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VOL. VII—No. 11.

NEW YORK, NOVEMBER 1, 1889.

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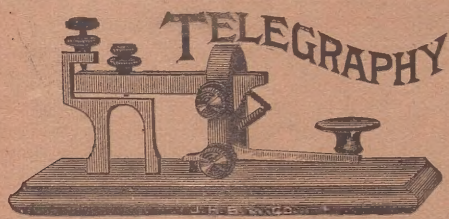
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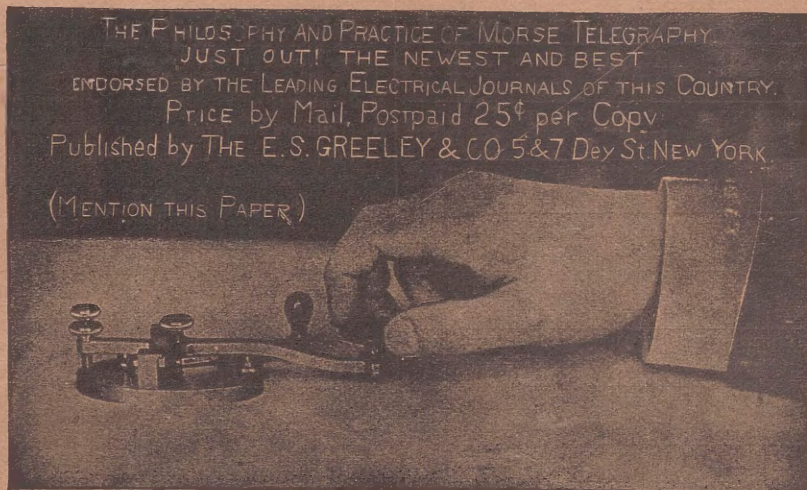
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The truth (referring to the true position of the telegrapher's hand in the act of "sending") exposed by a lightning wink of the instantaneous camera, and permanently fixed for our deliberate inspection by the science of photography, dawns upon the 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 24, 1888.

The following diagram from the *Philosophy and Practice of Morse Telegraphy* gives an intimation of its scope.

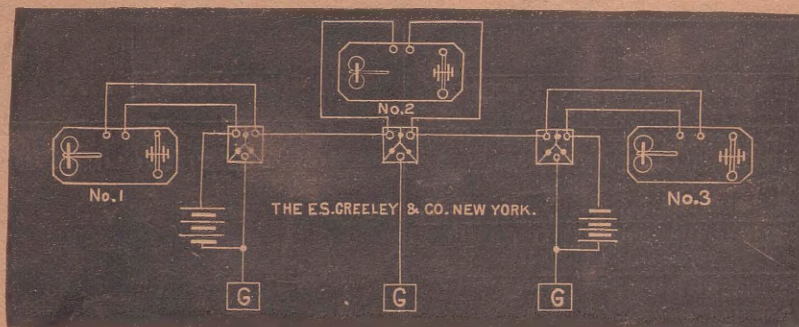


DIAGRAM No. 19.

Diagram No. 19, showing three Home Instruments or other short line combination sets, connected up on a grounded circuit with Excelsior Lightning Arresters at three distinct offices. The Switch Pin in this case, when instruments are in use, must be kept in the "dead hole," which is the hole in the center of the middle plate.

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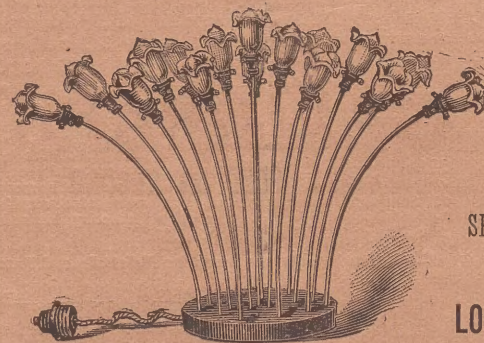


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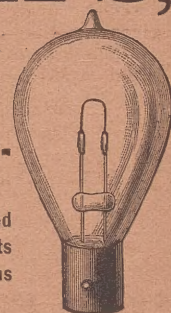
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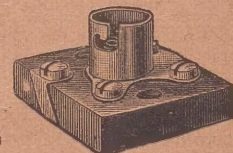


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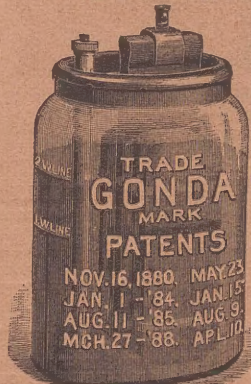
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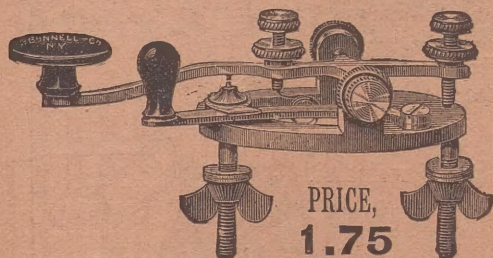
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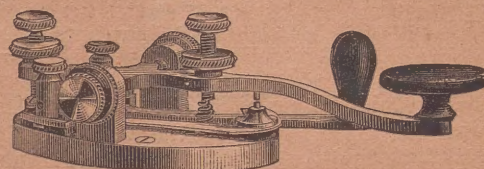
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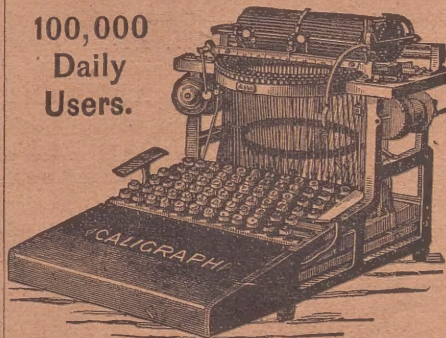
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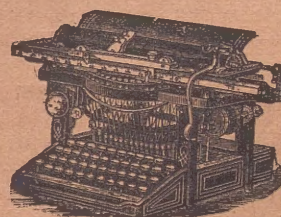
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THE BEGINNING OF THE END.

Edison Company Sustained. Westinghouse Company Defeated.

Sawyer-Man Patent Decided by the Court to be a Fraud and Absolutely Valueless.

Extracts from the Decision of Justice Bradley, Oct. 5, 1889.

Circuit Court of the United States for the Western District of Pennsylvania.

THE CONSOLIDATED ELECTRIC LIGHT COMPANY (WESTINGHOUSE COMPANY) versus McKEESPORT LIGHT COMPANY (EDISON COMPANY).

No. 5, May Term 1888. On Bill and Final Hearing.

EXTRACTS FROM OPINION OF THE COURT.

"The great question in this suit is whether the patent sued on is valid, so far as involves a general claim for the use in electric lamps of incandescing carbon conductors made of fibrous or textile substances. If it is, the complainant must prevail. If it is not, the bill must be dismissed"

"Is the patent valid for such a broad claim? The defendants contend that it is not; first, because no such invention was set forth in the original application, but was introduced more than four years after it was filed, and after the same material had been used by Edison, and claimed by him in application for a patent; secondly, because Edison, and not Sawyer-Man, was really the original and first inventor of an incandescent conductor made of fibrous or textile material for an electric lamp."

"It is very clear to us that in the original application for the patent sued on the applicants had no such object in view as that of claiming all carbon made from fibrous and textile substances as a conductor for an incandescing electric lamp. Nothing on which to base any such claim is disclosed in the original application. We have carefully compared it with the amended application, on which the patent was issued, and are fully satisfied that after Edison's inventions on this subject had been published to the world there was an entire change of base on the part of Sawyer & Man, and that the application was amended to give it an entirely different direction and purpose from what it had in its original form."

"By an adroit amendment made in 1885, they say: 'Our improvement relates more especially to the incandescing conductor, its substance, its form and its combination with the other elements composing the lamp.' The purpose of this amendment is obvious, and needs no comment."

"The fact is that Sawyer & Man were unconscious that the arc was not new, and supposed that they could get a patent for it; but, as their eyes were opened, they changed about and amended their application, and made the material of the conductor the great object—carbon made from fibrous or textile material. Compare the original with the amended application, as first stated in this opinion, and this purpose most obviously appears."

"The fact that the whole object of the application was changed is evinced by the correspondence of the parties."

"This testimony of Mr. Broadnax, which is undoubtedly to be relied on, in connection with the letter just quoted, shows that the idea of claiming carbons made from fibrous and textile materials was an afterthought, and was no part of the purpose of the original application. The amendments relating to this new and broad claim were made afterward, in February and March, 1885."

"We are of the opinion that the changes made in the application in this regard were not justifiable, and that the claim in question cannot be sustained."

"We are not at all satisfied that Sawyer and Man ever made and reduced to practical operation any such invention as is set forth and claimed in the patent in suit. Their principal experiments were made in 1878, and perhaps the beginning of 1879. The evidence as to what they accomplished in the construction of electric lamps is so contradictory and suspicious that we can with difficulty give credence to the conclusions sought to be drawn from it. We are not satisfied that they ever produced an electric lamp with a burner of carbon made from fibrous material, or any other material, which was a success."

"The application for the patent in suit was not made until January, 1880, nearly or quite a year after all their experiments had ceased, and after the inventions of Edison had been published to the world."

"The explanations made by the complainants for the delay in applying for the patent in suit fail to satisfy our minds that Sawyer & Man, or their assignees for them, have not sought to obtain a patent to which they were not legitimately entitled."

"But, suppose it to be true, as the supposed inventors and some of the other witnesses testify, that they did in 1878 construct some lamps with burners of carbon made of fibrous material, and of an arched shape, which continued to give light for days or weeks or months; still, were they a successful invention? Would any one purchase or touch them now? Did they not lack an essential ingredient which was necessary to their adoption and use? Did they go any farther in principle, if they did in degree, than did other lamps which had been constructed before? It seems to us that they were following a wrong principle—the principle of small resistance in an incandescing conductor, and a strong current of electricity—and that the great discovery in the art was that of adopting high resistance in the conductor with a small illuminating surface, and a corresponding diminution in the strength of the current. This was accomplished by Edison in his filamental thread-like conductors, rendered practicable by the perfection of the vacuum in the globe of the lamp. He abandoned the old method of making the globe in separate pieces, cemented together, and adopted a globe of one entire piece of glass, into which he introduced small platinum conductors, fastened by fusion of the glass around them, thus being able to procure and maintain perhaps the most perfect vacuum known in the arts. In such a vacuum the slender filaments of carbon, attenuated to the last degree of fineness, may be maintained in a state of incandescence without deterioration for an indefinite time, and with a small expenditure of electric force. This was really the grand discovery in the art of electric lighting, without which it could not have become a practical art for the purposes of general use in houses and cities."

"The principle and great thing described is the attenuated filament and its enclosure in a perfect vacuum."

"We think we are not mistaken in saying that but for this discovery electric lighting would never have become a fact. We have supposed it to be the discovery of Edison because he has a patent for it. This may not be the case. It may be the discovery of some other person; but, whoever discovered it, it is undoubtedly the great discovery in the art of practical lighting by electricity."

"THE BILL MUST BE DISMISSED."

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NEW YORK, NOVEMBER 1, 1889.

THE INCANDESCENT ELECTRIC LIGHT DECISION.

The famous incandescent electric light case which was dismissed at Pittsburgh, Pa., on October 5, by Judge Bradley is attracting world-wide attention. Notwithstanding that the case may be appealed to the highest tribunal, this decision is a sweeping victory for Mr. Edison. The important portion of Judge Bradley's document reads as follows:

"We are fully satisfied that after Edison's invention had been published to the world there was an entire change of base on the part of Sawyer and Man, and that the application was amended to give it an entirely different direction and purpose from what it had in its original form.

"Sawyer and Man were following the wrong principle of small resistance and strong current: Edison accomplished the great discovery of high resistance and low current. We are not mistaken in saying that but for this discovery of Edison, an attenuated filament in a perfect vacuum, electric lighting would never have become a fact.

"It is undoubtedly a great discovery in the art of practical lighting by electricity. Did Sawyer and Man succeed in making a lamp of commercial value or in finding out the principle on which it could be made? We do not so read the evidence."

Who amended the application referred to in the first paragraph to give it an entirely different direction and purpose from what it had in its original form? The inference from the statement that "Sawyer and Man were following the wrong principle of small resistance and strong current," leads the reader to believe that some one enjoys privileges in the patent office not allowed to the average man. If there are "leaks" in the patent office, the sooner the public is correctly informed of the fact the better.

ELECTRIC CARS ENJOINED.

Judge Lacombe, of the U. S. Circuit Court has filed a decision upon the motion of the Electrical Accumulator Co., for an injunction against the Julien Electric Traction Company, and the New York & Harlem Railroad Company, restraining those companies from using or selling accumulators or secondary batteries made according to any of the various modifications devised by the Julien Company since the issue of the first injunction last April by Judge Coxe, which was adopted and emphasized by Judge Lacombe. The effect of this motion was the stoppage of the Fourth Avenue cars in New York City.

THE RICHMOND ELECTRIC STREET RAILWAY.

The recent sensational accounts touching the Richmond Union Passenger Railway Company, and matters connected with that road which were widely published during the last month in the daily newspapers through the country, have called out replies from all the leading street railway and electrical journals.

Most of these reports died the natural death of exaggeration soon after they were published, and Mr. Johnson's statement of facts published in our last edition has shown the animus of these attacks at the electric system in use on the Richmond road and the real cause of trouble.

The action of the bondholders, subsequent to the issue of our last number in uniting to put the road under the management of a receiver, shows that the truth of the claims made by the Sprague Company of inefficient management has been recognized.

The board of directors of the Union Passenger Railway met in Richmond, October 10th, 1889, and the result of their meeting was the election of a new executive committee, of which the president of the Sprague Co. is a member, and it is their intention to put the Sprague equipment at Richmond in thoroughly effective condition.

It is true that improvements in mechanical devices and in construction have been made within the last two years, but it is not true that the equipment of the Richmond Union Passenger Railway was fundamentally wrong.

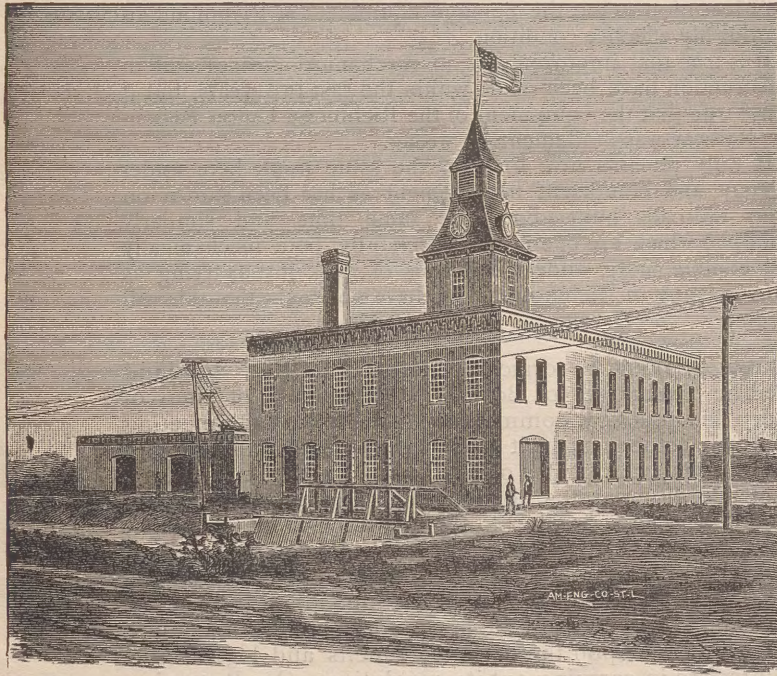
It only remains now to show the same result here under efficient and competent management as has been shown on other railroads built about the same time and similarly equipped which are operating successfully, both mechanically and commercially, under conditions of work just as trying as those existing in Richmond. We have no doubt that this will be done.

COMMON SENSE ELECTRICAL VIEWS.—The New England Electric Exchange, of Boston, is composed of men of every day practical common sense views. At the meeting held on October 14th, it was decided to force those not now holding certificates of ability, and who are in charge of electrical apparatus, to submit an explanation and receive a license according to the worthiness of the applicant. The Exchange recognizes also the advisability of saving the electric-lighting business from any further unnecessary criticism, insist upon the immediate removal of dead and tramp wires in the large cities, and the Exchange intends to call upon the various councils and legislatures to interfere in carrying out its resolution. Our Bostonian friends are to be congratulated upon the determined stand they have assumed, and it is to be hoped they will be successful in their efforts. If the companies, months ago, had rid their poles of the tramp and dead wires, not quite so many deaths would now be charged to the electrical industry. So, too, in regard to hiring inefficient persons and placing them in charge of electrical plants, when, in reality, they were better qualified to have charge of a span of mules. It is needless to add, the Massachusetts electric light and power interests are watched over and protected in a manner becoming a worthy industry and an enterprising locality.

ELECTRIC STREET RAILWAYS.—The American Street Railway Association met at Minneapolis Oct. 16. The electric motor for street car propulsion received an unqualified endorsement at the hands of the delegates present, those who had already substituted electricity for horse power reported larger receipts, cleaner service, and general satisfaction all round. The electric railway promoters who were present at the meeting were jubilant over their triumph, and well they might be. The patience which they have displayed, under adverse criticism and downright slander, has at last achieved its just reward.

THE HEISLER ELECTRIC LIGHTING PLANT AT OTTAWA, ILLS.

The Heisler plant operated at Ottawa, Ills., is one of the most remarkable incandescent electric light plants in existence. We illustrate some of its prominent features. The location and arrangement of this plant are so characteristic of the Heisler system as to deserve more than ordinary notice. The area covered has never been equalled in the history of incandescent lighting. Their circuit of 45 miles is, so far as we have been able to learn, the longest incandescent circuit in the world, nor do we know of a longer arc circuit. Another fact characteristic of the system is that the most distant lights burn fully as brightly as those near the dynamos. The most gratifying feature of this plant is the fact that it is a commercial success. The results have been eminently satisfactory, both to the parties using the light, and the public-spirited citizens who inaugurated the enterprise, and carried it through to success.



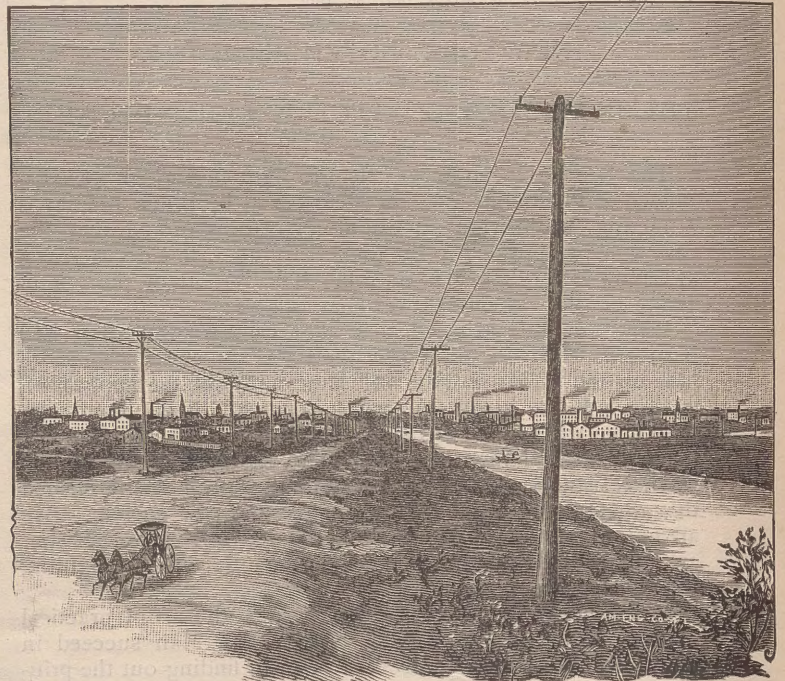
HEISLER ELECTRIC LIGHT PLANT AT OTTAWA, ILL.

The Illinois Valley Electric Light and Power Co. was organized at Ottawa, Illinois, in the spring of 1889. Desiring their operating expenses to be a minimum, they looked around for a suitable location. They were fully impressed with the advantages of water power, but found the only available site at Ottawa in the hands of competitors. Being thus compelled to look elsewhere, they found an excellent site at Marseilles, 8 miles distant. The advantages of the incandescent light were such as to lead the projectors of the enterprise to favor its adoption. They found that the Heisler System required a very simple and inexpensive plan of wiring, permitting of the greatest flexibility. The investigation resulted in the adoption of the Heisler System, and the installation of an extensive plant at Marseilles. The lights were started in the summer of 1889 and have been successful from the beginning. Arrangements are now being perfected to extend the circuits from Marseilles to Seneca, located five miles distant in the opposite direction from Ottawa. The capacity of the original apparatus is now almost fully taken up, and immediate enlargements are necessary.

STORAGE BATTERY LITIGATION.—The Electrical Accumulator Company in availing itself of the decision of Judge Cox, sustaining the Faure patents, recently filed bills in equity against Henry D. Thayer and the Western Electric Company of New York, who were using a secondary battery made by The Woodward Electric Company, of Detroit, commonly known as the "Detroit Battery." A preliminary injunction was asked for and granted by Judge Lacombe on October 4th.

The same complainant about the same time filed bills in equity against The Citizens' Electric Illuminating Company of Brooklyn, who were using a battery made by the Mutual Electric Manufacturing Company of Brooklyn, which infringed the three patents of Faure and a key-lock patent of Sellon. The preliminary injunction asked for in this case was also granted by Judge Lacombe. These proceedings seem to indicate, beyond a reasonable doubt, that The Electrical Accumulator Company has secured complete control of the secondary battery industry.

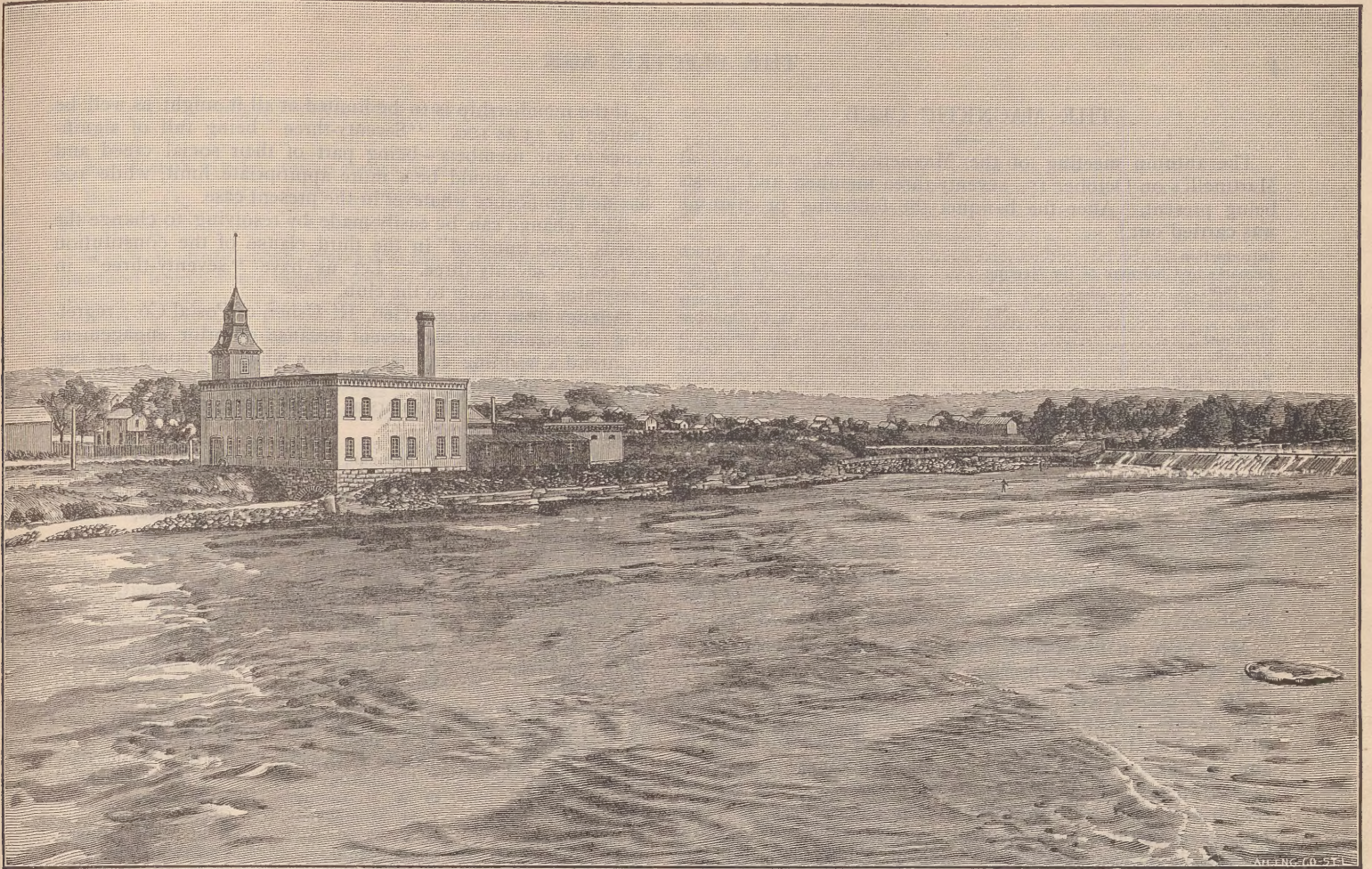
THE TELEPHONE AND THE TELEGRAPH.—The New York



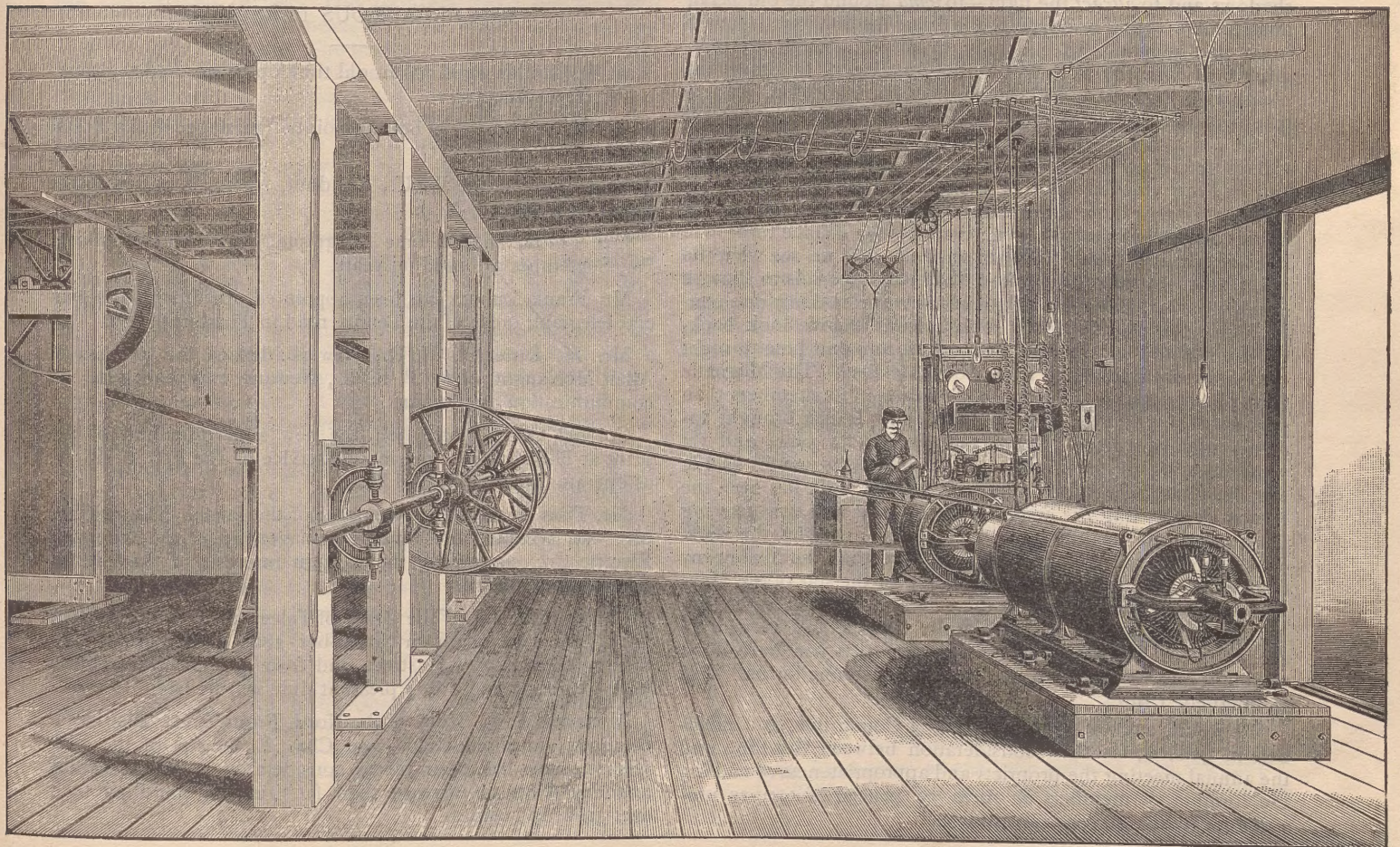
Times is authority for the statement that the Western Union Telegraph Company will shortly enter action against the Bell Telephone Company to determine the exact terms of the contract now existing between the two companies. The success of the Bell long-distance telephone service would appear to be the thorn which causes the telegraph company so much uneasiness. For a long time it has been predicted that sooner or later the interests of these gigantic corporations would clash, then would ensue a legal contest calculated to eclipse all previous efforts in this line.

In accordance with a law recently passed, the French government took formal possession of the telephone stations on the 1st inst. The company protested against the government's action as illegal, and only submitted to force.

Mr. William Brophy, expert of the New England insurance exchange, at the meeting of the National Association of Chief Engineers, held at Kansas City, Mo., Sept. 10, read a paper on "Electric Light Wires in Buildings."



