel.

It having been stated that boilers were burned out by the use of oil the President said he believed such reports had no foundation in fact.

At 3 P. M. the meeting adjourned, until 10 A. M. on Thursday.

LIST OF ATTENDANTS.

- |                               |                               |
|-------------------------------|-------------------------------|
| Abeauk, B., Pittsburg, Pa.    | Card, B. F., Brooklyn, N. Y.  |
| Brooks David, Philadelphia.   | Cox, S. E. Cleveland.         |
| Bradbury, J. Y., Lowell, Mass | Curtis, G. F., Lynn.          |
| Bishop, R. D., Cleveland.     | Cartwright, F G, Utica.       |
| Boynton, F. J. Boston.        | Cullen, W. F., New York.      |
| Brady, T. H., New Brit. Ct.   | Coombs, M., Youngstown, O.    |
| Brown, C. A., Chicago.        | Cross, J. H., Johnstown, Md.  |
| Brunken, H. D., Chicago.,     | Curtiss, C. C., Cleveland, O. |
| Beetle, G. L. Brooklyn.       | Crane, H. B., Boston.         |
| Bunnell, J. H., New York.     | Coleman, R., New York.        |
| Bliss, A. E., Malden, Mass.   | Calisch, New York.            |
| Baird, M. E. Windsor, Conn.   | Degenhardt, F. E., Chicago.   |
| Bigelow, F. L.,               | Dillon, L. W.,                |
| New Haven, Conn               | No. Attleboro, Mass.          |
| Blaxter, G. H.,               | Deland, F, Chicago            |
| Pittsburgh, Pa.               | DeCamp, A J, Phila            |
| Bates, D. H., New York.       | Duncan, S A, Pittsburgh, Pa   |
| Bogle, C H, New York          | Dee, J R, Houghton, Mich      |
| Candee, W. L., New York.      | English, James, Portland      |

- |                             |                             |
|-----------------------------|-----------------------------|
| Eustis, H H, Boston         | Hess, J, New York           |
| Edgecomb, D W, New York     | Huntley, C R, Buffalo       |
| Evans, D E, Baltimore, Md   | Hasegawa, Fei, Tokio, Japan |
| Footo, A R, Cincinnati      | Halsey, Mr, New York        |
| Francisco, M J, Rutland, Vt | Johnston, W J, New York     |
| Ferguson, S, Brooklyn, N Y  | Johnson, H H,               |
| Gates, C A, Massillon, O    | Hartford, Conn              |
| Gibbons, D L, New York      | Johnson, G A,               |
| Ganatt, A V, Boston         | Hartford, Conn              |
| Garnett, Jas, St Louis      | King, F W, Baltimore, Md    |
| Guy, Geo H, New York        | Kreidler, W A, Chicago      |
| Grodyear, M W, New York     | Kearney, H                  |
| Giles, C K, Chicago         | Kulhotz, P O, Baltimore     |
| Godfrey, J W, New York      | Leam, C H, Boston           |
| Hennich, R G, Philadelphia  | Longwell, H E, Chicago      |
| Harding, W H,               | Latshaw, Z, New York        |
| Baltimore, Md               | Leslie, E A, New York       |
| Hess, J, New York           | Leonard, F H, Ezmira, N Y   |
| Huntley, C R, Buffalo       | McIntire, W C,              |
| Hasegawa, Fei, Tokio, Japan | Windsor, Conn               |
| Halsey, Mr, New York        | Morrison, W J, Toronto      |
| Johnston, W J, New York     | Mayo, G A, Chicago          |
| Johnson, H H,               | Murkland, J, Lowell, Mass   |
| Hartford, Conn              | McGonnigle, R D,            |
| Johnson, G A,               | Pittsburgh, Pa              |
| Hartford, Conn              | Morrison, J F,              |
| King, F W, Baltimore, Md    | Baltimore, Md               |
| Kreidler, W A, Chicago      | McCoubray, T, New York      |
| Kearney, H                  | McCarty, N, New York        |
| Kulhotz, P O, Baltimore     | Moss, T C, New York         |
| Leam, C H, Boston           | Martin, T C, New York       |
| Longwell, H E, Chicago      | McTighe, T J, New York      |
| Latshaw, Z, New York        | Moses, Dr Otto A,           |
| Leslie, E A, New York       | New York                    |
| Leonard, F H, Ezmira, N Y   | Mead, M W, Pittsburgh       |
| McIntire, W C,              |                             |

- |                              |                             |
|------------------------------|-----------------------------|
| Minahan, J C, Troy, N Y      | Rochester, N Y              |
| McGee, Mr, New York          | Rhodes, B,                  |
| Morris, R L, Nashville, Tenn | Niagara Falls, N Y          |
| Newton, A D, Windsor, Conn   | Rice, T B, Buffalo, N Y     |
| Noonan, J F, Paterson, N J   | Smith, T Carpenter,         |
| Pope, R W, New York          | Philadelphia                |
| Pope, A W, Elizabeth, N J    | Shay, J H, Chicago, Ills.   |
| Pope, F L, New York          | Sprague, T W, New York      |
| Price, C W, New York         | Scott, E A, Philadelphia    |
| Porter, G F, Pittsburgh, Pa  | Sunny, B E, Chicago         |
| Perry, M J, Providence       | Sefton, W J, Chicago        |
| Perry, D P, Chicago          | Stump, Clarence E,          |
| Peck, E F, Brooklyn, N Y     | New York                    |
| Ross, R F, Boston            | Stanley, H D,               |
| Ransom, Col, Boston          | Bridgeport, Conn            |
| Ridlon, Frank, Boston        | Schieren, Chas W, New York  |
| Ridman, G A,                 | Stiles, A K, Chicago        |
|                              | Terry, C A, New York        |
|                              | Truex, C R, New York        |
|                              | Van derWeyde, P. H., B'klyn |
|                              | Wirt, Chas, Orange, N J     |
|                              | Wilkins, F H, New York      |
|                              | Waterhouse, F G,            |
|                              | Hartford, Conn              |
|                              | Weeks, E R,                 |
|                              | Kansas City, Mo             |
|                              | Worthington, Geo, New York  |
|                              | Williams, J, New York       |
|                              | Wetzler, J, New York        |
|                              | Wheeler, S S, New York      |
|                              | Whitney, L C,               |
|                              | North Britain, C            |
|                              | Wightman, E T,              |
|                              | Danbury, Conn               |
|                              | Woods, G P, Cincinnati      |

It shows a lack of enterprise for combinations of men to waste valuable time in examining cable roads. Electric cars have come to stay, and cable roads, while being an improvement on the horse car roads, will have to yield to the inevitable.

Congratulations were exchanged recently between the American and Venezuelan and San Domingo authorities, on the completion of cable communication connecting these countries.

ATLANTIC CABLE REPAIRS.—The Direct United States Cable between Ireland and Halifax is now in efficient working order.

The Hibbard Electric Manufacturing Co. of Montreal has been organized with a capital of \$150,000.

The Illinois Phonograph Co. of Chicago has been incorporated with a capital of \$1,250,000.



## "PETROLEUM FUEL."

BY S. S. LEONARD.

The use of petroleum is by no means of recent date, it was known to the ancient Greeks and Romans, being used by them for illuminating purposes, as they had no electric lights in that day. In fact the word "Petroleum" is of Latin derivation meaning, "rock oil." It has, and is being used for various purposes, from the sure cure of numerous diseases to the generating of steam for electric light stations. It is found in many parts of the globe, although there is but a few localities that are especially noted for its production. In our country, New York, Pennsylvania, Ohio and West Virginia produce the greater part of the supply. Although it was known to the early settlers of these States, very little importance was attached to its value. I presume that there are none so young here but who well remember the oil craze, and the saying which was heard almost daily of "So and So" has struck "ile," perhaps some of the members of this convention were fortunate enough to strike "ile" and possibly some were unfortunate enough to have been struck by "ile." But to return to our subject, petroleum fuel: To say that it is a new fuel would hardly be correct, for petroleum has been used as fuel for a number of years; experiments to determine its practicability as a fuel have been creating a great deal of attention from those interested in the matter for the last twenty years, and is now occupying the minds of some of our ablest engineers and inventors. Quoting from a very able paper on this subject by Chas. E. Ashcroft, which was published in the *Boston Journal of Commerce*, May 26th, 1888, Mr. Ashcroft says:

"That the calorific power of petroleum for the purpose of generating steam, and the evaporation of water is several times greater than that of ordinary coal. The successful use of oil as a fuel has, however, been of very recent date, yet so rapidly has it grown in favor that to-day it is regarded as a strong competitor of coal, for steam generating purposes or where heat and fire are wanted. It was with a great many knowing winks and nods of the head from the engineers and fire men, who laughed at the idea of making steam by the use of oil, that the writer attempted the use of petroleum as a fuel, of course it would not work, and it did not work, why? because those who were using it did not want it to, as they were afraid some one would loose his job. We had seen enough of its workings to satisfy ourselves that we could make it a success, and the result is, that to-day we are saving from 20 to 25 per cent. on the cost of the fuel and 50 per cent. in labor, and these same men who laughed so hard on the start at our attempt to use oil would feel that this world was a poor place to live in, were we to return to the use of coal, for not only their hearts but their backs would certainly be broken.

Its advantages over other fuels are many; in the first place, it is much easier handled; a steadier fire is easily maintained under your boilers, consequently the steam is kept at a more even pressure, a very important thing in the running of electric lights; there is no opening of furnace doors, allowing cold air to come in contact with the boilers, and there are no impurities in the oil such as abound in coal; when through with it by a simple turn of the wrist your fire is put out, and your ash pits are as clean as they were before the fire was started; in less time than it takes to tell it you can start the fire. It is only rivaled in handling by natural gas, and even then, unless we have all the modern appliances for the handling of this gas, it is far easier to manipulate.

Permit me to describe the arrangements for the handling and use of this oil put in under the supervision of the writer. The oil is received in tank cars holding from 90 to 150 barrels each (42 gals. to a bbl.). From these cars it is drawn off through a valve in the bottom of the car to a storage tank or tanks, there being two of them, holding about 320 bbls. each; these are placed under ground so that the oil runs from the car into them by gravity; care should be taken not to spill the oil or stir it up more than is possible as the odor from it is fully equal in strength to new mown hay if not quite as agreeable. To prevent the stirring up of the oil, the supply pipes entering through the top of the tanks run nearly to the bottom, so that the tanks are practically filled from the bottom. In the top of each tank are man-holes and a vent pipe; this latter is extended above the tanks a short distance. These tanks, which are boiler shaped, are placed end to end with a space of about eight feet between them; this gives room to get at the various pipes; they are joined together at the bottom by a pipe which also connects with the supply pipe running to the boiler room, then in the bottom of each is a drain pipe which will admit of cleaning them out when ever necessary; there is also a guage glass in the end of each to show how much, if any, water is in them; there is also a guage made by a copper float which indicates the amount of oil in each tank. In cold weather a small steam coil is inserted in the tank around the mouth of the valve to heat the oil so that it will flow readily, for when the thermometer gets in the vicinity of 30 or

40 below, the oil is apt to be a little thick; care should be taken not to heat the oil too much, for when hot it generates considerable gas which is not only very odorous, but is really the cream of the fuel. I think it an advantage to have the storage tanks under ground, there being less danger from them in case of fire and during the winter the oil is less likely to chill. An open light should never be used near them, although the oil itself is really hard to ignite unless heated to a certain degree; still there is apt to be more or less gas around, which is quite explosive if brought in contact with fire. The supply pipes to the furnaces are provided with a valve where they enter each tank, also one in the fire room; this pipe, a two and one-half inch one, is enlarged to a six inch for about four feet, and in this six inch pipe a small steam pipe is inserted; with this the oil is heated from 130 to 140 degrees; this lightens it so that it burns more readily, or I should say is turned into gas.

We now come to the burners, which are also fed by gravity as the storage tanks, although under ground are still higher than the furnaces.

One might suppose that owing to the recent introduction of petroleum as a fuel, that some difficulty might be experienced in obtaining a burner, but their name is legion, and they are as numerous as electric light systems, and like them in another respect, each man's is the best; our experience has been that the more simple the burner, the better the result; one that thoroughly vaporizes the oil before burning it, is, we think, preferable to one that burns the oil; in the former there can possibly be no waste; in furnaces where we have been using this kind of a burner the bricks are as clean as they were the day they were put in. Steam and hot air are the other ingredients that are used in connection with the oil, and an abundant supply of the latter we have found adds very much to the efficiency of the fire.

Regarding the proper settings, circumstances will determine that to a certain extent; an excellent plan is given by the Standard Oil Company, in their pamphlet of "Oil as a Fuel;" this we have adopted with a few modifications which we found necessary by experience; there is no doubt but what a hotter fire can be obtained from oil than from coal or wood, and when properly used the smoke nuisance is solved which has been agitating the minds of the people of some of our large cities, for there is not a particle of smoke to be seen issuing from the stack, not even when everything is running full blast.

A word as to its danger: When properly put in and handled with ordinary care, or when good common sense is used in the use of this oil, I do not see why it should be any more apt to cause trouble than coal, although the insurance companies insist on higher rates when used. I think it more from ignorance of the subject than from there being any more danger; at the same time I am willing to admit that it could be put in and used in such a way as to greatly increase the danger of fire. So might your house be wired for electric lights, piped for gas, a kerosene lamp hung or your gasoline stove, filled in such a manner that the fire risk is much greater than your neighbor who uses electric lights, gas, kerosene or gasoline the same as you do, but has his put in properly and handles it as it should be. As to its economy over coal I have already mentioned that there was a saving of from 20 to 25 per cent. on the cost of fuel, and from 40 to 50 per cent. in labor. From tests recently made by us, the following figures were obtained: 111.34 H. P. running six hours used 250 gals. of oil costing \$5.50, or at the rate of \$.70 per 100 H. P. per hour; 104.8 H. P., running six hours used 3,461 lbs. of coal, costing \$5.45, or at the rate of \$.86 per hundred H. P. per hour. Another test gave the following figures: 96.45 H. P., running 8 hours used 4,014.75 lbs. of coal, costing \$6.32, or \$.80 per 100 H. P. per hour; 115.54 H. P., running 7 hours used 233 gals. of oil, costing \$5.05, or \$.62 per 100 H. P. per hour. On the above figures oil is from 17 to 32 per cent. cheaper than coal. The highest evaporation made with oil was 14.8 pounds of water per lb. of oil with feed water at 103, and with coal 5.38 lbs. of water per pound of coal, feed water at 103. The coal used was a good grade of Illinois lump, costing \$3.15 per ton, but which is usually worth \$3.25.

In the matter of labor one man can easily attend from 7 to 10, 150 H. P. boilers, and then have less to do than he would were he firing one boiler with coal. After a week's run with oil your boiler flues are much cleaner than they would be from the use of bituminous coal for one night, especially Western coal. Your fire room can be kept as clean as your dynamo room. There being no ashes you are saved the expense of handling them as well as the dirt, and the former is no small matter where some twenty tons of coal are being used every twenty-four hours. I might say that the above tests were made during a part of the day's run, and it is our opinion that a more favorable showing could be made with the oil, where a larger number of boilers are in use. It seems to work better with a good fire than where a small fire is sufficient. With our pipe lines affording a cheap method of transportation, the future of "Petroleum Fuel" is assured, and I think there is no doubt but with true Yankee ingenuity a burner or some method will be brought forward by which the use of petroleum as a fuel will be greatly improved.



## THE ELECTRIC LIGHT ASSOCIATION.

THE SECOND DAY'S PROCEEDINGS—AUGUST 30th, 1888.

The meeting was called to order by the President, at 10 o'clock A. M.

The chair announced that the morning session would be devoted to the consideration of the underground question, and that in order to facilitate discussions, the following papers would be discussed jointly, "Electrical Conductors of New York City," by Dr. Schuyler S. Wheeler; "Descriptive discharges in underground Cables," by E. G. Acheson; "Description of an underground Conduit," by H. C. Chenoweth.

Communications were read by the Secretary in reference to the Paris Exposition of 1889, and the Centennial Exposition of 1888, in Ohio, also from the Metropolitan Telephone and Telegraph Co., and the American Telephone and Telegraph Co., stating that local and long distance telephones had been placed in the hotel for the free use of the association.

Resignation of Prof. Elihu Thomson from the chairmanship of the Committee on Insulation and Installation was read and accepted.

Mr. Wheeler's paper was an exhaustive history of the underground electrical work in this city. It was copiously illustrated with maps and diagrams, and elicited the closest attention. Mr. Wheeler was followed by Messrs. Acheson and Chenoweth, whose papers also related to underground conductors and conduits. At 12.30 P. M. the meeting adjourned to examine the drawing in of an electric light cable by the Brush Company, in the Broadway conduit, corner of 15th street.

His Honor, the Mayor, was in his happiest mood, and apparently oblivious of the fact that Commissioner Gibbens was taking it all in.

Mr. Gibbens thoroughly appreciates the acuteness of the Mayor, and it was a sad day for the city press when they agreed to disagree, and to meet hereafter as strangers.

## AFTERNOON SESSION, THURSDAY, AUGUST 30th.

The meeting was called to order promptly at 2.30 P. M., by the President. The largest attendance since the opening session, evinced the intense interest which still pervades the association, regarding the underground question.

Mr. Wheeler was again put on the rack, and Mr. Lynch promptly opened the ball by inquiring how many arc light wires it was proposed to place in each of the 2½ inch ducts.

Mr. Wheeler replied that the cable now being drawn in was composed of eight conductors, each of No. 4 B & S gauge. The cables were about 2 inches in diameter including the lead covering. He added that it was not the intention hereafter, however, to introduce arc lighting conductors in the form of cables, but to draw them in singly.

In reply to a question by Mr. Lynch, Mr. E. A. Leslie stated that the rentals established by the company were as follows. \$1,000 per mile for a 3 inch duct; \$850 per mile for a 2½ inch duct; \$750 for a 2 inch duct.

Mr. A. J. De Camp, of Philadelphia, addressed the convention at length, and very clearly pointed out the inconsistencies of legislation which has led to the construction of expensive subways, that were perhaps suitable from a mechanical point of view. There having been built, the attempt was now being made to force the various electrical companies to occupy them. The great difficulty was that this business had been begun at the wrong end.

The inquiry had been made of Mr. Wheeler as to the cost of these subways; he did not know; Mr. Leslie did not know. He submitted that this was not a proper method of doing business.

Dr. Otto A. Moses read a cablegram from London, stating that "Reckenzaun and friends sent greetings to the convention." Dr. Moses followed with an eloquent address

upon the system of electrical distribution. Mr. DeCamp followed with an analysis of the cost of doing a central station arc lighting business, based upon the rental established by the Subway Co. in New York, maintaining that the conditions were such as to render it impossible for any arc light company to comply with them.

Mr. T. Carpenter Smith, of Philadelphia, at the risk of being called a "crank" on the underground question, feared that Mr. DeCamp had forgotten that he had told him at Pittsburgh that in that city there had been in use 15 miles of underground wire for two years. Several newspaper offices had been supplied continuously, and had dispensed entirely with gas. The cost of laying a 16 duct box including trenching and everything but conductor was \$7,000 per mile.