HEISLER ELECTRIC LIGHT PLANT AT OTTAWA, ILL.



HEISLER ELECTRIC LIGHT PLANT AT OTTAWA, ILL.

THE MAGNETIC CLUB.

The autumn meeting of the Magnetic Club was held at Martinelli's on October 17, seventy-three members and guests being present. After the banquet the following programme was carried out:

Introduction.....	C. P. Bruch
Remarks by Chairman of the Meeting.....	Lant. S. Jones
Overture.....	Prof. Elsen
Remarks.....	W. J. Dealy
Song.....	D. C. Donohue
Humorist.....	T. A. Ballantyne
Remarks.....	E. C. Cockey
Trumpet Calls.....	J. C. Van Cura
Remarks.....	W. H. Baker
Recitation.....	E. Delaney
Remarks.....	{ J. B. Taltavall
A "Spaich" by.....	{ J. A. Osborne
Song.....	{ J. K. Calvert
Recitation.....	{ A. F. Hurd
Remarks.....	{ W. C. Burton
Song.....	{ A. F. Louer
Remarks.....	{ E. F. Howell
Song.....	{ D. W. McAneeny
Violincello Obligato.....	A. Beatty.
A Story.....	C. P. Bruch
Remarks.....	W. L. Ives

Mr. Dealy, in his usually happy manner, put every one at ease by delivering the following:

Mr. President and Gentlemen: "The question why are we here, always presents itself at the meetings of the Magnetic Club, and strangely enough it has never yet been answered by any one of us. I don't know why Brother Moody is watching me so intently, unless he is trying to tell us how many will answer it now [here all present shouted in chorus "73"]. This I claim to be one of the original De's Brevities. If Brother Delaney is present he will, however, no doubt, later on, take it up in his story for further illustration. Although the object of this club is well known, I feel that it cannot be too often proclaimed. It is to *charge* the heart with a *force* to *repel* the shadows and to *attract* the light—to *wind* around the old *plant*, as streamers round a maypole, the *branches* that have left with those that remain, and generally, by an occasional intermingling with *other lines*, to add to the *impulses* of fraternity the pleasures of sociability and the privileges of friendship. These meetings are a *series* of social pictures, social in design, social in the finish, social in the original, social in comparison, social in reference, social in description, social in every scene and in every view we take of them. It is not possible in an evening to give them more than a passing glance, but in our homes and at our desks, or wherever we may chance to be, the light of memory steadily falls upon them, and we see what the mind and heart can follow, but what language fails to show, a *combination* of the *series* in social *elements* making one continuous picture produced by social *waves*. As we look backward it seems like a dream, but is there any one here to-night who does not know that it is a social reality? The Magnetic Club has brought more cheer to the hearts of its members than perhaps they will ever give it credit for. It has brought together men who have labored side by side for years and yet were unknown to one another; it has paved the way for *sparks* that have outlined happy homes; its social light has been the means of *checking the errors* of the young who are growing up around us; its influence leads to and includes the stars. Was there ever a grander social picture than the McAneeny Concert? Could it ever have been but for the star of the Magnetic Club? We will all be there, brother, at the *repetition*, November 28, and we will bring our friends, and we will fill the house in Thanksgiving for the good that you have done the club, and for the good that the club has done for us. *Vive la Magnetic Club!*"

We would suggest to the Governing Committee, and members in general, for their consideration between this time and the annual meeting the propriety and appropriateness of making the number of members *de facto* 73, instead of 100, as provided for by the present constitution.

If the membership is to be limited at all it might as well be limited to 73 as 100. "Seventy-three" being full of significance to the members—being part of their social creed and club insignia—would be a more appropriate limit, while 100 has no significance whatever in the present case.

This change can be easily made by resolving to change the words "one hundred" in the third clause of the constitution to read "seventy-three." Let us have "seventy-three" in everything pertaining to the club.

A letter from manager Geo. H. Usher, of Postal Co., regretting his inability to be present because of prior engagement to attend a wedding anniversary from which he could not beg off, also, telegrams from Mr. T. C. Martin of *Electrical World*, and from Old-Timers at Louisville were read.

Those present were:

Geo. Roehm,	T. Brennan,	John H. Fleming,
T. H. Hamilton,	F. B. Bailey,	W. J. Morrison,
A. McParlan,	A. Beatty,	D. C. Donohue,
H. A. Moody,	P. J. Wicks,	M. J. Elsen,
E. S. Baintz,	R. J. Marrin,	F. P. Clark,
M. R. Cockey,	J. B. Taltavall,	F. T. Meyer,
T. J. Kinsella,	Wm. J. Dealy,	W. C. Cherry,
B. Franklin Ely,	P. Sheehan,	J. S. Bennett,
J. A. Osborne,	Thos. A. Ballantyne,	J. J. Kihm,
H. S. Young, Jr.,	Jos. Knittle,	John Brant,
D. W. Carry,	W. E. Rath,	T. B. Fullon,
T. G. Singleton,	P. H. Freyer,	Geo. E. Baker,
E. F. Howell,	Edward C. Cockey,	J. K. Calvert,
R. J. Hutchinson,	Wm. L. Ives,	V. J. Knittle,
W. A. Hennessey,	Wm. H. Baker,	J. M. Moffatt,
W. J. Magowan,	T. A. Brooks,	M. Greene,
Edward Delaney,	Thomas T. Dennis,	Thos. R. Taltavall,
W. C. Burton,	J. J. Calahan,	Geo. E. Holbrook,
Martin J. Dixon,	D. W. McAneeny,	L. S. Jones,
Chas. E. Orr,	J. H. Montgomery,	Chas. P. Bruch,
A. G. Hummel,	G. F. Fagan,	Robt. T. McNamara,
R. L. Bamford,	H. C. Fardon,	Terence Conaty,
A. F. Hurd,	G. W. Roberts,	Richard J. Murphy,
T. W. Greene,	M. J. O'Leary,	Jos. C. Van Cura
A. F. Louer,	T. E. Fleming,	

MISCELLANEOUS PERSONALS.

W. O. Shelley, aged 57, an old time operator, died at Rome, N. Y., September 30.

Mr. M. S. Harris has been appointed manager of the Postal office at Columbia, S. C.

Miss Voyer, of the W. U., Rondout, N. Y., is now with the Postal at Hoboken, N. J.

J. S. Fraim, an old time telegrapher, died at Harrisburg, Pa., September 25, aged 69 years.

Mr. Frank Lucock has been appointed operator in the general telegraph office of the Penna. road in Pittsburgh, Pa.

Mr. M. Ritter, P. R. R., Newark, desires the address of Allan McNaught, of the P. R. R., Newark, two years ago. A communication awaits him.

Colonel O. C. Bosbyshell, the new superintendent of the Mint at Philadelphia, was in the service of the P. & R. R. R. as operator before the Civil War.

Mr. Thos. F. Clohesey, manager of the Postal, Kansas City, Mo., has accepted the general managership of the Interstate Electric Co., controlling the western interests of the Electrical Accumulator Co.

Chicago Division of the Order of Telegraphers will give their third annual reception on November 28th, at Martine's West Side Academy, 55 Ada street, and from present indications a large gathering and a very pleasant time will be had.

Managers F. L. Scott, of the North Front Street District for the Postal in Philadelphia, and Chas. E. Stump, of the Fish District, have had their offices considerably enlarged, thereby enabling them to increase their facilities for handling their ever-growing business.

NEW YORK PERSONALS.

Mr. Joseph Hurley was in town last week.

BORN.—On October 22d, to Mr. and Mrs. H. I. Jolley, a son. Congratulations are extended.

Mr. A. C. Frost, chief operator of the Direct Cable Co., has returned from a three months' trip to Europe.

John J. Clancy, clerk in the Western Union office, 8, 23d street, is short in his accounts to the extent of \$1,500.

Night Manager Roloson, of the Postal, an expert wheelman, has a son four years old who rides a 25-inch wheel, and is said to be the youngest bicyclist in America.

Mr. S. J. Pryor, a well-known English operator, who has been a resident of New York for the past two years, has accepted a position with a newspaper at Kingston, Jamaica, and he left last week for that city.

A District messenger accosted an operator at 195 a few days since with: "Say boss, who's de man wot has charge of dem elevator conductors?" He was directed to Supt. Hinchman. "By the way," said the operator, "been having trouble with one?" "Yes," said the boy, "dem elevator fellers is too fly. I just come up wid a collection and I went to get in de elevator, and his job lots said, kinder sassy like, take de odder elevator, and den de bloke in de odder one gimme de same racket and kep me sirkulatin', and when I got on one de next trip he kep me waitin' till he took a fit of goin' up. It makes me bilious." Then he departed for the superintendent's office with fire in his bright, blue eye.

NEW YORK WESTERN UNION NOTES.—The 16 candle power lights, for some time in use here, having been found inadequate in certain portions of the room, a large number just double in strength have been introduced, greatly to the satisfaction of all. The painters have reached the door of the operating room, and the walls and ceilings sigh for their entrance. The management is entitled to the thanks of every member of the New York Telegraph Club for his kindness in running to the club house a loop for the convenience of members. Not to be behind in the procession, we take this opportunity to express ours. The handsome box relay in use there is the gift of the well known firm The E. S. Greeley & Co., who at the last meeting of the governing committee were tendered a vote of thanks for their generosity. Mr. Harrington resumes for 6 nights a week his former trick, from 5:30 to 9:30. Miss May Finley has been assigned to the Pittsfield and North Adams wire. Mr. McGuire has left the 7 to 4:30 trick for one from 8 to 5:30. During the absence of Mr. Erbelding his position as Mr. Jay Gould's private operator is being most acceptably filled by Mr. John Van Horn, whose regular assignment here is the Albany quad. A more sober, reliable and generally trustworthy team than Messrs. George H. Goodfellow and John F. King, who have recently been assigned to the Rochester duplex, it would be hard to find. In this connection we take pleasure in announcing the great improvement in Mr. Goodfellow's health since he left the night force. It is the wish of his many friends that the change now so marked may be permanent. Miss Ritie Gowans has been transferred to the 8 to 5:30 trick. The hours of Mr. W. B. Richardson have been made 6:30 to 2:30. He has been permanently added to the newspaper force. A more careful, painstaking operator than Mr. Moore, who works 145 and 146 West, does not, we believe, exist in this department. His patience is something remarkable. He has been so successful in getting rid of business by simply calling an office once or twice, and this, too, after some skirmisher had pounded away for 15 or 20 minutes, that the chief has given him the title of "Mascot." That he is popular along the line

is abundantly shown by the many useful and valuable presents he has from time to time received from the "boys." Mr. Ward says that ever since the appearance of the previous issue of this journal he has been hailed by his friends as "Hustling Gis," and he wants them to let up. "I am so badly hustled during the day," he said to your correspondent, "that I can't sleep at night." George E. Baker, chief on the West, is known pretty well in this office as well as out of it, as a lover of a good joke. He denies being the originator of the following, which was sent from the switch board to a lady not a dozen feet away, but it is no better than a score of others he has been known to perpetrate on the unsophisticated: "To traffic chief: We do not get you on the condensers. Have you got the tap wire in all right? Try us on the induction coil now." But it is needless to add that he didn't. W. F. Sterling has accepted the 7 to 4:40 trick, recently vacated by the transfer of Mr. Sharkey to the 8 to 5:30 force. Mr. Davenport, having resigned his position on the 8 to 5:30 force, has been taken by Mr. Conklin. Returned from vacations: Frank Woods, F. P. Blanks, Miss Millie Patterson, R. E. Daniels, and C. H. Schram. Retiring Chief Ed. Blakeney of the western ways has been made the recipient of a present by his old associates of that division in recognition of his ability and gentlemanly conduct. Mr. Blakeney's health is not of the best. We all extend hearty congratulations to Mr. H. I. Jolly, who is the happy father of a boy.

SYRACUSE NOTES.—Martin Dauer, manager of the Mutual Union at this place, was recently united in marriage to Miss Kate Kane of this city. Mr. Dauer is very popular, and his numerous friends unite in congratulating the happy couple. Thomas Tyrrell has been appointed superintendent of the Fire Alarm Telegraph, for the city of Syracuse. Mr. Tyrrell was office inspector under superintendent Gifford for many years. His successor has not yet been named. Mr. R. A. Mitchell, of the Western Union time service, was in town a few days since.

TRANSFERS.—L. W. Welch, Louisville, Ky., to Brown, Ia.; J. F. Paddock, Watertown to Syracuse, N. Y.; Geo. Hardaker, Philadelphia to Lock Haven, Pa.; J. G. Minniece, Mobile, Ala., to Meridian, Miss.; R. E. Farmer, Cleburne to Bowie, Texas; G. B. Dresser, Minneapolis to Pittsburgh, Pa.; Berton Hall, New Orleans to Augusta; H. E. Leslie, West Fort William to British Columbia.

MARRIED.—W. J. Lloyd, assistant superintendent of the W. U., Chicago, to Miss Mary E. Holligan, principal of Rodgers' School, on Oct. 21, at the Holy Family Jesuit Church. The happy couple were the recipients of many beautiful and costly presents, but best of all the sincere congratulations of the entire telegraphic profession. Mr. and Mrs. Lloyd are enjoying a brief wedding tour in the north.

In the death notice of C. A. Bruce, published in our last issue, we were made to say that the deceased at one time was secretary to President Bates of the Baltimore and Ohio Telegraph Co. This was an error. Mr. Edward Bruce, who was secretary to Mr. Bates, is now a prosperous diamond merchant of New York.

It appears that E. L. Mann, whose suicide was chronicled in the last issue, was a well-known and respected member of the craft at Louisville, Ky. Overwork during President Garfield's illness caused his health to break down and he has brooded over his ill health ever since, until finally he became insane on the subject.

A despatch when filed read: "Amos quite sick last night. Better to-day." When delivered; "A mosquito sick last night. Better to-day."

Benjamin Thompson, at one time assistant chief operator of the W. U., Toledo, O., has been taken to an insane asylum at Ovid, N. Y.

THE FAMOUS INCANDESCENT ELECTRIC LIGHT CASE DISMISSED.

In the United States Court at Pittsburgh, Pa., on October 5, Justice Bradley, of the Supreme Court, handed down an opinion dismissing the famous electric light case of Westinghouse against Edison. The suit was brought two years ago by the Westinghouse interests against the McKeesport or Edison Electric Light Company, to restrain the defendants from using the fibrous carbon of the incandescent conductor in the air-tight globe. The point at issue was the form and substance of the conductor.

It was claimed by the plaintiffs that they had been granted a patent on the fibrous carbon, while upon the other hand the Edison interest claimed that they had filed an application for a patent a month before the application of the plaintiff.

The Court holds that the claim to priority of invention in the fibrous carbon filament is not valid, as Edison had accomplished the result before Sawyer, Man or Westinghouse.

The following are extracts from the decision :

"We are fully satisfied that after Edison's invention had been published to the world there was an entire change of base on the part of Sawyer and Man, and that the application was amended to give it an entirely different direction and purpose from what it had in its original form.

Sawyer and Man were following the wrong principle of small resistance and strong current; Edison accomplished the great discovery of high resistance and low current. We are not mistaken in saying that but for this discovery of Edison, an attenuated filament in a perfect vacuum, electric lighting would never have become a fact.

It is undoubtedly a great discovery in the art of practical lighting by electricity. Did Sawyer and Mann succeed in making a lamp of commercial value or in finding out the principle on which it could be made? We do not so read the evidence."

George Westinghouse, jr., president of the Westinghouse Electric Company, makes the following statement :

"This decision leaves the Westinghouse Company just where it was before and cannot under any circumstances affect it adversely, although, of course, we would have much preferred a different result. We have strong hopes of obtaining a favorable decision from the Supreme Court on appeal, but whatever happens, our company will still be able to manufacture and sell incandescent electric lamps as freely as it did before, and our customers can continue to purchase them of us with perfect safety. The worst that can happen is that the incandescent lamp shall be finally declared public property, as is already the case with the arc lamp.

"This decision affects only one of our patents. We own others covering essential details in the manufacture of incandescent lamps, which we feel confident of sustaining and which all users and makers of lamps not licensed by us must infringe. Under its contract with us the Thomson-Houston Electric Company will still have to pay us the same royalties as before this decision. While the Edison Company will, if the decision is affirmed by the Supreme Court, destroy the Sawyer-Man fibrous carbon filament patent, they have no patent for the same themselves. Therefore, while this decision is against us, it is not in favor of Mr. Edison or his patents."

INCREASING FACILITIES.—The Edison Machine Company, Schenectady, N. Y., is to erect a large building near its present establishment, at a cost of \$105,000

The freshest ailment is an affection of the fingers due to constantly thumping a type-writer.

HOW TO MAKE MAGNETS.

There are two general classes of magnets, electro-magnets and permanent magnets. The electro-magnet is active only when a current of electricity is passing around it; the permanent magnet, as its name indicates, retains its magnetism after the magnetizing agent is removed. Electro-magnets are always made of soft iron, while permanent ones are made of steel. An electro-magnet can be easily constructed as follows :

Procure from a blacksmith or from any source a small soft iron horseshoe. Commencing just above the heel-cork on one side, wind closely three or five layers of two inches length of No. 22 insulated copper wire. Without cutting the wire, proceed spirally along the toe of the shoe, and then wind the same number of similar layers on the other end.

All the windings must be in the same direction in reference to the iron. If now the ends of the wire be connected with an electric battery, quite large pieces of soft iron, for instance, large nails or spikes, will be held up by the two heelcorks, which act as pole pieces.

As soon as the battery is disconnected the spike will fall. This, however, would not be the case if the horseshoe was made of steel, for it would then, because of the passage of the electric current, have become a permanent magnet. To pass an electric current around a piece of steel is indeed the easiest way of making a permanent magnet.

To try it wind several layers of the same wire used on the horseshoe around a lead pencil. Then carefully remove the lead pencil, and insert in the hollow coil left a common darning-needle, the head of which has been broken off, leaving about an inch of length.

Pass the current from the battery through the coil for a minute, disconnect and remove the needle, and it will be found to be magnetized. If it be drawn through iron filings or small tacks, they will adhere to it.

PARIS EXPOSITION AWARDS.

GRAND PRIZES AND GOLD MEDALS FOR AMERICAN ELECTRICAL EXHIBITORS.

The following awards have been made :

- Bell Telephone Company—Grand prize.
- Cobb Vulcanite Wire Company—Gold medal.
- Thomas A. Edison—Grand prize.
- Flisha Gray, Illinois, telegraphy—Grand prize.
- Heisler Electric Light Company, St. Louis—Gold medal.
- Okonite Company, New York—Gold medal.
- Elihu Thompson, Lynn, Mass., electrical appliances—Grand prize.
- Western Electric Company, Chicago—Gold medal.
- Sprague Tramway Company—Gold medal.
- Volta-Graphophone Company—Gold medal.
- Massachusetts Institute of Technology, Boston—Gold medal.
- New York University—Grand prize.
- Rensselaer Polytechnic Institute, Troy—Grand prize.
- Smithsonian Institution, Washington—Grand prize.
- Johns Hopkins University, Baltimore—Grand prize.
- H. A. Rowland—Gold medal.
- Herman Hollerith, Washington—Gold medal.
- United States Signal Service. A. W. Greely, chief officer—Grand prize.
- United States Naval Observation—Grand prize.

ELECTRIC LIGHTS CAUSE INSOMNIA—The latest discovery about the electric street-lights is that the shade trees in the vicinity actually suffer from insomnia as if they were human beings.

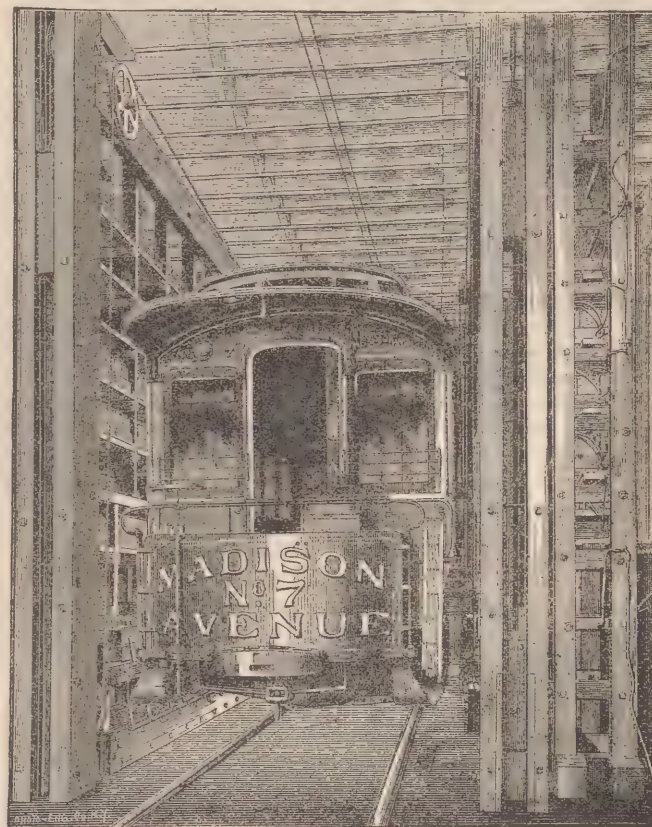
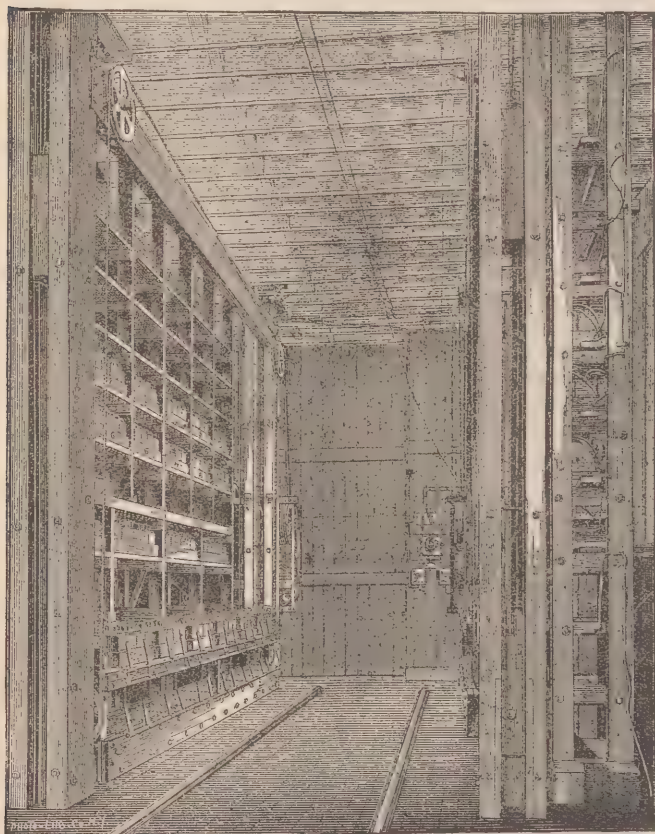
SUCCESS OF THE STORAGE BATTERY CARS ON
THE FOURTH AND MADISON AVENUES,
NEW YORK.

Now that the success of the Julien Electric Traction System on the Fourth and Madison avenue line has been doubly assured, it may be of interest to recount the rapid and satisfactory development of this particular plant.

* The storage of electricity seems to be the only means of obtaining satisfactory results, and it has been the labor of many years to bring this system to its present state of perfection. The first of the standard cars of the Julien Electric Traction Company, operating on the Fourth and Madison avenue line in New York city—No. 7—ran over 6,000 miles and carried over 80,000 passengers, it is said, without costing one dollar for repairs.

Having proved that a storage battery car could be built that would be reliable, the Julien Company began the con-

high, would in a large installation, be an item of perhaps vital consideration, should not the proper means be at hand for their charging and manipulation. One of the most ingenious and attractive features in the Julien system is their battery shifting device which is shown in the illustrations. The car runs into the station between two elevators 16 feet long, composed of two shelves, the lower one containing the charged set, while the upper one is used to receive the discharged set, when withdrawn from the car. When the fresh set has been put in place through the outside panels of the car, the car goes out, and the elevators are raised up between a series of racks into which the discharged batteries are placed and a fresh set is lowered, which operation is repeated with each car. The batteries, which are in six trays on each side of the car, make automatic contact with the regulator the moment they are pushed in position in the car, and they in the same manner make contact with the dynamo, as soon as they are placed on the shelves. These elevators are



ARRANGEMENT OF STATION FOR SHIFTING STORAGE BATTERY—FOURTH AVENUE LINE.

struction of thirty cars at the works of the John Stephenson Company, based on the experience gained by car No. 7; the first of these cars—No. 8—was placed on the road June 22d, and on Wednesday, August 8th, car No. 17, the last of the first group of 10, was placed in the service and have since then run continuously in regular passenger service, to the great satisfaction of the company and of the officials of the Fourth and Madison avenue road.

The performance of these cars is particularly creditable, when it is considered that they are sent out between horse cars, and are dependent entirely on their self-contained energy, and have never failed to return to the station by their own power.

When storage batteries were first introduced for the propulsion of street cars, the question of the handling and charging of the batteries was considered one of grave importance. It will be seen that each car, requiring 216 accumulators, measuring six inches square and seven inches

run by stationary motors, and the entire change from the time the car enters the station until it is again on the road occupies but three minutes; and while the battery is being changed the regulators and motors are examined. These racks, with motors, etc., occupy a space of but 24x7 feet on each side of the car, or 336 square feet, which represents the stall room of 135 to 150 horses, or 6,000 square feet. This item of saving the floor space is one of great importance in large cities, where land is at a premium.

The best proof of the favor with which the officials of the Fourth avenue road view the operation of these new standard cars, is the fact that they have recently placed an additional order with the Julien Company for a second group of ten cars, which will doubtless be followed by the entire equipment of the road. Two cars have just been sent to Providence, which will be operated by the Union Passenger Railway there, and the Pullman Palace Car Company are building twelve bodies, a number of which will be placed in service on the horse-car line in Pullman, Illinois.

* From *Electric Power*.

MR. AND MRS. CHANDLER'S SILVER WEDDING.

A NOTABLE ANNIVERSARY CELEBRATED.

The Vermont papers of October 12, 1864, under the heading "Married," contained the notice of the marriage, at West Randolph, on October 11, at the residence of the bride's parents, by the Rev. O. D. Allis, of Miss Marilla E. Stedman to Mr. Albert B. Chandler. Almost immediately after the wedding Mr. Chandler took his bride to Washington, where he held a position in the War Department Telegraph Bureau during President Lincoln's administration. To-day Mr. Chandler is one of the best known and respected telegraph men in America. He is the president of the Postal Telegraph Company and of the Commercial Telegram Company, and one of the vice-presidents of the Commercial Cable Company, of which John W. Mackay is president. At the close of the Civil War Mr. and Mrs. Chandler came to Brooklyn to reside. Their two handsome sons, Albert Eckert, aged 16, and Willis Derwin, aged 8 years, were born in Brooklyn. The house, 389 Clinton avenue, in which they now live was designed and erected under the personal supervision of Mr. Chandler, and is a triumph of modern domestic architecture. October 11, 1889, Mr. and Mrs. Chandler celebrated the twenty-fifth anniversary of their wedding-day by holding a reception to which a very large number of friends thronged to offer felicitations on the auspicious occasion. The house was magnificently decorated by the florist's art. To the left of the entrance hall is an alcove room. This was reserved for an orchestra of mandolin players and harpists who, concealed by a festooned curtain of smilax dotted with white carnations and hung with strings of pink roses, discoursed sweet music throughout the evening. The parlor to the right was the reception room proper. Before a mass of white and pink flowers erected against a background of dwarf palms arranged in the embrasure of the large bay windows stood Mr. and Mrs. Chandler, their two sons keeping them company, as the guests passed as if in review before them. Above them was a pillow of white roses bearing in pink carnations the inscription :

.....
 1864. C S 1889.

Mr. Chandler looked, as he always does, young and amiable, while Mrs. Chandler, who seemed very happy, had the appearance of a bride, wearing a handsome dress of white satin and silver brocade and holding a large bouquet of red roses in her hand.

The mantels were banked with yellow roses and in each corner of the room was an ireka palm towering from a bed of white dahlias and moss. The folding doors between the front and rear reception rooms had been removed and in their place was a gracefully draped curtain of trailing vines and pink roses drawn to one side and fastened with a large bouquet of the roses. The stairway was lined with baskets of flowers and the upper hallway presented a perfect bed of many colored roses. The banisters were entwined with smilax and the newel post was covered with a crush basket of yellow roses.

After the merely formal part of the reception was over an adjournment was made to the dining room, where a superb supper was served and congratulations many and sincere were showered upon the host and Mrs. Chandler. An original poem, written for the occasion by Mr. L. Welles, an intimate friend of the family, formed a notable feature of the occasion. The poem, which is after Will Carleton's style, was engrossed on parchment and bound in white silk, with tassels of silver cord. It recited in quaint dialect a sketch of the life of the host and hostess.

A great number of congratulatory letters and telegrams came from all over the country from friends who lived at so great a distance that their acceptance of the invitation

to be present was almost an impossibility. From eight o'clock until past midnight, wide as Clinton avenue is near Greene, it was so crowded with carriages and conveyances that traversing it was almost an impossibility. Mr. and Mrs. Chandler received a large number of beautiful presents, and as we have succeeded, through a friend, in obtaining a complete list, we take pleasure in publishing it :

Prof. John J. Anderson—A handsomely bound set of "Anderson's histories," with autograph "compliments of the author." Miss Mary E. Armstrong—Large silver salad bowl. Mr. and Mrs. Chas. E. Arnold—Large silver nut dish. Mrs. Dr. H. F. Aten, Silver butter pick. Mr. and Mrs. Wm. H. Baker—Case of after-dinner coffee spoons, each of different design. Miss Kate C. Baldwin—Silver paper cutter and book mark. Dr. and Mrs. E. O. Blanchard—Case of silver nut picks. Mr. and Mrs. William B. Boorum—Large gravy spoon. Mr. and Mrs. William H. Bancker—Silver bon-bon dish and spoon. Mr. and Mrs. James Brady—Heavy silver paper cutter. Mr. and Mrs. John H. Brewer—Silver bon-bon dish and silver tongs. Mr. and Mrs. F. B. Chandler—Silver pickle fork. Mr. and Mrs. Isaac H. Cary—Silver sugar shaker. Mr. and Mrs. Frank H. Chandler—Silver tea caddy and large fish knife and fork. Mr. and Mrs. W. W. Chandler, Jr.—Silver salad server. Rev. Theo. L. Cuyler—A handsomely bound volume, illustrating in full description and in colored engravings the cathedrals of England and Wales. Mr. Theo. L. Cuyler, Jr.—Silver lamp. Mr. Hector de Castro—Vase of vari colored glass encased in silver. Mr. and Mrs. Wm. H. Dubois—Silver bon-bon dish and silver tongs. Mr. and Mrs. Henry Elliott—Cut glass perfumery bottle with silver top. Mr. and Mrs. John H. Emerick—Silver pudding dish. Mr. and Mrs. Chas. N. Finch—Silver pickle fork. Mr. and Mrs. Edwin Gaskill—Unique flower basket. Mrs. W. Gay—Books of poetry. Mr. and Mrs. James H. Hart—Royal Worcester vase. Dr. Lucius C. Herrick—Silver napkin ring. Miss Emma Hinchman—Painting: four-leaf clover with couplet of "good luck." Dr. and Mrs. C. N. Hoagland—Silver tea caddy and spoons. Mr. and Mrs. Chas. R. Hosmer—Set of silver salt cellars and spoons. Col. and Mrs. Robert G. Ingersoll—Silver mounted toilet set: hair brush, comb, clothes brush and silver powder box. Mrs. Alice I. Jackson—Duchesse and point lace handkerchief. Dr. and Mrs. J. Lester Keep—Large gravy spoon. Mr. and Mrs. Robert J. Kimball—Silver sugar bowl, sugar tongs, and cream pitcher. Mrs. Micah Mann and Mrs. Hayden Sharp—Silver candlestick. Mr. and Mrs. Horace J. Morse—Large salad fork. Mr. and Mrs. Clarence F. Moulton—Cut glass vinegar cruet with silver top and handle. Mr. Gilman S. Moulton—A silver cream pitcher, figure of Jersey cow. Mr. and Mrs. Richard O'Brien—Large berry spoon. Mr. and Mrs. Geo. L. Pease—Pair of silver candlesticks. Mr. and Mrs. H. J. Pettengill—Pair of silver salt cellars and spoons. Mr. and Mrs. H. B. Platt—Bureau tray. Mrs. J. R. Reid and daughter—Silver berry spoon. Miss Grace Rider—Silver bon-bon spoon. Miss Kate W. Rider—Jelly spoon and photograph. Mr. Russell H. Robbins—Silver sugar sifter. Mr. and Mrs. E. Gerry Russ—Jelly spoon. Mr. and Mrs. Chas. S. Shivler—Sugar spoon. Miss L. H. Snow—Sugar bowl of vari-colored ware with silver trimmings, handle and cover. Mr. and Mrs. Chas. A. Tinker—Silver ice pitcher, frame, and two goblets. Miss Marie Van—Case of spoons, brought from Paris Exposition, each made in a different country and having the characteristic design of each country. Mrs. W. B. Viall—Book of poetry. Mr. and Mrs. Geo. G. Ward—Silver ice cream knife. Mr. Edward L. Welles—Pair of large silver candelabra, each arranged for one, four, or five lights. Mr. and Mrs. Geo. R. Williamson—Silver card receiver. Mr. and Mrs. Fred. H. Wing—Silver sugar sifter.

All the articles in this list were of new and beautiful de-

signs, some of them unique. The discriminating taste and practical judgment of the donors is exhibited in a remarkable degree by their selections.

In addition to the foregoing, baskets of flowers, positively magnificent in proportions, and of surpassing loveliness, were received from Mrs. Harriett C. Baldwin, Mr. and Mrs. S. T. Dauchy, Dr. and Mrs. William Jarvie, Mr. and Mrs. S. W. Johnson, Mr. John W. Mackay, Mr. and Mrs. E. G. Webster.

Boxes of roses from Mr. and Mrs. J. C. Hinchman, of Summit, N. J., from Dr. and Mrs. Wm. Cheseman, Auburn, N. Y., and Mrs. Mary Smith Sawtelle, Newtonville, Mass., and an elegant bouquet of Jacqueminot roses, tied with silver girdle, from Francis Fischer Powers.

Upwards of one thousand invitations were sent out, nearly seven hundred of which were to New York and Brooklyn friends, and it is needless to say the fraternity from all branches of the profession was well represented.

DEMING, N. M., NOTES.—The personnel of this office is as follows: J. H. Kaine, manager; W. H. Sleight, chief operator; Mrs. J. H. Kaine, D. L. Kaine, J. P. Kelley, H. A. Culver, E. T. Locey, Harry Heritage, (formerly New York), Samuel Davis, and T. V. Marling comprise the operating force. Recent departures: G. M. Lawrence for California; W. A. Redfield, Mexico; J. C. Robb, Mexico. The remainder of the boys, most of whom are from Chicago, are (their friends will be pleased to learn) doing well here and expect to remain through the winter, the mild, healthful climate of this region being a strong inducement. Mr. E. T. Locey has been acting deputy marshall for a week past, during the absence of the city marshall. In that time Mr. Locey has not only preserved the peace of the city, but arrested and brought about the conviction of several daring thieves and hard characters who have terrorized the town for some time. He is receiving congratulations from all law abiding citizens upon his efficiency and courage.

TORONTO, C. P. R. NOTES.—The C. P. R. Telegraph have recently opened several offices in the eastern Canadian provinces, establishing communication from the Atlantic to the Pacific coasts. There have been a few changes in the staff of this office since our last notes. The following is a list of the C. P. R. force: Messrs. F. C. Robertson, chief operator; J. D. Smith, assistant; H. Wilson, night chief; Ed. McSweeney, Harry Lily, Geo. Carlisle, J. Collie, C. Graham, John Conway, R. Green, J. Strachan, R. Stiver, M. Cummings, W. Barber, W. Richardson, C. S. Smith, Norman McCallum, and W. J. Anderson, Misses Wynn, Smith, and Thorley. Mr. Wilson has changed off with Ed. McSweeney for a month. The latter is acting as night chief and the former as wire chief in day time.

CANADIAN PACIFIC NOTES.—Eastern Division: Returned from vacations: J. A. Nicol, White River. Resigned: S. Laugrin, Peninsula; T. D. Sutherland, Schreiber. Transfers: C. W. Wemsworth, Middleton to Peninsula; A. Currie, Trudeau to Middleton; J. Fraser, Heron Bay to Trudeau; J. A. Nicol, White River to Heron Bay; W. Lautlet, Black River to Heron Bay, nights; P. A. Leitch, Rosspport to Schreiber. J. E. Mullin remains at White River. The AGE is becoming very popular among the boys on this division. Western Division Notes: A. A. Marlatt, "X" office, has been suddenly called east, his mother being very sick. Returned from vacation: F. H. King, sent to Kaministiquia; A. S. McLellan, Bonheur. Transfers: J. Jackson, Kaministiquia to "X" office; F. W. Whitfield, Eagle River to Kaministiquia; D. Signac, Monmouth to Eagle River. Resigned: S. A. King, Kaministiquia.

CHICAGO NOTES.—There has been no little complaint (and not unfounded complaint) among subscribers here of the omission of Chicago notes in one of the September numbers. To these and all other subscribers we desire to say that after the present issue we intend giving the affairs of this office more in

detail than ever before. On account of this month's notes being misplaced, however, we are compelled to depend wholly upon memory for this issue of the AGE, but can assure our friends that there will be no further cause for any displeasure. Business is already beginning to settle down into the usual winter channels. On this account several transfers of tricks have been made recently on the night force. Messrs. Price, Eaton, Hotchkiss and Gibson being transferred from straight seven to straight five-thirty tricks. Larry Pearson is on leave of absence, having been called home by the illness of his mother. Joe Unwin has been acting as chief operator at the Union Stock Yards for the past few weeks, during Mr. Glass' absence on vacation. Frank Delavan, who has been seriously ill for some time, is again on deck. Mr. Delavan went to Omaha about six weeks ago to try the effects of a change of climate, but was forced to return home almost immediately. Mr. Allen, absent for a month's vacation, is again at his desk. "Nick" Kilburg has gone to Pierre, Dakota, to help out during State elections there. Mr. Dixon has returned from a six weeks' leave of absence looking greatly improved. Miss Small and Miss Mollie Gibbons, both of whom have been on quite extended vacations, have returned also looking much benefited. Mr. Tate has returned from Armour's. Mr. Morris, manager of the Milwaukee Chamber of Commerce, accompanied by Mr. Dean, also of Milwaukee, paid us a flying visit last week. Arrivals: E. P. Jones, from C. & A. Ry. Departures: W. C. Smith, Atlanta, Ga.; Mr. Hazlett to C. & M. Ry. Among the latest "combinations" are Bug City for Butte City; gooles for Tuttiles, and Duerghonth for Due eighteenth. Through being misinformed we stated in last issue that Miss Mary Clark had returned from her vacation; she is still visiting at Lake Geneva.

BOSTON NOTES.—Arrivals: I. O. Wright, from Providence, R. I., assigned to night force. Departures: Messrs. S. C. Tugo, Birmingham, Alabama; D. Pontin and J. Lawson to Savannah, Ga.; Miss E. A. Brigham and J. F. Nolan to Postal, city; C. W. Fisk to Pool room, city. Mr. A. W. Austin has resigned to go with a broker. Messrs. R. A. Boyle, Walter Lynch and Mr. Geo. Watts have been assigned to the regular night force from the extra list. Mr. J. H. Driscoll has been transferred from the all-night force to the 5.30-1 trick. During the week of the races in this city, affairs in the operating-room resumed the lively aspect of midsummer. An involuntary vacation was given the pool-room operators, their services not being required. Those who desired it, however, were fortunate enough to secure extra work at 109. Messrs. Elliot, Finan and Cox were detailed for outside duty at the race tracks with Messrs. Joe Walton and Dan McCarty at *Herald* and *Globe* ends respectively. The Telegraph Mutual Aid and Literary Association of Boston resumed its monthly meetings Sunday, Oct. 6th, at Young's Hotel. There was a large attendance, and the work for the year was undertaken with renewed vigor and enthusiasm. Preparations for the seventh annual Ball will begin at once, a committee of arrangements having been appointed at the meeting by President Tobin. Mr. R. J. Gray, of the ELECTRIC AGE, was an interested guest at the meeting. Mr. Harry N. Barrett, eldest son of the late James C. Barrett, for many years with the Western Union Telegraph Company in this city, a well-known and favorite operator, associated with the banking establishment of Cordley & Co., was married last month to Miss Mary L. Cooney, a most estimable young lady of Boston.

We learn that the tickets for the McAneeny Concert are almost all taken, and that as fine an audience of representative telegraphers will be present as graced the previous concert. Many ex-telegraphers will also, we learn, once more renew old acquaintances by their attendance. The opportunity to secure choice seats should not be delayed too long.

Edward Rausing, of Lancaster, Pa., has sued the Western Union Telegraph Company for \$900 lost through an error of the company in the sending of a telegram concerning the sale of six carloads of potatoes.

NEW PUBLICATIONS.

A Dictionary of Electrical Words, Terms and Phrases.—A valuable and interesting book has just been published by The W. J. Johnston Company, Limited, of this city, which bears the same relation to the technical phraseology of the science of electricity that Webster's and Worcester's dictionaries do to the English language. This unique volume, which is entitled "A DICTIONARY OF ELECTRICAL WORDS, TERMS AND PHRASES," is from the pen of Edwin J. Houston, A. M., Professor of Natural Philosophy and Physical Geography in the Central High School of Philadelphia, Professor of Physics in the Franklin Institute of Pennsylvania, Electrician of the International Electrical Exhibition, etc., and will unquestionably fill a long-felt need among professional electricians and students of the science. In the opening words of the preface: "The rapid growth of electrical science, and the almost daily addition to it of new words, terms and phrases, coined as they too frequently are in ignorance of those already existing, have led to the production of an electrical vocabulary that is already bewildering in its extent. This multiplicity of words is extremely discouraging to the student, and acts as a serious obstacle to the general dissemination of electrical knowledge. It is with the hope of removing these difficulties to some extent that the author has ventured to present the *Dictionary of Electrical Words, Terms and Phrases* to his brother electricians and the public generally." The book is more in the nature of an Encyclopædia than a dictionary. Besides giving the definition of the words, terms or phrases; it reviews briefly the science involved in each definition. Hence we find considerable space allotted to many of the most important subjects. For instance, the "Block System for Railways" takes up six pages including several illustrations; and, "Cells, Voltaic," covers nine pages and is illustrated very fully. The article on the dynamo is very complete, and treats very clearly the different parts and characteristics of the machines of the various types. This subject is given eleven pages and is elucidated by no less than eighteen illustrations. From these examples of its contents it will be seen that the scope of the work is far greater than that of a dictionary. The book is replete with very clear and well executed diagrams and illustrations, many of which are evidently original. The work embraces every word or term used in the science in all its branches. It also brings us down to date. We thus find a very comprehensive article on pyro-magnetic motors, which invention is hardly beyond its embryotic stage of development, though it is full of possibilities. Valuable tables and formulæ are given in their proper places and taken altogether this work can be truly called a complete electrical library between two covers. It will certainly be a valuable addition to the library of every electrician, practical or professing, and to every student. Even the general public, who have hitherto regarded the science of electricity as something beyond the power of ordinary humanity to understand, need not be kept in ignorance in matters electric when such a book as this can be obtained. All subjects are very plainly and clearly set forth; and considering that this book is the pioneer of its kind it is remarkably free from inaccuracies. The work bears unmistakable evidence of unusual care in its preparation and production, and we predict for it a very hearty welcome among electricians and a large sale. No one engaged in electrical pursuits of whatever kind should be without a copy of this book if he has no other, for it is literally the sum and substance of all the principal works on the subject of electricity. The *Dictionary of Electrical Words, Terms and Phrases* has 656 pages and 397 illustrations. The price is \$2.50, and considering the amount of valuable information the book contains, two dollars and a half could not be more profitably invested.

Evolution of the Electric Incandescent Lamp. By Franklin Leonard Pope. Cloth, 8vo, pp. 100; with illustrations. Price \$1. Henry Cook, publisher, Elizabeth, N. J.—The mere fact that Mr. F. L. Pope's name is attached to this work is a guarantee that the contents are the result of careful study by an apt scholar. Mr. Pope has been closely identified with the development of the incandescent lamp throughout its entire history and, possessing scholarly attainments, has compiled from contemporary newspapers and Patent Office records the necessary material which goes to form this interesting volume. Strangely enough, at this very time, the question of incandescent lamps occupies the attention of courts and has been the subject of considerable litigation for a long time. This litigation has caused electricians to divide on the question of priority of invention of this lamp. Therefore, while many may disagree with Mr. Pope on that particular and important point, all must credit him with having contributed a valuable history of facts and figures readable and interesting.

Alternate Current Machinery.—By Gisbert Kapp, Assoc. M. Inst., C. E., reprinted from the minutes of proceedings of the Institution of Civil Engineers, London; price, 50 cents; D. Van Nostrand Company, New York. The subject under the title comprises these sections: alternators, transformers, motors, meters and mains. The author deals especially with the first three subjects. The size of the work is $3\frac{1}{2} \times 6$ inches and contains 200 pages.

SIGNAL SERVICE CHANGES.—The Government telegraph lines in Massachusetts, Rhode Island, Virginia, North Carolina and Florida, are placed in charge of Lieut. John P. Finley, who is stationed at Boston, and the office at Woods Holl, Mass., heretofore in charge of Lieut. Wright, is closed. The lines in Montana, Dakota, Wyoming and Utah are in charge of Lieut. John C. Walshe, at St. Paul, Minn.; those in Arizona in charge of Lieut. Greene at Prescott, while the lines on the Pacific coast are under the management of Lieut. Jas. A. Swift, whose headquarters are at Ashland, Ore.

We are in receipt of a copy of the second edition of a pamphlet entitled "Standing and Record of the Heisler System of Long Distance Incandescent Electric Lighting." Among the new matter therein is a descriptive write-up of the Ottawa, Ills., plant, which is of more than ordinary interest. Copies of the pamphlet may be had on application to The Heisler Electric Light Company, St. Louis, Mo.

The *Western Electrician's* San Francisco correspondent is authority for the statement that the officers of the Postal Telegraph Company say the company will spend \$4,000,000 in construction work this year; most of the sum is to be expended in lines south of that city. Next year Oregon and Washington will be favored with better facilities.

The active minds of the editors of our great dailies are beginning to realize the wonderful growth and extent of electrical work. The magazines, the great weeklies, and other general publications are taking notice of the results that this comparatively new science and its energetic apostles have wrought in the past ten years.

Electricity is being introduced into the mines of England, especially the coal mines, where some of the latest machines are doing the work of several men, and this force is also used in hauling the coal out of the mines.

Prof. Thomson of electric welding fame has just perfected an invention by which the rails of street or steam railways may be welded together by electricity after being placed in position.

At Yarmouthville, Me., an incandescent lamp was in good condition after 12,168 hours.

THE BENNETT TELEPHONE.

People who fancy they know something about almost everything, oftentimes discover that their knowledge is somewhat limited. If the question were to be asked of a thousand business men, selected at random in the city of Boston, "Did you ever hear of the Bennett Telephone?" we imagine that at least ninety per cent. would answer that they didn't know anything about it, and furthermore, didn't wish to. Probably

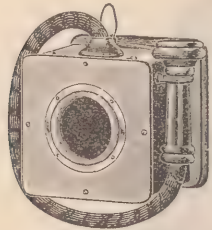


FIG. 1.
BENNETT TELEPHONE.

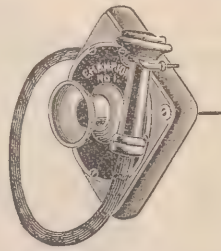


FIG. 2.
CHAMPION TELEPHONE.

they would go on to state that they believed it to be only another infringement of the Bell telephone, and, in the same breath, grumble over the high prices which are demanded for the use of the latter.

It so happens, however, that the Bennett telephone is not only *not* an infringement of the Bell instrument, but it does not even depend upon electricity for its operation; moreover, it costs but a very little money for the service which it renders. Almost everybody has heard of the "lovers' telephone." The

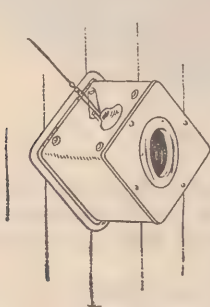


FIG. 3.

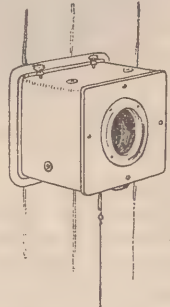


FIG. 4.

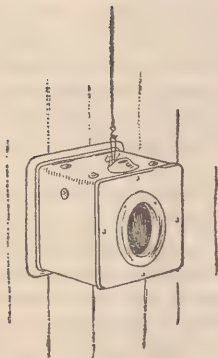


FIG. 5.

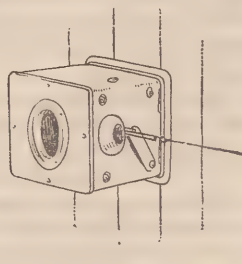


FIG. 6.

CHANGES IN POSITION OF THE BENNETT TELEPHONE.

Bennett telephone, is in brief, the same *acoustic instrument*, grown-up, developed, and therefore improved like the lovers' telephone in principle only, but in every other respect as unlike it as Watt's tea-kettle was unlike a Corliss engine.

For short private lines—thousands of such will readily suggest themselves—the acoustic instrument to which we allude will answer just as well as an electric instrument, and will cost not one tenth the money asked for the very moderate use of the latter. Just think of the mills and manufacturing establish-

ments throughout the land, the banks, the insurance offices, the railroad offices, and the like, where inter-communication is being constantly held, and where, as a rule, the best and most profitable business of the American Bell Telephone Company is done to-day. One can't begin to even enumerate them; and yet, in these same places, an acoustic telephone system could be used as advantageously, and, by its substitution, thousands of dollars could be saved to the business public. This is a fact which requires no argument. Personal

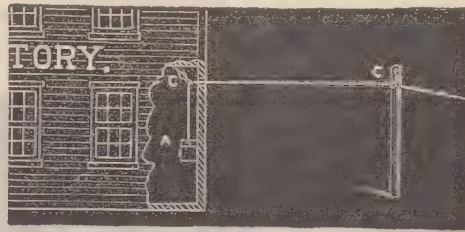


FIG. 7.

investigation will convince the most skeptical that what we assert is true.

The accompanying illustrations will further explain the Bennett system. Figs. 1 and 2 show the latest patterns of the telephone, and it will be noted that they are exceedingly compact and shapely.

The essential features of their simple construction and operation may be briefly outlined as follows:

In the system are included a separate receiving instrument which concentrates and conducts the sound waves to the ear of the listener, thus admitting of private conversation, and avoiding the necessity of turning the head back and forth to talk and listen; second, a curved transmitter tube, which permits placing the diaphragm at a right angle with the mouth piece, so that the line wire may easily and practically be connected to the instrument, and likewise admits of the instrument being placed in a convenient location, since the line wire on this account may extend from it straight up or down, to the right or left, or at any intermediate angle. This line wire is of peculiar construction, being composed of two or more strands interlaced, twisted or braided together, giving the desirable feature of a strong yet pliable conductor.

Another feature of great importance is the improved "Gilliland" insulator, for the purpose of reducing the loss of sound in acoustic telephone lines, caused by the presence of angles, which is one of the most serious difficulties encountered with this class of devices; and still another feature is the adoption of a simple arrangement by which the tension of the line may easily and quickly be adjusted without tampering with the line. If after the line has been some time in service, it should become a little slack, it may by this method easily be adjusted to the proper tension of the instrument.

The Bennett Telephone occupies a space of five and one-half inches square; the diaphragm is practically imperishable; the instrument works well in all kinds and conditions of weather. It is, of course, understood that as this instrument is non-electric, the use of batteries or electric generators is dispensed with. For signalling from one terminal to the other a mechanical signal system has been devised, which answers well on all ordinary lines. For long lines the ordinary



FIG. 8.

magneto-signal bell is recommended. These instruments are not adapted for exchange purposes, but, when properly connected, three or four of them may be used on the same line. The working distance will be governed in a measure by location of instruments as regards noise, and by the disposition of the line in respect to angles. If free from sharp turns, a properly constructed line is claimed to operate well over a distance of two or three miles. On a line of 2,500 feet in length, with terminals in fairly quiet locations, from two to five right angles may be introduced without very seriously impairing the efficiency of the line.

Figs. 3, 4, 5 and 6 show some of the various positions in which the Bennett telephone can be placed so that the line

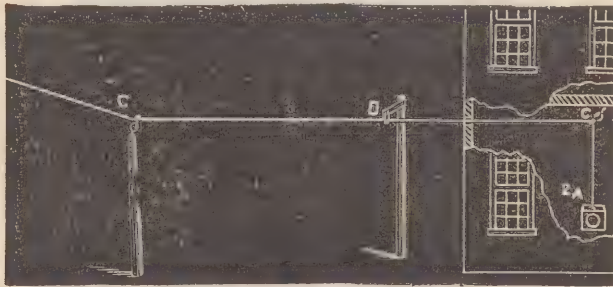


FIG. 9.

wire can extend up or down, to right or left, or at any intervening angle.

Figs. 7, 8 and 9 show the general plan of arranging the line wire from one station to another, and require no special explanation.

The entire system is controlled and installations are made of same by the National Telephone Manufacturing Company, of Boston, Mass. Its utility, its efficiency, its durability and its economy, cannot be questioned. We have seen and tested many acoustic telephones in our day, and we have no hesitation in asserting that the "Bennett" amply deserves the great success which it is achieving.

THE NEW YORK OPERATING ROOM OF THE WESTERN UNION TELEGRAPH COMPANY.

The *Woman's Illustrated World*, of November 16th and November 23d, will contain photographic illustrations, the best ever taken, of the Main Office of the Western Union Telegraph Company, New York, showing the faces of the operators while at work, a great many of whom are readily recognized.

The engravings are 58 inches square, and are accompanied by a well-written article, descriptive of the same, from the graphic pen of Mrs. A. M. Payne.

Besides the faces of hundreds of the operators and other employes seen, an unusually accurate idea can be formed of the immensity of the room, of the switchboards containing thousands of wires connecting with all quarters of the continent, of the pneumatic tubes by which messages are exchanged with the newspaper and important city offices, and also of the aerial "carrier" wires for transferring messages to and from the different sections of the room.

The view is from the gallery of the Commercial News Department.

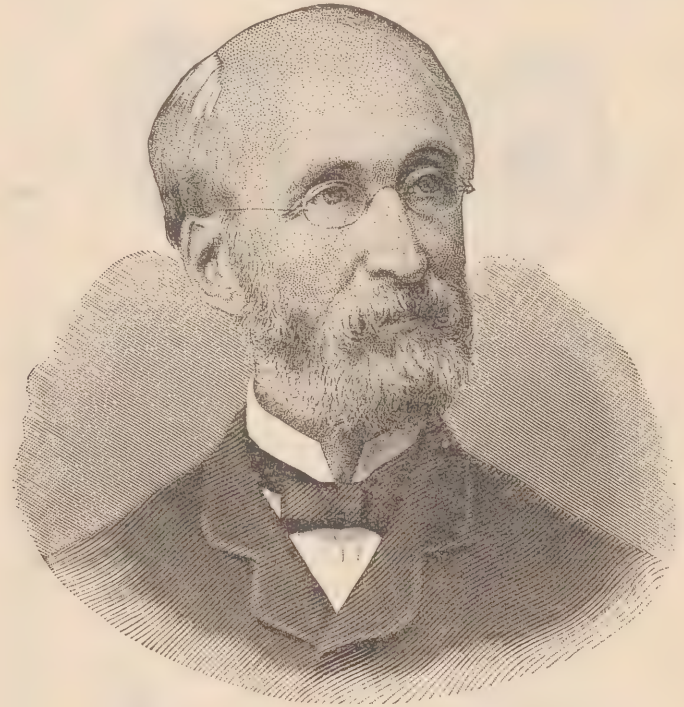
Mr. Thos. Finnegan, the veteran doorkeeper, comes in for his share of the glory of the department by appearing in an excellent cut accompanied by a brief but interesting biographical sketch. The article is interesting in every line, and every telegrapher in the United States should have a copy of it, which will be mailed on receipt of six two-cent postage stamps.

Address,

Woman's Illustrated World,
No. 10 West 23d Street,
New York.

JAMES D. REID APPOINTED UNITED STATES CONSUL AT DUNFERMLINE, SCOTLAND.

Mr. James D. Reid, familiarly spoken of among his friends as the father of the telegraph, and well known throughout the entire country, has accepted the State portfolio at Dunfermline, Scotland, and he will leave for that post on the German Lloyd steamer Lahn, November 27, at 9 a. m., from Hoboken.



JAMES DOUGLAS REID.

The appointment of Mr. Reid, while it takes from among us the most worthy of old timers and a genial companion, gives general satisfaction and elicits many warm congratulations from among his telegraphic friends.

Advanced in years, but mentally and physically alert and active with yet a strong capacity for enjoyment of life, Mr. Reid is by this unsolicited appointment invited from the desk in the executive department of the Western Union Telegraph Co. to return to his native land, almost to his very birthplace, and accept the light duties of the Dunfermline Consulship. The appointment is felicitous in more than one respect and it is probably none the less welcome to Mr. Reid, because the suggestion of it was not his own, but the happy thought of a friend of Mr. Blaine.

Mr. Reid may be separated from his friends by a few thousand miles for about four years to come, but he will not be forgotten for a moment. The tender regard in which he is held by all telegraph people is too sincere and deep rooted to admit of his departure from the country for even four years without much regret. But while this warm attachment manifests itself on every occasion, his friends feel that he has eminently earned the well merited rest. It is the hope and wish of all that he may return to us with renewed vigor at the end of his term.

Dunfermline is one of the oldest and most beautiful of the inland towns of Scotland, and formerly the place of the crowning of Scottish Kings. It is somewhat celebrated for the manufacture of fine linens and has several large manufacturing establishments which do a heavy export trade. It has a large and useful library, the gift of Andrew Carnegie to his native town. It may be particularly pleasant to Mr. Reid to remember that in 1847 he hired Mr. Carnegie in Pittsburg, Pa., to carry messages. Mr. Carnegie soon became an expert operator, and is to-day loud in his praise that he was once a telegrapher.

CORNELL UNIVERSITY NOTES ON ELECTRICAL ENGINEERING.—The department on electrical engineering opened on Monday, September 30, for the fall term's work. The number of entering students in that department was very large, showing a great gain over years previous. There are now over 150 students registered in the electrical course. Last June there were only about 75 students. As soon as the New Chemical Building, now being constructed, is finished, the whole of Lincoln Hall will be devoted to physical and electrical work. All of the graduates of last June have lucrative positions, and many juniors have been employed during the summer months by leading electrical firms. Mr. Chas. L. Cornell, '89, is superintending the construction of an electrical railway at Omaha, Neb. Prof. Harris J. Ryan has been appointed assisting professor of electrical engineering, to fill the vacancy of Prof. E. P. Roberts, who is now with the Brush Electric Co., Cleveland, O. Prof. R. H. Thurston, engineering director of Sibley College, gave a reception Friday evening, Oct. 4th, to the students in mechanical and electrical engineering, at Barnes Hall. Several hundred students were present, and all had a very enjoyable time. The list of non-resident lecturers in the electrical engineering course will soon be arranged and published. Mr. Lee Hamilton Parker, '89, is visiting friends in Ithaca, and will soon take charge of an isolated electrical plant at Elmira, N. Y.