Mr. Lynch again assumed the position of cross-examiner, and asked Mr. Wheeler if the Subway Commission had adopted the conduits made of iron pipes embedded in cement, and whether the same had been used elsewhere.

Adjourned until Friday.

## ADDITIONAL LIST OF ATTENDANTS.

|                               |                                |
|-------------------------------|--------------------------------|
| Ackerman, P C, New York       | Kelley, W H, New York          |
| Alexander, P H, Boston        | Lufkin, H F, New York          |
| Acheson, E G, Pittsburgh      | Lynch, E T. Jr, New York       |
| Abakanowicz, B, Paris, France | Lawrence, W H, Cleveland       |
| Avango, A, New York           | La Rue, G W, New York          |
| Angell, F, Trenton, N J       | Larbig, Theodore, New York     |
| Butterworth, A W, New York    | Larkin, James, Baltimore       |
| Barney, C H, New York         | Lugo, O, New York              |
| Boulton, W H, Cleveland       | Law, M D, Philadelphia         |
| Baker, C O, Jr, Newark, N J   | Lane, J, New York              |
| Brown, C A, Chicago           | Mason, Dr A F, Boston          |
| Barclay, J L, Chicago         | Manson, Geo T, New York        |
| Byllesby, H M, Pittsburgh     | Madden, O E, New York          |
| Biddulph, W W, New York       | McDonald, R T, Ft. Wayne       |
| Cram, H B, Boston, Mass       | Moore, J J, New York           |
| Callender, W M, New York      | Marsh, E A, Waltham, Mass      |
| Conkling, Addison, New York   | Morrison, W J, Toronto, Ont    |
| Colvin, F R, Baltimore        | Nichols, E L, Ithaca, N Y      |
| Church, Wm Lee, Pittsburgh    | Officer, T, Council Bluffs, Ia |
| Clark, Walter P, Boston       | Pettinger, F E, Boston         |
| Clark, F E, Boston            | Phelps, Geo M, New York        |
| Crouse, J B, Cleveland        | Pendleton, J M, New York       |
| Cartwright, F G, Utica, N Y   | Phillips, Eugene F, New York   |
| Cherry, E V, Cincinnati       | Patterson, A H, Providence     |
| Candee, J M,                  | Patten, Jarvis, New York       |
| Poughkeepsie, N Y             | Perry, M J, Providence         |
| Crocker, H, New York          | Pond, A C, Boston              |
| Collins, W F, Boston          | Perry, C L, New York           |
| Clark, E P, New York          | Pratt, R J, Troy, N Y          |
| Cleverly, H A, Philadelphia   | Ryan, R W, New York            |
| Cheever, C A, New York        | Russell, D R, St Louis         |
| Chalmers, D, New York         | Rosenbaum, W A, New York       |
| Davis, Henry C, New York      | Royce, F W, Washington         |
| Dowd, P A, New York           | Steuart, Arthur, Baltimore     |
| Davis, Isaac H, New York      | Scoville, J S, Cleveland       |
| Dee, J R, Houghton, Mich      | Shallenberger, O B, Pitts'gh   |
| Edgar, C L, Boston            | Spurgeon, Wm, Baltimore        |
| Eliott, J F, New York         | Slattery, M M, Ft. Wayne       |
| Edson, Jarvis B, New York     | Stone, Frank G, New York       |
| Eagan, S F, Buffalo           | Stockbridge, G H, New York     |
| Fox, S J, New Haven           | Smith, A M, Worcester, Mass    |
| Godfrey, J W, New York        | Smythe, T T, New York          |
| Gethin, E B, Cleveland        | Seymour, A P, Syracuse N Y     |
| Giles, W A, Chicago           | Smith, C D, New York           |
| Harrington, F W, Chicago      | Seeley, J A, New York          |
| Harding, H McL, New York      | Sanderson, E M, New York       |
| Hapgood, John H,              | Skinner, F, New York           |
| New York                      | Shedlock, A, New York          |
| Hunt, Walter T,               | Waldo, Dr Leonard, N Haven     |
| Kinsman, F E, New York        | Wiley, G L, New York           |
| Kerr, W C, New York           | Whittle, Fred H, Detroit       |
| Knudson, A A, St John, N B    | Wilkes, Gilbert, Baltimore     |



## EXHIBITS.

The Standard Underground Cable Co., of Pittsburgh, Pa., was well represented by many exhibits in parlor No. 13, where Mr. Geo. L. Wiley, the Eastern manager, F. E. Degenhart, the Western manager and E. G. Acheson, the electrician, were constantly in attendance. Among their exhibits were samples of the 8 conductor arc light cable, now being laid for the Brush Electric Illuminating Co. of New York. This is the first arc light cable laid underground in the city of New York.

The Industrial Fibre Co., of 37 Barclay street, had on exhibition many excellent samples of wood fibre pipe and battery jars and storage battery cells. Mr. R. Coleman, the enterprising representative, has charge of the exhibit. The Electrical Accumulator Co. has just placed an order with this company for 10,000 storage battery cells. The Pennsylvania Ry. and the Bell Telephone of Philadelphia, are using the pipe for underground conduits.

Mr. Chas. W. Schieren, the link belt manufacturer of New York, was in constant attendance, explaining the merits of the link belt, and the new patented perforated belt, which is especially designed for electrical purposes, either light or power, and will be found one of the latest and best improvements for transmitting power and perfect running belt.

The New York Insulated Wire Co. had an excellent wire and tape display in parlor No. 17. The genial manager, Mr. J. W. Godfrey was on hand explaining the merit of his goods. Among their display were samples of "competition" line wire, which is being extensively used by the arc light companies throughout the country, it being absolutely safe under all conductors.

The Baxter Electric Manufacturing and Motor Co., whose exhibit of electric motor for lighting the incandescent lamps in use during the convention, occupied parlor No. 130, where the interests of that company were well looked after by J. F. Morrison, David E. Evans, N. McCarty, T. McCoubrey, Jas. Larkin, of Baltimore, and Frank Ridlon, of Boston.

The Standard Paint Co. had a display in parlor No. 13, of the P. & B. Electrical Compounds. Mr. H. J. Bird is the representative. This company has painted a man-hole which was below tide water mark and made it absolutely water and gas tight, and they claim to be able to do this with every man-hole in the city.

The affairs of the National Conduit Mfg. Co., of 18 Cortlandt street, was in the hands of Mr. Edward S. Perot, general manager. They had on exhibition, samples of their wrought iron cement lined conduit.

The Western Electric Co. occupied parlor 16, and was represented by Mr. H. B. Thayer, F. W. Harrington, F. H. Wilkins, of New York; C. A. Brown, G. L. Beetle and C. E. Scribner, of Chicago.

The Empire City Electric Co. of New York, was represented by Mr. E. W. Carritt. The Ireson self-adjusting leather link belt was represented by Mr. Chas. L. Ireson, of Boston.

The Phoenix Glass Company was represented by A. H. Patterson, manager; F. E. Pettingill & Co., of Boston, represented by Mr. F. E. Pettingill, electrical supplies.

The Okonite people made an excellent display and were represented by Charles A. Cheever, President; Captain W. L. Candee, Treasurer, and Geo. T. Manson.

The exhibit of the Sawyer-Man Electric Company was the centre of attraction. A Baxter motor furnished the current.

Mr. Frank A. Magee, represented the E. S. Greeley & Co., which establishment occupied parlor No. 132, with quite a display of electrical goods.

James W. Queen & Co., of Philadelphia, has a beautiful display of electrical goods.

Mr. P. C. Ackerman, represented the American Electric Works of Philadelphia.

The *Electrical World* and THE ELECTRIC AGE occupied parlor No. 2.

J. S. Hoffecker, Wilmington, Del., represented the Celluvert Manufacturing Co.

Mr. G. R. Kates, represented the electrical supply establishment of this city.

## ELECTRICITIES.

The description of an underground conduit reads a little bit like ancient history, and where there is so much to be said regarding practical electrical quotations, it seems a pity to occupy valuable time in details of theoretical systems. Mr. Lynch did the proper thing in securing the appointment of a committee of five to examine into and report upon the conduits already laid in the country, and the number of arc light wires actually used in them. Give us facts, gentlemen. That is what we are here for.

The AGE will venture the prediction that at the next convention, Mr. DeCamp will be on hand with all the reasons why Philadelphia manufacturers discarded petroleum fuel. He is on the scent, and before he gets through the association will know all about it. The question is an important one; but it must be remembered that present employes will object to any change that abolishes shoveling coal and carting ashes. Perhaps burned-out boilers can be avoided by careful handling.

Mr. Morrison is not afraid of spooks in any guise. He believes every member of the association should learn through the united experience of the body, the best type of steam engine and boiler, the best kind of fuel and how to use it; the best underground system and the best "all round" insulated wire. When it comes to dynamos and lamps however, he draws the line.

President Duncan is a good business man, and an admirable chairman, and the association did not make a grievous mistake when they gave Mr. Morrison a chance on the floor. He is a vigorous and fearless speaker. He strikes straight from the shoulder, and says what he believes to be for the general good, no matter who he hits.

The AGE is the connecting link between the telegraph—the oldest electrical industry—and electric light and power, which is to-day the youngest and most promising. We take pleasure in pointing to the fact that Ex-President, J. F. Morrison, and President, S. A. Duncan, are both old-time dyed-in-the-wool Morse operators.

Nothing conduces to the success of an association so effectively as an enthusiastic, hard working Board of Managers. Let the President lay out the course, the Executive Committee pull together, and the members boost energetically, and all will get there. The AGE will take pleasure in recording the result.

Secretary Harding has handled his multifarious duties with promptness, accuracy and good nature. There are a great many men who make more noise; but it is only fair to say that the genial secretary pulls his own oar with quiet vigor, and keeps the machinery of the association thoroughly oiled.

That the executive committee has done its work thoroughly is evident from the careful manner in which the details have been looked after, connected with this convention. As its genial chairman says, the committee may be a "zero" to-day, but it will be big as ever next week.

The association has never met in a more satisfactory hall than at the Hotel Brunswick.



# THE EDISON MACHINE WORKS,

SCHENECTADY, N. Y.,

MANUFACTURERS OF

## Insulated Wires, Flexible Cords and Cables,

### For Telephone, Telegraph and Electric Light.

## JAMES F. KELLY,

General Sales Agent,

19 DEY STREET,

NEW YORK.

#### "NOTICE."

Annual dramatic performance and reception by the New York telegraph operators at Turn Hall Theater, 66 and 68 East 4th street, New York City, on Monday evening, October 15th, at 8 P. M. Reception 10.30. Tickets admitting gentlemen and ladies 50 cents. For sale at all telegraph offices.

WESTERN UNION NOTES.—Wire Chief George Baker is authority for the statement that he was never more agreeably surprised in a man than he was in the Hon. Tom Powers of Albany, whose guest he was for some time during his recent vacation. A more hospitable reception he never met, and the one regret of his life is that he doesn't own this town so that in the event of genial Tom paying him a visit, he might reciprocate even in part the courtesy and pleasure enjoyed in his company. During the ten day's vacation of Mr. Lawson, Chief of evening newspaper loops, his duties were very satisfactorily performed by Mr. David Christie, who works the evening *Sun* wire. Superintendent Charles Erwin was a passenger on board the ocean *Greyhound* steamer which distanced by more than a day the new steamship, *City of New York*. Mr. Erwin expects to remain abroad about a month. Wm. J. Landy, the gentlemanly artist who works First Chicago, nights, is as frisky as a two year old since he returned from his month's vacation. The boys gave him a right royal reception that pleased him almost as much as an increase in salary. Mrs. McWha, the other day greatly surprised her husband, the well-known operator, who works the Pittsburg quad, by presenting him with a pair of beautiful twins. Dr. Blanchard, after a week's absence in the country, has resumed his old position on the night force. Mr. Stanbery, from Jacksonville, and Harry Whalen, from The United Press, this city, are among the recent additions to the waiting list. Dr. Farwell, Mr. Webster and Jack Wright have been added to the regular night force. Les Bradley, than whom there is no more popular operator in the office, mourns the loss of two canaries, for either one of which he would have refused \$25. His anxiety to get off before daylight is accounted for by the fact that he has a doubled barreled army musket, picked up by him on the battle field of Chickamauga, with which he wishes to experiment on the un-

known cat that deprived him of his pets. Miss M. O'Brien has been transferred to the United States Hotel, Long Branch, to relieve Miss Rosie Uth, who is away on a vacation. Miss Nellie Reeves has returned from the Octagon House, Sea Bright. Mrs. Fones, after an absence of five years is again with us. Miss Lizzie Stacom, one of the brightest operators of her sex, is relieving for a month, Miss Aggie Fitzgerald, at 9 New street. Miss McNally, one of the most popular traffic chiefs in the room, is spending her vacation in the Catskills. Chief Operator "Con" Meyers, whose absence from the office for a few days past, was due to an attack of rheumatic gout, is once more enjoying his usual good health. As one of his ladies remarked "he looks ever so much jollier since he got rid of that horrid thing." Ed Stevens and James Nallin have been transferred to Saratoga, to assist the force there in handling the convention matter. Joe Graham, of the eighth and Charles Schram, of the first Chicago wires nights, have changed places. To meet the enormous rush of business handled the last week in August, the entire waiting list force, together with such night men as could get around, were ordered on between 9 and 10 o'clock every morning, while the day men were stuck until a late hour at night.

Intelligence from Jacksonville, Fla., states that several members of the telegraph and telephone forces have been stricken down with yellow fever. No fatal cases have as yet been reported. Mrs. D. J. Crowley, wife of the W. U. manager, is among the new cases, as is also operator W. J. Ford. *Later*.—Mrs. Crowley has died.

Mr. James Irving, a well and favorably known telegrapher, of Los Angeles, Cal., has accepted a position in the chief dispatcher's office of the Southern Pacific Road at that point. The railroad is to be congratulated upon securing the services of so able and efficient a gentleman as we know Mr. Irving to be.

Mr. James T. Wafer, a well-known New York telegrapher, has been appointed Inspector of Telegraphs of the Brooklyn Fire Department.

Mr. J. F. Agne of Rochester, N. Y., an old time New York operator, gave us a call a few days since.



WORCESTER, MASS., NOTES.—The personnel of the Western Union office is as follows: E. W. Bradford, manager; P. Cunningham, chief operator; P. L. Rider, on the day report; D. C. Martin, T. F. Conroy and John Higgins as operators. J. Burns and J. Moran represent the clerkship. The night force consists of F. L. Wheaton on night report and C. W. Gilmore as operator. F. A. Braymon is lineman. At the Union Depot, A. Beers, manager; J. Powers, day operator and A. J. Jewitt nights. James Higgins covers the Bay State House. The Mutual Union is represented by Miss Hall, manager; Miss Learned, formerly of Pawtucket, R. I., as operator. The United Lines has C. H. Morse as manager and O. W. Oridge, operator.

BOSTON NOTES.—Arrivals. Messrs. Ahern, Demmier from White River Junction; Hatch, from Portsmouth, N. H.; Parker, Athol, Mass.; Pontin, Lowell, Mass.; Evans, Springfield; Rice, Holyoke; Martin, Buffalo; Towne, Nelson and Kenna, New York city; Fiske, Fitchburg; Kruger, Pigeon Cove, Mass.; Greene from San Francisco; Losea, N. Y. and N. E. R. R. Departures.—Harry Thompson and Peter Van Allen, Bar Harbor, Me.; E. Elliot and Harrison, Cottage City; McCre a, Saratoga, N. Y.; Crawford, Jacksonville, Fla.; Alden and Dewolf to Cable Station, Duxbury, Mass. Arrivals in city line department.—Miss Brigham from Postal office; Miss Kittie Crowley from N. Y. city; Miss Mollie Dunn from broker office; Miss Daily from South Boston; Miss Bumpus from Quincy, Mass.; John F. Sheehan, Sandy Hill, N. Y.; Misses Marshall and Emslie from B. & O. office: Mrs. Bernam, Waltham, Mass. Departures.—Miss Reed to Narragansett Pier; Miss Coffay, York Beach, Maine. Mr. Matt C. Harrington has returned from a two weeks sojourn at North Adams. Miss Dulling relieves Miss Hay, who is on a vacation, as are also Messrs. Sullivan, Marchessault, Marcy, Coney, Bradford, Misses Morse, Brigham, Abbie Googs, Mr. Chas. Norton and Mr. Robt. Booth, the latter making a flying trip to England. Mr. Hanna subbing. Mr. J. C. O'Leary has resigned to accept a position with the *Globe* on its special *World* loop, relieving R. A. Pillsbury transferred to the New York Bureau, as assistant correspondent and operator Mr. Wm. A. Hazelboom, one of our most popular young operators has resigned to go with Brown Bros. & Co. as private operator. We wish him success in his new position.

ASSIGNMENTS.—Day force.—C. E. Lyman, assistant to Senior Chief Stevens; F. A. Osborn, assistant to Chief Stevens, on Southern Board; Herrick to assist Secretary Eldredge *vice* Burke resigned; Pontin *vice* Herrick, promoted; Demmier, *vice* Harrison, transferred; A. Hearn, White Mountain wire; Hatch, Portsmouth and Isle of Shoals; Parker Fitchburg and Clark to Chamber of Commerce; Mr. Evans to Cottage City duplex. Night force: Reginald Patterson, Buffalo *vice* Ansley, resigned; Wheelock, Halifax *vice* Rankin, resigned; Kirkpatrick, Philadelphia *vice* Wheelock; Dowd, Washington *vice* O'Leary; Brewer, third New York *vice* Pillsbury; Perkins, Dow and McRae, *Globe* office; Flaherty and Clinch, *Herald* office. J. M. Sullivan has been appointed manager of the Chamber of Commerce and Ship News office. John Greene, split trick *vice* Thompson, transferred. Joseph Walton and Wallace Cox have been following the New York and Eastern fleets on their annual cruise for the past two weeks and members of the night force now make a wide detour around the Cottage City wires, so they will not catch the elegant Morse from these gentlemen. The B. & O. system in this city was discontinued July 1st, and the entire force is now working at the W. U. office. The Mutual Union office under the management of Mr. D. J. Hern, now occupies the old B. & O. quarters.