PHILADELPHIA W. U. NOTES.—Business suddenly slacked up, and in consequence the services of a number of extra operators have been dispensed with. F. L. Welt and H. G. Hoyler have been assigned to the 3 to 10:30 P. M. trick. Miss Mame Prosser has been added to the auditing department force. Miss Emma Henry returned from a summer office. W. H. Stetson is quite ill at his home in New Hampshire. Mr. A. D. Thurston, Grand Chief Telegrapher of the O. R. T., visited Division 100 in this city Oct. 11, and met with a pleasing reception. Gen'l John A. Logan Castle, No. 144, A. O. K. M. C., composed largely of telegraphers, had a gala time Oct. 3. They paraded over one hundred men. A handsome silk banner was presented to them by the select Castle of the State, for their strength, numerically and financially, and for the exceptional good class of membership. Upon arriving at their Castle chamber, they were greeted with vocal and instrumental music, which continued the remainder of the evening. At 11:30 the banquet commenced, and comprised everything desirable. A hop concluded the festivities. A. P. Sell was chairman of the committee and master of ceremonies, and to him is largely due the success of the enterprise.

PHILADELPHIA POSTAL NOTES.—Departures: W. E. Todd, all-night chief, to New York; James A. McNichol, who for a number of years has been performing creditable service on the "N. Y." quad, has been promoted to the position vacated by Mr. Todd. Every one has a good word for "Mac," and all are unanimous in wishing him unbounded success and further advancement. The familiar face of Jack McDonald is now seen in McNichol's place on the quad. A private room, abundant space, excellent light, and absence of street dust, are some of the advantages enjoyed by our Superintendent C. C. Adams and Cashier Geo. G. Glenn in their new and handsome office on the second floor into which they have but recently moved. Night-chief Harry Hughes and T. P. Stevens have returned from their gunning trip, hale and hearty, having had an excellent time. On the evening of October the 9th, "Smiling Bob" Jaggard severed all connections with bachelordom and entered an experience of connubial bliss with an estimable young lady as his life-partner. We herewith extend our heartiest congratulations and wish the young couple a long life of prosperity and happiness. **A. D. T. NOTES:** Operators W. J. Dougherty and Ed. Addleton have changed night tricks at the 8th and 4th districts respectively. W. S. Logan, formerly day sergeant at the 3rd, has been promoted to a position at the key.

He is already engaged in the lucrative practice of "scooping" and will soon be a wealthy (?) man. J. R. Landis, A. D. T. operator at the P. & R. Office, is off on vacation, being relieved alternately by operators Given and Dougherty.

KANSAS CITY NOTES.—Business is so heavy that all the chiefs are obliged to hustle, but to their credit the business is handled without much delay. The arrivals are: Mr. Hawley, from Denver; Arthur, from New York; Miss Elston, Ottawa, Ks.; Anderson, from "Isaac Peyton Comedy Co."; G. I. Knapp, formerly night report man, Wichita, Ks.; Chas. Eberts, Denver, Colo.; T. W. Baker, Carrollton Mo.; Geo. Fields, Denver; H. B. Logan, from Ass'd Press, Kansas City; Frank Gibbons, Sedalia, Mo.; L. S. Howe and W. G. Lowe, Cleveland, O. Departures are: C. B. McConaha, to the Sante Fé in the city; I. J. McDonald, to W. U., St. Louis; S. Davis, to Deming, N. M., for W. U.; Daniel Minnehan, to Postal, this city; W. L. Buchanan, gone South for the winter; J. N. Scott, to Chicago with W. U.; Mrs. Boone and Mrs. Ward are off on short vacation; J. B. Sullivan resigned to go with "A Horrible Fate" Co.; F. B. Jackson, the "old reliable," to W. U., Chicago. We all miss Mr. Jackson, L. D. Gaskell, and Louis. Mr. O. G. Moore, who has suffered for so many weeks with the small pox, will soon be able to return to work. We regret to note the serious illness of Mr. Gideon Huscher; malaria fever having victimized him for the time being. It will doubtless be several weeks before he will be able to be about. He has the best wishes of all for a speedy recovery. W. R. Mitchell is off on a leave. Miss Lovelace, who works Salina wire, and Miss Cook, who works Mexico, Mo., wire, left on Friday last for a short visit to the home of the former at Lawrence, Ks. Mr. W. C. Carswell, manager, Newton, Ks., was a welcome visitor not long ago. Not long since, during a rush of business, Miss Bertha Godecke, working St. Joe quad, handled alone about 400 messages from 8 to 5. Who dares say the ladies are not a success at the business? "K. 60 atallo" is the latest for "La Plata, Mo.," "8 usx" is a fine interpretation of "Be used." More anon.

WICHITA, Ks., NOTES.—Business fairly good. Changes made since last letter are rather numerous. Miss Nellie P. Hackett, cashier, retiring—returning to her home in Texas—being succeeded by Miss Sallie Pope. A. L. Porter, from the broker's office, going to Kansas City for the W. U. Mrs. B. C. Elder, day report, resigning to join her husband, with the W. U., in Kansas City. Her place filled by night chief E. S. Bowers, who, tiring of night work, preferred to work days; his place in turn being filled by Mr. Sullivan of Ft. Scott, Ks. Mr. O. R. Crooks left us to go to Ft. Smith, Ark., for the W. U. His place being filled by Mrs. C. A. Allison, from the W. U. at Atchison, Kansas. Harry Meredith, of the stock yard's office, is visiting home folks in Kansas City, Mo. Howard Hartzell, who was formerly delivery clerk, is subbing for him. Night report man, G. I. Knapp, has resigned; gone with the W. U. at Kansas City, Mo., Mr. Wm. Williams, Michigan, relieving him on report. Mrs. Williams has accepted a position with the Mo. Pac. R'y in their general offices here. More anon.

DES MOINES, IOWA, POSTAL NOTES.—Business brisk, and the force is kept very busy. Mr. E. A. Hawkins, who in an old timer with the W. U., is now chief operator, and Mr. F. K. Holtzinger is manager. Will give personnel of the office later.

Mr. J. J. Elliott, formerly an operator at Kingston, but now one of the biggest and most enterprising cattle dealers of Liverpool, called on Mayor Clarke on Saturday. A dozen or more cattle ships carry stock to Mr. Elliott's establishment from America, Spain and British ports every week.

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BOSTON NOTES.—During the summer season several vacancies occur, and presumably, owing to the rush of other business, these vacancies are held open until the rush is over, and the management have time to deliberate and fill them acceptably; in the meantime the vacancies are filled by men on the extra list. Some much desired positions became vacant this summer and as they were held open quite a long time, speculation was rife as to who the lucky ones would be. These vacancies are now all filled; and, we think, sound consideration and good judgment was used in making the selections; yet there are some who are dissatisfied because the lucky mantles did not fall on their shoulders. These, too, are men well deserving of promotion, who make an effort to advance themselves and are regarded in a favorable light by the management, but their turn had not come, and, as the wheels of promotion move slowly, they must be patient and persevering. Some men who came in during the summer months were given straight day tricks, and were congratulating themselves on their good luck; but, with the decline of business, these summer tricks were done away with, and those would be fortunate individuals placed on the extra list. So far there has been no lack of work, all succeed in getting in full time, and the outlook at present is encouraging. The State elections are at hand, and shortly after that event is over will come the holiday rush. We would not, however, encourage any out of positions to come Bostonwards; we believe their chances would be very slim for the next six months.

The rule against reading in the office while on duty is strictly enforced here. During the winter months, while business is dull and the operators will have an occasional leisure time at their desks, it may not be unreasonable to ask that this rule be rescinded, and the privilege of reading granted during leisure moments. As we understand the privilege of reading, and knitting, and sewing is permitted in New York office. We think this is a good plea for similar privileges here. We are aware that the granting of such privileges is often abused; yet in consideration of the stringency and length of time the rule has been in force, at least a straining of the rule would be welcomed and appreciated. Such a privilege would, in our estimation, be beneficial both to the operators and the interests of the company. There are many young operators who did not have the opportunity of acquiring more than a very moderate education, and many words occurring in the routine of business seem strange and difficult to them. If they were permitted to read the daily papers during their leisure moments, many of these words would become familiar.

An inspection of the gas jets by a gasfitter would be beneficial. Many of them show a very poor light, and, as such are hard on the eyes. A few Sundays ago Miss M. E. Arnold, of the W. U., Pawtucket, R. I., was escorted through the several departments by M. C. Harrington. George Watts, lately with the Associated Press at Providence, has been appointed to a position on the regular night force. James H. Driscoll has been transferred from the all night to regular night force, and assigned to Buffalo quad. Patrick Ferriter changed from 11 P. M. to 6:30 A. M. to 1 A. M. to 8:30 A. M.; Phillip E. Carey of the extra list appointed 11 P. M. to 6:30 A. M.; Walter E. Lynch from extra list to regular night force; vice Ponbin gone to Augusta, Ga.; Miss M. A. Willard has returned from the White Mountains to the city line department. I. O. Wright, of Providence, has been given a split trick and assigned to the third New York. F. E. Perkins of the Boston *Globe* has been sent by that paper to attend to their interests in New York. Warren C. Dow, also of the *Globe*, has been promoted to Mr. Perkins' position; Joseph Couillard filling Mr. Dow's place. H. A. MacDonald has returned from Bar Harbor to his old position on the third New York quad. Dan McCarthy of the second New York quad, has been seriously ill at his home, North Cambridge. We hope to hear of his speedy recovery. John S. Sullivan of "He" office is also on the sick list, and is being attended to by the Aid Association. C. W. Rice is a happy papa; congratulations.

NEW YORK TELEGRAPH CLUB NOTES.—Arrangements are being rapidly perfected for the first annual dinner of the Club, which is to be a banquet in honor of Thomas A. Edison. Due notice of date will be given members. The committee having the affair in charge is Geo. E. Holbrook, Andrew Carnegie, Geo. W. Hann, Thomas W. Greene, and Robert T. Howard.

The first annual reception and ball will occur a few weeks later, and will be in charge of a committee of fifteen members, composed as follows: Leslie Miller, Chairman, Geo. E. Holbrook, Jno. R. Powers, Jas. E. Tomkins, E. F. Stevens, J. Clayton Watts, Jas. J. Buxton, Geo. W. Hann, Thos. W. Greene, P. J. Byrne, M. F. O'Brien, J. J. Smollen, Thos. J. Dunn, E. W. Morrison, and W. L. Waugh.

The benevolent face of the Father of the Telegraph, Prof. Sam'l F. B. Morse, is now encircled by a magnificent oak frame, and is one of the most attractive features of the reception room.

The house committee, after canvassing every modern method of heating, finally settled upon coal stoves as the most economical and satisfactory means of warming the rooms, and have caused one to be placed in the reception room and one in the billiard room. Mr. Andrew Carnegie has kindly consented to act on the banquet committee, and also to speak in response to a toast on that occasion. He was once an operator, and a good one, too. The last statement of the financial secretary and treasurer show the Club to be in good financial condition, notwithstanding the recent heavy drafts made on the treasury. The governing committee have adopted a policy of reducing indebtedness, which will soon wipe out the last cent and leave the Club without a financial obligation, and with a good surplus in the treasury. The house committee will arrange a tournament at fifteen ball pool, to take place in the Club rooms during November. Two prizes will be awarded by the Club, and a sweepstakes match will be played, which will be open to all members at \$5 per entrance fee; first and second money to be awarded. The games will be regular continuous pool at 120 points; ties to be played off at end of series. Here is a chance for some of our cue experts to show their skill and reap its reward. We have many good players, and Messrs. Giles, Griffiths, Stevens, Sink, Newman, Waugh, Boyle, Hann, Tomkins, Emanuel, Warton, Richardson, Betts, and others should make an interesting contest. Like all other mundane affairs, the governing committee is subject to occasional mutation, and Messrs. Richard Kane and James E. Tomkins have been appointed governors by President Holbrook, to fill vacancies caused by the resignations of B. B. Palmer and N. F. Beow. The McAneeny concert, to be given on Thanksgiving night, must not be forgotten by the boys, and they ought to turn out *en masse*, "Mac" is a member of the Club, you know, and an enthusiastic "bull" on its stock. Let us give him a rousing "send off." The subject of a gymnasium has been discussed at considerable length, but the governors have, as yet, arrived at no satisfactory solution of the problem. Lack of room is the greatest obstacle. The rest would be easy enough. Still, we should have one as soon as possible.

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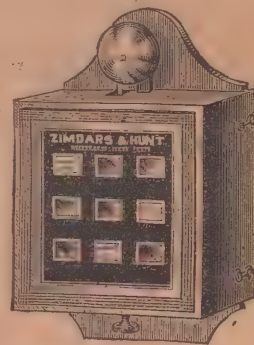
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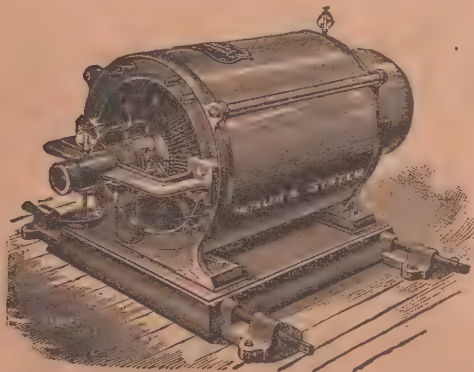
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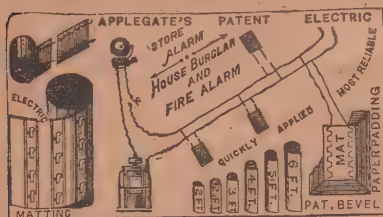
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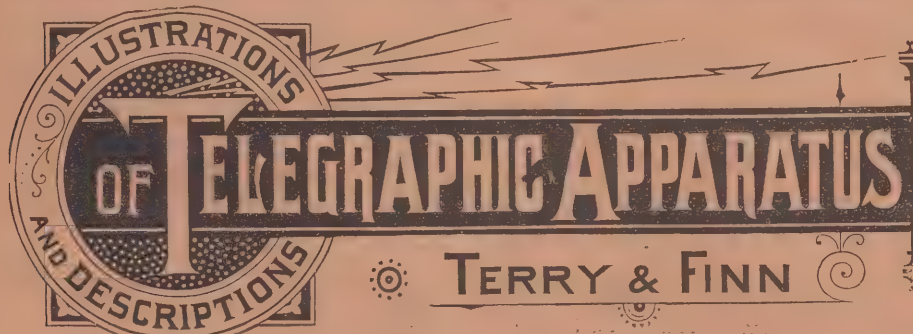
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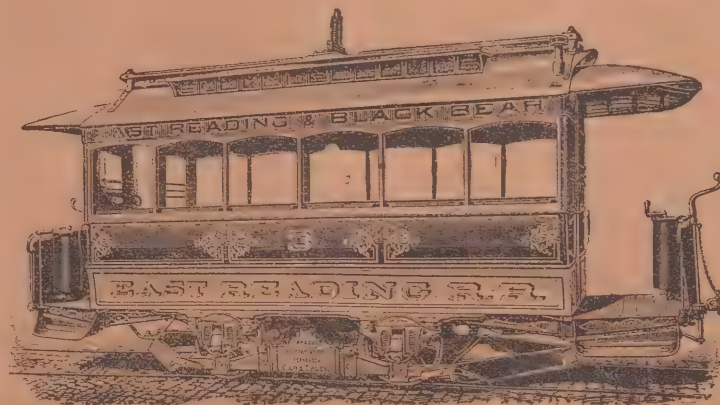
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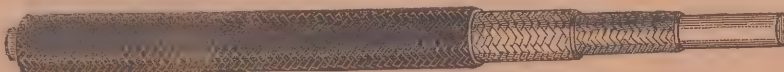
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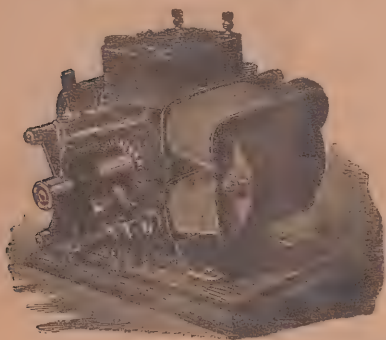
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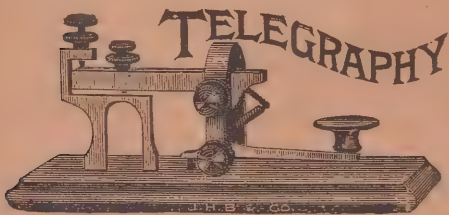
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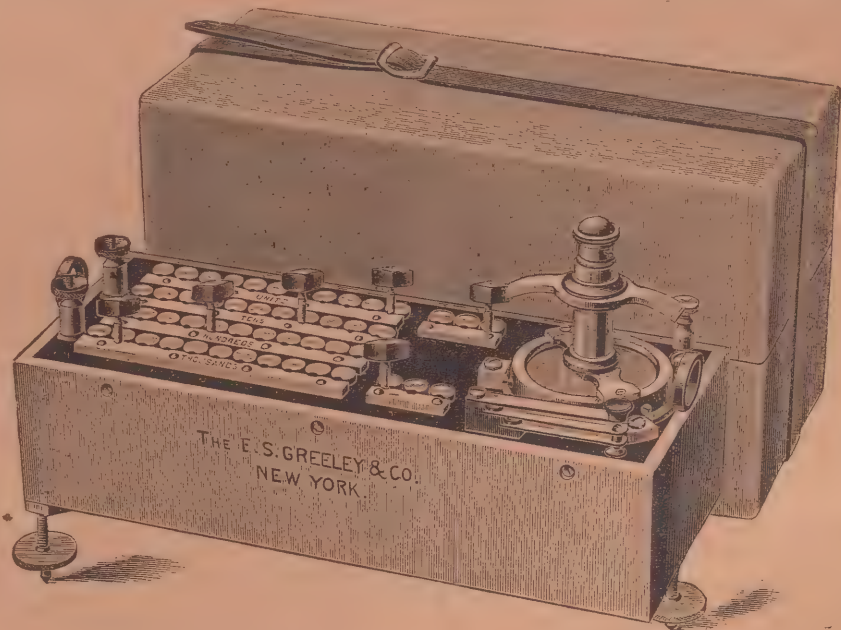
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Edison Company Sustained. Westinghouse Company Defeated.

Sawyer-Man Patent Decided by the Court to be a Fraud and Absolutely Valueless. Extracts from the Decision of Justice Bradley, Oct. 5, 1889.

Circuit Court of the United States for the Western District of Pennsylvania.

THE CONSOLIDATED ELECTRIC LIGHT COMPANY (WESTINGHOUSE COMPANY) versus MCKEESPORT LIGHT COMPANY (EDISON COMPANY).

No. 5, May Term 1888. On Bill and Final Hearing.

EXTRACTS FROM OPINION OF THE COURT.

"The great question in this suit is whether the patent sued on is valid, so far as involves a general claim for the use in electric lamps of incandescing carbon conductors made of fibrous or textile substances. If it is, the complainant must prevail. If it is not, the bill must be dismissed"

"Is the patent valid for such a broad claim? The defendants contend that it is not; first, because no such invention was set forth in the original application, but was introduced more than four years after it was filed, and after the same material had been used by Edison, and claimed by him in application for a patent; secondly, because Edison, and not Sawyer-Man, was really the original and first inventor of an incandescing conductor made of fibrous or textile material for an electric lamp."

"It is very clear to us that in the original application for the patent sued on the applicants had no such object in view as that of claiming all carbon made from fibrous and textile substances as a conductor for an incandescing electric lamp. Nothing on which to base any such claim is disclosed in the original application. We have carefully compared it with the amended application, on which the patent was issued, and are fully satisfied that after Edison's inventions on this subject had been published to the world there was an entire change of base on the part of Sawyer & Man, and that the application was amended to give it an entirely different direction and purpose from what it had in its original form."

"By an adroit amendment made in 1885, they say: 'Our improvement relates more especially to the incandescing conductor, its substance, its form and its combination with the other elements composing the lamp.' The purpose of this amendment is obvious, and needs no comment."

"The fact is that Sawyer & Man were unconscious that the arc was not new, and supposed that they could get a patent for it; but, as their eyes were opened, they changed about and amended their application, and made the material of the conductor the great object—carbon made from fibrous or textile material. Compare the original with the amended application, as first stated in this opinion, and this purpose most obviously appears."

"The fact that the whole object of the application was changed is evinced by the correspondence of the parties."

"This testimony of Mr. Broadnax, which is undoubtedly to be relied on, in connection with the letter just quoted, shows that the idea of claiming carbons made from fibrous and textile materials was an afterthought, and was no part of the purpose of the original application. The amendments relating to this new and broad claim were made afterward, in February and March, 1885."

"We are of the opinion that the changes made in the application in this regard were not justifiable, and that the claim in question cannot be sustained."

"We are not at all satisfied that Sawyer and Man ever made and reduced to practical operation any such invention as is set forth and claimed in the patent in suit. Their principal experiments were made in 1878, and perhaps the beginning of 1879. The evidence as to what they accomplished in the construction of electric lamps is so contradictory and suspicious that we can with difficulty give credence to the conclusions sought to be drawn from it. We are not satisfied that they ever produced an electric lamp with a burner of carbon made from fibrous material, or any other material, which was a success."

"The application for the patent in suit was not made until January, 1880, nearly or quite a year after all their experiments had ceased, and after the inventions of Edison had been published to the world."

"The explanations made by the complainants for the delay in applying for the patent in suit fail to satisfy our minds that Sawyer & Man, or their assignees for them, have not sought to obtain a patent to which they were not legitimately entitled."

"But, suppose it to be true, as the supposed inventors and some of the other witnesses testify, that they did in 1878 construct some lamps with burners of carbon made of fibrous material, and of an arched shape, which continued to give light for days or weeks or months; still, were they a successful invention? Would any one purchase or touch them now? Did they not lack an essential ingredient which was necessary to their adoption and use? Did they go any farther in principle, if they did in degree, than did other lamps which had been constructed before? It seems to us that they were following a wrong principle—the principle of small resistance in an incandescing conductor, and a strong current of electricity—and that the great discovery in the art was that of adopting high resistance in the conductor with a small illuminating surface, and a corresponding diminution in the strength of the current. This was accomplished by Edison in his filamental thread-like conductors, rendered practicable by the perfection of the vacuum in the globe of the lamp. He abandoned the old method of making the globe in separate pieces, cemented together, and adopted a globe of one entire piece of glass, into which he introduced small platinum conductors, fastened by fusion of the glass around them, thus being able to procure and maintain perhaps the most perfect vacuum known in the arts. In such a vacuum the slender filaments of carbon, attenuated to the last degree of fineness, may be maintained in a state of incandescence without deterioration for an indefinite time, and with a small expenditure of electric force. This was really the grand discovery in the art of electric-lighting, without which it could not have become a practical art for the purposes of general use in houses and cities."

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"We think we are not mistaken in saying that but for this discovery electric lighting would never have become a fact. We have supposed it to be the discovery of Edison because he has a patent for it. This may not be the case. It may be the discovery of some other person; but, whoever discovered it, it is undoubtedly the great discovery in the art of practical lighting by electricity."

"THE BILL MUST BE DISMISSED."

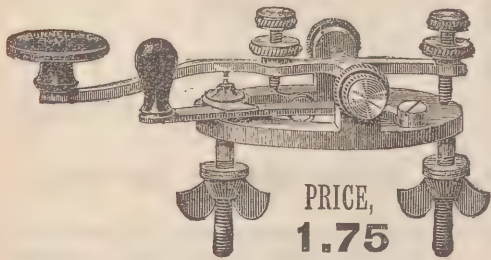
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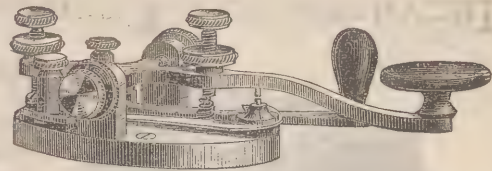


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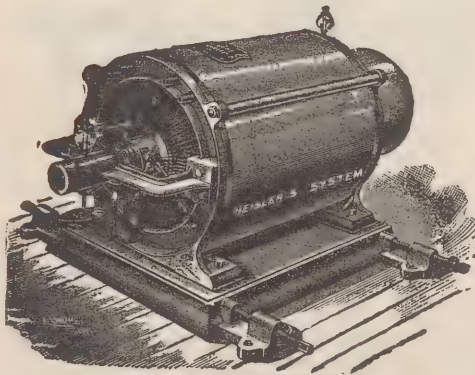
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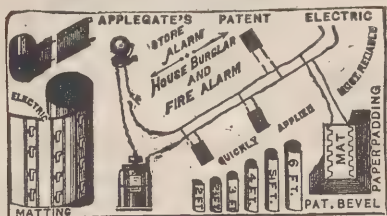
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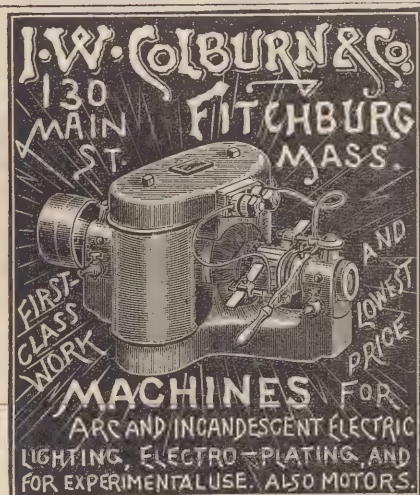
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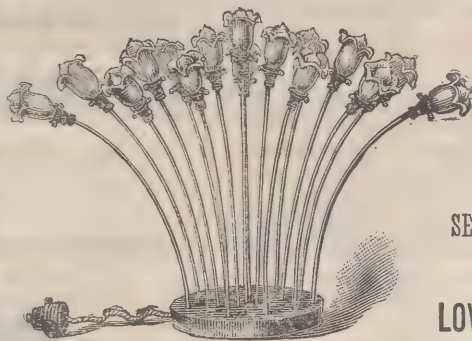
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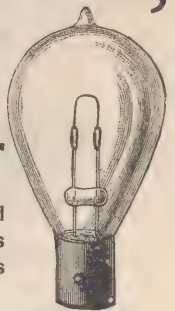
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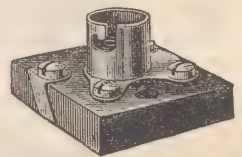
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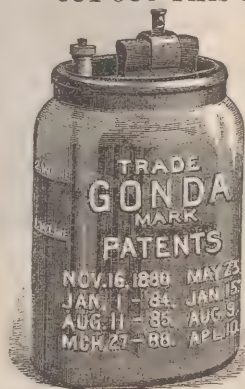
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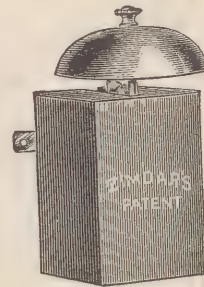
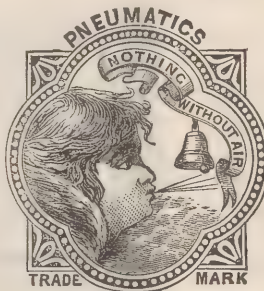
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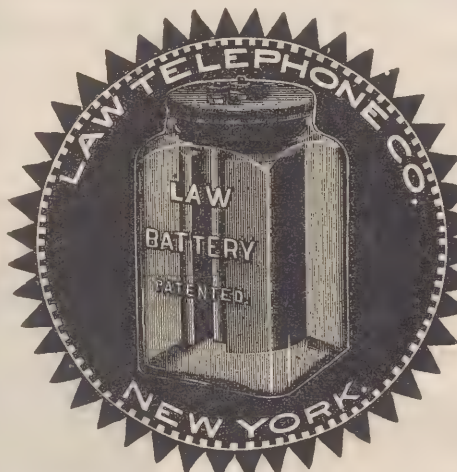
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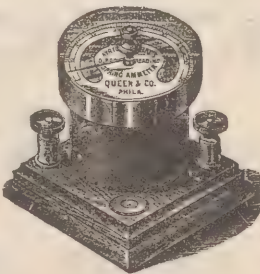
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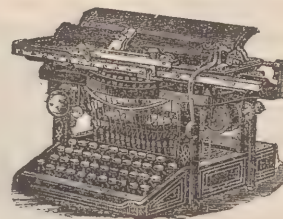
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NEW YORK, NOVEMBER 16, 1889.

UNINTERRUPTED CABLE SERVICE.—It is some three years ago that we advised the Western Union Telegraph Co. to lay a cable so as to connect New York city with Halifax or one of the other points where cables land. Owing to the constant interruption incident to winter storms on the land lines connecting this city with these distant points, this action seemed necessary, to hold the business of the commercial houses, which suffered so greatly by the delay and which was gradually being absorbed by the vigorous rival, the Commercial Company. The company was slow to act on this vital question, but we are glad to see that the matter has at last been settled very satisfactorily to all concerned. The Western Union Co. now possesses two first-class cables to Halifax, which will ensure from this time forth uninterrupted communication with Europe over its own cables.

ELECTRIC BUSINESS BOOMING.—The present boom in the electrical business is general, all manufacturers of the various apparatus participating alike in the unusual prosperity. The electric light people were never more pressed to fill orders than at the present time. The smaller towns in the various States, as well as the foreign countries, are just awakening to the fact that in order to keep abreast of the times their respective localities must possess electric light plants, at as early a day as possible. The electric-motor trade and the general supply houses are also rejoicing over increased orders, which indicate a still greater rush in the near future.

Every electric motor manufactory in the United States is said to be crowded to its utmost capacity to meet the demands for electric power. Of the thousands turned out very few of them are seen by the public. They are placed in some out-of-the-way corner in the factory or shop and perform their work without making the slightest noise or attracting the attention of passers-by. Unlike the electric light which shines for all, it has to be searched for in cellars and garrets; but it has come to stay, and the wonder now is how have we got along without it so long.

BIG JUDGMENT FOR J. W. MACKAY.—A judgment for \$285,916, in favor of John W. Mackay, was obtained in the Superior Court, Nov. 2, against the Commercial Telegram Company.