OLEAN, N. Y., NOTES.—At the Postal office quite a number of changes have occurred since our last letter. P. F. Gallagher has closed his broker office and is on days again; Fred. Tarbell is manager; Joseph Carroll, formerly all night

chief, B. & O., Buffalo, is night manager; W. A. Dana, of Little Genesee, works split trick, and J. H. Simpson is battery man and lineman. Arrivals: A. J. Mayer, of Rutland, Vt. At the office of the W.N.Y. & P. R.R., Mr. F. J. Martin is train master and superintendent of telegraph, assisted by Geo. P. Jackson, dispatcher narrow gauge systems, and M. A. Miller and W. A. Gessie day and night dispatchers Rochester Division, respectively. At the freight office Thomas Campbell; at shops, Mr. Reed and Griffin; at Junction, P. Small and Jerry Driscoll; at Erie R. R. office, Mr. Fred. Hill, days and John Salisbury, late of N. Y. P. & O., nights. Harry D. Hagerdon, formerly of Superintendent Martin's office here, now train dispatcher L. & P. R. R., Angelica, N. Y., and Miss Ella Luther, daughter of J. H. Luther, a prominent foundry man here, were married August 15th. Their many friends here wish them life long happiness. Wade Van Nata, formerly dispatcher W. N. Y. & P. R. R., is subbing for Mr. Hagerdon for two weeks at Angelica. J. C. Caswell, an old time P. & E. R. R. operator, is manager of the Telephone district, assisted by Miss Flora Chamberlain. Mr. E. E. Morian, formerly of Tide Water Pipe Line Co., is in the confectionary business here. At Tide Water office, F. H. Reaser, is manager. United Pipe Line office, F. B. Humphrey; at pump station, Fred. Holliday. Mr. L. M. Holmes has charge of the Allegheny Lumber Co's telegraph office. Mr. M. M. Davis, electrician for the Postal, recently spent several days here among his friends. Along the Postal lines we find J. J. Ellis at Elkland, Pa.; H. S. Clarke, Harrison Valley, Pa.; E. E. Strickland, Alma, N. Y.; A. A. Mulkins, Shingle House, Pa.; Mr. Call, Ceres, N. Y.; Frank Snider, Allegheny, N. Y.; B. E. Weaver, Salamanca, N. Y.; F. Larkin, Jr., Randolph, N. Y.; Edward Hall, Jamestown, N. Y.; J. A. Roof, Corry, Pa.; Mr. Van Dusen, Union City, Pa.; C. A. Johnson, Meadville, Pa.; Mr. T. E. Crosson, manager; Will Shafer, operator at Greenville, Pa.; Miss Maggie O'Connor, Franklinville, N. Y.; on B. & M., F. D. Leland, Springville, N. Y.; J. S. McMahan, Ellicottville, N. Y. E. H. Lindsley, operator, W. U., Salamanca, is a weekly caller in town.

POSTAL NOTES.—M. F. Finn has resigned to accept stenographer's position, his place here being filled by Mr. Churchill, late of New Haven. Miss M. E. Morrow, who has been subbing for several young ladies, has resigned to accept a position at 54 Park Place. W. C. Christian has transferred from 187 to the Hoffman House. C. F. Letham, night operator at the latter place, has resigned. Miss G. Day, the manager, fills the position. Miss McCue is relieving Miss M. T. Shade for several weeks. Miss Annette M. Conway, formerly clerk at 88 Gold street, has been appointed operator here in the city department. Messrs. Barnwell, McGuire, Higgins and Miss Leahy have returned from vacations. A number of others are still away, including Miss Hattie Guthman, Bessie Conway, May McDonald, M. E. Gumaer, Emma Rath and Lizzie Lewis. Their places are being filled by extra men, among whom we notice several new faces. They include Messrs. C. F. Peckham, A. J. Broderick, J. R. Dougherty, R. M. Williams and H. C. Richardson. C. F. Richardson, the city chief, is away on his annual vacation, being relieved by all-night chief Davis. J. J. Davis and A. A. Anderson are on the regular day force. Every little while some new improvement is introduced into the workings of the office, and in almost every case proves to be a success. The operators, however, are waiting for the, to them, best improvement that could be made, and that is making "pay-days" on the first and fifteenth of each month. Everyone feels that it will be an assured success from the start. Miss M. L. Wenk, who has been on the sick list, is again at her desk.

Mr. D. H. Craig, the founder of the Associated Press, has just issued a pamphlet in which he describes his system of machine telegraphy, by which he claims a speed of 4,000 words per minute can be attained.







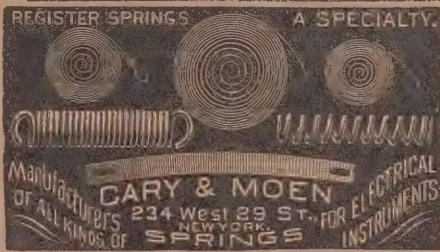
**AERIAL, SUBMARINE  
and Underground  
Wires and Cables**



TRADE MARK.

For Telegraph, Telephone and  
Electric Uses.

**THE OKONITE CO.,**  
No. 13 Park Row, New York.



**CARBON PAPERS**

Superior Qualities for use with  
**Type Writer and Stylus.**

**J. UNDERWOOD & CO.,**  
30 Vesey St., New York.  
163 La Salle St., Chicago.  
10 Johnston St., Toronto, Ont.

**HENRY CONNETT,**  
PATENT SOLICITOR and EXPERT.  
20 years' experience.  
132 Nassau Street, New York.

**HEADQUARTERS FOR  
TYPE-WRITER RIBBONS.**  
MANUFACTURER OF  
CARBON AND MANIFOLD PAPERS, STY-  
LUSES, TINS, ETC.

S. T. SMITH,  
14 Park Place, NEW YORK.

**JOHN A. ROEBLING'S SONS CO.**

Manufacturers of  
Galvanized Iron and Copper Telegraph and  
Telephone Wire,  
Insulated **ELECTRIC WIRES** and Wire  
For All Electrical Purposes.

**WIRE ROPE.**  
E. L. SHIPPY, Manager N. Y. Office,  
117 and 119 Liberty Street.

**ELECTRICAL PATENTS**  
**J. B. SABINE,**  
COUNSELOR AT LAW,  
181 BROADWAY,  
NEW YORK.  
SPECIALTY  
ELECTRICAL PATENTS

**G. W. Miatt,** Counselor at Law,  
SOLICITOR OF PATENTS.  
10 years' experience in Patent Matters  
178 Temple Court, N. Y. City

# BRUSH MOTORS.

THE GREATEST EFFICIENCY IS OBTAINED FROM

## GENERATORS AND MOTORS,

MANUFACTURED BY THE

# BRUSH ELECTRIC CO.,

## CLEVELAND, OHIO.

**WILLIAM F. SWIFT,**  
SECRETARY,  
No. 36 UNION SQUARE,  
NEW YORK.

## ANSONIA BRASS & COPPER CO.

SOLE MANUFACTURERS OF COWLES' PATENTED  
**Fire-Proof and Weather-Proof Line Wire.**



Samples furnished upon application. Pure Electric Copper Wire, bare and covered, of every description. Warerooms: 19 and 21 Cliff St., New York; 64 Washington St., Chicago, Ill. Factories: Ansonia, Conn.

## DAY'S KERITE Wires and Cables

For Aerial, Underground and Submarine use  
**CLARK B. HOTCHKISS,**  
General Agent,

16 DEY ST., NEW YORK.

## THE EDISON MACHINE WORKS

Wire Insulating Department.

**JAS. F. KELLY,**

GENERAL SALES AGENT,

19 Dey St.,

New York.

ESTABLISHED 1867.

## PARTRICK & CARTER,

MANUFACTURERS AND DEALERS IN

## Electrical Supplies

For the  
Telegraph, Telephone, Electric Light, &c.

SOLE PROPRIETORS OF THE

Patent Needle Annunciators & Burglar Alarms,

Send for Catalogue, and Mention this Paper

114 SOUTH SECOND STREET,

PHILADELPHIA, PA.



# THE ELECTRIC AGE.

DEVOTED TO TELEGRAPHY, TELEPHONY, ELECTRIC LIGHTING AND ALL PHASES OF ELECTRICAL DEVELOPMENT.

VOL. VI—No. 8.

NEW YORK, SEPTEMBER 16, 1888.

\$2.00 per annum.  
Single copies 10 cents.

## J. A. BUNNELL & CO.,

106 and 108 Liberty Street,

NEW YORK

# Telegraph Instruments

BATTERIES, BELLS  
& ELECTRICAL  
SUPPLIES.

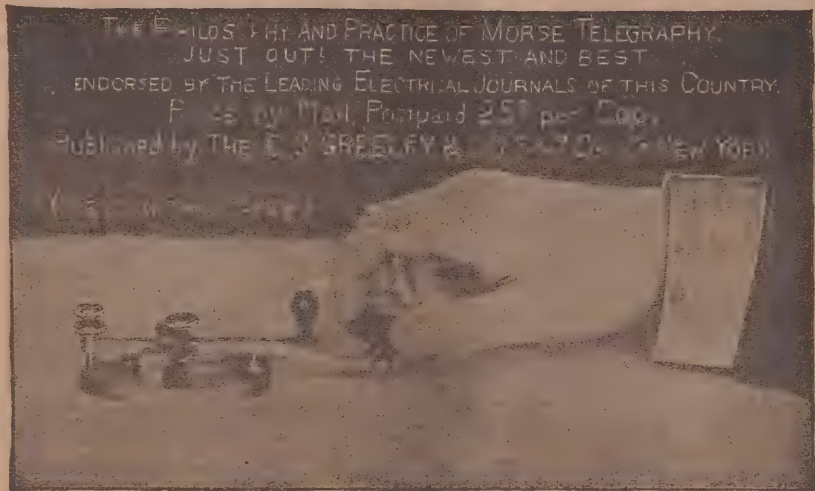
The largest stock and best  
variety of main line and  
short line instruments in any  
American establishment.

Send for our latest Illustrat-  
ed price List and Catalogue

No. 9, of January, 1888.

containing over four hun-  
dred cuts of Telegraph In-  
struments, Batteries and  
Electrical Appliances, FREE  
also Manual of Telegraphy,  
FREE to any Address.

## HALF PRICE TO OPERATORS.



**SPECIAL NOTICE.**—To any TELEGRAPH OPERATOR in the UNITED STATES or CANADA, sending us his Office Address or other satisfactory evidence of his profession, together with 12 cents in postage stamps or otherwise, we will forward by mail, postpaid, a copy of the above book, entitled *The Philosophy and Practice of Morse Telegraphy*, just issued.

### WHAT THE ELECTRICAL PRESS SAY:

"An excellent little work \* \* \*

"A rational and practical guide for the young telegrapher, intended to make him acquainted early in his career with a few underlying facts and laws that usually, without specific study, only come to his knowledge after years of service and practical observation."—*The Electrical World*, March 24th, '88.

The truth (referring to the true position of the telegraphers' hand in the act of "sending") exposed by a lightning wink of the instantaneous camera, and permanently fixed for our deliberate inspection by the science of photography, dawns upon the craft intellect accompanied with something of the amazement that startled the artistic world when the elaborate anatomical studies by Rosa Bonheur of the horse in the act of running, were delivered over to universal ridicule by the subtleties of the same agent, instantaneous photography.

*The Electrical Review*, March 24th, '88.

## THE E. S. GREELEY & CO.

Successors to L. G. TILLOTSON & CO.

5 and 7 DEY STREET, NEW YORK.

Manufacturers, Importers of, Dealers in and Headquarters for

TELEGRAPH, TELEPHONE, ELECTRIC LIGHT, DISTRICT,  
BURGLAR ALARM, ELECTRIC BELL, EXPERIMENTAL  
AND GENERAL ELECTRICAL SUPPLIES.

SOLE MANUFACTURERS OF THE

### Victor Telegraph Instruments.

EFFECTIVE IN WORK! BEAUTIFUL IN APPEAR-  
ANCE!! SCIENTIFIC IN CONSTRUCTION!!!

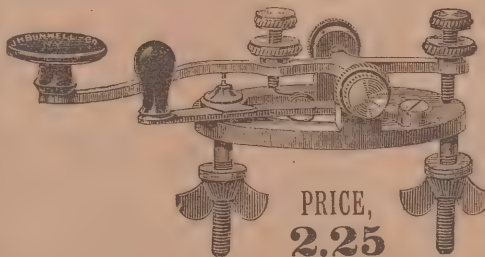
Authorized Agents for the Sale of EDISON INCANDESCENT MINIATURE  
LAMPS and all other EDISON LAMPS for EXPERIMENTAL USES.



## J. H. BUNNELL & CO'S STEEL LEVER SOLID TRUNNION KEY.

Telegraphers cannot fail to have noticed that upon the introduction of the BUNNELL STEEL LEVER KEY four years since, it at once achieved a vast popularity, such as never before attached to any specialty in Telegraph Instruments, and that this popularity has continually increased, and is still increasing.

It will also be noticed by Telegraphers, that since the STEEL LEVER KEY was introduced, a brood of "improved" keys has been hatched and put forward from various sources from time to time each one made to look as much like the



STEEL LEVER KEY as possible, or made with some kind of a "steel lever," or "patent lever," and in every case claiming all the merits possible and impossible that language could describe.

Most of these "improved keys" have become exterminated by the force of their own worthlessness. Years of practical test in the use of THOUSANDS of BUNNELL STEEL LEVER KEYS throughout America demonstrates their perfection and popularity. BE NOT DECEIVED BY THE ABSURD IMITATIONS.

THE BUNNELL STEEL LEVER KEY is more durable, and in every respect better than any other for rapid and perfect sending for the following reasons:

The Lever is only one-half the weight of the ordinary brass lever as generally made.

The entire Lever and Trunnions together being made of but one piece of fine wrought steel, the common defect of loose trunnions is avoided, the strength of a heavy brass lever is obtained with much less weight of metal, and, by the perfect bearing which the solid trunnion gives, together with the use of hardened platina points, sticking is absolutely prevented.

The size and proportions are such as to make it the most perfect operating key possible to obtain, either for the hand of the skilled and rapid expert, or the beginner.

**Price, \$2.25. Finely Finished, and Lever Nickel Plated.**

**LIBERAL DISCOUNT ON ORDERS FOR COMPANY SUPPLIES.**

Steel Lever key sent by mail, post-paid to any part of the U. S. or Canada on receipt of the above price, by Registered Letter or Money Order.

Until further notice we will exchange our New Steel Lever Keys for old keys for a cash difference of \$1.50 each. This price applies to any number of Keys, no matter in what condition the old ones may be. They must be delivered to us in packages plainly marked KEYS with all charges prepaid.

Where exchanges of not less than Six Keys at one time are desired for Keys which are already in use and which cannot be spared until the new ones arrive, we will, upon receipt of order, send on the new ones and the old ones may be sent to us afterwards. Cash should accompany all orders except from Superintendents and from Purchasing Agents of well known companies.

SEND FOR OUR 1888 ILLUSTRATED CATALOGUE.

J. H. BUNNELL & CO.,

106 and 108 Liberty Street,

NEW YORK.

## IT STANDS AT THE HEAD

ONE touch of the finger should produce any character used in a Writing Machine. Instruments that fail to accomplish this are deficient and do not fully meet the necessity that brought them forth. These facts are self-evident.

The No. 2 Caligraph is the only writing machine that fully economizes time and labor, and economy of time and labor is the best ground we have for soliciting trade.

Granting that we are in the front in this, we can show that our late improved machines excel in mechanical merit, durability and beauty of work.

10,000 Caligraphs are in daily use. We publish 400 letters from prominent men and firms which are convincing.

THE COMMERCIAL GAZETTE.

C. G. Muller, Agent Caligraph, Cincinnati, O.

Cincinnati, October 5th, 1885.

Sir:—About three months since, I commenced to use the Caligraph with a view to receiving special despatches from the wires, instead of by the old method by the pen. In about three weeks I was able, by diligent practice, to write from thirty-five to forty words per minute. Since then I have been using the machine with success receiving from five to six thousand words per night upon it. We have found the machine of such value in the work as to be able to receive the despatches by code, or abbreviation, thus increasing this capacity of the wire, though the matter is written out in full upon the Caligraph. We make an average speed of fifty words per minute by this method, and expect to do still better work with it.

The machine is a No. 2 and must be a marvel of durability, as it has never been out of order under this continuous and heavy strain, and is always ready for use.

Very truly yours, Signed; Frank B. Ross, Opr. Commercial Gazette.

C. G. Muller, Esq., Agent Caligraph, Cincinnati, O.

October 5th, 1885.

Dear Sir:—I cheerfully certify to the correctness of the above statement of our operator.

Signed; Chas. E. Thorp, Telegraph Editor C. G.

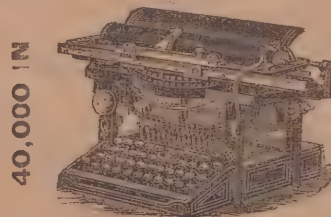
Guaranteed to be unequalled in Manifolding capacity.

**THE AMERICAN WRITING MACHINE CO.,**

New York Office, 237 Broadway,

Hartford Conn

## Remington Standard Typewriter.



40,000 IN

DAILY USE.

THE STANDARD OF THE WORLD.

Especially adapted for manifolding, and for rapid work.

Adopted by the New York Associated Press, Western Associated Press and New England Associated Press, and a large number of telegraphers throughout the country for receiving messages.

Send for handsome illustrated pamphlet.

**SPEED CONTESTS.**

CINCINNATI, July 25, '88. Highest speed on legal work.

NEW YORK, Aug. 2, '88. Highest speed on correspondence.

TORONTO, Aug. 13, '88. (Internal Tournament for World's Championship) 1st and 2nd Prizes, business correspondence. 1st and 2nd Prizes, legal testimony (gold and silver medals.) Send for circular and price-list.

**Wyckoff, Seamans & Benedict,**  
327 Broadway, New York.



# THE ELECTRIC AGE.

Published on the 1st and 16th of every month  
by the Electric Age Association.

Entered as Second-class Mail Matter.

Registered Cable Address  
"ELECTAGE" NEW YORK.

## TERMS OF SUBSCRIPTION:

One Copy, one year, . . . . . \$1 50  
One Copy, six months . . . . . .75  
Great Britain and other Countries, . . . . . 2.00

(INVARIABLY IN ADVANCE.)

CLUBS.—One extra copy of the ELECTRIC AGE will be supplied gratis for every Club of five subscribers.

We invite correspondence from members of the profession and solicit articles from manufacturers for publication.

Subscribers should promptly notify us of any change in their addresses, giving the old as well as the new one, that they may receive all the papers they pay for.

**ADVERTISING RATES: \$2.00 PER INCH.**

Reading Notices, 25 cents per line.

Births, Marriages, Deaths and other Notices, 50 cents each.

**Papers will be discontinued at the expiration of the time contracted for with due notice of same.**

WALTER P. PHILLIPS, Editor.

J. B. TALTAVALL, Publisher,

C. H. BOGLE, Manager, Advertising Dept

No. 5 Dey St., New York.

NEW YORK, SEPTEMBER 16, 1888.

It is a significant fact that during the recent Electric Light Convention, held in New York City, the President, Mr. S. A. Duncan, with considerable emphasis, advised the various electric light companies to at once take steps to enlarge their plants, in order to admit of their furnishing power as well as light. The average reader can hardly conceive of the importance of this suggestion, and it is quite safe to assert, it will not pass unheeded. Of course, many of the enterprising electric light establishments are already in the field and have been for some time furnishing power, but the general adoption of the idea that it is possible to furnish power to the extent of from three to ten horse power to any number of customers, seems to be doubted by many. Those who have, so far, been induced to adopt electricity as a means of lighting and for the furnishing of power, are highly satisfied with the result. The economy of this substitution is apparent. The thousands of dynamos which are now idle during the day can be utilized very profitably by the transmission of power and in no way interfere with the lighting.