The Commercial Cable Company was the only Atlantic company awarded a prize medal at the Paris Exposition.

THE BELL TELEPHONE SUIT.—A motion has been filed at Boston by the defendant in the case of the United States vs. the American Bell Telephone Company, that the following order be passed by the Court: Ordered, that the testimony to be taken by the respective parties under the pleas of the defendant shall be limited to the single issues raised by said pleas, namely, whether the said Bell obtained either of said patents by means of the fraud set up in the bill, and that no testimony shall be taken in reference to any prior inventions set up in the bill unless upon the further order of the Court.

Postmaster-General Wanamaker has probably learned by this time that the telegraph companies are entitled to a little remuneration for the privilege of transmitting Government despatches. He has accepted as true the statements of the Western Union Telegraph Company which were, that at one mill per word the companies would actually lose money. Mr. Wanamaker has very wisely restored the old rates, and the company is in consequence happy.

The presentation to President Diaz of the phonograph expressly manufactured for him by Mr. Thomas A. Edison, says a despatch from the City of Mexico, took place Wednesday evening at the President's town residence. The presenting party consisted of Thomas B. Connery and Councilor Edwin M. Fox, of New York, and J. J. Balleras, a phonograph expert, formerly in the employ of Mr. Edison at Nashville, Tenn.

SHE READ THE PAPERS.—Elderly female—"Do you keep all kinds of plants here?"

Florist—"Yes, ma'am."

Elderly female—"Well, you can give me a couple of electric light plants, I guess."—*Time.*

The action of Edward Harlan, Receiver of the American Rapid Telegraph Company, against the United Lines Telegraph and the Postal Telegraph and Cable Companies, brought to recover \$60,000 rental for the use of wires, was ended by the entering of a nonsuit with the consent of the plaintiff.

A fan, a walking stick, a hat and a bonnet frame, an easy chair, a hair comb, a corset, a horse, a steamboat, a clock, a cigar, an omelet and a dance, bear the name of Edison. Such is fame.

The site for the location of the electric light plant at Griffin, Ga., has been purchased, and work will commence on it as soon as a bid for the building can be made and accepted.

The Haverhill (Mass.) Electric Light Company has finally decided to put in the Brush alternating dynamo, and a 1000-light machine will be installed immediately.

An electric pump has been placed on the market. A motor, placed alongside of the pump, and taking up not more than two feet of room, does the work in an excellent manner.

Messrs. J. H. Bunnell & Co., the well-known electrical manufacturers, will shortly move into new, larger and better adapted quarters to meet their rapidly growing business.

The Winchendon Electric Light and Power Company of Winchendon, Mass., has been formed with a capital of \$12,000.

The Central Electric Company of Chicago has increased its capital stock from \$50,000 to \$225,000.

The Carlinville Telephone Company has been organized at Carlinville, with a capital of \$25,000.

Indicating temperatures, by electricity, at a distance, is something entirely feasible and reliable.

A \$25,000 Thomson-Houston plant will be placed at Peabody, Mass.

SOME METHODS OF REGULATING ACCUMULATORS IN ELECTRIC LIGHTING.*

BY GEO. B. PRESCOTT, JR.

In preparing the following paper, the limited scope of which is indicated by its title, I have assumed that it is generally conceded that the modern electric accumulator is an apparatus capable of performing a peculiar but useful function in the art of electric lighting as now commercially practiced, and that it is free from defects which would render it unsuitable for such application. Indeed, I am sure that every careful observer has noted in the somewhat slow evolution of the accumulator, that structural improvement and adaptation to practical requirements which unquestionably show that it has come to stay, and will acknowledge that even as it exists to-day, the accu-

effectiveness and impairing its durability. Generally speaking the limits referred to, which vary with every type and size of cell, relate to the rate and quantity of charge and discharge, these factors being measured respectively in ampères and ampère-hours.

In considering this admission, however, it should not be forgotten that every dynamo-electric machine is, to a certain extent, subject to similar limitations: for, like the accumulator, if it is demanded of them, they are capable of generating a current far exceeding their safe carrying capacity. Here the likeness ceases, however, for while the dynamo will deliver its normal current as long as adequate power is applied to the shaft, by continuing to draw current from an accumulator for too long a time, as likewise from an excessive rate and quantity of charge, serious damage may result. In fact, in some respects an accu-

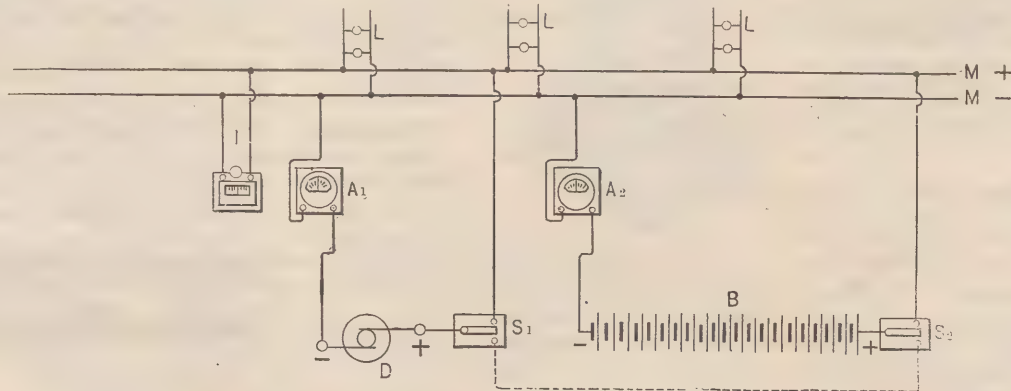


Fig. 1

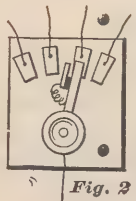


Fig. 2

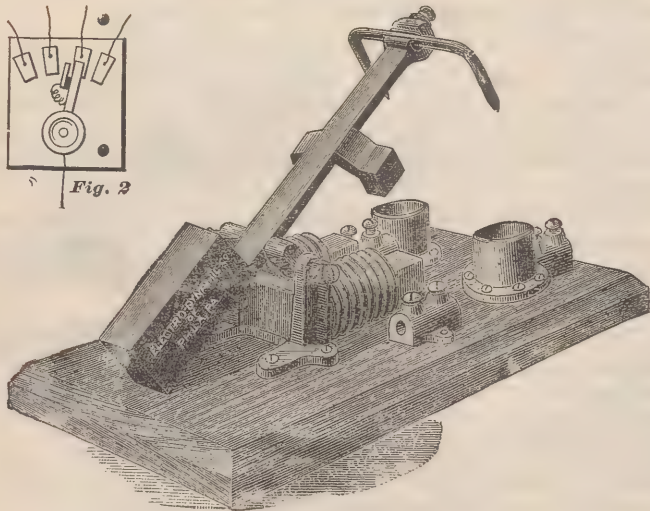


Fig. 4.

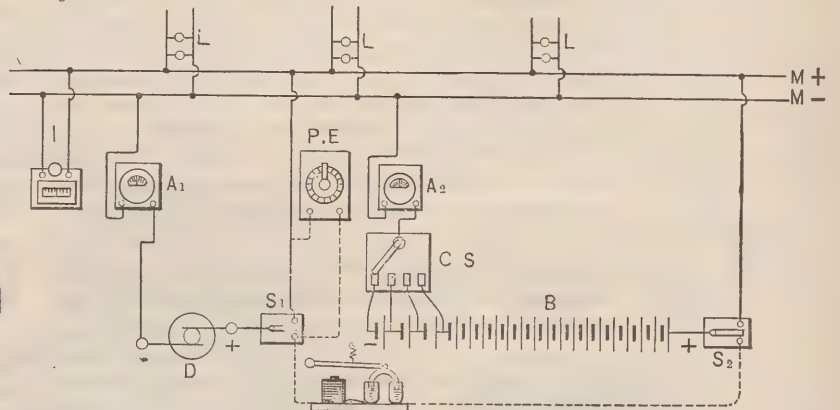


Fig. 2

mulator is a factor in electrical industry too important to be ignored by those who take a broad view of the situation.

It is not my intention to refer to those numerous successful applications of accumulators to the propulsion of small marine vessels and land vehicles, to car lighting and other minor work where the continuous generation of power from the combustion of fuel would be impracticable; neither can I fully discuss their characteristic actions under working conditions, within the limits of this paper. Nevertheless, before proceeding to the subject proper, I deem it incumbent to point out that the electrical accumulator, even in its more improved forms, is an apparatus having well-defined limits of capacity and that these limits cannot be habitually exceeded without endangering its

mulator may be likened to a draught animal, which can be made to perform abnormally large amounts of work for short periods of time, but only at the expense of its vitality if the practice is frequent.

While much might be said regarding the maintenance of accumulators, and, moreover, the apparatus to be presently described is employed in a large measure for the purpose of effecting proper maintenance as well as regulation, it must suffice to say here that the normal working rate and capacity of an accumulator battery having been stated by the makers, all necessary data relating to its use may be ascertained from the indications of ordinary hydrometers, ammeters and voltmeters. That is to say, during the charge and discharge of such a battery the rise and fall of its potential and of the specific gravity of the electrolyte in its cells, are both quantitatively indicative of its condition and capacity for doing work. It is evident from what has already been said regarding the importance of working accumulators within certain prescribed limits, that in order to effect this result two classes of apparatus must be provided with every accumulator installa-

* Paper read before the American Institute of Electrical Engineers, New York, Oct. 29, 1889.

tion, viz: Indicating or measuring instruments, and regulating appliances to be operated either automatically or by hand. I am constrained to add here that careful and extended observation leads me to believe that a lack of appreciation of these now obvious facts will largely account for the ill success attending many of the earlier accumulator installations.

Although there is reason for believing that some of the early promoters of business enterprises based on the manufacture of electrical accumulators, anticipated that accumulator systems of lighting were destined to compete with and perhaps supersede many direct systems, I be-

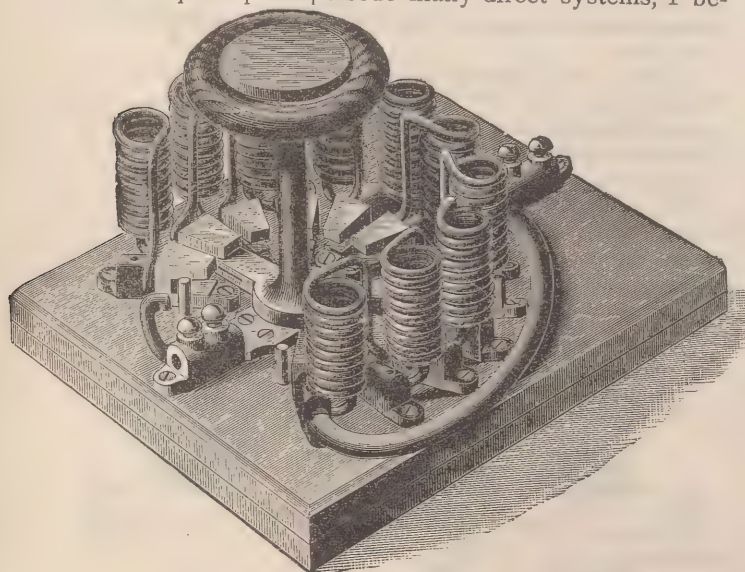


Fig. 5.

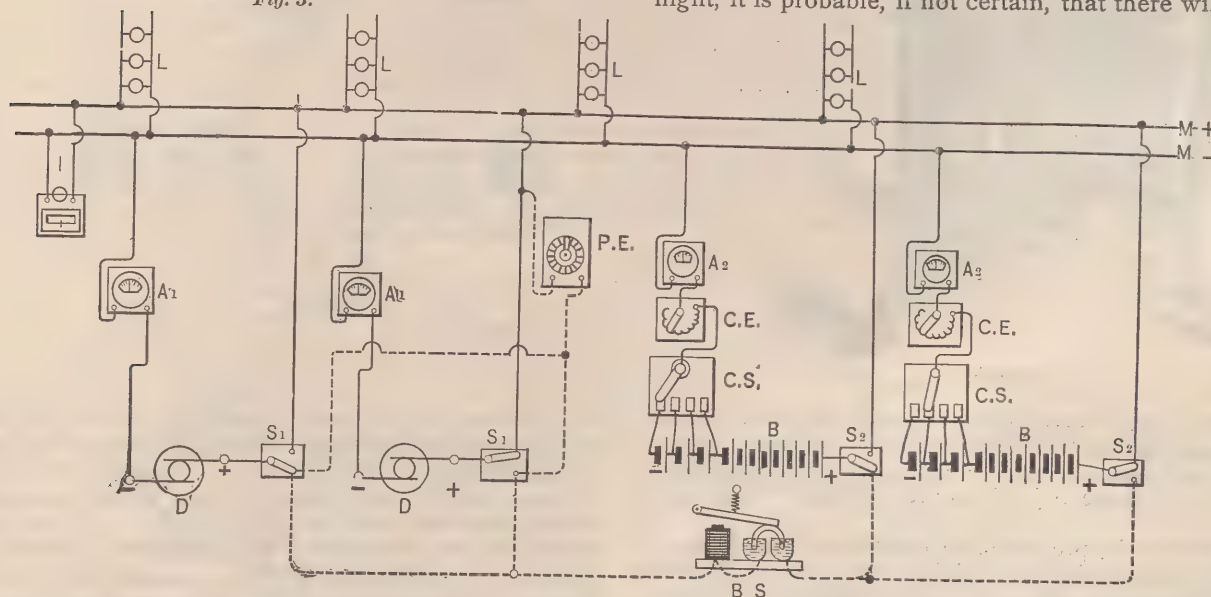


Fig. 6

lieve that the more mature modern idea is that they are, for the present at least, mainly subsidiary to other electric lighting systems. As auxiliaries to many direct systems, accumulators undoubtedly effect a reduction in running expenses, and add an element of reliability, besides accomplishing certain results that are not otherwise obtainable. In order to fully appreciate the truth of these statements, it will be necessary to glance at the conditions commonly existing in ordinary isolated and central station plants as they are operated at the present time. Doubtless every one who is familiar with the electric lighting business is acquainted with the vagaries of the load curves during each 24 hours of a central station's run. Generally speaking, about sunset the load begins to increase gradually, finally reaches a maximum which is maintained for a greater or

less period of time, and then falls to a minimum, about which it fluctuates for the remainder of the twenty-four hours. Almost every isolated plant, whether it be in office building, hotel or apartment house, has a curve of the same general character; and probably most manufacturing establishments would prefer to have a few lights burning through the night, if only for the watchman's convenience, were it not for the expense entailed by the continuous operation of the plant. It is a truism to say that the cost of fuel per horse-power increases inversely as the power plant operates below its normal capacity, and that other operating expenses are, to a considerable extent, fixed independently of the load. In view of these facts it is universally acknowledged that the operation of large power plants of any character during periods of light loads, is enormously wasteful. Many have hoped that the supplying of current to small electric motors during the day would remedy the evil in lighting stations, and to some extent the expectation has been realized in manufacturing centres; but even here the unfortunate overlapping of the motor and lamp service still leaves an undesirable margin.

Here, then, is a field in which accumulators may perform their special function, not in competition with direct systems, but as supplying the missing feature in the commercially successful operation of 24-hour plants of moderate size. There is no obstacle in the way of applying a sufficient number of accumulators to a plant of the character mentioned, to maintain the light load during the time it would not pay to operate the power plant, and to provide for the charging of the accumulators during the regular running time of the dynamos. Assuming, in illustration of this statement that 10 hours is the ordinary working day, and that the engines of a central lighting station are started at 2 P. M. and are operated until midnight, it is probable, if not certain, that there will be suffi-

cient surplus current for an ample length of time to charge enough accumulators for the service required after the engines cease to revolve, excluding, of course, the period of maximum load, when the dynamos will be taxed to their full capacity in their regular service. Under such conditions the engines could be operated at somewhere near their normal capacity during the whole period of their running time, and the cost of unit power would be a minimum, while only one staff of men will be required. It may be advisable to explain here that although the current available for charging the batteries during the regular running time of the dynamos would vary with the lamp load, this is of no importance, as it is not essential that the batteries should be charged at a uniform rate. In the case of such stations as also supply arc lights, the engines could be

started later and operated through the night. Besides reducing the operating expenses of a station during its periods of light load to a greater extent than they increase them at other times, in the event of an accident to the power plant or incandescent dynamos, the accumulators can always be called upon for extra service; while whenever there is an abnormally heavy demand for current, they may also be operated in conjunction with the dynamos.

But there is still another field in which accumulators may be employed to equal advantage, viz., that of long-distance lighting now so successfully occupied by the alternator-converter system. An accumulator is indeed merely a chemical converter, which is unequalled as a pressure-reducer, and any one who gives careful thought to the subject will perceive what an excellent substitute it is for the alternator-converter in those situations where the character of the lighting makes it necessary to run "light" for many hours each day. Indeed, I can only account for the fact that accumulators were not long since more extensively used for this class of lighting, by the existence of a feeling of skepticism as to their durability, together with their somewhat formidable first cost.

As manufacturers now guarantee the durability of ac-

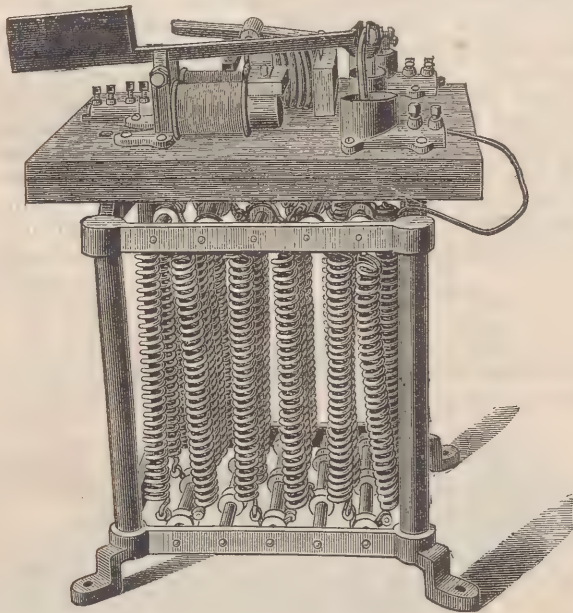


Fig. 8.

cumulators, under certain conditions of use, for an annual percentage on their first cost, and as methods of manufacture must improve with experience and moderate that cost, both of these objections are gradually being modified.

But even in the present state of the art, the question of first cost, depreciation and efficiency may be duly allowed for, and a considerable reduction in operating expenses still shown to result from the use of accumulators under many circumstances. To quote from an article by the writer "On the Place of Accumulators in Electric Lighting," which was published in the March issue of *The Electrical Engineer*:

"Whenever one kind of energy is transformed into another kind, more or less loss can be shown to occur, and the action of the accumulator is not an exception to this rule. The proportion of loss generally varies with the conditions under which the transformation is effected, and in the case of the accumulator depends mainly upon the rate of charge and discharge. If these double transformations are conducted slowly the loss may be nearly inappreciable, but at the higher rates which are frequently

demand in practice the efficiency is proportionately reduced. The fact of the existence of this loss clearly indicates that the direct production and consumption of electricity must always be less expensive, both in original outlay and cost of production, than its subsequent use through the medium of accumulators; unless, indeed, there are other modifying conditions which overbalance the additional cost of accumulators and offset their maintenance. That such conditions do exist in many branches of the electric lighting industry can be readily demonstrated, and it may likewise be shown that the use of accumulators as auxiliaries to many existing lighting plants would insure a marked reduction in their running expenses. * * * * *

"From what has already been said regarding the inflexible certainty of loss resulting from any form of conversion of energy, it is evident that if the load were equal to the capacity of a plant for 24 hours each day no system of conversion could compete in point of economy with one which effected the direct production and use of the current. There is an exception even to this general statement, however, when one or more groups of lamps are located at such a great distance from the source of power, that the interest on the cost of conductors, together

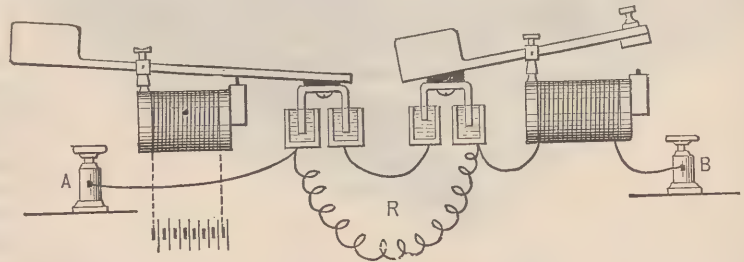


Fig. 7.

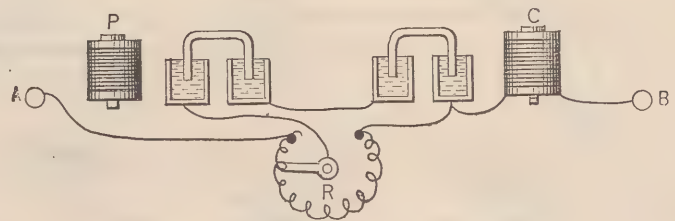


Fig. 3.

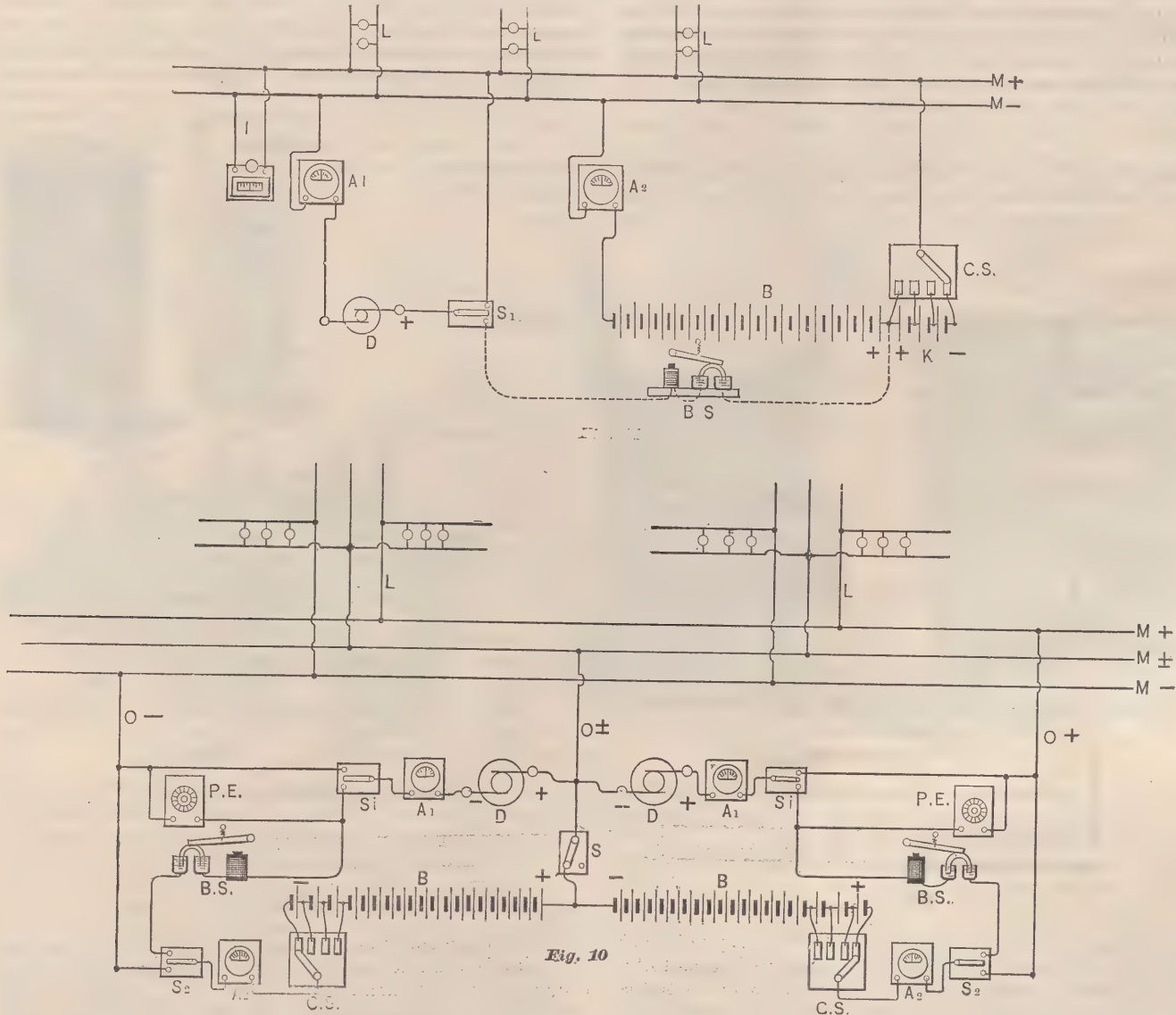
with the cost of the energy wasted in them, becomes of serious importance, not to mention the increased difficulties of regulation. In cases of this character, the value of the accumulator as an auxiliary to a direct incandescent system becomes obvious. The cells may be located directly at the centres of consumption and charged by a moderate current at high pressure over a small conductor. They may be charged during the hours of light load and discharged as required, the whole charging current, in addition to the current of the batteries, being available on the lamp circuits during the period of maximum load, if it should be so desired. Often the interest on the cost of such an accumulator installation, plus the cost of the energy lost in conversion of current, is much less than the loss by the direct system as previously specified. Another and vastly important consideration in favor of the accumulators is that during the 10 or 12 hours of each day when the consumption of current is so small that a station can only be operated at a loss, the power could be shut off entirely and the accumulators resorted to for the current required during that period."

As a matter of fact, the ideal condition of a continuous

maximum load, as assumed above, nowhere exists in practice. The actual load curves for stations of similar capacity throughout the country differ not only in respect to the duration of the maximum period, but likewise in the hours during which the light and heavy loads occur, according to the character of the lighting. It is, nevertheless, true that they all show a remarkable similarity in the variation of current consumption, and all the 24 hour stations, particularly the smaller ones, require but a very small portion of the capacity of the plant for the greater part of the day. For this reason, many of the smaller stations cannot be profitably operated for more than 12 hours a day, and customers are therefore unable to obtain the light for the remainder of the 24 hours, the system

they are properly installed and maintained to meet such conditions, the class of small stations referred to will be enabled to supply satisfactory light for 24 hours a day at moderate cost, while the larger stations may greatly reduce their running expenses, and at the same time maintain the efficiency of their service.

Before proceeding to consider the methods of regulating accumulator currents, it will be advisable to examine some of the peculiarities of the element with which we have to deal. Generally speaking, the total current capacity, expressed in ampère-hours, of a single cell of accumulator of the lead-oxide type, is proportional to the number and size of its plates; its rate of discharge depending upon the number of plates and the effective surface of each,



being thereby deprived of much of its value to many consumers.

Here again the utility of the accumulator for tiding over these costly periods of light loads becomes apparent. It is evident that any ordinary station running for 12 hours a day, more or less, is not likely to have an output approaching its capacity for more than two hours at the longest, while for the greater part of the time it will be much below it. Why should not such a station be operated during that period of 12 hours at somewhere near its full capacity, and, therefore, under the most economical conditions for the power produced, and utilize the excess of current to charge a sufficient number of accumulators to maintain the lighter load during the remainder of the day?

This is the legitimate work of accumulators, and when

while the time of such discharge varies with their thickness. Although there are no obvious theoretical reasons why a single cell of accumulator should not be made sufficiently large to possess any desired capacity, there are mechanical considerations which make it advisable to limit the dimensions of a cell to the extent that it may be conveniently portable. Therefore, when higher rates or longer discharges than an ordinary cell will give are demanded, two or more cells must be connected in parallel. On the other hand, the electromotive force of all sizes of accumulators composed of the same elements is of course identical, but as the internal resistance of a cell varies with the number and surface of its plates, its effective working potential must be a function of the strength of the discharge current. As, however, the internal resistance of

all sizes of accumulators is, in virtue of the large surface and compactness of their electrodes, exceedingly small in comparison with their rate of discharge, their working potential nearly equals their electromotive force on open circuit. While the normal effective working potential of a fully charged accumulator in good condition is usually stated as about two volts, as a matter of fact it is somewhat higher than this after being charged, and rather lower after normal discharge, the average effective potential being about 1.95 volts. During the operation of charging an accumulator, its potential, or what is then usually called its counter electromotive force, rises gradually until the cell is nearly charged, and then more suddenly as gas is evolved, sometimes requiring an effective charging pressure of as high as 2.5 volts per cell if the current is continued after the cell is charged. In actual practice the accumulator is usually considered to be fully charged when the potential of the normal charging cur-

the others. While the larger current flowing into the less charged cells will have a tendency to bring up their potentials to the average, it is found in practice that some series will become fully charged sooner than others. The simple means provided for compensating for these variations will be duly described.

One of the commonest, and perhaps the simplest, applications of accumulators to lighting work is found in their employment in connection with direct isolated plants in factories, office buildings, etc. In illustration of the method of applying accumulators in such cases, we may select as a type of this class of lighting one of those office buildings common in New York and other large cities. This building, we may assume, has already been, or is about to be, wired for 500 16-candle, 100-volt, $\frac{1}{2}$ -ampere lamps on the multiple arc plan, and is to be provided with a 125-volt, 200-ampere dynamo; it being calculated that more than 400 lamps will rarely be lighted simultaneously.