Mr. Gibbens, one of the members of the Underground Commission, makes the assertion that the electric light companies will be fully satisfied with the underground system furnished for their use. The companies very naturally object to making false steps, but gradually they will learn that the underground problem will have been satisfactorily solved before another twelve months go by, despite all opposition. Mr. Gibbens is quite a young man, but it cannot be denied that he has been making the best use of his time in the study of electrical conduits since he became a member of the much abused commission.

The question of poor insulation in the wiring of business blocks, for incandescent lighting, is receiving considerable attention at the hands of those whose business is now suffering from past indifference in this regard. If a building is improperly wired and fire is the result, the system of lighting receives all the condemnation, and the man who furnishes

the worthless wire is never once thought of. In addition to this, the insurance officials get their heads together and the premiums are raised on all buildings using the system which they suppose is at fault. To avoid these expensive annoyances in the future, each electric light company which is awarded the contract to furnish buildings with light, should see to it, by thorough inspection, that the wire work is properly done. Their future reputation depends upon this. At the same time it will be well to see that owners of buildings are duly cautioned against the cheap wiring of their buildings. A majority of the contracts for wiring buildings have been given to the lowest bidders, as is customary, but through ignorance. Light on this important subject would have guided the builder in placing the contract with responsible firms, which could be relied upon to fulfill all the requirements of good workmanship.

The subject of electrical education was ably treated by Mr. E. R. Weeks, of Kansas City, Mo., in a paper which he read before the recent Electric Light Convention. He said that in the rapid development of the applications of electricity, the demand for skilled workmen far exceeds the supply, and both employers and employees are beginning to realize that the men at hand must be assisted to a mental culture; whose lack is one of the drawbacks to perfect service. Mr. Weeks is a thoroughly practical business man and realizes the importance of employing workmen who are something more than mere machines. Mr. Weeks has set a good example to all companies, and it was evident by the discussion which his paper provoked, that a very careful note was made of everything said by the various members. The result of the discussion was the unanimous adoption of a resolution appointing a committee to consider the advisability of making a recommendation to all our scientific colleges of a course of practical electric lighting education.

Superintendent Kerts of the Union Pacific telegraph, and Superintendent Dickey of the Western Union, at Omaha, Neb., have just returned from a trip to Eastern Pennsylvania, where they made a thorough investigation of the railway induction telegraph system as in operation on two divisions of the Lehigh Valley road. They were greatly pleased with the system and are anxious to have it tested on a division of the Union Pacific, which will be done soon. President Adams is desirous of introducing the system on the whole line of the Union Pacific, but is deterred by reason of the great expense. It is believed that the fast trains and the most important stations will be equipped for the operation of the system in spite of its cost.

A petition was recently circulated along the whole system of the Pennsylvania Railroad asking for an increase in salary of 15 per cent. and a two weeks' vacation annually with pay. It was signed by nearly every operator on the Middle division and met with success on other divisions. The chief operator of the Middle division thereupon requested the resignations of two of his oldest operators and transferred two others to smaller offices with a reduction in salary of 20 per cent. This action has caused much excitement in railroad circles and public sentiment is against the division operator for the summary action taken.

The Westinghouse Electric Co., has taken up the alternate current motor of Mr. Nikola Tesla, and has now for some time been carrying on experiments under the supervision of the inventor looking to the commercial development of the motor.

At Lima, Ohio, crude petroleum is used to make steam for the engine which drives the dynamo supplying current to the electric railway.



A SYNTHETIC STUDY OF DYNAMO MACHINES

I. INDUCTION.\*

Let us now explore the vicinity of the bar magnet which did us such excellent service in our former experiments. Here, again, we find that the needle takes up for each position a definite direction, and we get, representing the direction of forces exerted in the vicinity of the magnet, the lines shown in fig. 8. These are also curves like the lines of force in the neighborhood of the coil. They proceed from the N end, say, of the magnet, curve through the air to the S end,

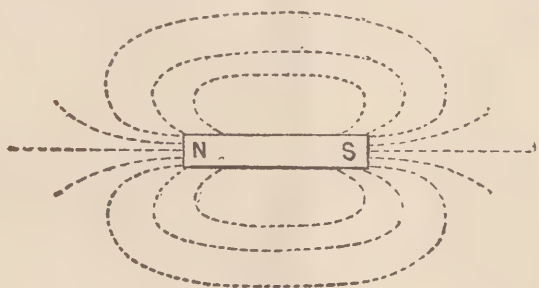


FIG. 8.

enter there, and pass through the interior of the steel. A pretty as well as instructive picture of these lines is produced by placing on the top of the magnet a piece of card-board, sprinkling iron filings on it, and gently tapping the card-board the while to aid the filings in arranging themselves.

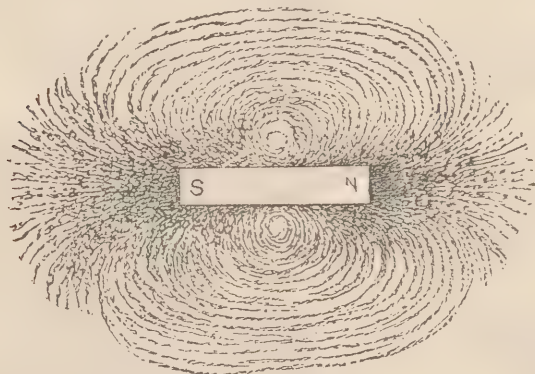


FIG. 9.

The result is the beautiful curves shown in fig. 9. Provisionally we will assume that near the coil and magnet the lines of force are more closely packed, and the force exerted

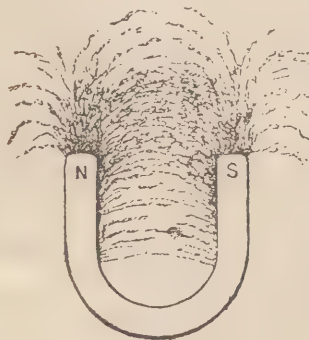


FIG. 10'

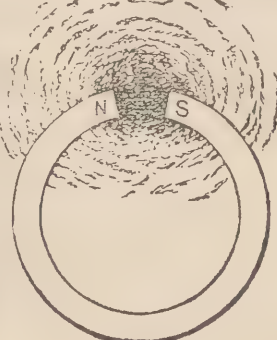


FIG. 11.

greater than at some distance off. Let the steel magnet take the form of a horseshoe and we have the arrangement

\*Electrical Review, London.

as shown in fig. 10. Lastly, if the magnet be a steel ring with a gap in it, the lines take the direction as in fig. 11. The space in the region of the magnet wherein the magnetic influence is felt is termed the *magnetic field*. When on removal from this region the influence ceases to be felt the needle is said to be outside the field.

We have here a result produced alike by a current carrying coil and magnet. Both exert in their vicinity magnetic forces in well-defined directions; both create in surrounding space a magnetic field. The space in which an electromotive force is induced in a moving coil is not, we perceive, like ordinary space; it is a region in which magnetic forces are exerted. But in order that an E. M. F. may be created in this region motion is necessary. How must lines of force and motion be related in order that a current may flow?

5. *Summary of experiments.*—Having demonstrated the existence of forces in the magnetic field or space surrounding the coil and magnet, and having mapped out their directions, we proceed to consider the E. M. F. induced in the coil, c, as a result of movement in the field. We have seen that the face, a, of the coil, A, while the current was flowing behaved like the N pole of a magnet, while the face, b, behaved like the S pole.

Looking at face a the current flows in the opposite direction to the hands of a watch, looking at b it flows in the same direction as the hands of a watch. Suppose the current to

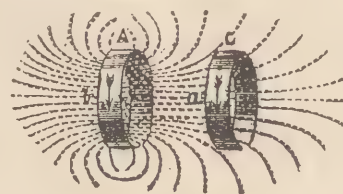


FIG. 12.

be flowing in a and the coil c in position (fig. 12). There is so long as the current remains uniform no motion of the galvanometer needle. Break the current the needle gives a sudden swing showing that in coil c, there is a momentary current in the direction of the arrow. We know that from A when a current flows there stream lines of force (fig. 12) which pass through the coil c. The latter is thus in a magnetic field. Stop the current this field is annihilated, and

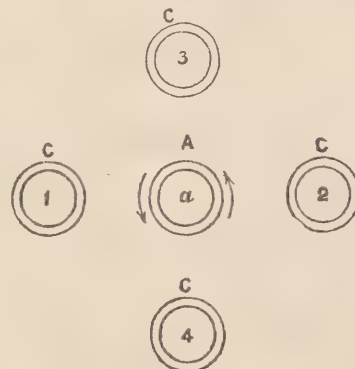


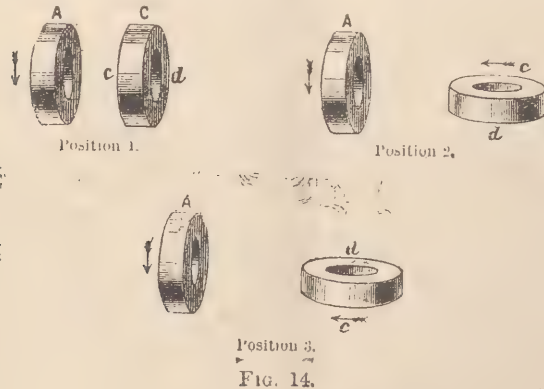
FIG. 13

the lines of force are suddenly withdrawn from c. Simultaneously with the annihilation of the field consequent on the stoppage of the current, there is induced in c an E. M. F., and there dawns upon us some idea of these two events being related as cause and effect. But if an E. M. F. results simply from a decrease in the number of lines of force passing through the coil, the effect can be produced in another way. Place c in front of a and while the current continues to flow in the latter remove c rapidly to each of the positions 1, 2, 3, 4 (fig. 13). Each time the induced current is in the same direction showing that decreasing the lines in all cases



produces similar effects, no matter by what means the reduction is effected.

The lines from face *a* of *A* are of the same character as the lines proceeding from the *N* pole of a magnet, they produce consequently similar results, as our repetition of the experiments using a magnet instead of a coil already disclosed. The current flows in *c* in the direction of the arrow when the latter is moved out the field, or in the direction which makes its face next *A* and *s* poles. If lines from an *N* pole



enter a coil a movement of the latter which diminishes the lines entering it will cause a current to flow in such direction that the face by which they enter becomes an *s* pole. When the movement increases the number of lines, the entering face is an *N* pole. If the lines entering are of opposite sign or proceed from an *s* pole instead of an *N*, the movements make the entering face *N* for diminishing and *s* for increasing. Of course *N* lines cannot be subtracted from or added to one face of the coil without *s* lines being at the same time subtracted from or added to the other face. The above statements merely mean that when the lines through the coil are diminished the poles at its two faces are of opposite character to those from which the lines of force entering them proceed, while if the lines are increased the poles at the faces are of the same sign. As a last experiment instead of keeping the face of *c* parallel to *A* during the movement as we have hitherto done, let us give it a twist first from position 1 into position 2 (fig. 14). We find the current flows in the direction of the arrow. Now twist it back again and the current flows in the opposite direction. Twisting it still in same direction let it take position 3. The current once more reverses, but is in the same direction in the coil as for the first movement. The data are now fairly complete, and the following facts have been elicited:—

(*a*) An increase in the number of *N* lines entering a coil induces a current in such direction as to make the face by which the lines enter an *N* pole, or makes a current flow looking at that face in an opposite direction to the hands of a watch. A reduction in the lines produces poles in the coil of opposite character.

(*b*) An increase of lines coming from an *N* pole produces the same effect on a coil as a reduction of lines coming from an *s* pole, also an increase of *s* lines has a similar effect to a reduction of *N* lines. The effects are independent of the kind of movement employed to produce them.

(To be continued.)

The telegraph plays an important part in the social world, but not often is it called upon to perform such an important function as that which it executed at Alvarado, Tex., on Aug. 19th. On that day the Missouri Pacific depot was the center of a hymeneal affair of decidedly romantic character. The Western Union wires were so manipulated as to unite in marriage William Newland of Trever, Cal., and Miss Dora Castion of Barnesville, Tex. A justice of the peace officiated at Alvarado, and a clergyman assisted Mr. Newland.

## THE ELECTRIC LIGHT ASSOCIATION.

(Continued from page 22, September 1.)

The President then appointed Dr. Liebig on the Committee on Installation and Insulation in place of Professor Elihu Thomson, resigned. Messrs. Steuart, Mason, Morrison, Weeks and Stanley were appointed to report on the president's recommendations.

The following revised constitution was then adopted:

### CONSTITUTION.

#### ARTICLE I.

##### Name.

The name of this association shall be The National Electric Light Association.

#### ARTICLE II.

##### Membership.

SECTION 1.—Any individual or member of a company or firm operating an electric light, power, heat or welding station for public or commercial purposes, and any individual or member of a company or firm manufacturing electric supplies or apparatus, may become a member of this association by the payment to the treasurer of one year's dues.

SEC. 2.—Electricians, electrical engineers, and those whose profession or business is directly related to electrical interests or to the commercial application of electricity, may upon the recommendation of the executive committee and a two-thirds vote of the association, become members thereof, by the payment to the treasurer of one year's dues.

SEC. 3.—Upon the unanimous recommendation of the Executive Committee and the approval of a two-thirds vote of the association, persons may be made honorary members of the association, with all the privileges of membership, except the right to vote.

#### ARTICLE III.

##### Officers.

SECTION 1.—The officers of the association shall be president, two vice-presidents, a treasurer and a secretary, and an executive committee, to consist of the above-named officers, *ex-officio*, and nine other members.

SEC. 2.—The president and vice-presidents shall be elected by ballot to serve from the close of the annual meeting at which they are elected until the close of the next annual meeting.

SEC. 3.—No person shall be eligible for the office of president or vice-president for more than two successive terms, but this shall not be construed to forbid the election to the office of president of one who has served as vice-president.

SEC. 4.—The secretary and treasurer, who may be one and the same person, shall be nominated by the president, subject to confirmation by the executive committee. The salary of the secretary shall be fixed by the executive committee.

SEC. 5.—The executive committee shall be chosen by ballot at each meeting, either annual, semi-annual or special, and hold office from the close of the meeting at which they are elected until the end of the meeting at which their successors are chosen.

SEC. 6.—The treasurer, secretary and executive committee shall make written reports at each meeting, which reports, upon their acceptance, shall be spread upon the records of the association.

SEC. 7.—The executive committee shall be the governing body of the association. They shall meet at the call of their chairman, from time to time, and shall report upon applications for membership, shall gather and prepare information upon topics of interest, and shall arrange for their discussion at the several meetings of the association. Five members of the committee shall constitute a quorum.

#### ARTICLE IV.

##### Meetings.

The annual meeting of this association shall be held in February, and a semi-annual meeting may be held in August



of each year, at such places as the association shall determine, and on such dates as may be determined by the executive committee.

ARTICLE V.  
*Dues.*

The annual dues shall be \$20, payable in advance, and shall cover the calendar year.

ARTICLE VI.  
*Ballot.*

On any question before the association a ballot may be demanded by ten of the members present.

ARTICLE VII.  
*Amendments.*

SECTION I.—Amendments to the Constitution shall be presented in writing and referred to a committee to be appointed by the chairman before being acted upon by the association; a two-thirds vote of those present shall be necessary to their adoption.

SEC. 2.—No amendment shall be voted upon on the day of its first presentation.

|                   |              |
|-------------------|--------------|
| A. F. MASON,      | } Committee. |
| G. M. PHELPS,     |              |
| GEO. F. PORTER,   |              |
| HENRY D. STANLEY, |              |

THIRD DAY, AUGUST 31.

The meeting was called to order at ten o'clock by President Duncan. A new committee on transportation was appointed, with Mr. G. F. Porter as chairman.

Mr. Frank Ridlon read the report of the Committee on "Insurance Exchange," giving details of the method pursued by the Boston Electric Exchange and of reduced rates granted by the New England Insurance Exchange to the licensees of the former. The report was accepted and the committee continued.

Messrs. E. T. Lynch, Jr., C. H. Barney, H. C. Davis, W. C. Kerr and F. B. Crocker were appointed to report on underground wires.

Mr. Arthur Steuart then submitted the following which was unanimously adopted:

*Resolved*, That the National Electric Light Association, after a full discussion of the subject, decide to express their hearty sympathy with the views expressed by his Honor, Mayor Hewitt, in his address before the association, upon the subject of putting wires underground, and in addition desire to take this opportunity of expressing the opinion that up to the present time no commercially practical method has been brought to their notice by which high tension direct currents such as are used for arc lighting can be placed underground.

Mr. P. H. Vander Weyde's paper on the "comparative danger of alternating vs. direct currents" was read by Mr. Steuart.

Dr. Otto A. Moses offered the following which was adopted:

*Resolved*, That the National Electric Light Association emphatically declares that it is beyond doubt possible to produce and distribute high tension currents for public use without any more danger or difficulty than attends the distribution of gas and water in our dwellings; and further be it

*Resolved*, That they would impress all legislatures with the fact that success in the electric light and power business is based chiefly upon economy in the size of conductors, and that to utilize this fact high tension currents were adopted in the first stages of development of electric lighting and have been used ever since and will continue to be used; and further, be it

*Resolved*, That it is our conviction that there is no difference in the danger attending the use of continuous or alternating currents, and that both may be so transformed before being used as to render them perfectly harmless and tractable means of distributing electric power for use in cities.

Dr. G. A. Liebig then read his paper on "Some Methods of Electrical Measurements."

Mr. Arthur Steuart reported that the committee on patent legislation had succeeded in having the bill submitted and passed favorably upon.

Mr. E. R. Weeks at this juncture read his paper on "Electrical Education."

Messrs. O. A. Moses, E. R. Weeks and A. R. Foote were appointed to suggest to the various colleges a course of instruction in practical electric lighting.

Chicago was selected as the next place of meeting and B. E. Sunny, chairman, S. E. Barton, W. A. Kreidler, O. A. Moses, J. F. Morrison, E. T. Lynch, Jr., F. Ridlon and E. F. Peck were elected as the executive committee.

The following was then agreed to:

*Resolved*, That this association shall have a permanent office in the City of New York, which shall be in charge of an expert electrical engineer, who shall be the secretary and treasurer of the association, and that the president at once take steps to procure the services of such a person, and establish him in suitable quarters and with suitable facilities in this city.

Secretary Harding was at this point unanimously thanked for his good work.

Mr. A. J. DeCamp offered a resolution which was agreed, to, to the effect that the practice of parent companies of furnishing apparatus and capital for the establishment of plants in cities and towns where local capital has already been invested, is a growing evil and should be discontinued, and urge the members to suppress the practice.

Mr. H. L. Lufkin then read a paper on "a basis from which to calculate charges for electric motor service." The convention then adjourned.

ELECTRICIANS EATING CLAMS.

One hundred and forty-five men, mostly members of the National Electric Light Association, which had just concluded its sessions in New York, enjoyed their tenth annual complimentary clam dinner and reception given by the American Electrical Works of Providence, (President, Eugene F. Phillips), at the Vue de l'Eau Club, September 2d. The guests are the customers of the works giving the dinner, and the occasion, like all those that have preceded it, was a refreshing exemplification of the good fellowship existing among the men representing the different branches of this important business. President Phillips, who had the affair in hand, and Treasurer W. H. Sawyer, of the company, were assiduous in caring for the comfort of their guests, and the result being highly gratifying, especially to the visitors from abroad, many of whom struggled with the mysteries of a Rhode Island clam dinner for the first time. Judging from the expressions of satisfaction the novel exercise was highly appreciated and also very filling. The New York delegation which had chartered a steamer, was under direction of General C. H. Barney, who, it was said, had officiated as captain, first mate, steward, engineer and deck hand of the steamer since the beginning of her eventful voyage from New York. A large and very handsome cut-glass dish was presented to Mr. Phillips, and six small cut glass dishes to Mr. Sawyer, both being the gift of the New York delegation. The presentation was made by Henry C. Davis, President of the New York Electric Club. Ex-Governor Howard responded in behalf of Mr. Phillips, and Mr. Sawyer expressed his thanks in a few words. Mr. Phillips and Mr. Sawyer were presented with two stunning diamonds made out of glass, and when they were adjusted in their shirt fronts the crystals lapped their suspenders.

The National Carbon Co., of Cleveland, O., earned a national reputation for itself by a free distribution of copies of its new directory of arc lighting plants, central and isolated.



## THE TELEPHONE CONVENTION.

The Telephone Convention was called to order on September 4, at 11 A. M., by President Henry Metzger. The roll call by Secretary C. H. Barney showed that 26 companies in active membership were represented, and that two associate members and five honorary members were in attendance.

Mr. Henry C. Davis, president of the Electric Club, extended the privileges of the club to the members.

The secretary's report showed that there were upon the roll 36 active, five associate and 29 honorary members. The publication of the *News Letter* had been continued, and it had had been Mr. Barney's privilege not only to visit the more important exchanges in New York and vicinity, but many others at distant points, including Boston, Providence, Philadelphia, Pittsburgh, Cincinnati, Chicago, Minneapolis and St. Paul.

The receipts of the year were \$1,937.69, and the expenses \$1,953.17, thus drawing slightly upon the surplus of the previous year:

Mr. Henry Metzger, of Pittsburgh, was re-elected President. Following officers were also re-elected; W. D. Sargent, Vice-President; H. L. Storke; Treasurer, C. H. Barney, Secretary; M. F. Tyler, member of the Advisory Committee; and Messrs. S. M. Byran and G. N. Stone, members of the Executive Committee, W. J. Denver and C. F. Cutler were elected as new members of the same committee.

The business of the meeting was opened with an able paper by Mr. F. A. Pickernell, on telephone batteries. The paper elicited favorable comment from Messrs. Lockwood, Gifford, Baily and Thornberry who took part in the discussion.

The session of Tuesday afternoon was behind closed doors and related to the future policy of the association.

When Wednesday's meeting was called to order at 10 A. M. Mr. C. L. McClure read his paper on dynamo current interferences with telephone systems, and means of relief.

Mr. T. D. Lockwood then read his paper on the electrical relations of telephone and electric light and power circuits and railways. The paper dealt altogether with the disturbing effects of electric light and power currents upon telephone lines.

Secretary Barney then read Mr. W. D. Sargent's paper on underground work in Brooklyn, N. Y.

Mr. L. F. Beckwith's paper on the New York subways then followed.

Mr. E. F. Sherwood read his paper on the telephone exchanges of New York City.

Secretary Barney read Dr. S. M. Pluch's paper on the telephone.

The next meeting of the convention will take place at Minneapolis, Minn.

An interesting judicial opinion as to the rights of a telephone company against house movers was then read by Mr. McCully.

The Secretary's report was then adopted and the convention adjourned *sine die*.

The following were in attendance:

Albany, N. Y.—W. H. Cull, A. B. Uline.

Atlanta, Ga.—W. J. Cole.

Bridgeport, Conn.—F. T. Mason, H. D. Stanley.

Boston, Mass.—Geo. Albee, P. H. Alexander, F. J. Boynton, W. J. Denver, T. B. Doolittle, A. H. Farnham, C. J. French, F. W. Harrington, W. A. Hovey, N. W. Lillie, T. D. Lockwood, A. O. Morgan, R. F. Ross.

Brooklyn, N. Y.—C. F. Cutler, E. G. Main, J. C. Reilly, W. D. Sargent, Prof. Plympton.

Charleston, S. C.—J. D. Easterlin.

Chicago, Ill.—G. L. Beetle, C. A. Brown, F. E. Degenhardt, J. M. Jackson, W. A. Kreidler, C. E. Scribner.

Cincinnati, Ohio.—A. D. Bullock, E. V. Cherry.

Dallas, Texas.—F. B. Knight.

Denver, Colo.—E. B. Field.

Detroit, Mich.—F. A. Forbes.

Easton, Pa.—W. N. Eastabrook.

Houghton, Michigan.—J. R. Dee.

Kansas City, Mo.—C. W. McDaniel.

Louisville, Ky.—Jas. Clark, H. N. Gifford, J. B. Speed.

Lowell, Mass.—C. J. Glidden.

Montreal, Can.—C. F. Sise, H. S. Thornberry.

Morristown, N. J.—J. C. Clark.

Newark, N. J.—C. O. Baker, Jr.

New Bedford, Mass.—Samuel Ivers.

New Haven, Conn.—E. B. Baker, T. A. Barnes, J. E. McConnell.

New York, N. Y.—P. C. Ackerman, G. W. Arnold, Jr.; W. H. Baker, C. H. Barney, L. F. Beckwith, D. I. Carson, J. J. Carty, J. C. Chamberlain, W. A. Childs, R. Crawford, C. F. Cutler, H. C. Davis, Thos. Delano, A. S. Dodd, Chas. Dutton, W. H. Eckert, J. W. Godfrey, H. Green, G. H. Guy, E. J. Hall, Jr., M. M. Hayden, A. S. Hibbard, F. J. Hovey, C. A. Hussey, W. J. Johnston, J. F. Kelly, O. E. Madden, A. H. Mackinnon; E. B. McClees, F. A. Magee, G. T. Manson, T. C. Martin, J. C. McQuade, R. W. Pope, D. B. Parker, E. L. Perot, F. A. Pickernell, J. C. Pierrez, C. W. Price, W. R. Ryan, A. L. Salt, J. A. Seely, W. H. Sheldon, E. F. Sherwood, T. T. Smythe, J. E. Smith, H. L. Storke, C. E. Stump, J. B. Taltavall, H. B. Thayer, C. R. Truex, T. N. Vail, W. A. Vail, W. B. Van Size, W. T. Westbrook, J. A. Wetmore, Jos. Wetzler, G. L. Wiley, G. Worthington.

Omaha, Neb.—F. Drake.

Paris, France.—B. Abdank-Abakanowicz.

Philadelphia, Pa.—David Brooks, J. M. Plush.

Pittsburgh, Pa.—F. E. Degenhardt, Henry Metzger.

Providence, R. I.—A. C. White.

Richmond, Va.—C. E. McClure.

St. John, N. B.—A. A. Knudson.

St. Louis, Mo.—G. F. Durant.

Utica, N. Y.—C. A. Nicholson, F. G. Wood.

Washington, D. C.—G. M. Brown, S. M. Bryan, J. E. Crondell, H. W. Upperman, Fred. W. Royce.

Williamsport, Pa.—F. Bailey.

## SPEED OF TYPEWRITERS.

In winning the international speed contest at Toronto, Ont., on Monday, August 13th, Mr. T. W. Osborne, the caligraph operator made the astonishing speed of 630 words in five minutes, or 126 words per minute. Very few, even among manufacturers and operators of typewriters, expected anything approaching this speed would be accomplished, although it was known that the best operators in the United States and Canada would take part.

In writing at the speed of 126 words per minute, Mr. Osborne had to make 10½ finger strikes per second for 300 consecutive seconds, and when we consider the fact that a typewriter is started and stopped with each finger stroke the wonderful accuracy and precision of the caligraph is better understood.

At this contest the different typewriters were also tested on manifolding, using fifteen sheets of linen paper and a like number of heavy carbon paper. In this test of usefulness the caligraph also carried off the honors. Its fifteenth copy was good and readable; better than the tenth copy done on competing machines.

It is possible that better results may yet be accomplished on typewriters, but this test has proven it to be capable of faster speed than the average stenographer. *Adv.*

The executive committee of the Western Union Telegraph Company, on September 11th, recommended the payment of a quarterly dividend of 1½ per cent.

Mr. Eugene Perkins, who, for the past three years has been in the service of the Siamese Government, at Bangkok, Siam, has returned to the United States.



## THE HEISLER INCANDESCENT SYSTEM.

The Heisler Incandescent plant for the illumination of the city of Wabash, Ind., has been completed during the month of June. One hundred and thirty-two lights of 30 C. P. have been placed at each intersection of the streets. The circuits extend over an area of twelve miles of streets, No. 9 wire being used throughout. The street fixtures are directly attached to the poles in the well-known substantial fashion supported by iron castings made for that purpose, each light being at the height of about twelve feet above the ground.

Wabash was the first city in the United States to adopt the tower system for the illumination of the streets. It did not take long, however, before its defects made themselves felt, so that finally the system began to be thought of as a failure. A change was thought necessary and improvement sought in the direction of better distribution of light by using a greater number of lights of small C. P. at a regular

enough capacity left to light the interior of the commercial part of the city, while previously seven-eighths of the entire illumination were wasted for the illumination of the sky and the roofs of the buildings.

The change from Tower Lighting to Incandescent must naturally have had a strange effect, and it is interesting to take note of the statements made in regard to the success of the new illumination under the first impression received from it.

The *Wabash Times* writes on the 15th of June on "Wednesday evening, when but few citizens were expecting it, the electric light was turned on. The contractors completed their work Wednesday afternoon, and decided to surprise the citizens by illuminating the city without notifying anybody of their intentions.

Opinion was varied at first as to the merits of the light. A number seemed surprised because the light differed from



STREET LIGHTING AT WABASH—OLD SYSTEM.

and suitable distance from each other, and of obtaining an equal amount of illumination in every part of the city, no matter how remote from the centre.

A number of prominent citizens formed a company for the purpose of supplying the city and commercial and private circuits from one central station by incandescent light of the Heisler system. The steam plant which had been used for the arc lights on the tower, consisting of 45 H. P. engine and a 50 H. P. boiler, was turned over to the company and has proved sufficient to supply not only the street illumination over the whole extent of the city, but also a plant of about 200 lights of 20 and 30 C. P. for stores and private residences. This demonstrates plainly the financial strength of the new enterprise, considering that the entire energy of the steam and electric plant is utilized for lighting the streets and side-walks with satisfaction to the tax-payers, and

the old system which proved such a failure. But a large majority of the citizens hailed the change with enthusiasm and delight. There is no denying the fact that the present illumination is a great improvement over the tower plan, as used by Wabash for nearly, if not fully eight years. The Heisler light is suitable for both street and indoor illumination, and the large number of lights now used insures a more thorough illumination of the city than could possibly be attained by the other plan. Last night a representative of the *Times* accompanied by Secretary Bogue and Councilmen Hipskind and Crane drove all around the city and visited streets that were formerly as dark as Egypt. At present there are but few localities not lighted. In many places the dense shade trees interfere very much with the light; but on the whole the change is a decided improvement and one that will be greatly appreciated by the citizens."



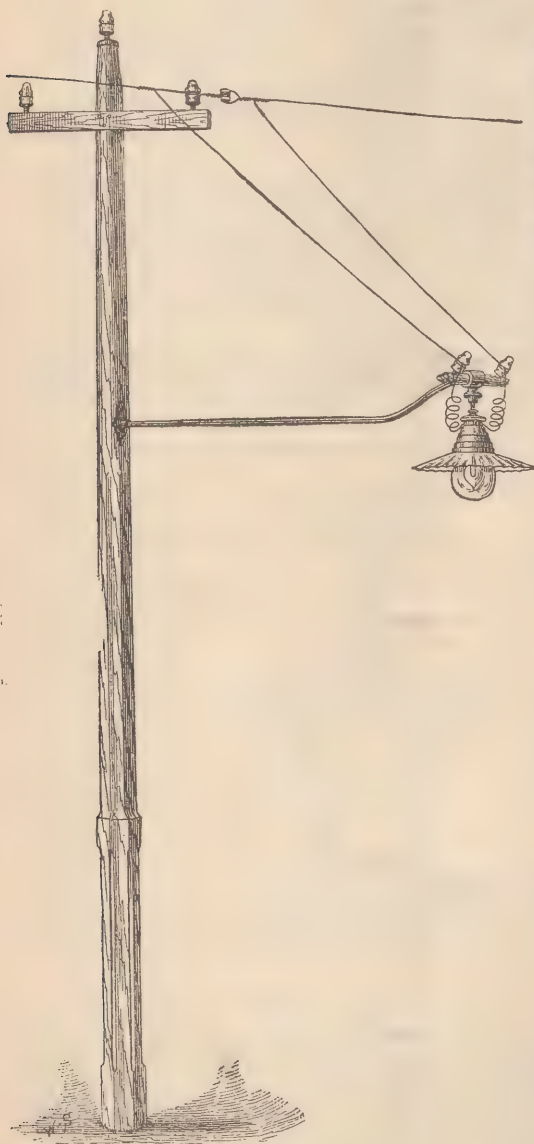
The Standard Oil Company, twenty years ago burned naphtha under its boilers and stills, which goes to prove that petroleum fuel is not a new discovery by any means. That company, after a fair trial, abandoned the scheme because of the great destruction in the iron bottoms. This fault may, however, be remedied by a better distribution of the oil in the fire place.

An electrical society has been established at Tokio, Japan, at the first meeting of which the secretary was able to announce a membership of over 800. The President is Viscount Enomotto, Minister of "the Department of Communications," and the local honorary Secretary in Japan of the Society of Telegraph-Engineers and Electricians; Mr. R. Shida, is chairman of council.

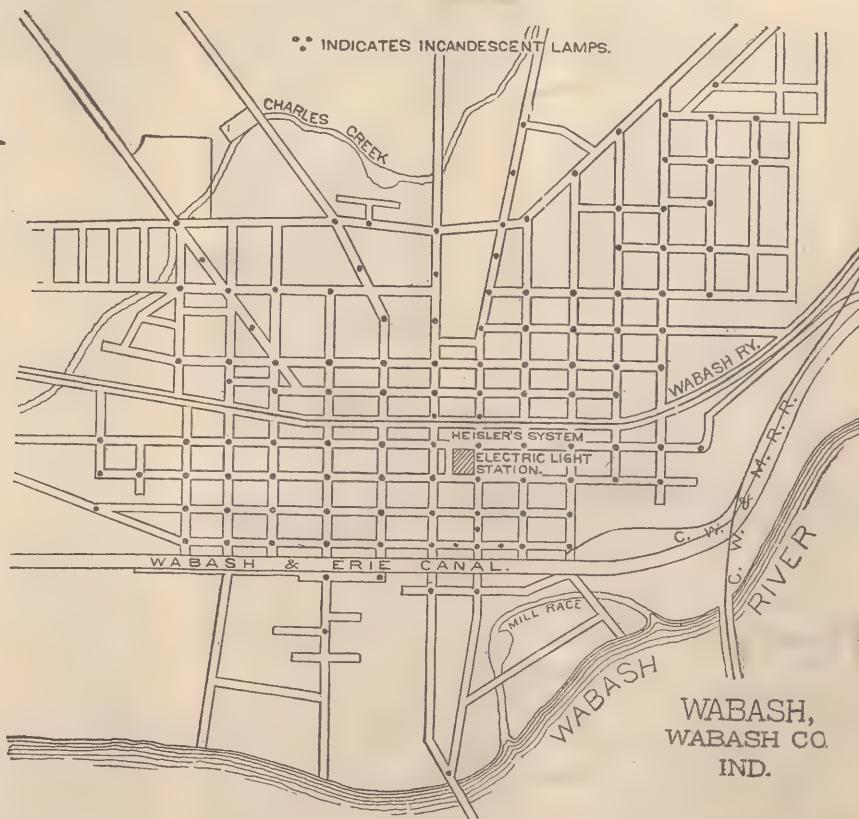
The stockholders of the defunct Great Western Telegraph company have asked to have the decree making them liable for \$400,000 set aside on the ground of its procurement by the receiver.



STREET LIGHTING AT WABASH—HEISLER NEW SYSTEM.



HEISLER LAMP POST.

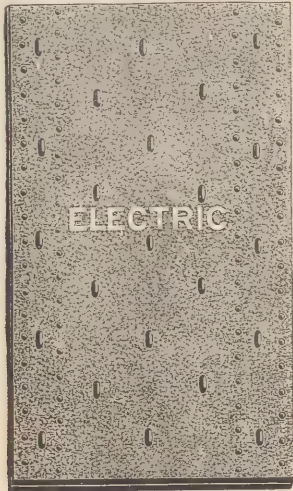


DISTRIBUTION OF LIGHTS AT WABASH.



## PERFORATED "ELECTRIC" LEATHER BELTING.

Chas. A. Schieren & Co., of New York, have placed upon the market something new for dynamos in the line of belting. After making several tests, this firm found that belts when perforated will run smoother and more steady and make less noise, and at the same time they also keep their speed much better, and in fact are superior to any other belt ever used on dynamos.



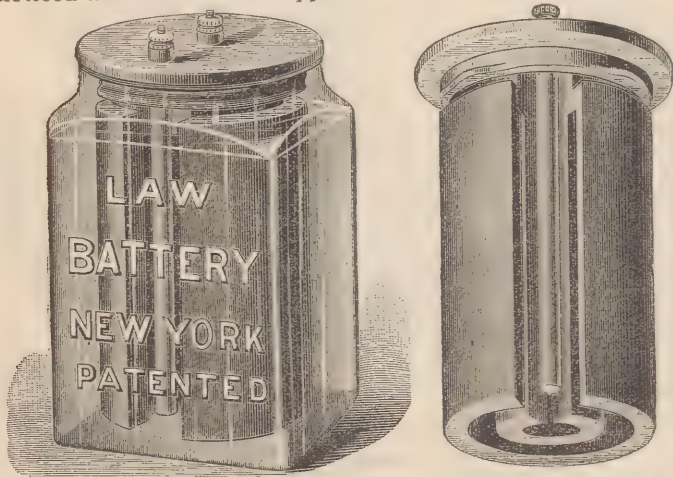
PERFORATED LEATHER BELTING.

A machine has been constructed which makes these perforations. The holes are punched in a regular and uniform manner and at equal distances apart over the entire belt, which insures equal tension, and does not injure the tensile strength of the leather. The belt thereby retains its usual power.

The invention is considered one of the most important improvements in the belting line, especially for very high speed machinery, such as is used in connection with dynamos.

## IMPROVEMENTS IN BATTERIES

The Law Telephone Co., of 112 Liberty street, New York, has made valuable improvements in its battery, as will be noticed in the cuts which appear herewith.