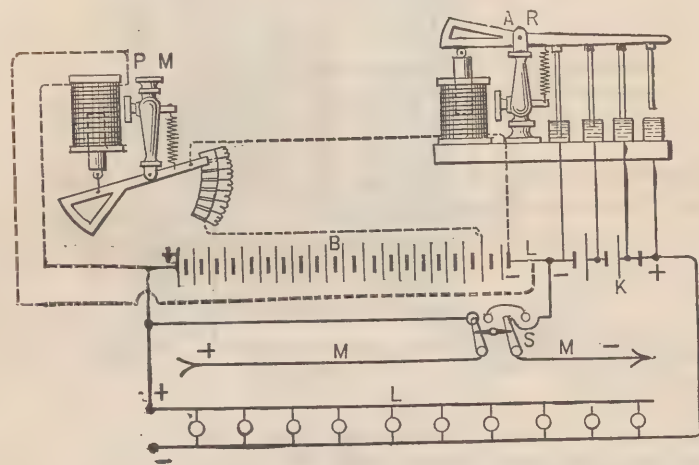
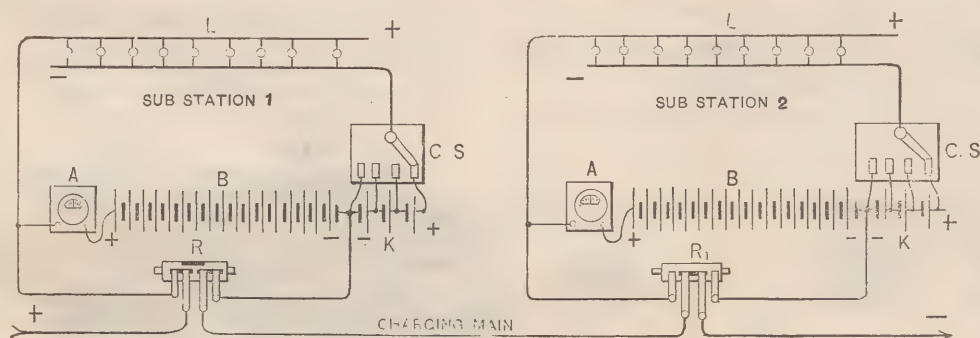


Fig. 15

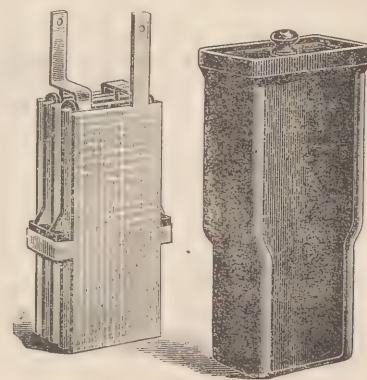


Fig. 21.

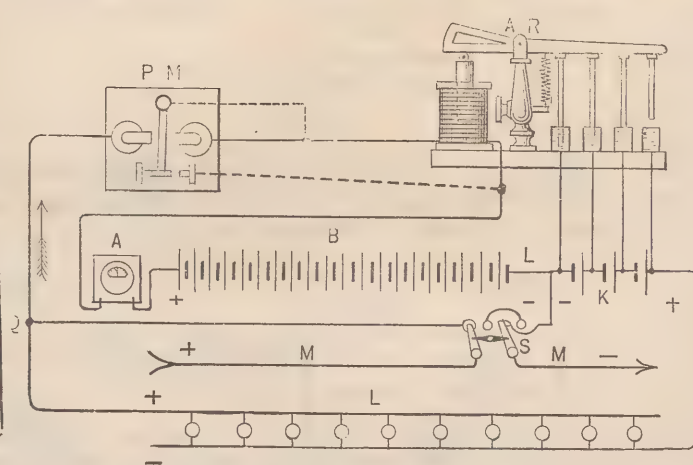


Fig. 15

rent reaches 2.3 volts per cell, or at 2.2 to 2.25 volts per cell when the charging rate is reduced as gas begins to be freely evolved towards the end. Similarly when a cell is discharged at the normal rate its effective potential falls during the progress of the discharge from 2 volts to 1.8 volts, at which latter point it is considered to be discharged to its normal limit.

The facts above cited, to the effect that the electromotive force of accumulators rises during charge and falls during discharge, and that their capacity for charge and discharge is limited, are the keynotes to the regulative processes; and only one other point need be here considered. When two or more series of cells connected in parallel are to be charged at the same potential, it is evident that, unless each series is in precisely the same state in respect to residual charge, there will be a difference in their electromotive forces; and, in consequence, less current will flow in those series having higher potentials than

We are not specially concerned with the power plant, and will simply assume that it is of ample capacity, it being remembered that such buildings are usually steam heated, and, therefore, offer favorable conditions for the operation of a plant of the character under consideration. Now it can be deduced from experience, that during the day say from 9 o'clock in the morning until about sunset, only a limited number of lights will be burned in certain dark corners of the building, and that as twilight and darkness come on the load will gradually increase, reaching a maximum at a certain hour, depending upon the season; subsequently the load will decrease, finally reaching a minimum after the janitor and his assistants have finished their cleaning operations, which load will probably be maintained for the remainder of the twenty-four hours. It is evident that a direct plant operating under such conditions would necessitate the employment of two forces of men, either one or two in each, and would, moreover, be run-

ning under exceedingly uneconomical conditions for a large part of the time. Let us now consider in what manner accumulators may be added to this plant in order that it may supply the variable load for twenty-four hours daily, while at the same time dispensing with the services of one staff of men and reducing the running time of the engine to eight hours.

It has been shown in a general way how the load varies during 24 hours; but in order to ascertain the capacity of the accumulators required, it will be necessary to assume, though only approximately, somewhat more precise figures. Say that the load is as follows:

From 9 P. M. to 9 A. M.,	20 lamps = 120 ampère hours
“ 9 A. M. to 4 P. M.,	200 “ = 700 “ “
“ 4 P. M. to 6 P. M.,	400 “ = 400 “ “
“ 6 P. M. to 9 P. M.,	50 “ = 75 “ “

An inspection of the above schedule shows that for 12 hours out of the 24 only 20 lamps, or 10 ampères, are used, while for three hours more only 50 lamps, or 25 ampères, are required; and a simple calculation proves that a set of accumulators having a capacity of 200 ampère hours will be amply sufficient to maintain the light lamp load for 14 hours out of the 24. If the dynamo is started at 8 A. M.

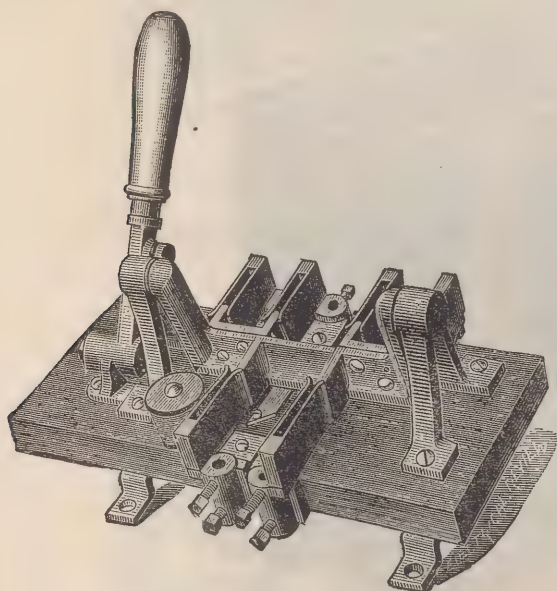


Fig. 13.

and operated until 6 P. M., while maintaining the required number of lamps during that period, it will still have surplus current for charging the battery as follows:

From 8 A. M. to 9 A. M.,	190 ampères for 1 hour,
“ 9 A. M. to 4 P. M.,	100 “ 7 hours,

or 890 ampère-hours, an available capacity vastly in excess of the requirements. Now, if during the eight hours in which the dynamo is operating the accumulators are charged at the rate of 30 ampères, in that period they will receive a total charge of 240 ampère hours. According to the schedule, the maximum output required from the battery will be 185 ampère hours, whence it follows that the charge received by it is more than ample, even after making the customary allowance of 20 per cent. for loss by conversion; and the desired result has been accomplished.

We have now to consider the details pertaining to the practical arrangements of such an installation. According to the stipulated schedule, after the dynamo ceases to run at 6 P. M., the battery alone must supply 25 ampères for three hours; and thereafter 10 ampères for 11 hours, or a total output of 185 ampère-hours. One series of 50 cells, having, say, a normal capacity of 30 ampères for eight hours, will satisfy these requirements, and will be well within the nominal rating of ordinary commercial cells.

Assuming that these 50 cells, connected in series, have been suitably placed on insulated shelving at any convenient distance from the dynamo, they may be electrically connected with the latter and with the lamp circuit, as shown diagrammatically in Fig. 1.

In this diagram the two parallel wires $M(+)$ and $M(-)$ represent the common dynamo and lamp mains to which the pressure indicator I is permanently connected in the usual manner; and $L L L$ represents the lamp circuits. The dynamo D is connected to the mains through the ammeter A_1 on one side, and through the upper contact of the two-way switch S_1 on the other. These are the ordinary connections of a multiple arc plant; and the $(+)$ and $(-)$ terminals of the accumulator battery B are also connected with the mains through the ammeter A_2 and two-way switch S_2 in precisely the same way. It is evident that if the levers of both switches $S_1 S_2$ are against their upper contacts, the dynamo and battery will supply current to the lamp circuits in exactly the same manner as would two dynamos connected in parallel, provided, of course, that they are both at the same potential. On the other hand, if the potential of the dynamo slightly exceeds that of the battery, the current from the former will divide

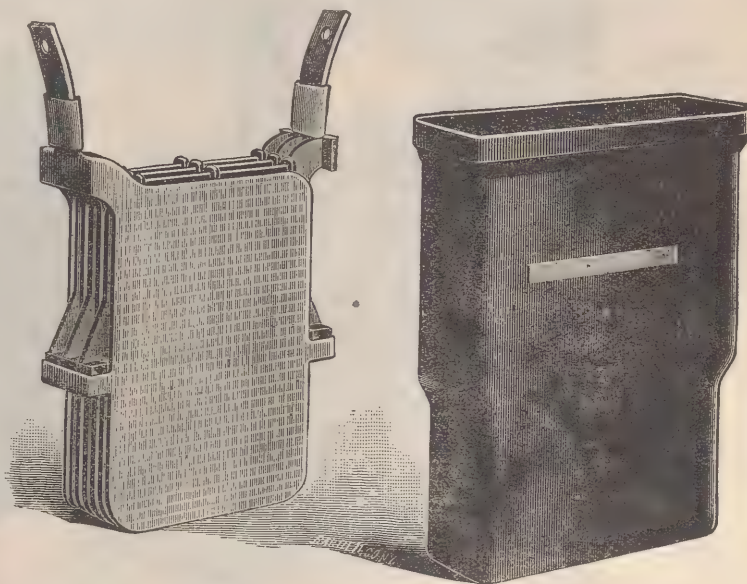


Fig. 19.

between the battery and the lamp circuit in a certain proportion determined by the ratio of the resistance of the lamp circuit to the internal resistance and counter electromotive force of the battery. If the levers of the two switches $S_1 S_2$ are now moved to their lower contacts, the dynamo and battery will be connected in series with their like poles opposed, the main $M(-)$ acting as part of the circuit; and supposing that the pressure of the dynamo still exceeds that of the battery, the latter will receive a charge. Thus by this very simple arrangement, the dynamo and the battery, either separately or together, may be connected with the lamp circuit, or with each other, or be entirely disconnected.

(To be continued.)

Twenty-seven miles of telegraph and telephone and one mile of railroad line have already been constructed in Nicaragua and the work of extending them is rapidly progressing.

The most widely separated points between which it is possible to send a telegram are British Columbia and New Zealand, via America and Europe.

The Western Union Telegraph Company will rebuild its line from Chicago to Sioux City.

THE WESTINGHOUSE ELECTRIC COMPANY.

The name of Mr. Westinghouse is familiar to the public in this country and on the Continent by its association with the continuous air brake so generally in use throughout Europe, and especially to those connected with railway management who remember the long and earnest fight he carried on, and the successful issue of the protracted struggle. After his return to America some years since, and when he had succeeded in establishing his system of brakes as the only one recognized to any extent on the United States railroads, George Westinghouse turned his attention to another gigantic undertaking, the utilization of natural gas in and around Pittsburg, and it was almost wholly due to his efforts that the conditions of industry in that great manufacturing centre have been revolutionized. Not content with these two great enterprises, which would have sufficed for the career of any half-dozen ordinary men, Mr. Westinghouse found it necessary to discover some new outlet for his energies, this time in the direction of electrical industry. In February, 1886, he organized in Pittsburg the Westinghouse Electric Company, and this, like his other enterprises, has grown into great proportions, and is brilliantly successful. One factory at Pittsburg employs 1,200 hands, another at New-

to any particular class of apparatus. In addition to all the patents owned and controlled by the parent company, the London Association are the proprietors of Dr. Hopkinson's three-wire patents, under which the Edison Company is working in the United States. The offices of the new company are at No. 4 Victoria Mansions, Victoria street, and its factory will be situated in Canal Road, King's Cross, immediately adjoining the works of the Westinghouse Air Brake Company. These works are not yet completed, and, till they are in working order, machinery and apparatus will be imported from Pittsburg to fill orders. The officers of the Westinghouse Electric Light Company—the capital of which is £600,000—are George Westinghouse, Jr., president; Captain Francis Parry, vice-president; Mr. H. M. Byllesby, managing director; and Mr. A. G. Scanes, secretary. Sir Henry Tyler and others are on the Board of Directors. With the wide and successful experience obtained in the United States, with practically unlimited means at his disposal, and with the wonderful energy, ability and enthusiasm possessed by Mr. Westinghouse, and which he knows how to impart to his immediate collaborators, there is little doubt but that the formation of this company will attain his object—that it will reach the same position as is occupied by the parent company. The time is well chosen for making the

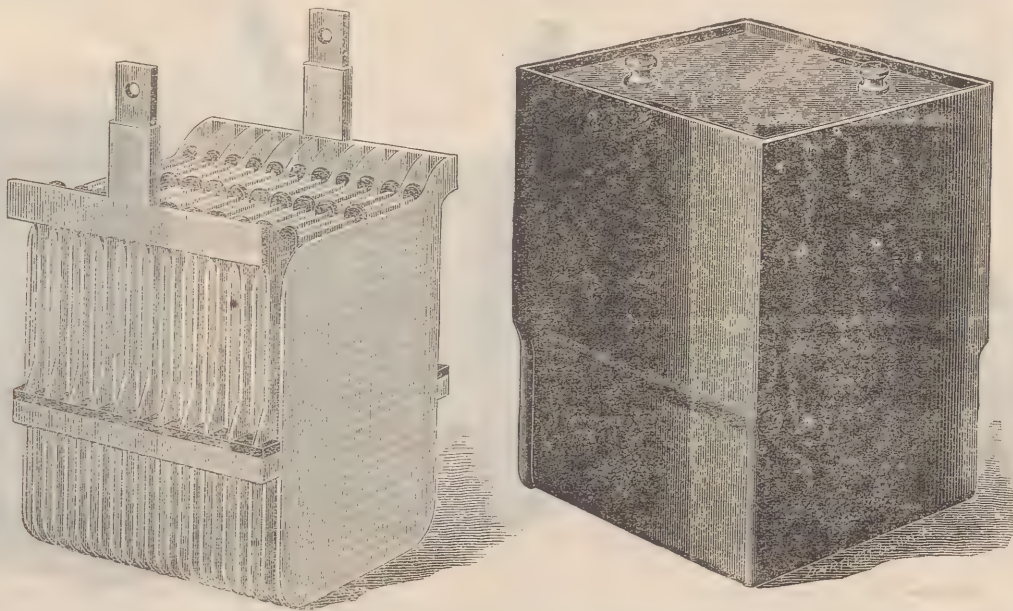


FIG. 18.—SOME METHODS OF REGULATING ACCUMULATORS IN ELECTRIC LIGHTING.

ark, N. J., has 600, and a third in New York City, 400 hands. In addition to this, the Westinghouse Electric Company has leased, in other words acquired, the business of the Sawyer-Man Electric Company, the Consolidated Electric Light Company, the United States Electric Light Company, the Waterhouse Electric Manufacturing Company, and the Tesla Electric Light Company. The parent company was the first to introduce into the United States the alternating system, under the Gaulard and Gibbs patents, and no less than 235 central lighting stations, which are now at work in America have been carried out by the company. Mr. Westinghouse, considering that the time is come for extending throughout Europe the business he has so largely developed at home, has recently established an association in London, which, under the name of the Westinghouse Electric Light Company, Limited, has now commenced operations with a capital of £600,000, or \$3,000,000.

The special object of this company is to manufacture and sell electric light and power machinery of every description, although the alternating current system will be made the special feature of the business. The manufacturing scope of the company will indeed be very large, as it intends not to limit itself

attempt, now that a fresh impetus has been given to electric lighting industries in this country, and there seems every prospect of a solid and increasing business in the immediate future. The competition thus introduced from abroad will prove a healthy stimulus to English manufacturers, and it is probable that the energy and enterprise of Mr. Westinghouse will make itself manifest by an extension of electric lighting, and the installation of central stations, both for light and power transmission, in many directions, in addition to the mere manufacturing and supply business which the new company has been formed to develop.—*Engineering* (London).

Mrs. Erdman, wife of the unfortunate lineman who was killed by electricity a short time ago, has not been forgotten by those charitably inclined, and we are pleased to note among the contributors to the *Herald* fund, R. H., \$5; Frank Wilson, \$1; D. Coath, \$1; C. F. Mills, \$1; H. Harrington, \$1, and C. Tresnon 25 cents, all of whom are employes of the Commercial Cable Company at Rockport, Mass.

Mr. W. H. Baker, lately private secretary to Mr. T. N. Vail, has become vice-president of the Postal Telegraph Co.

THE CABLE STATION AND LANDING AT RYE BEACH.

We illustrate on this page the cable station at Rye Beach and the cable landing there made. The cable is that of the Direct United States Company, and was laid in 1874. Last spring the tides had worn and worked all the sand and

outside iron armor wires. The cable is only visible during the low spring tide, at all other times being covered with sand. The cable goes from Rye Beach to Halifax, N. S., and is there connected to the cable from Halifax to Ballinskelligs Bay, on the coast of Ireland, a distance of 2,400 miles.

The stumps among which the cable lies are very large, measuring eight or ten feet in circumference. They are mostly



FIG. 1. CABLE LANDING AT RYE BEACH, N. H.

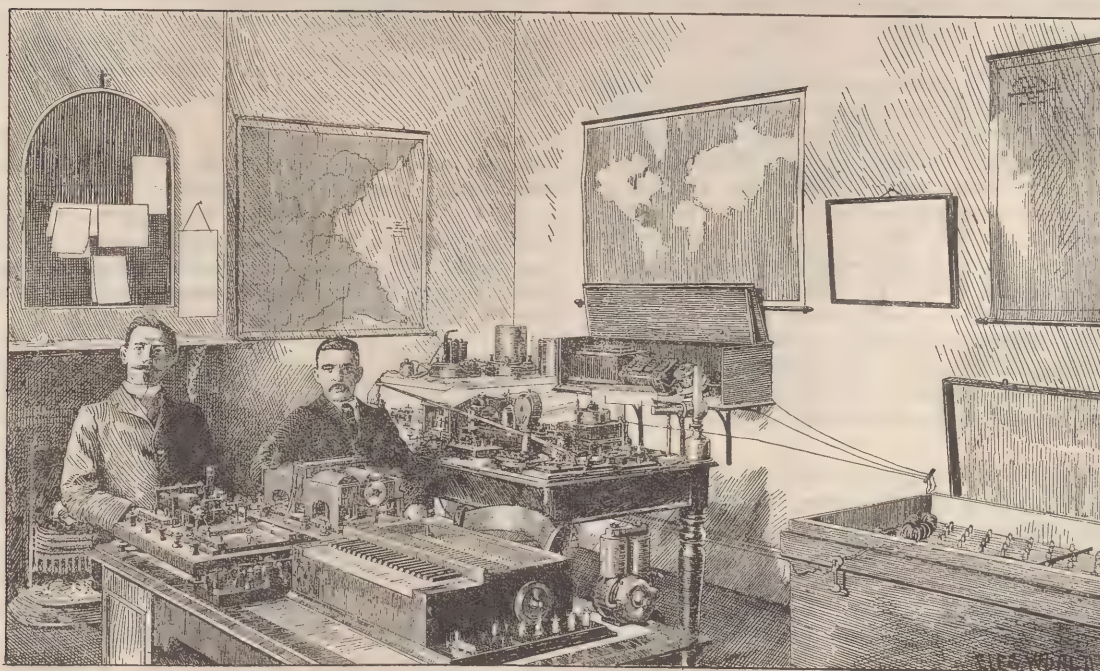


FIG. 2. CABLE STATION, RYE BEACH.

gravel away, leaving the cable bare, and revealing the submerged forest, Fig. 1. Usually cables are buried in trenches three or four feet deep, but in this case the cable lies fully in view as it runs up to the cable station, Fig. 2. The cable shown is the ordinary single conductor shore end. The iron sheathing is entirely intact, and bears no sign of decay. Here and there a few barnacles may be seen clinging to the

of cedar and are of a rare quality not known, it is said, to exist in forests of the present age. The forest extends out a considerable distance.—*Electrical World*.

A company to furnish light and power, and to be known as the Merrimac Electric Company, has been formed at Merrimac, Mass., with a capital of \$10,000.

GOVERNMENT TELEGRAPH TOLLS.

THE POSTMASTER-GENERAL READJUSTS THE RATES FOR THE CURRENT YEAR.

Postmaster-General Wanamaker has issued his order fixing telegraph rates on Government messages (not including Signal Service circuits) for the current fiscal year, as follows:

1. For day messages containing ten words, exclusive of place from, date, address and signature, 10 cents for all distances not exceeding 400 miles, and one-half cent for each word in excess of ten.
2. For distances exceeding 400 and not exceeding 1,000 miles, 15 cents for the first ten words and three-fourths of one cent for each word in excess of ten.
3. For all distances exceeding 1,000 miles there shall be added to the price of the message fixed in paragraph 2 the sum of one-half cent for each word.
4. For night messages not exceeding twenty words, exclusive of place from, date, address and signature, 15 cents for all distances and one-half cent for each additional word.
5. For all messages in cipher, known as the Signal-Service weather report, not exceeding two and one-half cents for each word sent over each circuit.

Distances are to be computed as between Washington and the capitals of the States and Territories according to a table prepared, which shows the shortest practicable routes. If the companies at any time give lower rates than these to the public they must reduce for the Government also. Each company will be allowed to charge for messages received from another line at the same rate as if received from the Government direct at the point of transfer.

Mr. Wanamaker has also addressed a letter to the President of the Western Union Telegraph Company suggesting the appointment of a special commission to fix the rates for next year.

THE NEW CABLES.—The cable steamer Faraday is again at Canso, N. S., where the ocean cables land, and is about sailing for New York. The Faraday has laid two deep sea cables to this city under an order from the Western Union Telegraph Company, and these cables will, to a great extent, take the place of the present land lines. The cables will cost nearly \$1,000,000, but as they will be able to handle the business more expeditiously, the expenditure is regarded as a judicious one. The Faraday, after it has finished laying these cables, will return immediately for material to repair the two breaks in the Gould cables between Nova Scotia and Ireland. It is estimated that these repairs will require 200 miles of new cable the break having occurred at points where the ocean is over two miles deep.

The Long-Distance Telephone Company will by January 1 have completed its lines from New York to Chicago, from Chicago to Denver, and from Denver to San Francisco. At the office of the company it was said that in less than two years from now the Bell Telephone Company will practically do away with telegraphing, and it is for that reason that the Western Union Company, headed by the far sighted Jay Gould, is making as little improvement in the Western Union plant as possible.

The Westinghouse Electric Light Company will in future mine its own copper, having purchased valuable mines in Arizona. It uses several million pounds of copper yearly in the manufacture of electrical machinery.

The Westinghouse Electric Light Company, of Pittsburg, has secured the contract to erect an electric-light plant at Pekin, China.

ELECTRICITY DIRECT FROM COAL.—A novel plan to produce electricity directly from coal is what is called a dry gas-battery, and consists of diaphragms of gypsum inserted in a barrow-like frame composed of antimony and lead, impregnated with sulphuric acid, and covered on both sides with very thin perforated platinum leaf and a thin leaf of platinum black, which are connected to the poles of the battery by suitable conductors, and are exposed on one side to gases containing oxygen and on the other to atmospheric air. In this way an electric current is set up. The hydrogen is oxidized to water, and fully 50 per cent. of the energy it can yield is converted into electricity. This is an immense increase upon the best results obtainable by steam engines and dynamos, which do not utilize more than 8 per cent. of the energy in the fuel employed.

POSTAL TELEGRAPH EXTENSIONS.—It is the purpose of the Postal Telegraph-Cable Co. to extend its lines from Kansas City west to Wichita, Topeka, Denver and Leadville, connecting with Texas by way of Wichita. They also contemplate a line to the Pacific coast with connections with all the principal cities between Kansas City and there. The business of the company in Kansas City, this month, is four times what it was a year ago, and this fact encourages the directors to push out into new fields. It is estimated that the proposed extensions, including the coast connections, will involve the expenditure of about one and a half million dollars.

UNDERGROUND CABLES IN NEW YORK.—A paragraph appeared in the last issue which might be interpreted to mean that the New York Fire Department has not done any underground work; to correct this we will state that last year the Standard Underground Cable Co. closed a contract with the New York Fire Department for nearly \$50,000 worth of cable and are now at work on a contract amounting to nearly \$40,000. Superintendent J. Elliot Smith, of the New York Fire Alarm Telegraph Department, is one of the pioneers in underground cable work, and deserves a great deal of credit for the extensive and efficient work that has been done in his department towards putting their wires underground.

Owing to the action of the National Telephone Exchange Association at its Minneapolis meeting, in entrusting the executive committee with the duty of editing the discussions held in executive session, and of deciding what portion of the same should be published, the printing of the proceedings of that meeting has been somewhat delayed. It is hoped, however, to get them out before the close of November.

By an ingenious signalling device which has lately been put into operation a "shunt" circuit is formed, so connecting the semaphore signal and the operator's key that when the safety signal is displayed the key cannot be used. The result is that the signal man must keep his signal at the normal danger point when a call distracts his attention. This will add to the safety of trains.

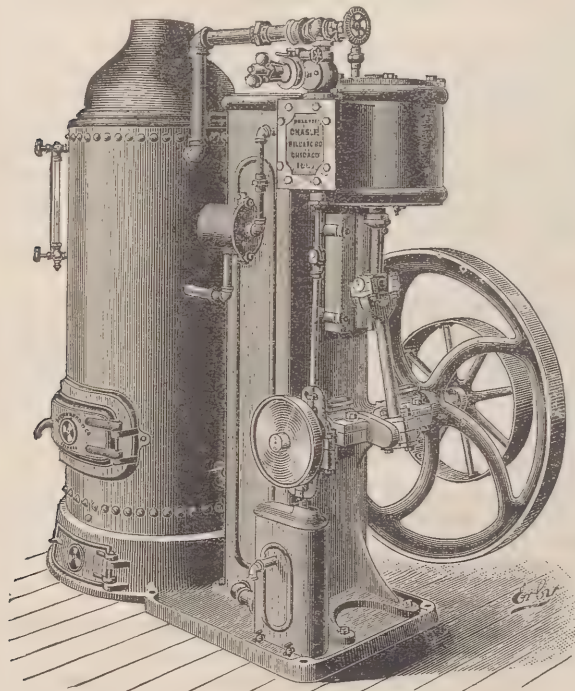
An anxious mother received a message from a relative which read, "Tom is receiving God; don't worry." She implied from this that her boy was dead, but presently all was changed to sunshine and happiness, when the message was corrected and read, "Tom is recovering good. Don't worry."

An electrical device whereby the name of an approaching station is inscribed on a conspicuous tablet on a railroad car is coming into use. It will be warmly welcomed, says an exchange, by the public, who have suffered so long from the Volapük, Choctaw and Hindustan of brakemen and porters.

A movement is on foot to light street cars by electricity.

WILLARD CONDENSING ENGINE.

The extensive sale of gas engines and hot air engines, notwithstanding the high cost of the engines, and of gas, reveals the very general demand for an engine of small power, say 2 to 4 H. P., for the use of small industries, which shall be *perfectly safe*, and the manufacturers of the Willard Condensing Engine (of which we give an illustration) who have been engaged in the manufacture of small engines of various types for the past ten years, believe that, in this new engine, which they have now put upon



WILLARD CONDENSING ENGINE.

the market for the first time, they offer a motor which possesses all the advantages of other motors of this class, and is free from the structural faults that exist in some of the other machines. The manufacturers claim that the cost of fuel will not exceed one cent per horse-power per hour; that it requires no watching; does not increase the rate of insurance, can be safely managed by a person having no knowledge of engines, and that it is absolutely safe under every and all circumstances, and cannot be exploded because there can be no steam pressure whatever.

The manufacturers, in putting this engine upon the market desire to impress upon the public the fact that it is not a hot air engine or a kerosene oil engine or a gas engine, but is a condensing engine using a small quantity of steam at less than one pound pressure, burning wood or coal, and is perfectly simple and reliable; making no noise or objectionable smell.

A full descriptive circular with illustrations and prices can be obtained by addressing Chas. P. Willard & Co., 236 Randolph St., Chicago.

Thomas A. Edison asserts that there is no insulation which will make an electric wire safe, either above or below ground. He says that high-tension underground wires will burn out the tubes and may force dangerous currents into houses and manholes. Herein is suggested a more unpleasant possibility than lurks in the overhead wires. Mr. Edison is right in his position that electric tension should be regulated by law. The only reasonable solution of the whole problem lies in making every electric wire safe, not because it is insulated, but because in its nakedness it carries no death-dealing power.—*World*.

ELECTRICAL PATENTS GRANTED OCT. 30, 1889.