It will be observed that the negative element is now made in the form of a double cylinder, one within the other, presenting very large surface and quantity—more surface by double than is in any other battery. Both the negative element as well as the zinc are now bolted underneath the cover instead of being secured by cementing them into the cover as heretofore. This new construction is more solid and durable and utilizes much space heretofore wasted within the cell. Both the zinc and carbon binding posts are in the new form permanently attached to the cover and are carefully and thoroughly guarded against corrosion.

## THE ELECTRIC LIGHT.

Electric light plants are about to be established at Amesbury, Mass.; Peoria, Ills.; Telluride, Colo.; House of Correction, Marquette, Mich.; Manchester, N. H.; Omaha, Neb.; Santa Jose, Central America; El Pasco, Tex.; Oakland, Cala., with a capacity of 1,000 lamps; Ogdensburg, N. Y.; Galena, Ills.; Ellensburg, W. T.; Fargo, D. T.

The Heisler Electric Light Co., of St. Louis, Mo., has secured patents in Belgium, England and Italy for its system of lighting, and is expecting the same favor to be accorded them in Germany and Austria at an early date.

**NEW CORPORATIONS.**—The Columbia Electrical Co., Portland, Ogn., capital \$25,000. Electro Magnetic Tube Co., New York, capital \$10,000. American Telephone Sonoretta Co., Chicago, capital \$50,000.

**FIRE ALARM SYSTEMS CONTEMPLATED.**—Marysville, Ohio, desires an electric fire alarm system. San Diego, Cala., desires bids for a fire alarm system.

Small moths have recently appeared in countless millions in many interior towns, where the electric lights were extinguished.

Coshocton, Ohio, has ordered a "Jenney" plant for the use of the town.

Kirksville, Mo., will use the electric light.

Natchez, Miss., is having the Van Depoele system of lighting built for it.

San Diego, Cala., will use the Westinghouse system.

The City of Dunkirk has accepted the electric light plant from the Western Electric Co.

The Fort Wayne Jenney Co. is erecting a large lighting station at 80th street and avenue A, New York City.

The Fort Wayne Jenney has contracted for a large plant at Dallas, Tex.

The general offices of the Sawyer-Man Electric Co. are now located at 510 West 23d street.

The Thomson-Houston Carbon Co. has purchased the business of the Richmond Carbon Co., of North Adams, Mass.

## THE ELECTRIC MOTOR.

Erie, Pa., will soon ask for proposals for a street railway system.

It is proposed to connect Watertown and Waltham, Mass., by an electric railway.

Louisville's electric railway is about completed.

Newport, R. I., talks of substituting the electric motor for horse power on its street railway.

The Des Moines, Ia., electric road will be eight miles, and operated by the Thomson-Houston system.

The electric street railway of the Thomson-Houston construction at Dayton, O., is a success.

The Brush-Swan Electric Co., have established an excellent plant at Geneva, N. Y., where Chas. H. Avery is superintendent.

The Motor business in Chicago is active and the indications point to an extremely busy season.

The New York State Agency, Sprague Electric Railway and Motor Co., has secured the services of Mr. C. H. MacLilie, of Chicago, Ill., to act as its representative in Eastern New York.

The Standard Underground Cable Co., has just been awarded a contract for one million and eight thousand feet of cable to be placed by them underground in the New York subways, for the New York Fire Department. That department has already in use one million feet of the same cables, which speaks volumes for the efficiency of the conductors.



## ON SOME EARLY FORMS OF ELECTRIC FURNACES.\*

BY PROF. EDWIN J. HOUSTON.

## SIEMENS'S ELECTRIC FURNACE OR CRUCIBLE.

In 1879 Charles William Siemens took out letters patent in Great Britain for "Improved Means and Apparatus for Producing Light and Heat by Electricity." This patent is numbered 2,110, of 1879. The completed specification is dated November 26th, 1879.

The matter contained in this patent is to some extent, an application of the principle described in a prior patent, No. 4,208 of 1878, to the same inventor. This principle consists briefly in cooling one of the electrodes of an electric source by means of a stream of water forced through a cavity in the same.

Siemens applies this principle to the utilization of the direct heat of the voltaic arc for the heating of a crucible, in which furnace operations that require great heat may be conveniently carried on.

The following general description of this process is taken from the provisional specification, viz.:

"In applying the electric current to the production of intense heat for the fusion of refractory substances, I employ two carbon rods, fitted to slide towards each other horizontally, within water-cased tubes, which are attached to the opposite sides of a crucible made of highly refractory material, such as lime or alumina, also water-cased if necessary. The substance to be fused is introduced into the crucible, and the carbon rods are advanced sufficiently near to each other to form the voltaic arc within the crucible. The clockwork which advances them has a flyer which can be retarded or arrested by a break or stop connected to a thin metal strip which forms a part of the electric circuit, or to the armature of an electro-magnet, the coil of which forms part of the circuit. As the heat in the crucible increases, the resistance to the voltaic arc within it diminishes, and consequently the arc can be elongated, a result which results from the automatic retardation or stoppage of the feeding clockwork. The crucible may be closed by a cover having apertures through which air or other gasses may be blown or drawn to act on the substance under treatment. In some cases instead of employing carbon for the terminals, they may be made of the material that is to be fused, when it has sufficient conductivity."

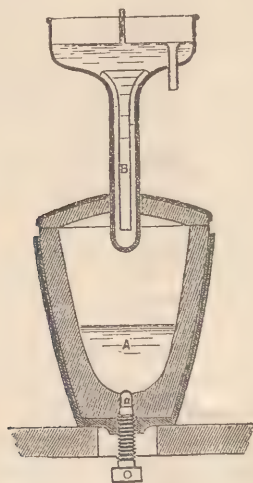


FIG. 1.

It will be noticed that the electric furnace of Siemens does not differ, in its essential features, from the earlier forms described by Depretz in connection with his experiments on the fusion of refractory substances, except that in some of Depretz's forms the voltaic arc did not play directly on the material subjected to fusion, but heated to intense incandes-

cence the carbon crucible or vessel in which said substance was placed. Depretz's furnace, however, provided no means for cooling the ends of the electrodes.

Siemens's furnace was not merely a crucible in which the fusion of highly refractory substances was accomplished. The hollow carbons, or the perforated cover, provided for the introduction of air or other gas, clearly shows that he contemplated the carrying on of what might properly be classed as furnace operations, or reductions, under the influence of the high temperature of the voltaic arc.

The forms of electric crucibles devised by Siemens will be best understood from the following description taken from the completed specifications, viz.: "Fig. 1 shows apparatus according to my invention for applying the heat of the voltaic arc within a crucible." \* \* "I have shown in the figure 1

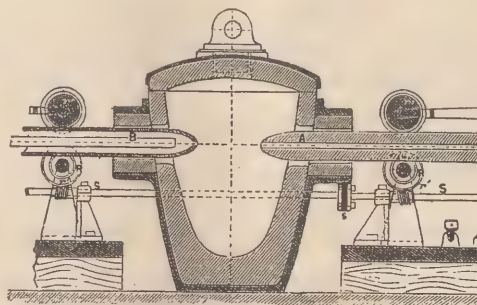


FIG. 2.

of the terminals, A, to be a carbon, and the other, B, as a metal pole cooled by circulation of water as described in the specification above referred to. Both terminals might, however, be carbons, and both, or either might be tubular, as shown with respect to A, so that currents of air or other gas might be sent through them into the crucible for effecting chemical reactions therein. The terminals rest on grooved rollers, R, R, being pressed down thereon by heavy rollers, r, r." \* \*

"When the material treated in the crucible is a conductor, the arrangement shown in fig. 2 may be adopted. In this connection material, A, such as fused metal forming the one terminal, lies in the bottom of the crucible in contact with a screw or pin a, faced with the platinum or other metal that will not be acted on by the material, A. The other terminal, B, which is cooled by the passage of water through it, as described in the specification above referred to, is suspended through a hole in the crucible cover, and it can be made to ascend or descend as required for regulating the distance between the terminals, by the action of a solenoid or expanding metal wire or strip as described above with reference to the carbons of electric lamps."

In the operation of this crucible it was found that there was a tendency of the voltaic arc to pass to the walls of the crucible, rather than to the substance subjected to the heat. This tendency was, to a great extent, checked by surrounding the outside of the crucible with a coil of wire.

Some experiments conducted with this crucible by Dr. Siemens and Prof. Huntington are recorded in a paper read by them at the fifty-second meeting of the British Association for the Advancement of Science, held in August, 1882.

The following abstract of some of the more interesting of these experiments is here given.

The current employed, which was of from 250 to 300 amperes, was obtained from five dynamo-electric machines, four of which were coupled together, and the other was employed as an exciter.

A number of difficult fusions were effected, viz.:

(1) Six pounds of wrought iron were kept in the heat of the arc for twenty minutes, and then poured into a mould. The cooled metal was found to be crystalline, and to no longer possess the ability to be wrought.

(2) Twenty pounds of steel were completely melted in one hour in a single charge.

\*Franklin Institute Journal.



(3) Three-fourths of a pound of copper, placed in carbon dust, were melted in half-an-hour—only three-fourths of an ounce, however, was found remaining in the retort. The rest had been vaporized!

(4) One-quarter of an hour was sufficient to reduce eight pounds of platinum to the liquid state.

(5) Some curious results are noticed both during the fusion and vaporization of tungsten, and in the properties of the product as found in the electric crucible.

The electric crucible, as constructed by Dr. Siemens, must be regarded as admirably suited for investigation on the fusion of refractory substances.

Central High School, Philadelphia, April 5th, 1888.

#### ELECTRICAL PATENTS

Granted August 26, 1888.

- 338,454 Electric resistance measuring apparatus; Charles E. Scribner, Chicago, Ills., assignor to the Western Electric Co., same place.
- 388,477 Electrical conductor; Wm. A. Conner, Pittsburg, Pa.
- 388,481 Telegraphy; Patrick B. Delany, New York, N. Y.
- 388,482 Dental electric apparatus; Charles A. Eizenhart, York, Pa.
- 388,512 Electric Motor; Jean T. van Gestel, New York, N. Y., assignor to the Van Gestel Manufacturing Company, of New York.
- 388,594 Electric arc lamp; Lewis W. Spencer, Hoosick Falls, and Frederick P. Jaquitt, Hoosick, N. Y.
- 388,601 Electrode for secondary batteries; Sylvanus L. Trippe, St. Louis, Mo.
- 388,622 Electric motor for self-winding clocks; Frank W. Brainerd, Chicago, Ills.
- 388,645 Apparatus for hardening and tempering by electricity; Philip Diehl, Elizabeth, N. J.
- 388,656 Wire rope or cable; Henry W. Farley; Urbana, Ills.
- 388,668 Storage battery plate; Charles D. P. Gibson, New York, N. Y.
- 388,791 Switchboard for telephone exchanges; Charles E. Scribner, Chicago, Ills., assignor to the Western Electric Company, same place.
- 388,803 Railway telegraphy; Granville F. Woods, Cincinnati, Ohio.

LIABILITY OF A TELEGRAPH COMPANY.—The Minnesota Supreme Court has ruled that a telegraph company is liable for the fraud and misfeasance of an agent intrusted with the duty of transmitting messages over its line, in sending a false and fraudulent message prepared by himself to a party who receives the same in the usual course of business, and in good faith acts thereon to his damage. The Court held that when the local agent of a telegraph company, who was also agent of an express company at the same place, sent a forged dispatch to a merchant in a neighboring city, requesting him to forward money to his correspondent at the former place, to use in buying grain, and the same was duly received and the money in good faith forwarded by express in response to the telegram, but was intercepted and converted to his own use by the agent, the transmission of the forged dispatch was the proximate cause of the loss, and the corporation was liable, though an action might also have been maintained against the express company.

Telegraph poles are preserved in Norway by making an auger hole about two feet from the ground, in which four or five ounces of sulphate of copper in coarse crystals are placed and plugged in. The chemical is gradually absorbed by the wood, until its whole outer surface turns a greenish hue. The sulphate requires an occasional renewal, and is said to be a perfect preservative.

Mr. George Kennan, the American writer whose articles in the *Century Magazine* are exposing in vivid colors the horrors of Russia's system in Siberia, was, says the *Electrical Review*, of London, in early life intimately associated with telegraphy by birth and by occupation. His mother was related to S. F. B. Morse, the famous electrician, and he himself became a telegraphist at the age of twelve. When the Civil War broke out, he strove to procure an appointment as telegraph operator in the field, but he did not succeed. He then pressed General Anson Stager, Superintendent of the Western Union Telegraph Company, to put him on the expedition being organized to establish a telegraphic system through British Columbia and Alaska, across Behring's Straits and through Siberia, this scheme being projected as an alternative to the first Atlantic Cable, which had failed. In this he was successful, and, while only twenty years of age, he started for Eastern Asia on July 3, 1865, with the other members of the party. Young as he was, he had already distinguished himself as an electrician, and during two year's work in Siberia he rendered valuable service on the expedition and increased his own reputation. The completion of the second Atlantic Cable, however, put an end to this overland project, and after waiting a year in St. Petersburg, hoping the scheme might be revived, he returned to America, and subsequently drifted into journalism and authorship. During his travels he went through many hardships and strange adventures, and the story he is now telling in the *Century* is the result of a special journey he undertook in 1885 to investigate the treatment meted out by the Russian Government to the unhappy exiles in Siberia.

In its publication notices, *The Agricultural Implement and Hardware Trade*, of Chicago, Ills., in its August issue says: "THE ELECTRIC AGE, New York City, is a valuable journal to anyone wishing to study the wonders of electricity. \$1.50 per year postpaid." This unsolicited notice, coming as it does from the leading paper in its line, is a fair illustration of how our work is viewed by those outside of the electrical ranks.

The Standard Electric Co., of Louisville, Ky., is out with a neat price list of telegraph instruments, telephones, electric call bells, batteries, wire and electrical supplies. This house, while established but recently, has met with unlooked for business, and those in charge of the enterprise anticipate much success. It is evident that there is ample room and support for electrical houses in the smaller inland cities. The price list referred to above are free to those who desire copies.

Mr. Robert Coleman, who represents the Union Indurated Fibre Co., of 37 Barclay street, New York, reports increased sales of his goods. Wood fibre battery jars and storage battery cells are indestructible, and it is only a matter of how rapidly they can be turned out, when telegraph and other companies will take kindly to them.

The field for storage batteries is quite extensive, yet their is no limit to the possibilities of future development. At first it was thought that the usefulness of the storage battery ended at isolated electric lighting. We observe however, that it is making considerable progress in the distribution of power, and no doubt it can be profitably used in the running of motors of a reasonable power.

An excellent picture of Wm. A. May, well-known in connection with the American Rapid Telegraph Co. as auditor, appeared in the *Graphic* on September 8, in the full page group of prize poets. Mr. May's poetical and musical contributions to the literature of the world have earned for him an enviable reputation.

Bone cutting by electricity is now said to be a successful surgical operation.

Prof. Geo. Forbes, of London, is out with an electric meter.



## THE TELEGRAPH.

CINCINNATI NOTES.—Miss Treuheit was married a few days since to a California pedagogue. The force, with their usual generosity, presented the young lady with a handsome clock. Geo. Stultz is now a papa. He has resigned his position with the W. U. Alonzo Duey has left the W. U. to go with The United Press. Mr. Livingston, whom Mr. Duey succeeds, has returned to the W. U., but expects to go Buffalo. The aged father of Mr. Curtis died last week. Miss Hattie Summerl, who has been filling Miss Ruesse's place during the past month, while the latter has been enjoying a vacation, returned to Chicago last week. Mr. and Mrs. W. T. McWhorter leave for a month's vacation in West Virginia. It read, "Ship car chris glons," but the sender insists it was sent ship car choice melons. Mr. Flingstay is on the sick list. Following is the personnel during the day of the more important wires: 1st N. Y., Ross and Welch; 2d N. Y., Miss Langenheim; 5th N. Y., Miss Hart; Pittsburg, Renner; Baltimore, Miss Ruesse; Philadelphia, Landaker; New Orleans, Melrose; Detroit, McWhorter; Augusta, Winsor; Dayton, Miss Macke; Memphis, Lukins; Piqua, Schmer; Lima, Rich. Malloy; St. Louis, Curtis and Foley; Indianapolis, Wagner; Washington, Colligan; Buffalo, Bernhard; Columbus, Miss Berney; Chicago, Doyle and Montgomery; Board of Trade, Chicago, Buchanan; Louisville, Jno. Duey and Al. Hermann; Nashville, Smith; Atlanta, Miller; Cleveland, Mr. Rey and Miss Tozzer; C. N. D's, Cleary and Yeager. The above are assisted by Miss Dibowski, Fred Duey, Keegan, Hund, Grant and others. Mr. Colligan who attended the exposition recently, says, a well-known electrical firm of this city were advertising a 25 cent learner's book containing the soothing assurance that "anyone who with the aid of this little work, cannot become proficient in the art of telegraphy by three months of careful practice had better give up." We agree with them.

GALVESTON, TEXAS, NOTES.—The Western Union force here is comprised of the following: Geo. A. Clark, day chief; V. C. Thompson, W. G. Knittle, Walter Cross, Chas. Aycock, Joe Brooks, Misses Espersom and Richardson and Mr. Gray, on days; on the night force, W. E. Church, as chief; F. E. Harrigan, all night chief; B. J. Burke, R. E. Richards, Jack Graham, L. F. Gates, R. L. Beal, Wm. Pollard, Gus Ewing and W. E. Stephens, operators. On the split trick we find R. P. Welmore and C. C. Reynolds. Arrivals.—Tom Russell, New Orleans; W. S. Puckett, Los Angeles, Cal.; R. E. Richards, from G. C. & S. F. Ry.; B. J. Burke, Natchez; Lee F. Gates, Omaha, Neb.; Fred Williamson, Mexico. Departures.—J. A. Bissell, to Santa Fe headquarters; Chas. Bourne, W. U., El Paso; L. F. Fox and G. S. Spaulding, W. U., San Antonio; E. V. West, New Orleans; Fred Williamson, Costa Rica, S. A.; R. E. Richards, Cleburne, Tex. At the hotels we find the following: Mr. Wolf at the beach and Miss Melville at the Tremont. Mr. J. H. Munday and Mr. Groves, formerly of the W. U. here, are doing nicely in their base ball pool rooms. The Island City Division, No. 94, Order of Railway Telegraphers was organized here recently with a good membership.

ASSOCIATED PRESS NOTES.—Mr. J. H. Smythe, day operator at Chicago, is on a five week's leave of absence, visiting relatives. Mr. W. F. Niel, a well-known Southern operator, who was transferred from Memphis, Tenn., to Chicago, is filling Mr. Smythe's place, and Mr. Shawn, recently of Milwaukee, for The Associated Press, is manipulating the keyboard on the second wire at this point. Mr. Will Wallis, of The Associated Press, Louisville, Ky., paid Chicago a visit while en-route to Waukesha Springs, a short time ago. Mr. Wallis hopes to regain his health which has been greatly impaired during the summer. Mr. J. E. Jennings, an old-time press operator, who is now making up the San Francis-

co Press, has just returned from a three-week's vacation. Mr. Jim Mooney, relieves Mr. Potter at Detroit. The effect of the Presidential year is showing itself in the increase in volume of news now being handled by the different press associations.