- 413,707. Metallic circuit; Henry F. Campbell, Malden, Mass.
 413,708. Electric safety lamp for miners; Theophilus Coad, Forrest Gate, County of Essex, England.
 413,731. Conduit for electric railways; Cecil P. Poole, Lynchburg, Va.
 413,782. Telephone diaphragm; Alexander W. Hall, New York, N. Y.
 413,795. Anti-induction system; John O. Stockwell, Burlington, Kan., and Albert Barrett, Kansas City, Mo.
 413,810. Transformer or converter for alternating electric currents; Leonard Paget, New York, N. Y., assignor of one-half to Charles J. Kintner, same place.
 413,813. Combined binding post and thermal cut-out; Howard C. Root, Brooklyn, N. Y., assignor one-half to John C. Reilly, same place.
 413,848. Telegraph key; Eugene S. Crull, Mount Carmel, Ill.
 413,879. Electric train signal; William Winder, Portsmouth, N. H.
 414,025. Electric stop motion for twisting machines, etc.; Victor I. Clenock Lowell, Mass.
 414,043. Electric regulator; Ludwig Gutman, Fort Wayne, Ind.
 414,049. Electric railway; Rudolph M. Hunter Philadelphia, Pa. assignor by mesne assignments to Thomson-Houston Electric Company, Boston, Mass.
 414,052. Method of regulating electric motors; Moritz Immisch, London, County of Middlesex, England.
 414,076. Electric current indicator; Gustav Pfaunkuche, Cleveland, Ohio.
 414,085. Electric mechanism for operating telephone call bells; Frederick W. A. Schneider, Toronto, Canada.
 414,130. Arc lamp; Friedrich W. R. Seifert, Atona, assignor to Otto Lindemann, Hamburg, Germany.
 414,132. Telephone supporting device; Samuel J. Adams, assignor of three-fourths to Jacob Brown and Arthur Brown, same place.
 414,141. Arc lamp; Frederic G. Chapman and Fred. M. Dearing, London, England, assignors of one-third to William George Chapman, same place.
 414,155. Electric fire signal; Charles B. Head, Allegheny, Pa.
 414,172. Electric railway; Frank J. Sprague and Patrick F. O'Shaughnessy, New York, N. Y., assignors to the Sprague Electric Motor and Railway Company, same place.

Copies of the specifications and drawings complete of any of the patents issued since 1866, can be had for 25 cents. Give the date and number of patent desired.—THE ELECTRIC AGE Publishing Company, 5 Dey Street, N. Y.

St. Louis, Mo.—It will be remembered that when the city of St. Louis decided to adopt electric lighting, beginning January 1st, 1890, a large part of the work, including incandescent lights in alleys, parks and public buildings, was awarded to Chas. A. Brown. This contract was afterwards assigned to the Laclede Gas Light Co., which has just placed the order with the Heisler Electric Light Co. of the same city, for three of their largest dynamos, together with a full equipment of Heisler combined automatic cut-outs, and lamp sockets, 30 candle power lamps, street fixtures, station apparatus, etc. This apparatus is to be delivered early in December, and will be of the most improved form of the Heisler Co.'s manufacture. The areas covered by this contract, it is believed, will be among the largest over which public illumination by incandescent lights has ever been undertaken.

Preemptory orders have been issued by the Government for the removal of the telegraph poles on the Government lot at Reading, Pa.

STORAGE BATTERY LITIGATION.

The litigation involving a patent monopoly of the secondary battery industry has been so prolonged, and is so technical, that it is believed a few words of explanation are appropriate, in order to enable the public to have a clear understanding of the situation.

In March, 1887, suit in equity was commenced in New York, by the Electrical Accumulator Company, owning the Faure patent, against the Julien Electric Company, designed to stop further infringement of that patent, covering improvements in secondary batteries. During the progress of the suit it became evident that the Faure patent would be sustained, and early in 1888, the Julien Company modified their method of applying the active material to the battery plates. In March, 1889, Judge Coxe rendered his decision sustaining the Faure patent, and holding that it could be construed to cover any secondary battery having the active material applied to a plate or support in the form of a "paint, paste or cement." The modified method of the Julien Company accordingly came within the scope of the Faure patent. On April 11th, 1889, an injunction was issued restraining the defendants from further acts of infringement. In June, the Julien Company petitioned the Court for a re-hearing of the case, and their factory, which had shut down in April, after the injunction was issued, again resumed operations, the method of manufacturing the batteries being again slightly modified, which second modification, it was claimed, did not infringe the Faure patent. Apparently becoming alarmed at the probability that this second modification was also an infringement, the Julien Company devised a third form, and subsequently a fourth form was employed.

In August, a new suit in equity was brought against the New York and Harlem Railroad Company and the Julien Electric Traction Company as co-defendants; these parties were using large numbers of these so-called new forms of battery. Motion was made for a preliminary injunction, and in October Judge Lacombe rendered his decision, which, as will be seen after careful perusal, virtually gave the Electrical Accumulator Company all that they asked or claimed; an injunction was issued on October 28th ult. operating to stop the use of all of their four modifications as well as the original form. This decision of Judge Lacombe has been printed for the information of interested parties; it is concise, accurate, and clearly defines what Brush is said to have done in anticipation of Faure's patent.

Quoting from the decision on this point, "What Brush did was to immerse a plate coated with dry material not only into fluid, but into the very fluid in which it was forthwith, and *without removal therefrom*, put to use as a "battery plate." It is to be noted, that under this decision the manufacture of secondary batteries, in any quantity will, if at all possible, be utterly impracticable without infringing Faure's patent.

It has yet to be demonstrated that such form of battery will work outside of the laboratory. It has never been done, although ten years have elapsed since Brush is said to have made the experiment, while manufacturers, both in this country and Europe, have been studying the problem with the strongest incentives to attain success.

The Council Bluffs Electric Light and Power Company has disposed of its electric plant to the Sperry Electric Light Company of Chicago. The consideration is supposed to be about \$65,000.

The Salem Electric Lighting Company is now running separate wires from Salem to Peabody, Mass., for the purpose of furnishing incandescent lights.

Work has commenced on the electric-light plant at Eufaula, Ala., and will be pushed to an early completion.

ELECTRIC CURRENT METRE.

A simple and reliable current metre seems to be in great demand just at this time. Professor H. Aron's electric current counter is said to be the best and most reliable instrument for the measurement of electric currents ever placed on the market. Any person who can read figures can understand this metre. Small or large currents are alike measured correctly. The counter indicates from the fraction of an ampere up to its full capacity.

Of the great number sent out on trial not one has ever returned. On the contrary, additional meters have been ordered.

The figures of the metre are read upon its face the same as one tells the time of day by looking at the face of a watch. This renders unquestionably its superiority. It is used exclusively in Paris, Vienna, Constantinople and other European cities, and though only introduced in this country a few months ago, it has earned for its inventor an excellent reputation and a permanent place among useful electrical devices.

It is built for direct 2 wire, 3 wire, 5 to 9 wire and alternating system.

The following remarks of L. H. Landy, Ph. D., of the Columbia College, are significant: "I have in use at the School of Mines at this college one of Prof. Aron's current counters for 3-wire system and find it is very sensitive to the smallest current as well as the largest, and from observation made with it I find it correct in every particular and the best I ever saw."

A very large number of these counters are used all over the United States by the Edison, Brush, Westinghouse and Thomson-Houston companies, which proves conclusively that it can be used by any system.

BRUSH ELECTRIC HOIST.—This is a compact combination of an electro-motor with a winding drum for hoisting purposes. The motor is mounted on the same base as the hoisting drum. The Brush Company have contracted to equip the copper mines of the Calumet and Hecla Company at Calumet, Mich., with five 80 H. P. motors and five 130 H. P. dynamos.

The Rawson & Root Lumber Co., of Michigan City, Ind., which has been operating a Heisler Electric Lighting plant for about a year, has contracted to furnish a large number of lights to the furniture manufacturers, whose works are run in connection with the Northern Indiana State Prison. To carry out this contract an order has been placed with the Heisler Electric Light Co., of St. Louis, for one of their largest dynamos, with the necessary lamps, sockets, etc. The new apparatus is to be in operation before the middle of November.

The Elektron Manufacturing Co., of Brooklyn, manufacturers of the Perret Motor, was burned out on October 31, damaging the stock to the extent of \$16,000, but which is covered by insurance. The company at once secured new quarters at Nos. 79-81 Washington street, and in less than one week's time will again be in complete running order, with increased facilities, which will enable the company to catch up on back orders.

The Lafayette Car Co. has decided to install an electric lighting plant for the illumination of their extensive buildings and yards at Lafayette, Ind. The order was placed with the Heisler Electric Light Co., of St. Louis, and prompt shipment required. The apparatus was shipped from St. Louis on the day following the receipt of the order.

The Electrical Trades' Directory and Hand-Book for 1890, published by *The Electrician*, of London, Eng., is now being printed and will be on the market very soon.

Samuel Edison, father of the inventor, is a jovial man of 86, who lives in a modest house at Fort Gratiot, Mich.

NEW ENGLAND LETTER.

BOSTON, Nov. 10, 1889.

As might be expected, the reported purchase of the controlling interest in the Brush Company of Cleveland, by the Thomson-Houston Company of this city, has caused considerable stir in electrical circles in this quarter during the past week. The development of the Thomson-Houston Company has been phenomenal, to say the least, and difficult to account for to those unacquainted with the enterprise and business sagacity of its founders, and the value of the patents it now controls. Although there was no outright transfer of the Brush Company to the Thomson-Houston, the opinion here is that the local company has accomplished its purpose of securing the controlling power in the Cleveland concern, and the accompanying control of many subordinate plants throughout the country. The only competitors of the Thomson-Houston Company now are the Westinghouse in arc lighting and the Edison in incandescent. The report that the Boston Electric Light Company was concerned in the transaction is officially denied.

The Thomson-Houston Company has now on hand contracts for a dozen electric railways in different parts of the country, involving over one hundred cars and upward of one hundred and fifty miles of road, in addition to its work in the city of Boston, which includes over thirty miles of road in operation and upward of fifty cars, and which is constantly being increased.

The elevator about to be placed in the Tremont House, this city, by the Whittier Machine Company, will be run by an electric motor which, contrary to the motors heretofore used for this purpose, will run only when the elevator itself is in motion, thereby greatly economizing the current, and effecting a considerable saving in the cost of running. The motor will be twenty-horse power, and a speed of two hundred feet per minute is claimed for it.

A charter has been granted the Essex Railway Company of Salem, Mass., to build an electric road for a distance of three miles through that city. The storage battery system of the Union Car Company will be employed. It is expected to have the road with an outfit of twenty cars in operation by spring.

Two competing companies have been organized in Whitman, Mass., twenty miles south of Boston, each with the purpose of building an electric road. The companies have a capital stock of \$30,000 and \$40,000 respectively, all of which has been subscribed. A hearing will be given the competitors by the town authorities at an early date.

The Naumkeag Street Railway Company, Salem, Mass., will increase its capital stock \$200,000 for the purpose of equipping its road with electric apparatus.

Mr. Alexander P. Wright is to read the first paper before the Boston Electric Company, which meets at an early date. His subject will be one of great interest to all electricians at the present time—"Underground Electric Wires."

H. J. Crowley, a well-known electrician of Boston, was tendered a complimentary banquet at Young's Hotel, Tuesday evening, by a number of electricians connected with the Thomson-Houston Company.

The new plant of the United Electric Light Company of Springfield, Mass., was opened Oct. 16. It runs 200 arc and 2,500 incandescent lights.

Permission has been granted the Holtzer Cabot Electric Company of Boston, by the city government of Chelsea, Mass., to connect the Winnisimmet National Bank of that city with the office of the chief of police, for burglar alarm purposes.

A controversy has been in progress for some time past between the local electric lighting companies and the Underwriters' Union relative to the maintenance of the inspection of electric wiring. There is now some prospect of a settlement, however, if the total expense to the companies can be placed at a low enough figure. The expense will be proportioned as follows: The Underwriters will assume one-third the cost of inspection, and the other two-thirds will be borne by the two

local electric lighting companies, the Edison and the Boston. This is provided the expense of inspection does not exceed \$4,000. If the expense to each lighting company is more than one-third that amount, the excess is to be borne by the Underwriters. The Underwriters' Union propose to assess individuals and property owners for the cost of inspection, where independent plants are employed or where parties outside of the electrical exchange do the wiring.

The Boston Edison Electric Illuminating Company have an immense number of contracts on hand in and about the city. Among the largest are: Mason & Hamlin Organ Co., 800 incandescent lights; new Ames Building, on Washington street, 800 incandescent; Boston Theater, 600 incandescent lights. This will make a total of over 1,000 in the Boston Theater, a number equalled in but few theaters in this country.

The New England Electric Exchange have recently opened a free school of instruction for young men who are engaged in the electrical business. The object is to furnish a more technical education than can be obtained by experience in the factory or on the wires. There had been some injustice done to parties who have a sound practical knowledge of the electrical business, yet, lacking the technical instruction, cannot pass the examination necessary to obtain a license. This school will doubtless remedy the defect, the instruction being principally in the form of lectures.

Three companies are competing for the privilege of lighting the city of Rockland, N. Y., viz.: The Easton Co., of New York, the Westinghouse and a local company under the name of the Rockland Light and Power Co.

By experimenting on cables, the Thomson Electric Welding Co. has recently demonstrated the fact that by an electric weld 80 per cent. of the strength of a perfect cable can be secured, while by splicing only 30 per cent. is obtained.

A large number of new lighting companies have been incorporated in this State during the past month, and there is scarcely a town of over a thousand inhabitants which is not agitating some scheme for electric lighting.

The Randolph & Holbrook Electric Light and Power Co. was incorporated Thursday, Nov. 7, at Randolph, Mass., to establish and operate a plant before April 1, of next year. The Thomson-Houston system will be employed.

Forty-five gentlemen, representing 40 electric lighting companies in all parts of Massachusetts, using all forms of apparatus and having a combined capital of \$4,000,000 or \$5,000,000, met at the Tremont House, Boston, Thursday, Nov. 7, and formed the Massachusetts Electric Light Association. Hon. T. C. Bates, of Worcester, called the assemblage to order, and E. W. Burdett, the attorney for the Boston Electric Light Company, acted as secretary. Mr. F. A. Gilbert, the president of the Boston Electric Light Company, was elected president of the association, and an executive committee, consisting of the president, ex-officio, Hon. T. C. Bates, of Worcester, Geo. W. Fifield, of Lowell, C. L. Edgar, of Boston and C. A. Nichols, of Springfield, was chosen to have charge of the affairs of the organization. A set of bylaws were adopted in lieu of a constitution, and they provide that the object of the association shall be to foster and promote the common interest of its members.

W. F. M.

ELECTRIC RAILWAYS.—During the past few weeks the Thomson-Houston Electric Company of Boston has completed the electrical equipment of a number of street-railways on which the electric cars are now in daily operation. Among them are the following: Central Railway, Peoria, Ill.; Citizens' Electric Street Railway, Decatur, Ill.; Metropolitan Street Railway, Kansas City, Mo.; Omaha Motor Railway, Omaha, Neb.; Ottumwa Street Railway, Ottumwa, Ill.; Quincy Street Railway, Quincy, Mass.; Richmond Street Railway, Richmond, Ind. The total number of cars in use on these roads is 63; and the number of miles operated about 44.

The use of electricity in medicine is rapidly on the increase.

THE NEW HUSSEY BATTERY.

Since the invention of the Daniell battery, which is the first and original form of the bluestone cell, scientists, inventors and chemists have endeavored to prevent the deposit of copper on the zinc plate, but have never succeeded altogether, all admitting that if this could be accomplished the cell would be a theoretically and practically perfect one.



FIG. 1.

The Hussey bluestone Battery which we illustrate in the accompanying figures accomplishes this perfectly, it is claimed, preventing all deposit of copper on the zinc plate which remains bright and clean, the cell giving at the same time a much greater current than the older forms of bluestone battery of the

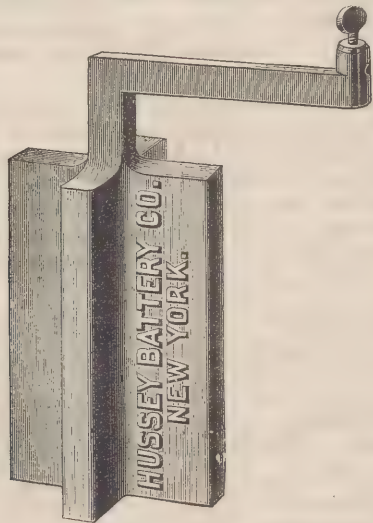


FIG. 4.

same dimensions, and consequently increasing its field of usefulness very largely.

Our engraving, Fig. 1, is a perspective view of the complete cell, as set up ready for use. It consists of an outer glass jar, in which is placed a copper disc forming one plate, represented

in Fig. 2, on which rests a porous cup, which is glazed on its outside from top to bottom, thus rendering its sides non-porous, while the bottom, being unglazed, is porous. This cup is shown in Fig. 3 and serves to receive the other plate of zinc, Fig. 4.

To charge the cell the bluestone is placed between the glass jar and the porous cup to a little above the centre of the jar, there being a space of about one inch between the porous cup and jar to contain it. To the bluestone in the glass jar is added a solution of sulphuric acid and water, so as to cover the bluestone crystals. In the porous cup is also put a solution of sulphuric acid and water. The zinc plate is an amalgam of zinc and mercury, and hence requires no further amalgamating. As the bluestone is consumed, it feeds downward toward the bottom of the porous cup, where the action takes place, furnishing a constant supply of sulphate of copper solution to the active portion of the cell.

The prominent feature of the battery, namely, the prevention

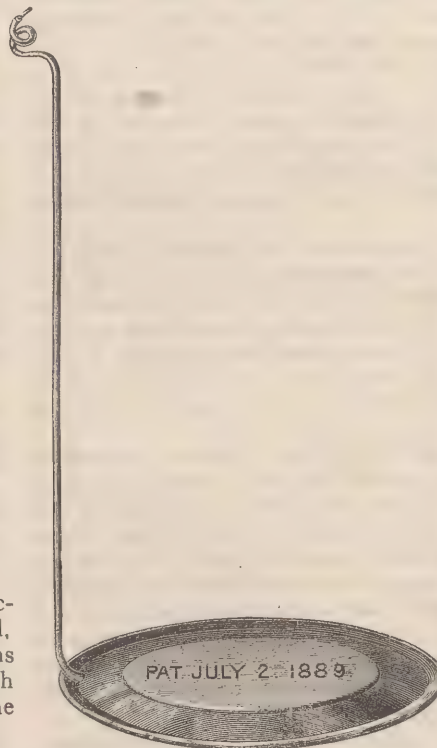


FIG. 2.

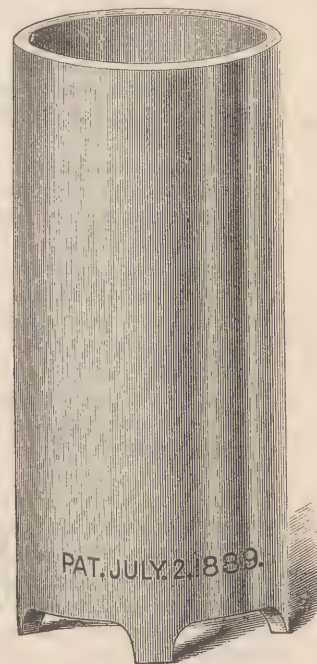


FIG. 3.

of a copper deposit on the zinc plate, is accomplished by means of the peculiar form of porous cup employed, the sides of which, being non-porous, prevent all endosmose. The fluid in this porous cup is kept at a higher level than that in the glass jar, consequently the pressure on the inner surface of the porous bottom is downward, so that the bluestone solution can never get into the porous cup to come in contact with the zinc. The electromotive force of this cell is 1.1 volt, and its internal resistance .22 ohm.

Some of the principal advantages claimed for this battery are its cleanliness, low internal resistance, economical consumption of zinc and small amount of attendance required. The battery never has to be dismantled, thus saving both time and labor. To keep it in action it is only necessary to feed the cell with bluestone, and, when required, to draw off the solution in the porous cup with a syringe and replace it with fresh.

These cells are already in large demand for charging storage batteries, and have been in use for this purpose for some time by the Gibson Electric Company, the Metropolitan Phonograph Company, Dr. Goodwillie, a surgeon of this city, and many others, and, we understand, are giving satisfaction.

It is proposed to manufacture cells of a size sufficient to charge a set of accumulators capable of running from 25 to 50 lights, thus enabling private individuals to enjoy the luxury

and comfort of the incandescent light without the attendant trouble and annoyance in the employment of boiler, engine and dynamo. These cells would be employed to charge the accumulators for, say, 24 hours, which in turn would furnish a strong current capable of maintaining a number of incandescent lights, for, say, 6 hours. The Hussey Battery Company, of this city, the manufacturers of this cell, are now engaged in constructing a plant of this kind suitable for running 30 lights.

The batteries are particularly fitted for telegraphic work of all kinds on account of the large current they are capable of furnishing. They are also claimed to be applicable for either open or closed circuit work, on account of the absence of all local action; and, among other uses are adapted for district and messenger telegraph service, bell work of all kinds, annunciators and burglar alarms, electric door-openers, and motors engaged in performing any light work, such as driving fans, etc.

A CURIOUS CAUSE OF FAULT IN A SUBMARINE CABLE.*

On September 9th a fault broke out in the Santos-Santa Catharina section of the Western and Brazilian Telegraph Company's system of cables, but through which signals were exchanged up to the moment of cutting by the repairing steamer *Viking*. The latter, whilst engaged on the repair on the 17th inst., picking up towards the fault in 57 fathoms, and about 70 miles north from Sta. Catharina, brought to the surface a monster dead whale, measuring about 50 feet long, intact, with the exception of the upper part (the belly), from which all the skin had been worn or eaten away, leaving only a small portion on the neck and tail; the cable parted at the fault with the strain put upon it in lifting, and the carcass of the whale being relieved of the downward pressure, rose like a torpedo and inflated like a balloon, a portion on arising at the surface of the water bursting and creating a most offensive odor, so that everyone was thankful when the cable was cut, and the obnoxious object drifted to leeward; the tail of the whale had two complete turns round the shank and three or four across the flat or fan part. It would be interesting to know how long this creature had been thus imprisoned; from the advanced stage of decomposition it must have been there some considerable time; its body was covered with barnacles and some even on the white part, where the skin had disappeared.

It is worthy of note that this cable was laid in 1874, and with the exception of one repair by the contractors in 1875, has never since been touched, and is as perfect as the day it was laid.

SS. *Vyking*, M. Video, October 22, 1889.

Since the opening of the Paris Exposition over 19,000,000 people have visited it

The Thomson Electric Welding Company has made arrangements with the Secretary of the Navy to supply welding machines for the men-of-war.

Mr. A. H. Bauer, electrician of the Pullman Palace Car Co., has just equipped electrically the finest train ever constructed in this country.

The San Francisco Electric Club has been successfully established.

Mr. Thomas A. Edison is a recent contributor to the *North American Review*.

Night Chief Operator Harvey, of the Western Union, Memphis, Tenn., has invented a device for keeping circuits clear of trouble.

Lieutenant J. A. Norris, of the U. S. N., is off on a six months' cruise to determine longitudes, which he does by aid of the telegraph.

KANSAS CITY.

THE PLACE WHERE THE NEXT ELECTRIC LIGHT CONVENTION WILL BE HELD.

Kansas City has a population of 247,000 and \$20,000,000 are invested in street railroads. It has a greater mileage of cable street railroads than any other city in the world. Upward of \$9,500,000 were invested in buildings during the past year and it has become the twelfth city of the United States in banking capital. It is the 10th in bank clearings; 9th in volume of post-office business; 5th in volume of telegraph business; 3rd in transfers of real estate; 2nd in live stock and packing house business; 2nd in the number of steam railroads; 2nd in volume of passenger traffic; 1st in per cent. of profit from post-office; 1st in the number of telephones in proportion to the population; 1st in the number of telephone calls per telephone; 1st in volume of agricultural implement business, and 1st in extent and resources of tributary territory. Nineteen railroads radiate in all directions from Kansas City and in the tributary regions there are over 600 cities whose population range from 3,000 upwards.

It is said that less than fifty per cent. of these cities are supplied with central electric light service. Although most of them have street railroads there are only 45 electric roads in operation.

The value of the total products in Kansas and Texas alone for 1889, computed upon the basis of estimates from the commissioners of agriculture, is \$432,000,000.

From these statistics it is evident that the association made a wise selection when Kansas City was declared the choice.

The hospitality of the citizens of Kansas City is well known, and for this reason alone almost every branch of the electrical industry will have an exhibition for the inspection of the southwestern trade specimens of every kind of electrical appliance and apparatus. The space allotted to exhibitors is ample to meet the requirements of all, and from present indications the meeting will be better attended than any of the previous ones.

President Weeks is laboring diligently for the success of the association and his efforts are justly meeting the hearty approval of every member of the association.

WRITING TELEGRAPH DECISION.—Ont., Oct. 26.—A favorable decision was rendered in favor of the Writing Telegraph Co., of this city, in its suit with Professor Gray against the telautograph system of the latter. The suit has occupied the attention of the Court since last May.

It has always been the desire of engineers to obtain "black" prints from plans and drawings, in place of the present blue prints. The discovery of a new substance by a French chemist, M. Pechar, announced in *Iron*, may make such a result possible.

General Greeley, Chief Signal Officer says: The deterioration of army military signalling has steadily increased, and at the end of the fiscal year the condition of signal instruction in the army is at the lowest ebb it has ever been known.

The accounts of the horrors of the electric wires in New York have terrified the Londoners and almost nullified the efforts of the electric light companies seeking to replace the gas lamps with electric lights throughout the metropolis.

Miss Sarah Lavinia Barney, daughter of Gen. C. H. Barney, the well-known and popular secretary of the National Telephone Exchange Association, was married to Mr. C. H. Carter of this city October 30.

The Telephone Exchange at Denver, Colorado, was considerably damaged by fire on the 13th inst., caused by an electric light wire, and service was discontinued for four or five days.

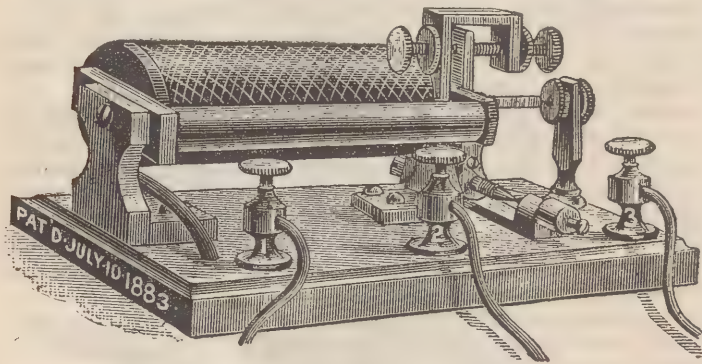
*London Electrical Review.

ELECTRIC PROTECTOR.

PROTECTION AGAINST DANGER FROM LIGHTNING AND ELECTRIC LIGHT CURRENTS.

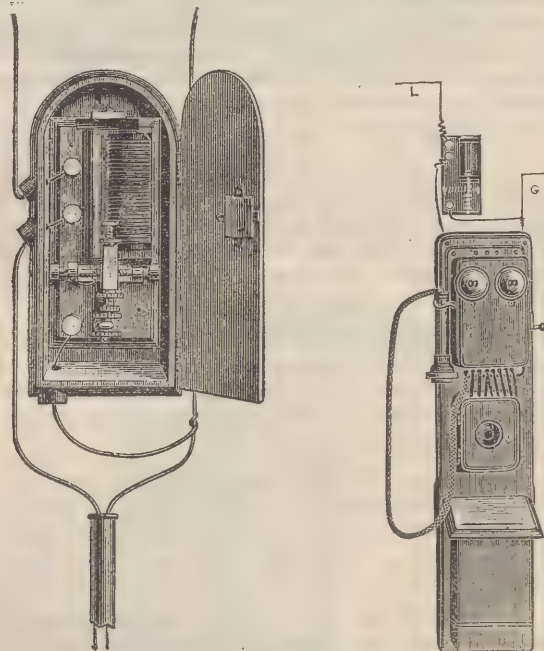
The cut we herewith present is a representation of an instrument which has stood very severe tests and proved its ability to absolutely protect telephones and other electrical instruments against overcharges of electricity caused by lightning or contact of the wires with electric light wires.

The protector is a small instrument (6x2½ inches) with a single electro magnet wound with coarse wire to a very low re-



THE PROTECTOR.

sistance, (about one-tenth of an ohm) and is placed in the circuit of the telephone or any electric system. It remains quiescent until the wire or circuit becomes abnormally charged by atmospheric, electric light or other strong current, when the magnet attracts the armature and automatically grounds or shunts the excess as long as the excessive current remains. When the excessive current ceases or is removed the protector readjusts itself automatically and restores the circuit to its normal condition.



PROTECTOR IN IRON BOX FOR OUT-DOOR USE, VIZ.: PROTECTING FIRE ALARM BOXES, ETC. SHOWING COMPARATIVE SIZE OF TELEPHONE AND PROTECTOR.

Electric instruments or circuits without this protection are burned up or injured every day by electric light or other currents, and many cases are on record of houses wholly or partially destroyed by fire originating in this way. With this instrument in the circuit no damage of that character can occur.

This instrument has been adopted by the Fire Alarm Telegraph System in the cities of Rochester, Brooklyn, Providence,

Buffalo, New Haven, Worcester, Lowell, Lynn, Woonsocket, West Newton, etc., and seems to be universally approved as the only protector that can be absolutely relied upon.

Among those who testify to the excellent qualities of the "protector," are the well-known electricians, W. A. Vail, J. A. Seeley, Pearce and Jones, of New York; J. H. Cary, of Woonsocket, R. I.; A. J. DeCamp and M. D. Law, of Philadelphia; A. E. Scoullar, of New York; G. A. Steers and C. G. Cloudman, of Providence, R. I.; P. L. Watson, of Brooklyn, N. Y.; and J. W. Stover, of Boston.

Herman Stutzer, jr., is president, E. C. Halsey, secretary and treasurer and C. E. Sanford sole agent of the National Electric Protector Co., whose head office is at 18 Broadway, New York.

MINIATURE EDISON LAMPS.