SIoux CITY NOTES.—Mr. J. P. O'Donnell has been confined to his room with typhoid fever for some weeks, but is convalescing. Mr. O. T. Welch has also been sick. Mr. C. P. Ash is off on a vacation, being relieved by F. C. Cole, from Egan, Dak. Mr. Monnett will take a vacation when Mr. Ash returns. S. B. Runyon, from Vermillion, Dak., and R. E. Watson are new arrivals. Our manager Mr. Dayhoff, chief operator, Mr. Slack and night chief Palmer, have erected an excellent new spring jack switchboard of the New Haven Clock Co. manufacture.

Those who may desire an excellent picture of the "Victor" Key and Catlin Grip for the purpose of framing and hanging in their office, can procure a copy of the same by sending ten cents to the ELECTRIC AGE, 5 Dey street, New York. These pictures were gotten up for the purpose of ornamenting telegraph offices, and those who have already adorned their offices with these pictures testify that it is the cheapest and the best picture, and at the same time the most suggestive ever purchased. Send your orders in early.

The telegraph operators along the line of the Lake Shore and Michigan Southern railroad are in a state of anxiety over a recent order from the company to sever their connection with the order of railway telegraphers or vacate their positions. It is reported that the company has been making preparations to accomplish this for the past three months, and has secured men to fill every vacancy likely to occur under the order.

Elegant agate styluses can be had at the office of the ELECTRIC AGE, 5 Dey street, New York, for from 25 cents up to \$1.50. We have made the very best selection that has ever been made of these goods for the telegraph profession.

We are furnishing electrical books to those desiring the same, in any section of the world, postage prepaid, at the regular retail price. Send your orders to THE ELECTRIC AGE.

## THE ELECTRIC AGE.

We respectfully solicit your subscription. Subscriptions are what keep periodicals alive and you can realize from this, the importance of allowing your name to remain on our books without any personal solicitation whatever. There are so many subscriptions expiring with each issue of the paper that it would be impossible for us to write to each person personally, the reason why we would earnestly desire him to continue as a subscriber. We need him just the same. Owing to the great number expiring and the small margin of profit, we are compelled to stop the paper when the time is up. If we did not, it would be necessary to carry on our books thousands of names of persons, who would in a majority of cases, refuse to pay because the paper had been continued without their orders. As it is we lose the price of 500 papers of every issue.

THE ELECTRIC AGE has never been at any period so valuable to the profession as at present. It costs considerably more money to produce it and the contents are selected with the utmost care and designed to instruct and benefit all its readers. Twenty pages, copiously illustrated and carefully printed. Able original articles by the best writers; scientific principles explained in easy and simple language for non-electricians. Telegraphic and electrical progress, news and gossip faithfully chronicled; personals, promotions and changes among the craft carefully noted. Absolutely independent of official influence, as well as of cliques and factions of any kind. A journal that worthily represents all classes. Terms \$1.50 per year. Address J. B. Taltavall, Publisher, 5 Dey street, New York.



## "NOTICE."

Annual dramatic performance and reception by the New York telegraph operators at Turn Hall Theater, 66 and 68 East 4th street, New York City, on Monday evening, October 15th, at 8 P. M. Reception 10.30. Tickets admitting gentlemen and ladies 50 cents. For sale at all telegraph offices.

## OBITUARY.

Frederick E. Beardslee, an expert electrician, of New York, committed suicide by taking poison, in his laboratory, on August 7th. He was 45 years of age. Poverty was the cause of the rash act. Twelve years ago Beardslee introduced the electric light to the Mexicans and made considerable money. He also represented the Edison Company at Paris for a time. Lately he had been rather hard pushed for funds.

On August 20, Wm. P. McCabe, clerk to Superintendent Miller, of the W. U., Cincinnati, Ohio, was found dead in bed. Apoplexy was the cause. He was well known to the telegraph fraternity, having for a long time being paymaster of the Cincinnati office.

Ira G. Biehler, manager of the W. U. Telegraph Co. at Arkville, N. Y., died August 25, aged 37 years. Mr. Biehler was a trusted employee and endeared himself to all with whom he came in contact. He leaves a wife to mourn his untimely death.

The death of Miss Jessie Sutherland, manager of the G. N. W. Telegraph Co., Tilsonburg, Ont., is announced. Miss Sutherland commanded the highest esteem of all with whom she came in contact.

DIED.—Wm. B. Watson, who accepted one of the positions tendered by the Siamese Government about three years ago, died at Koukane, Siam, about 500 miles from Bangkok, of Asiatic cholera and jungle fever, on April 14th, 1887. Mr. Watson was a native of New York City, and was well respected by all who knew him. The Siamese Government had his remains brought to Bangkok, where they were interred in a magnificent manner.

MARRIED—Velie—Thompson, at Oshkosh, Wis., August 14th, A. P. Velie, of Milwaukee, to Miss Bertha Thompson, of Brandon, Wis.

WANTED—Situation, first-class operator, 11 years experience; address J. B. Hunt, Guelph, Ontario.

UNITED PRESS NOTES.—Mr. J. W. Eills, with the *Telegram* for the past year, has gone to Montana. Geo. Philpott has gone to Jamestown, N. Y. John H. Miller, from Binghamton, is now in the New York bureau. Mr. John Roe, of the Albany bureau, is now a traveling salesman for a tobacco house. Mr. J. G. McCloskey, of the New York bureau, has been subbing in the Providence and Boston offices.

Mr. J. H. Miller is at Saratoga for The United Press.

Mr. John E. Wright, London agent for The United Press, during the past fifteen months, has returned to New York.

Mr. Wm. J. Cook, of the Panama Ry., Aspinwall, for many years with the Associated Press, at Washington, D. C., is visiting friends in New York. He will remain in the States at least three months.

Mr. E. A. McCaffrey, of the Postal, Amsterdam, N. Y., was in town last week visiting friends.

TRANSFERS.—W. C. Stewart, Mercer, Pa., to Oil City, Pa.; Chas. F. Wolff, Fort Assiniboine, Montana, to Bismarck Mo.; W. L. Moore, Dallas, Texas, to Huntland, Tenn.; C. F. Sweeney, Galveston, Texas, to Jacksonville, Fla.; J. D. Ragland, Nashville, Tenn., to St. Louis, Mo.; E. M. Boyle, Carbon Centre, Pa., to Criddersville, O.; Robt. McGoldrick, Montgomery, Ala., to Nashville, Tenn.; M. J. Goff, Davenport, Iowa, to Omaha, Neb.; J. D. Wooten, Jacksonville, Fla., to Bainbridge, Ga.; Geo. S. Bleakeney, Cheyenne, Wyo., to Ogden, Utah.

POSTAL NOTES.—Among the arrivals are: G. F. McCrea, Boston; A. Krum, City; M. J. Gibbons, Philadelphia; F.

H. Phillips, Pittsburgh; Jno. Keegan, Brooklyn; W. H. Harvey, St. Louis; R. M. Williams, J. L. Byrne, E. O'Grady, W. C. Cherry and J. Stack. Miss L. G. Diamond and Messrs. Canfield and Ernswein. Mr. J. M. Murphy has gone to North Adams for a broker. J. O'Connor relieves Chas. Ruffer for a short time. Mr. Thos. Henning has left for Buffalo, and Messrs. Alexander and Preston for the South. B. D. Murphy is on regular nights. On vacations are Miss Minnie Kirk, Miss Mamie Coleman, and Miss L. McGuire. All others who were away have returned and the chiefs wear their wonted smiles of contentment. Miss Cusick and Miss Lizzie Wenk have been appointed clerks. The Postal's base-ball nine consisting of Messrs. Barnwell, Higgins, Daily McGuire, Gibbons, Foley, Nealis, McKiernan and Carroll made arrangements to play the nine from the Philadelphia office, but rain spoiled the programme. Another attempt to meet will soon be made. The trouble in regard to irregular pay days which was mentioned in the last issue, has been remedied by Superintendent Cochrane and Manager Flood, with a most gratifying result. The force will be agreeably surprised to know that regular half monthly payments will be made on the 3d and 16th of each month, instead of receiving as formerly about one-third of the month's salary on the 16th and the balance anywhere around the fourth or fifth of the month. It goes without saying that all are grateful for the change and return thanks to those who were instrumental in bringing it about. Business is very heavy here and although the waiting list is still large, containing some thirty names; all the extra men are required daily to handle the work properly.

JACKSONVILLE, FLA., NOTES.—Business has increased, 200 per cent. since the yellow fever became epidemic. Seven members of the force left the city, which compels those remaining to work pretty much all the time. Superintendent Dillon had a mild attack of the fever, and Manager Crowley's wife succumbed to the dread disease. The force is as follows: D. J. Crowley, manager; E. B. King, day chief; W. J. Wallace, traffic chief; Phil. Rivers, night chief; Tom Wallace, C. F. Sweeney, Geo. H. Armstrong, from New York; Mr. Hollenbeck, from Memphis; Mr. Robbins from Tampa and C. H. Birkner from New Orleans. Mr. J. R. Daniels has been very sick but is now recovering. V. G. Shearer has also recovered and is with us again. There is probably at least, a two month's siege of yellow fever before us yet, as it will hardly disappear before frost. The company has supplied us liberally with cigars, lemonade and medicine, tasting like a mixture of rosin and soap, which we all take as a preventative. Rules and regular tricks are suspended temporarily.

LATER.—Manager Crowley was given a vacation after his wife's death. Mr. G. H. Armstrong, who has the fever, is not doing well. Chief operator King fled from the city to escape the fever. Superintendent Dillon's clerk, P. H. Wiggs, and operator F. H. Wiggs fled at the outbreak of the epidemic. Mr. J. B. Driscoll, son of Manager Driscoll, of Charleston, has recovered. There are nine operators now on duty. Three clerks and one lineman are sick. Clerk H. L. Robinson has the black vomit and will die. The Western Union Company has sent a check for \$500 for relief purposes; besides this the company is paying for doctors and nurses to those of the force sick with fever.

WESTERN UNION NOTES.—On August 27th, Mr. W. C. Hoffman and Court Cunningham exchanged with Philadelphia on the first quad. 873 messages between 8 A. M. and 5.30 P. M., which breaks all previous records. Mrs. W. A. Hennessey, a former well-known member of the force, presented her genial husband with a fourteen pound boy, a few days since. It is needless to say the Hennessey family is proud of the acquisition. Mr. Wm. C. Leith has returned from Saratoga. (The remainder of these notes evidently have miscarried in the mails).



## NOTES OF THE CONVENTION.

When the convention adjourned the greater part of the delegates repaired to the Electric Club, where Mr. Duncan called upon Dr. Moses to explain the object of his taking the floor. Dr. Moses in a most happy fashion presented Mr. J. Frank Morrison, the retired president of the association, with an ornamental silver box containing a gavel. On the base in large silver letters were the names of the various cities in which the conventions have been held. The box was ornamented with Baxter and Brush motors and incandescent and arc lights. The gavel was suitably inscribed with Mr. Morrison's name. Mr. Morrison was quite overcome by the surprise, but acknowledged the present in a few feeling remarks.

Dr. Moses then presented to the Westinghouse Company, through Mr. H. C. Davis, president of the Electric Club, a set of beautifully bound volumes in a morocco case, containing the report of the proceedings of the association from its inception. This gift was intended to testify to the gratitude of the association for the generous checks handed in to the funds of the association by the Westinghouse companies at Pittsburgh, and for the many kindnesses received by the body while in that city last February.

On Thursday evening some 350 people on invitation of the Okonite people visited the new Broadway theatre, where the "Queen's Mate" was witnessed. The play is a spectacular comic opera and was highly enjoyed by all. After the theatre the party repaired to the Electric Club where a collation was awaiting it. Remarks were made by Dr. Moses, Dr. Mason, Commodore C. A. Cheever, Captain W. L. Candee and many others. At about 2 A. M. the delegates repaired to the Brunswick. They were loud in their praise of the generous hospitality showered upon them.

The Executive Committee should have engaged Mayor Hewitt and Commissioner Gibbens to participate in the discussion of the underground question. As it was, Messrs. Lynch, Wheeler and Leslie engaged in a triangular discussion, resembling the game which the boys used to call "one old cat." President Duncan, as umpire, reluctantly choked off the little talk out of fear that it might grow too big for him to handle.

The National Carbon Co., of Cleveland, O., during the recent electric light convention, presented to the members and visitors, a copy of the Directory of Electric Arc Lighting Plants in North America, in pamphlet form. The book is systematically arranged and contains valuable information in respect to the systems used in all sections of the country. There appeared to be a general demand for copies of the book.

Mr. George Worthington, of the *Electrical Review*, evidently had made a study of the enjoyments needed by the delegates, for almost every one of them accepted his invitation to visit the Fall of Rome, on Staten Island, where the party was also sumptuously entertained by Mr. Erastus Wiman.

The Duke of Palestine was on hand as usual. His entrance into the hall did not elicit the same applause that greeted Mayor Hewitt. He doubtless picked up various valuable points for his "School of Electrical Engineering."

Mr. DeCamp gave the Johnstone System of distribution for underground conductors a pleasant compliment, but added, that in Philadelphia they had found no insulated wire good enough to go into it.

The Electric Club during both conventions was the scene of general activity, and at all times during the day and night, crowds of electricians could be found there enjoying the hospitality of the club.

The Callendar Insulating and Waterproofing Co., The Thomson Electrical Welding Co., The C. & C. Motor Co., were all represented.

The long distance telephone provided by the Western Electric Co., was in constant use by the delegates and much appreciated.

The Electrical Accumulator Co. had an excellent display and the storage batteries received considerable attention.

## THE TELEPHONE.

A new telephone cable will be laid between Oakland and San Francisco, costing \$30,000.

The Kansas City Telephone Co. has ordered 10,000 feet of cable for street use.

During the recent severe wind storms it is reported that not one of the long distance circuits was interrupted.

It is said that the average life of telephone wires in New England is from 5 to 8 years.

The American Telephone Co. intends to erect a substantial structure, corner of Milk and Oliver streets, Boston, for the general offices.

The Chesapeake and Potomac Telephone Co., of Washington, desires to lay its wires underground. The company intends, if permitted, to lay 27,000 feet of underground cable.

A general inspection of telephone night bells is now being done in all exchanges of the Boston division, under the careful management of H. W. Wilder, a well-known electrician and inspector, of Somerville, Mass.

Ten public telephone exchanges are now in operation in Vienna.

All people who have occasion to telephone names have had great difficulty in making initials understood. B, C, D, E, G, P, T and V sound so much alike that to distinguish between them is almost impossible, and M and N also sound very similar. A system used in the *Palladium* office for some time past, and with very satisfactory results when the person at the other end of the wire has understood it, is to give a word beginning with the letter that is the initial in question. For instance, suppose the name is B. P. Smith. A score or more of other combinations have almost the same sound, but if the sender says, "B. P. Smith; B for butter and P for pepper; B. P. Smith," there is no difficulty in understanding.—*New Haven Palladium*.

The Washburn and Moen Manufacturing Co., of Worcester, Mass., has issued a Pocket Hand-book of copper and iron wire in electric transmission and the World's Facts of Electric Service (sixth edition). Although this small book of eighty pages can be conveniently carried in the vest pocket, yet it is brim full of valuable and interesting electrical knowledge. There is presented facts and figures which constitute the basis of the science and practice of electric telegraphy, the telephone and the various applications of electricity in relation to light and power, and the summary of electrical progress is brought down to the present day. The book is well worth possessing.

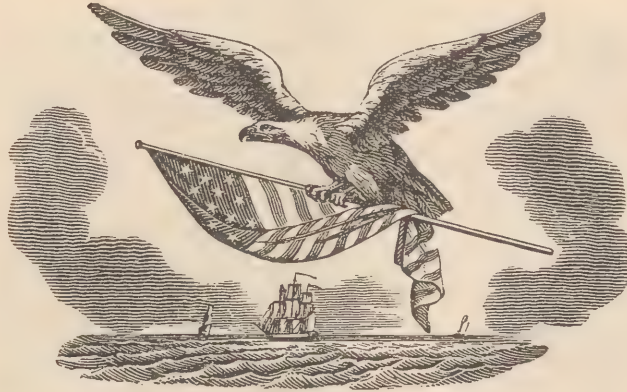
Mr. Roderick H. Smith, of New York, has issued a chart on which a complete and exact history, in condensed form, of the great movements in trade for the past thirty years, is shown. The idea which is endeavored to be conveyed is, that, by noticing what has occurred in the past, we may be enabled to form some conception of what business will be in the future, whether good or bad. The price of the chart is \$2.

On August 22d, there was an interesting gathering at Columbus Quarter, N. Y. It was a convention of the Pope family, and upwards of fifty members responded to the invitations. The entire day was given up to enjoyment, an interesting programme being carried out. In the persons of Franklin Leonard Pope and Ralph W. Pope, that family has been made illustrious in the annals of electricity.



ESTABLISHED 1823.

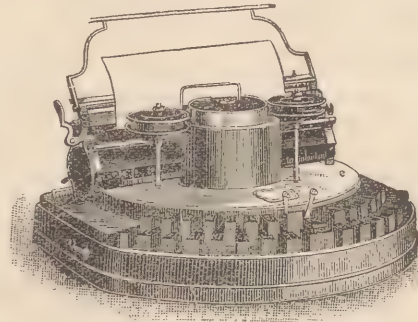
**ALBERT H. DAKIN,**  
(SON OF THE INVENTOR,)



MANUFACTURER OF THE  
**EAGLE BRAND OF MANIFOLD**  
AND  
**CARBON PAPERS,**  
FOR  
STYLUS AND MACHINE WRITING,  
60 BARCLAY ST., NEW YORK.

Prices on application.

**"HAMMOND"**



**TYPE-WRITER**

LONDON AWARD, OCTOBER, 1887.

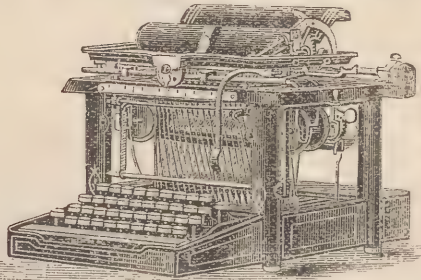
"The best type-writer for office work where speed is required."

MECHANICS' FAIR, BOSTON, DECEMBER, 1887.

AWARDED THE ONLY GOLD MEDAL.

The Hammond Type-Writer Co.  
75 & 77 NASSAU STREET NEW YORK.

**TYPE-WRITING & TELEGRAPHY**



Read what the foremost Telegraphers  
in New York say of the  
**REMINGTON STANDARD TYPE-WRITER**

WORLD OFFICE, NEW YORK, SEPT. 14th, 1887.

GENTLEMEN: We have used the REMINGTON TYPE-WRITER for some time and are highly pleased with the rapidity and ease with which matter can be copied from the wires. Operators who are expert with the type-writer find no difficulty in copying the fastest sending. Its work is entirely satisfactory to the compositors and copy readers of the *World*, and we find it a great improvement over the pen.  
Yours, truly, W. A. MCALLISTER and A. J. BOOTH, Telegraph Staff.

SUN OFFICE, NEW YORK, Sept. 19th, 1887.

GENTLEMEN: About two months ago I received a No. 2 REMINGTON machine to practice on. It wasn't in the office more than half an hour before all hands, from the editors down to the office devil, had written their names and at the next meeting of the *Evening Sun* Association, the "REMINGTON" was unanimously voted a "dandy," and a valuable acquisition to the office. I am now able to write from 40 to 45 words per minute, and would rather miss my Sunday dinner than be without it.  
Yours, O. S. KENNEDY, Operator, *Evening Sun*.

The REMINGTON TYPE-WRITER is, without a doubt, the best machine of its kind extant. A thorough test has convinced us of this fact, and it is only a matter of time when it will be used exclusively in connection with the telegraph. The "REMINGTON" is in use in the New York office of The United Press, as well as in other offices throughout the United States.

R. D. BLUMENFELD, C. H. H. COTTRELL, M. H. CRANE, J. G. MCCLOSKEY, R. SPILLANE,  
F. J. KIHM, JOSEPH T. HEENAN, CHAS. H. DAVIS, J. P. GARDNER.

The REMINGTON TYPE-WRITER is used exclusively in this office. Its usefulness in connection with telegraphy cannot be too highly praised. It is of much benefit to an operator, rendering "receiving" an easy task, when the machine is once mastered.

GEORGE H. SICKLES, New York Associated Press. P. T. BRADY, New York Associated Press.  
F. P. BLANKS, Western Associated Press. EDW. L. BOOLE, Western Associated Press.

Send for pamphlet.

**WYCKOFF, SEAMANS & BENEDICT, 327 Broadway, New York**  
BRANCH OFFICES.

|                                          |                                         |                                        |
|------------------------------------------|-----------------------------------------|----------------------------------------|
| Boston.....306 Washington street         | Washington.....LeDroit Building.        | St. Louis...No. 308 North Sixth street |
| Philadelphia...No. 834 Chestnut street   | Baltimore....No. 9 North Charles street | Kansas City...322 West Ninth street    |
| (Continental Hotel)                      | Chicago.....No. 196 La Salle street     | St. Paul....No. 116 East Third street  |
| Minneapolis, No. 12 Third street, South, | Indianapolis..No. 84 East Market street | London....No. 100 Gracechurch street   |



**INCANDESCENT,  
A SUCCESSFUL COMPETITOR AGAINST GAS**

AND GASOLINE FOR

**Illuminating Streets, Stores and Dwellings.**

Accomplished by our entirely new method of long-distance lighting in practical operation at St. Louis for the last two years

**HEISLER ELECTRIC LIGHT COMPANY,  
809 to 817 S. SEVENTH ST., ST. LOUIS, MO.**

**The Telegraphers' Mutual Benefit Association.  
A FRATERNAL LIFE INSURANCE SOCIETY.**

Twentieth Year.

For Particulars. Address **CHARLES P. BRUCH**, Secretary,  
Box 3175, New York.

**STYLUS**

Agate, Steel, Bone, Porcelain & Gutta Percha  
Mounted on  
Ebony, Pearl and Cedar Handles.

A great variety.

Send to the Manufacturer for Price List.  
**L. H. ROGERS, 75 Maiden Lane, N. Y.**  
Headquarters for Manifold Books,  
Carbon Paper.

See cut of Styluses, page 11, Jan. 1, 1888.

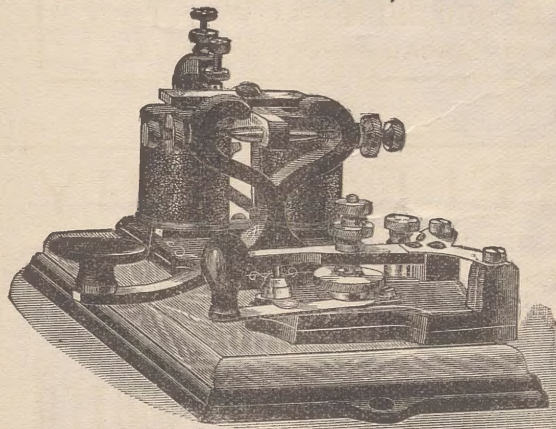
72 Page illustrated Catalogue of  
**RUBBER STAMPS**

Steel Stamps, Stencils, Seals, &c.

Sent Free on Application by Postal to

**S. W. REESE & CO,**  
29 CHURCH ST., NEW YORK

**Liberal Discount to Dealers, Send for Reduced Price List.**



**No. 2 O. K. Outfit**

WITH SOUNDER AND KEY

on same base, or separate, as  
ordered.

Complete Outfit, - \$3.75

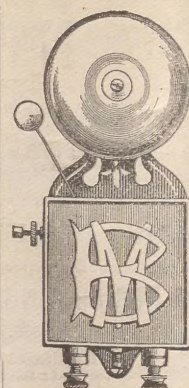
Sounder, - - - - 2.25

Key, - - - - 1.00

Sounder and Key on  
one Base, - - - 3.25

The above Outfit consist of a beautiful Sounder wound to 20 ohms, and one of my unrivaled Nickel Plated, Legless, Steel Lever Keys; One Cell 5x7 Battery (or 6x8 Battery, 10. extra); 15 ft. Insulated Office Wire, 1 lb. Vitriol, 1 Instruction Book, all safely packed and will be shipped on receipt of price, or sent C. O. D., subject to inspection, if you send me \$1.00 with order. State whether you wish Key and Sounder on same Base or separate. Write your address plain and full, also state by what Express Co. wish goods shipped. Address,

**A. B. LYMAN, 34 and 36 South Water street, Cleveland, Ohio.**



**\$2.00**

**Bell Outfit.**

Bell, \$1.00.

Battery, .80.

Push Button, 10.

50 ft. Wire, .15.

Electrical Supplies

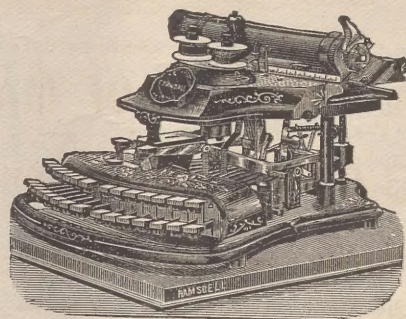
of every description,

**MOORE BROS.,**

108 Liberty St., N. Y.

**The New Model Crandall**

A PERFECT TYPE-WRITER.



PRICE, \$75.00.

**BEST FOR TELEGRAPHERS!**

This machine meets the requirements of Telegraph Operators better than any other Type Writer on the market. It is speedy, almost **Noiseless**, has perfect alignment and **writing in plain sight**, even to the last letter, thus allowing the operator to correct the "bulls" of a "blind" sender without the delay of shifting the carriage. **It is the cheapest** standard writing machine in the world. Send for circulars and illustrated catalogues to the

**IRELAND BENEDICT CO., (Limited)**

Sole Agents, Binghamton, N. Y.

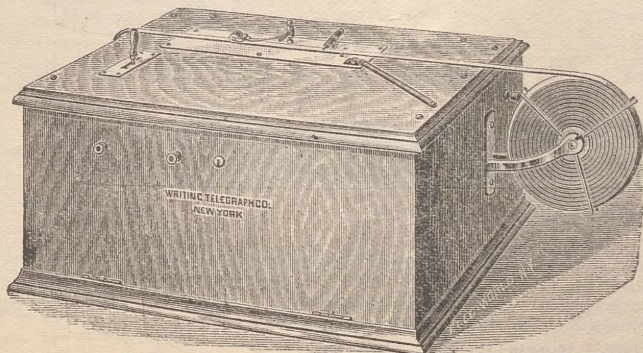
NEW YORK OFFICE,

**B. G. GRANVILLE, MANAGER.**

157 BROADWAY,

**WRITING TELEGRAPH CO.,**

57 Murray Street, New York.



This company owns the Letters Patent which thoroughly control the transmission of written messages by telegraph in the only known practical way, and are prepared to establish Central Office Exchanges as a means of communication between subscribers in cities and surrounding towns.

Communications are written with pen and ink in the handwriting of the person writing the message.

The pen in the office of the subscriber receiving a message makes a fac-simile of every letter as fast as it is made with the pen in the office of the person writing it.

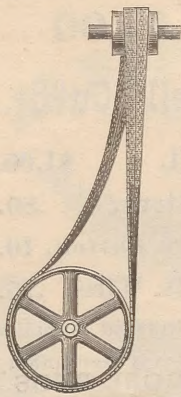
All instruments are under the control of the Central Office, and messages are recorded on the instrument of a subscriber, whether he is present or absent.

All communications are secret, and the written record is of great value in commercial use.

For particulars address

**WRITING TELEGRAPH CO., P. O. Box 1322, New York.**





### AMERICAN LEATHER LINK BELT CO.

A new article in Belting, which is made of small leather links joined together with steel bolts. It has been tested for Dynamos with remarkable success.

Write for particulars and prices to

**CHAS. A. SCHIEREN & CO.,**

Manufacturers and Tanners of

**LEATHER BELTING & ICE LEATHER**

**47 FERRY ST., NEW YORK.**

BRANCHES: **Philadelphia, 416 Arch St.**  
**Boston, 86 Federal St.**



### ELECTRICAL ACCUMULATORS AND STORAGE BATTERIES,

Successfully applied to  
Central Station Lighting, Isolated Lighting, Trolley  
Lighting, Street Car Propulsions, etc., securing  
great economy and reliability. For full particulars  
address,

**The Electrical Accumulator Co.,**  
44 BROADWAY, NEW YORK.

**WIEDERSHEIM & KINTNER.**  
**ELECTRICAL EXPERTS.**  
SOLICITORS OF PATENTS, TRADE-MARKS,  
ETC.

Office, No. 45 BROADWAY,  
NEW YORK.

Record Building, 919 Chestnut St., Philadelphia,  
Penna.  
CARL HERING, Consulting Electrician, No. 514 F  
St., Washington, D. C.

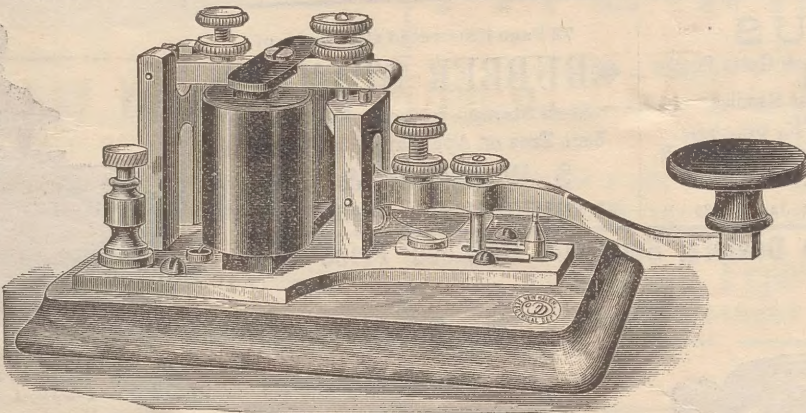
## New Haven Clock Co.,

29 MURRAY STREET, NEW YORK.

Manufacturers of all Styles of Electrical Apparatus.  
THE "UNIQUE" COMBINATION SET.

This Set is manufactured of Telegraph Metal, hand-finished. Magnets with Rubber Covers, Nickel-plated Key Lever, all mounted on a mahogany base.

The simplest and cheapest combination set ever placed on the market. Key and



sounder mounted on an ordinary size sounder base. Works well on one cell of battery.

The above Set, complete, with Cell of Gravity Battery and 50 feet of wire, \$3.75. Special prices made for quantities.

CUT ONE-HALF SIZE.

## The Law Battery.

New Form.

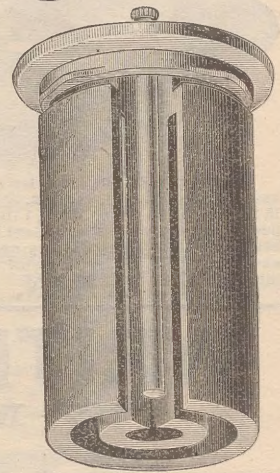
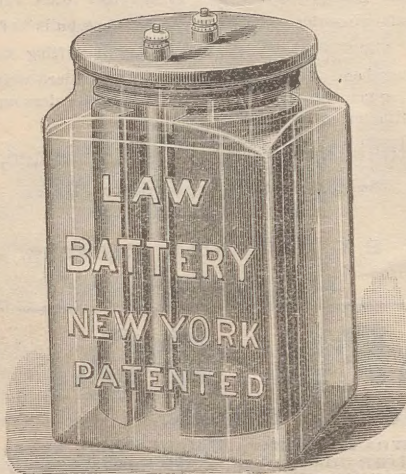
Quantity and Surface of Negative Element largely increased and shape improved. This Element is Guaranteed everlasting, and new ones given at any time for old without charge. Lock Tops that absolutely prevent evaporation and creeping of salts. No Grease. Binding Posts that cannot corrode. Price, \$1.00.

**LAW TELEPHONE CO.,**

112 Liberty Street,

NEW YORK.

Sole Agent for the Pacific Coast, Geo. L. Henzel, San Francisco, Cal.



## "STAR" GOLD FOUNTAIN PEN.



PRICE, \$1.50 AND UPWARDS.

Best writing Pen ever offered to the public. Holds ink for a week's use. Unequaled for Business and General Writing. Every Pen Warranted and Satisfaction Guaranteed. The STAR Pen consists of a highly-finished hard rubber holder fitted with a superior 14 karat GOLD PEN, to suit any writer. In ordering specify style of Pen wanted. SOLICITING A TRIAL ORDER.—Sent by mail or express on receipt of price. Repairs to Pens of all kinds a specialty. A GOOD, RELIABLE STYLOGRAPHIC PEN for \$1 and upward. N. B.—All goods will be shipped promptly on receipt of order.

**J. ULLRICH & CO., 106 and 108 Liberty Street, New York.**

Manufacturers of the "Star" and "Independent" Fountain and Stylographic Pens. Liberal Discount to Agents. Send for Price List.







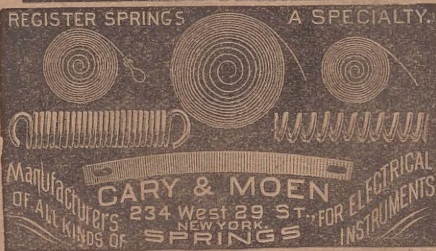
**AERIAL, SUBMARINE  
and Underground  
Wires and Cables**



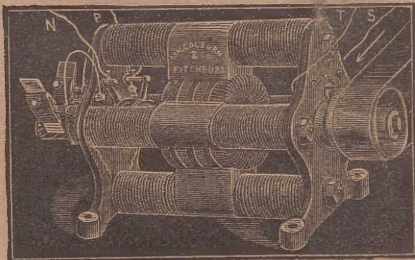
TRADE MARK.

For Telegraph, Telephone and  
Electric Uses.

**THE OKONITE CO.,**  
No. 13 Park Row, New York.



**I. W. COLBURN & CO.**  
130 MAIN ST., FITCHBURG, MASS.



Machines for Arc and Incandescent Electric  
Lighting. Electro-Plating and  
Experimental use.  
Send for large Illustrated Catalogue, also "Hand-  
Book of Ready Reference." Vest-pocket edition.

**THE EDISON MACHINE WORKS**

Wire Insulating Department.

**JAS. F. KELLY,**

GENERAL SALES AGENT,  
New York.

19 Dey St.,

**ELECTRICAL**

**J. B. SABINE,**  
COUNSELOR AT LAW,  
181 BROADWAY,  
NEW YORK.

**SPECIALTY**

**ELECTRICAL PATENTS**

**W. Miatt,** Counselor at Law.  
SOLICITOR OF PATENTS.  
20 years' experience in Patent Matters  
178 Temple Court, N. Y. City

**PATENTS**

**The United Press.**

International in scope, representing leading Journals  
throughout the United States, Canada, and Europe, and  
operating a complete system of leased wires to the principal  
American cities.

**BOARD OF DIRECTORS.**

|                                                  |                                                  |
|--------------------------------------------------|--------------------------------------------------|
| JAMES W. SCOTT, - - - - - Chicago Herald.        | ROBERT S. DAVIS, - - - - - Philadelphia Call.    |
| CHAS. H. TAYLOR, - - - - - Boston Globe.         | JAMES E. SCRIFFS, - - - - - Detroit Evening News |
| WILLIAM M. LAFFAN, - - - - - N. Y. Evening Sun.  | SAMUEL D. LEE, - - - - - Rochester Herald.       |
| WILLIAM L. BROWN, - - - - - New York Daily News. | E. H. BUTLER, - - - - - Buffalo Evening News.    |
| ARTHUR JENKINS, - - - - - Syracuse Herald.       | C. R. BALDWIN, - - - - - Waterbury American.     |
| JOHN H. FARRELL, - - - - - Albany Press          | W. C. BRYANT, - - - - - Brooklyn Times.          |
|                                                  | and Knickerbocker.                               |
|                                                  | WALTER P. PHILLIPS, - - - - - New York.          |

**EXECUTIVE OFFICERS.**

JAMES W. SCOTT, President.  
A. L. SUESMAN, General Western Manager,  
Chicago.

C. R. BALDWIN, Treasurer.  
WALTER P. PHILLIPS, General Manager,  
New York.

**BRUSH MOTORS.**  
THE GREATEST EFFICIENCY IS OBTAINED FROM  
**GENERATORS AND MOTORS,**  
MANUFACTURED BY THE  
**BRUSH ELECTRIC CO.,**  
**CLEVELAND, OHIO.**

**WILLIAM F. SWIFT,**  
SECRETARY,  
No. 36 UNION SQUARE,  
NEW YORK.

**ANSONIA BRASS & COPPER CO.**  
SOLE MANUFACTURERS OF COWLES' PATENTED  
**Fire-Proof and Weather-Proof Line Wire.**



Samples furnished upon application. Pure Electric Copper Wire, bare and covered, of  
every description. Warerooms: 19 and 21 Cliff St., New York; 64 Washington St.,  
Chicago, Ill. Factories: Ansonia, Conn.

**DAY'S KERITE**  
**Wires and Cables**

For Aerial, Underground and Submarine use  
**CLARK B. HOTCHKISS,**  
General Agent,  
16 DEY ST., NEW YORK.

**G. H. STOCKBRIDGE,**

Electrical Expert & Patent Solicitor,  
338 Broadway, New York.

Cable Address, LEGITIMIST.

ESTABLISHED 1867.

**PARTRICK & CARTER,**

MANUFACTURERS AND DEALERS IN  
**Electrical Supplies**

For the  
Telegraph, Telephone, Electric Light, &c.  
SOLE PROPRIETORS OF THE  
Patent Needle Annunciators & Burglar Alarms,  
Send for Catalogue, and Mention this Paper  
114 SOUTH SECOND STREET,  
PHILADELPHIA, PA.