The demand for miniature incandescent lamps is increasing. Not only are they used for purposes of ornamentation and decoration, but for numerous ingenious and useful purposes in the household and other places. At social gatherings these lamps may be placed among loose flowers in bouquet baskets or vases of real or artificial flowers. The accompanying cuts, Figs. 1 and 2, represents a small socketed Edison lamp and the receptacle designed to receive it. The base of the re-

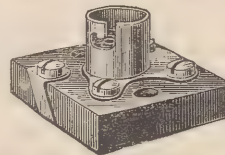


FIG. 1.

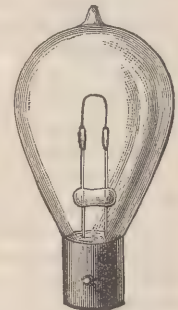


FIG. 2.

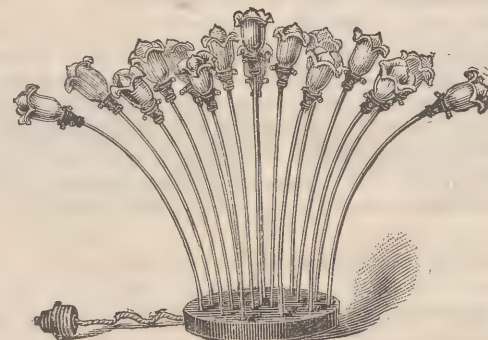


FIG. 3.

MINIATURE EDISON LAMPS.

ceptacle is made of hard fibrous material, the connections being of polished brass. It is shown of actual size in the cut. Fig. 3 shows a "bunch" or "spray" fixture. These sprays are fitted up with any number of lamps of any candle power so that they may be used in a basket or vase to contain flowers. As a rule the bunch is set in the basket or vase and the flowers filled in around the lamps. A most pleasing and artistic effect can in this way be produced. Fancy colored glass shades are also used with these fixtures. These not only heighten the effect of the lights among the flowers, but they keep the plants from resting upon the lamps and thus prevent their withering. The lamps are made by the Edison Lamp Co. of Harrison, N. J.

There was at the Paris Exposition a coal digger which was worked by an electro motor. By its aid a man and a helper can undercut 110 tons of coal in ten hours.

NEW YORK WESTERN UNION NOTES. — Eastern chief operator Thomas Kennedy, speaking of the recent election, said it was the nineteenth that had taken place since he has been in this office. "I never saw," said he, "the returns handled quicker or the wires work better than on that occasion." He considers the circumstances a forerunner of better times, more honest government and the introduction of ballot reform. Chief operator Conrad Meyer, one of the most steady and reliable men in the office, recently enjoyed, with a fair amount of success, a few days' fishing up the Hudson. Mr. Clem Foster was the recipient from Mr. H. J. Hope, operator at Durham, N. C., a few days ago, of a pound package of choice smoking tobacco which we had the privilege of sampling. Chief operator O. K. Newton, while witnessing a game between the New York and Brooklyn Clubs, a few days ago, was accorded a most enthusiastic reception by Mr. "Buck" Ewing, the celebrated baseball player. The two gentlemen had not seen each other in several years and their meeting was most cordial. Their acquaintance dates back to the time when Buck was a mere lad at his home in Cincinnati. It is a fact worthy of mention that it was through the earnest efforts of Chief Operator Newton that Mr. Buck Ewing became a professional ball player. John F. Cleverdon has left for a month's vacation. Western quad chief Gay, assisted by Mr. Remer, looks after his wires during his absence. Miss Sarah Dougherty, time-keeper of the Ladies' Department, was called home a few days ago on account of the serious illness of her mother. Miss Rose has charge of the books during Miss Dougherty's absence. "Come, come, doctor," said a chief to one of the boys the other night; "I don't like to wake you up so often." Slowly the fellow stretched himself, rubbed his eyes once or twice, yawned, and then looking up, remarked "Well, I don't like to have you." Returned from sick leave: Miss Simmons, Miss Robertson. Returned from vacations: Chas. E. Chase, chief in C. N. D. W. L. Geehr has been assigned to the Oswego wire, *vice* Guest; Gavigan and Cummings to the race bureau; J. M. Winder, J. Cornish and J. Falkenbury to Albany quad; Robert Christian to 1 to 8 a. m. force; Mr. T. Kinney to Syracuse wire, *vice* Edison to Washington quad. New arrivals: a little girl at the residence of John F. King. Resigned, to accept a position with a broker, Mr. McWha; he is relieved by Mr. Jacobs. Transferred: Mr. Van Horn to Mr. Jay Gould's office; Misses Uth, Barry, the Misses Stephenson, to split trick; R. A. McKenzie to split trick in Wheatstone dept., *vice* McKim; Mr. Morrissey to split trick, *vice* A. Miller, on 7 to 4 force; E. G. Wood, to split trick, *vice* Mr. Bergen, 6 to 3 force; Mr. Lewis to 7 to 4.30 trick; Messrs. Horace, Weir and Sharkey, split tricks; Messrs. Pease and Skirrow to day force; Mr. Frothingham 6 to 3 trick; Mr. Riley, waiting list; W. W. Friend, day force; W. E. Giffen to split trick; Mr. Bergen to day force; F. G. Griffith to night force; T. H. Grady to day force. Messrs. Stewart, Weden, Smollin, Giles, Tomkins, Landy, McAllister, Booth and Buxton, of race bureau, have had their extra discontinued; Miss Emma Anderson transferred to 8 a. m. force; Gus Miller to Cincinnati quad; Mr. Morrissey to split trick; Mr. Donovan to Wheatstone department to fill Hemsworth's place.

The McAneeny Concert will be repeated at Chickering Hall, Thanksgiving night, November 28, and it is guaranteed to be fully up to the standard of the last one and in one or two particulars it may excel. Mr. Pearsall, as a matter of course, will take part; also Mrs. Johnson, the soprano; Miss Rosa E. Penner, contralto, who will make her first bow to a New York audience; Mr. S. Harry Holland, basso, and a chorus of twenty or thirty picked voices from the Brooklyn Apollo Club under a competent director. Other strictly first-class talent is also being negotiated for. Tickets are now on sale and can be reserved upon application to Mr. McAneeny, 195 Broadway, New York.

The Russian ukase forbidding female telegraphers to marry any persons except male telegraphers has been cancelled. It was a peculiarly hard kase.

THE NEW YORK OPERATING ROOM OF THE WESTERN UNION TELEGRAPH COMPANY.

The *Woman's Illustrated World*, of November 16th and November 23d, will contain photographic illustrations, the best ever taken, of the Main Office of the Western Union Telegraph Company, New York, showing the faces of the operators while at work, a great many of whom are readily recognized.

The engravings are 58 inches square, and are accompanied by a well-written article, descriptive of the same, from the graphic pen of Mrs. A. M. Payne.

Besides the faces of hundreds of the operators and other employes seen, an unusually accurate idea can be formed of the immensity of the room, of the switchboards containing thousands of wires connecting with all quarters of the continent, of the pneumatic tubes by which messages are exchanged with the newspaper and important city offices, and also of the aerial "carrier" wires transferring messages to and from the different sections of the room.

The view is from the gallery of the Commercial News Department.

Mr. Thos. Finnegan, the veteran doorkeeper, comes in for his share of the glory of the department by appearing in an excellent cut accompanied by a brief but interesting biographical sketch. The article is interesting in every line, and every telegrapher in the United States should send six 2-cent postage stamps, for which the two numbers of the paper will be mailed.

Address,

Woman's Illustrated World,
No. 10 West 23d St., New York.

\$10.00 AND \$5.00 FOR ORIGINAL STORIES FROM LADY SUBSCRIBERS.

Here is an opportunity for our lady subscribers to earn one of two prizes for story writing.

The *ELECTRIC AGE* will give \$10.00 to the lady telegrapher who composes and sends us for publication the best original telegraph story. A second prize of \$5.00 will also be given to the lady telegrapher sending the second best story.

The conditions are: 1st. The lady must be a subscriber to the paper; 2d. The story must not exceed 500 words in length, and *one side* of the paper only should be written on.

A nom de plume may be used if preferred.

Two stories from the same author will not be admitted in the same contest. The prizes will be awarded when not less than ten stories have been printed, and at least two of the stories will appear in each issue until that number has been reached. The judge will be announced in our next issue.

NEW YORK PERSONALS.

Beginning with this issue the telegraph profession will receive a complete electrical journal together with the telegraph paper. We expect our friends to increase our subscription list by recommending this complete paper to non-subscribers, and volunteer to receive and remit the \$1.50 for them. Now let a boom take place.

Now that the playing of music by itinerant bands has been prohibited in the city, night operators who moved to the country to obtain rest are moving back.

Mr. John E. Hoey is the happy father of a boy, born to him some days since. Mr. and Mrs. Hoey have the hearty congratulations of a host of friends.

DIED.—John H. Collins, a well and favorably known telegrapher of 195 Broadway office, died of consumption in Middletown, N. Y., November 5, after a lingering illness. About two years ago Mr. Collins moved to Colorado in hopes of benefiting his health, but to no purpose, and he returned east several months ago to die.

PLATTSBURGH, N. Y. NOTES.—Mr. George W. Hickey, formerly of Watertown, is manager of the G. N. W. office with W. A. Crooks as chief and Chas. Grey as assistant. The Commercial Union is managed by M. J. O'Bryan, assisted by Mr. Farley. At the D. & H. C. Co., S. D. Curtis is manager, and J. Finnegan, lately from Westport, ticket agent and operator; Will Sleigh, night operator. Mr. Cory, late of Alexandria Bay, is at the freight depot. Mr. Fred. Yakel, of Paul Smith's summer office, passed through here a few days ago, en route to Albany. At Chateaugay R. R. office, Mr. H. D. Leadbetter is train despatcher, Frank Myhill and J. C. Parkhurst assistants. M. L. French, superintendent of the road was at one time an operator at this station. Along the road ascending the Adirondacks, we find at Cadyville, J. B. Hall; Dannemora, J. C. Lawrence; Dannemora Prison, C. M. Moon; Mofittsville, H. A. Wood; Clayburgh, Geo. Keyser; Russia depot, N. L. Collins; Lyon Mountain, F. M. Johnson, formerly of the G. N. W.; Ogdensburg, Standish station, Geo. Tormey; Loon Lake, D. M. Roberts; Bloomingdale, Mr. Otis; Saranac Lake, the terminus of the road, Mr. T. J. Balch. Mrs. M. L. Wolff, of Loon Lake summer office, has returned to Morrisonville. On the Ausable branch of the D. & H. C. Co.'s road, we find F. H. Clough at Lapham; Peru, Geo. A. Lewis; Ferrona, Chas. Payette; Ausable, J. G. McKinnon; Ausable Forks, John A. Smith; Clintonville, M. A. Buck; Keeseville, Miss M. M. Sheldon; Bloomingdale Village, Messrs. Titus and Towne; Ticonderoga, Miss Anna Marshall; Crown Point, Mrs. S. C. Babcock; Elizabethtown, Miss A. A. Babcock; Rouses Point, John A. Mannix, manager, and Geo. H. Santamour, night operator. Whitehall, Wm. B. Eddy, manager; J. W. Eddy, chief; Fred. Matthews and Geo. Dunning, operators. At D. & H., Rouses Point, W. M. Lighthall; L. A. Childs, Chazy, N. Y.; R. Jones, Mooers Junct.; F. G. Sheldon, West Chazy; Mr. Finnegan, Port Kent; D. J. Crouse, Willsboro; J. O. Atwood, Westport; M. Carmody, Port Henry; Chas. Wait, Crown Point; D. J. Crowley, Addison Junction; L. G. Perry, Ft. Ticonderoga; Chas. May, Whitehall depot. The O. R. T. meets monthly at Rouses Point and is well attended by all.

EMPORIUM, Ks., NOTES.—Changes in A. T. & S. F. railroad relay office have been quite numerous of late. C. E. Feninger, is chief despatcher assisted by despatchers Bjerke, Clements, Rohrig and Beebe. E. A. Flaherty, is manager of the relay office assisted by operators Beebe of Detroit, Porter of Kansas City, and Cone, of St. Joseph, Mo., all new arrivals. Messrs. Spencers, Phillips and Fenn leaving for the Denison, (Texas), relay office of the M. K. & T. At the W. U. office we find the force consisting of Manager C. W. Cleaver; Geo. M. Birdsall, day operator, and Frank L. Titus, late of New Orleans, La., on night report.

NEW YORK POSTAL NOTES.—Arrivals: O. Bergmann, Miss M. B. Murphy, D. Ralyea, A. Walker, F. N. Andrews, W. C. Christian, W. J. Donahue, G. V. Hobart, Jos. Hurley, T. S. James, M. McDonald, T. J. O'Leary, R. W. Perrin, J. F. Zeiss, Miss M. L. Lee, R. Hutchinson. Departures: C. Davenport, J. Kearns, W. J. McGarr, E. G. Kalaher, R. H. Brooks, T. Alcan, M. Willetts. Transfers: J. Masterson, to Chicago *Tribune* office; F. J. Higgins, to stock exchange. Mr. Harry G. Funk has been appointed assistant night chief.

TOPEKA, Ks., NOTES.—L. D. Parker, general superintendent of the Postal has submitted a proposal to the Board of Trade of this city, with a view to extending his lines to this point. The proposition will be accepted, as the W. U. is without opposition.

Dr. Norvin Green, president of the Western Union Company, says his company bought the Baltimore and Ohio telegraph plant for \$5,000,000, although it cost \$7,000,000, and that on account of its low rates it had to go out of business.

C. P. R. WESTERN DIVISION NOTES.—Returned from vacation, F. Hogle, Rat Portage and A. A. Marllatt; Transfers, J. G. Campbell, Rat Portage to Savanne; H. Hurley, Savanne to Ignace; F. C. Saunders, Ignace to assist in despatcher's office, Port Arthur; C. M. Wormworth, Dexter to Parrywood; A. B. McCoy, Tache to Hawk Lake; A. S. McLeelan, Bonheur to Tache; W. Uren, Parrywood to Bonheur; F. H. King, Kaministiquia to Buda; J. Jackson, Port Arthur to Kaministiquia; F. A. Eby, Hawk Lake, has resigned. Transfers.—R. S. Riddle, to Carlstad; W. Chauncey, Arizona to Murillo; R. Beattie, Seaforth, Ont., to Bonheur; J. T. Lillie, to West Fort Roundhouse; A. McDonald, Sault St. Marie, Mich., to Rossland.

C. P. R. EASTERN DIVISION NOTES.—F. B. Scott, Wolf River, resigned to accept position in Winnipeg commercial office; S. D. Ward, from Bremner, appointed agent in his stead. D. Strach, new arrival, goes to Bremner. Some of the boys on this division were becoming dissatisfied, but thanks to changes which have lately been made they are all happy again.

PHILADELPHIA POSTAL NOTES.—Mr. Wm. P. Egan, of the sugar district, has been made happy by a call from Pittsburgh, to report for duty at that place. Mr. James Mattson has been transferred from the main office to fill Mr. Egan's place. Mr. Joseph M. Crawford now reports for duty at the dry goods district, vice J. P. Williams, gone to a broker. Mr. G. W. Hiney from the A. D. T., and Mrs. V. H. Walker, late of the New York dry goods district, are new arrivals.

SIoux CITY, IOWA, NOTES.—The Western Union has moved into its new office, which is satisfactory and complete in every detail. It is situated in the business part of the city, and by the way, is the best equipped office in the State. Mr. F. H. Tubbs and W. J. Lloyd, our esteemed superintendent and assistant superintendent respectively, have furnished us with everything to make us comfortable and happy, and we all appreciate their kindness. J. B. Buckley is our bookkeeper; A. C. Mullen, delivery clerk, having charge of a complete force of elegantly uniformed messengers; Eddie Shortly, night delivery clerk. A district call system of 300 boxes is a part of the delivery department. The manager's office is located in the front of the spacious room. The operating department consists of three rows of quartette tables, three in a row. In the partition which separates this from the battery room is located a large switchboard, and a loopboard. The quads are placed on a shelf and loops run to the tables. Walter Little has charge of the battery room. To Mr. V. T. Kissinger, of Chicago, belongs the credit of the electrical engineering. He did his work in a gentlemanly and thorough manner. Archie Rainey, has gone to Milwaukee; G. B. Cleaver has also left us. G. H. Thomas has gone to Armour, Dak.; M. O. T. Welch has returned to the office.

WICHITA, KAN. NOTES.—Business is still good for this time of the year. Election made a flurry for a few days. Changes since our last issue: Mr. Cutler, transferred from day chief to night chief; Mr. Sullivan from night chief to day chief. Mrs. Allison gone to Omaha, Neb., for the W. U. Harry Meredith, of the stock yards' office, has resigned, to go with a railroad at Kansas City, Mo.; he was relieved by Howard Hartzell.

We call upon our friends to now send in their orders for copies of the second edition of Terry & Finn's "Illustrations and Description of Telegraphic Apparatus," price \$1.50, which is about ready for distribution. It is replete with valuable information descriptive of telegraphic apparatus, etc., and should be in the hands of every first-class telegrapher. In fact it is intended as their text-book and a guide in their daily work. Those who desire to act as agents for its sale are requested to write us for discount, etc.

CHICAGO NOTES.—Changes are numerous of late. Among the departures are Ed. Hayzlett to the Chicago & Milwaukee Tel. Co.; Stratton to Floyd & Co.; Martin to Minneapolis; W. C. Pimm, one of our esteemed old-timers to be manager of the Minneapolis Board of Trade; Miss Hayes to be manager at Ottawa, Ills.; Mr. Gibson and Mr. Kendricks to Armour & Co.; W. V. Pierce to Bloomington, Ills., in exchange with John Ryan; Mr. Cotton to Meridian, Miss.; L. Loewenthal to Murphy & Co., and Mr. Stafford to take charge of the telegraph department of Dominick & Dickerman. Among the arrivals are Mr. Ireland from Helena; Trelling, Portland, Oregon; Geo. Cadore from Mich.; C. M. Robuck, St. Paul; Messrs. Donar, Jackson, Grant and Wangerein, Des Moines, where they were sent to assist on election returns. (We have not heard positively whether these gentlemen were or not the cause of the State's changing her political complexion); Mason, Rockford, Ill.; Grant, Kinney, Mr. Mulcahy, Omaha; Mr. Paddock, the popular wire chief, from a two weeks' vacation. He relieves Mr. A. W. Graham, who represented him efficiently during his absence. Mr. A. C. Murphy, who has held the position of chief operator of the city lines has been promoted to the position of superintendent of city lines. Mr. Murphy is well liked by all and has the best wishes of the entire fraternity. We must not omit the arrival of a young telegraph operator at Walter Ogden's home, although we are unable to publish his "sign." Mrs. Hammell *nee* Miss Mary Lea Beau, of this office, has the hearty congratulations of her numerous telegraphic friends here. Messrs. Stratton, Graham and McIntosh have returned from a week's sojourn with rod and gun in the "rural districts," and are now engaged in removing the sunburn from their erstwhile fair complexions. The gentlemen had an excellent time, and we understand did terrible execution among the feathered tribes of that locality. (N. B.: At the table). "Colleen Bawn" will be produced by amateur talent for the benefit of St. Charles Church, Nov. 19, and a number of the fraternity are in the cast. We hope it will be a success. Morse Council No. 347, National Union, composed mostly of operators from this and Postal offices is preparing a series of entertainments for the coming winter, the first one to occur Nov. 16. The council is growing very rapidly and has now nearly 100 members. Dr. William Manners, formerly of Toledo, recently paid us a visit. The last issue of the AGE was somewhat delayed in the Chicago postoffice, which is not likely to occur again. One would suppose the Postal had no office in this city, so seldom do we hear from that locality through the AGE. Your agent there ought to be heard from occasionally.

KANSAS CITY W. U. NOTES.—Arrivals since last letter, are: Mr. Laird, from W. U., Cleveland, Ohio; Miss Dale, who was with us about a year ago, from the W. U., St. Louis, Mo., and Miss Shields, formerly manager W. U. at Warrensburg, Mo. Departures are: Hawley, Chicago; Slagle, South; Mooney, Springfield, Mo.; S. H. Whitaker, South. It is rumored that our friend, Mr. Harry Saylor, who has been visiting home, will make Chicago his future home. Mr. Gideon Huscher, who has been so ill with fever, has resumed his duties on "first Ex." Chicago quad. Miss Lovelace has been assigned to Emporia wire; Miss Cook, to Salina wire; Miss Elston, to Ottawa wire. Miss Shields works Sedalia wire; Miss Walters is working Carthage wire; Miss Sharon is yet on Leavenworth wire, while Miss Bessie Godecke has charge of the St. Joe quad. Miss Dale works Junction City wire. M. Dillon has been assigned to the Topeka quad. Knapp has been placed on "C" City wire. Major McConahay now works the stock yards wire, Mr. Marshall having been transferred to the New Orleans quad. Mr. Logan and Mr. Norman work Deming duplex. On the night of the 5th, Mr. L. E. Boome had charge of the bulletin service; 'tis needless to say that the service was excellent. The AGE is eagerly read here, much interest being manifested by the subscribers, but the crying evil of "borrowing" still flourishes. New

lightning arresters have been placed on all the main line wires, and patent circuit openers, which open the circuit, in case of an exceedingly heavy battery, or electric light wire cross, has been placed on all the quad loops.

KANSAS CITY POSTAL NOTES.—On Nov. 1, the following changes were made: Mr. A. B. Richards, former chief operator, was appointed manager, vice T. F. Clohesy, resigned. Mr. A. B. Shell, night chief, was appointed chief operator, vice Mr. Richards. Mr. Fairo, former assistant chief, is now night chief, his place being filled by Mr. Ben Rommell, who has been with the company as operator since its start in this city. The changes are very agreeable to all employees.

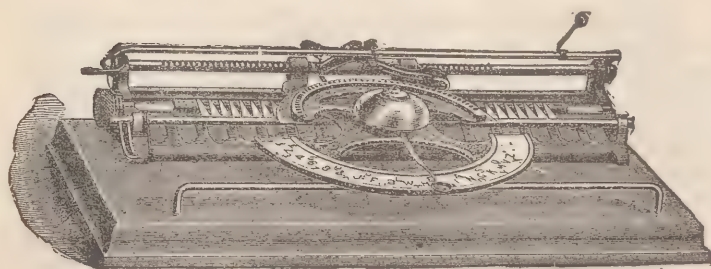
BOSTON POSTAL NOTES.—The following personnel of this office shows many changes to have taken place here since we were last heard from in the AGE: Mr. E. B. Pillsbury, manager; Mr. C. J. Foley, chief operator; Mr. George Starkey, traffic chief. On the first New York, Messrs. Geo. Bokelman, D. J. Donovan, Jack Murray and Thomas Quinn. The remainder of the force is as follows: Messrs. W. J. Clark, J. Ahearn, J. J. McGarty, F. R. Lovell, R. L. Kitts, Tim O'Brien, Geo. Carew, Nieman, Sampson, Fred. Johnson, J. H. Kenny and P. Cronin; also Misses Pillsbury, Brigham, Turner, Conley, Stearns and Mrs. Coffin. Night force—Mr. Day, Geo. H. Winston, manager. C. J. Shehan, first N. Y.; Joseph Walsh, Chicago; J. Weir, Washington. All-night operator, Selden Crowe. At the Broad Street office, Mr. Charles E. Bagley, manager, assisted by Messrs. C. A. Hart, C. F. Whitney and J. J. Benelisha. This office has recently been enlarged and fitted up in first-class style. J. F. Nolan, formerly of the W. U., has taken charge of the shoe and leather district office, relieving Mr. Daniel Carter, who has been appointed manager of a new office opened in the dry goods district, at 34 Bedford street. Mr. Wm. Peterson has charge of the Merchants' Row office, and Mr. W. E. Henderson, the Atlantic Avenue office, assisted by Messrs. O. F. Keating, Coughlan and Muloney. At the South End office, Mr. J. Muller, formerly of the W. U., Adams House, is manager, and Mr. Harry L. Flynn night manager. The new office in the Tremont Theatre is in charge of Mr. Harry Keating.

NEW ORLEANS NOTES.—With the busy season come the "winter men," among whom we find Messrs. LaPlace and Allison, from Memphis (Mr. Allison is with Ass'd Press, days); Wilkinson, Joe Morrow, Houston; Wendorf, Morgan line, this city; Dick Straley, Louisville; Pairan, Cormier, Collins, Cincinnati; Maynard, Kansas City; McMillan, Brooklyn, and Joe Keating Topolobampo, Mex. Phil Moake has been promoted from the Wheatstone; Mike Moloney, Miss. Valley road, city; Will Porteous, Lacy, Miss.; Harry Gilthorp, Tugalo, Ga.; Eddy Russell, Wilson, Ga. and Mr. Griffin, Red Top, Miss. Our old friend John Feehan is with us again, after an absence of a year at San Bernardino, Cal., where his health was greatly benefited. Departures: Burton Hall, Augusta, Ga.; Barney Jones, Memphis, to send the Ass'd Press. The Wheatstone artists are: Messrs. Hanmer, Rogers, Leefe, Alley, McBride, Heslin and Flippin. Married: Mr. Carl Weidemann to Miss Aline, daughter of our late, beloved night chief, Ben C. Higdon; Mr. W. C. Hudnall to Miss Bradford, a belle of Hattiesburg, Miss.

ARKANSAS CITY, Ks. NOTES.—Business has fallen off somewhat in the past six weeks, and the force was ordered reduced on Nov. 1. As a consequence, Miss Mattie VanAnsdale, who has been with us since the opening of the Oklahoma lands last spring has been transferred to Omaha.

Frank C. Miller has been appointed manager of the Western Union office at Huron, S. D. Mr. Miller is well and favorably known on the Pacific coast.

THIS TYPEWRITER FOR TEN NEW YEARLY
SUBSCRIBERS.



The World Typewriter will be given to any person who will secure ten NEW yearly subscribers to this journal. This is the greatest premium offer ever made by any paper and the offer no doubt will result in our friends everywhere putting forth their best efforts to earn a machine, which will prove of much assistance to them at all times. We guarantee that the commission on the ten new subscribers by securing this typewriter is \$10, or within one-third of the entire amount collected. In allowing this unusually large commission, of course, we expect new subscribers, and in fact this liberal offer is solely based upon this idea.

The World Typewriter was placed upon the market a little more than two years ago. Although then in a somewhat imperfect state compared with the World of to-day, its success from the start was remarkable, and it has steadily gained in favor. The World of to-day is the result of practical ideas, experiments, and improvements upon the original acceptable machine. The World is offered as the best machine for letter writing. It is practicable, durable, simple, and speedy, and will do as good work as any typewriter upon the market. It is intended as a legitimate companion to the telegraph and other office or professional desk, the stenographer's table and for any other place where the pen or pencil is used. During the two years that the World has been before the public nearly fifty thousand have been sold. The compactness of the machine gives it advantages not possessed by large and weighty typewriters. It is but 12 inches long, 6 inches wide, and 2½ inches high, and weighs but 3½ pounds; consequently it can be easily placed in a convenient position on the desk or in the drawer, not necessitating an extra table and change of position whenever a letter has to be written.

Address, THE ELECTRIC AGE Publishing Co., 5 Dey street, New York.

MISCELLANEOUS PERSONALS.

Mr. E. W. Emery, of The Associated Press, Philadelphia, has the sympathy of his many friends in the loss of his estimable wife, who died recently.

TRANSFERS.—W. T. Budds, Washington, D. C., to Augusta, Ga.; J. L. Dunlay, Bowie, A. T., to Lordsburg, N. M.; Geo. H. MacDonald, Albany, N. Y., to Portland, Me., for the Commercial Union; W. B. Swindell, Columbia, S. C., to Charlotte, N. C.; O. M. Gibbs, San Luis Obispo, Cal., to Savanna, Ill.; G. W. Harte, Philadelphia, to Baltimore.

DIED.—McLea, Thomas Walter, aged 29 years, a well-known telegrapher, native of Montreal, Canada, died of consumption, at Pasadena, Cal., on November 3d. His remains were interred in Pasadena cemetery.

T. M. B. A.—The annual meeting of this association will be held at 195 Broadway, November 20, when a full delegation will be present.

MESSENGER HOLIDAY GREETINGS.

We are prepared to furnish excellent Messenger Greetings, printed on plate paper, at the following prices:

25 copies, - - -	\$ 35	500 copies, - - -	\$3 50
50 " - - -	60	750 " - - -	5 00
100 " - - -	1 00	1000 " - - -	6 00
250 " - - -	2 00		

Send 2-cent stamp for sample. Address
ELECTRIC AGE, 5 Dey Street, New York.

BANQUETING JAMES D. REID.—On November 20th a banquet will be given in honor of Mr. James D. Reid by the Magnetic Club, at Martinelli's.

This is intended as a farewell expression of esteem and respect for the oldest living member of the telegraphic profession, as Mr. Reid, being appointed U. S. Consul to Dunfermline, will sail for Scotland on the 27th inst. The New York Telegraph Club has been invited to co-operate with its fellow organization by a general attendance at the banquet, and the occasion will be taken advantage of to present Mr. Reid with a handsome souvenir in the shape of a gold medal, as a token of the esteem in which he is held by his fellow members of the New York Telegraph Club.

The Telegraphers' Mutual Benefit Association will also co-operate.

CONGRATULATIONS FREE.—Gen. Thos. T. Eckert, general manager of the Western Union, and Mr. A. B. Chandler, president Postal Telegraph-Cable Co., have informed Mr. W. J. Dealy, secretary of the Old-Timers, that any farewell telegrams to Mr. Reid, from Old-Timers, on the evening of the banquet, will be forwarded free by both lines. A loop has been run to the banquet hall for the purpose of receiving the despatches. Mr. J. D. Reid entered the telegraph service in 1845 and will leave it Nov. 26, 1889.

On November 21st Mr. Andrew Carnegie and a few intimate friends will give Mr. J. D. Reid a farewell banquet. Mr. Reid leaves on the steamer Lahn on Nov. 27, at 9.30 a. m., from Hoboken.

Mr. James D. Reid presented the New York Telegraph Club with his compliments some thirty interesting books.

WESTERN ENTERPRISE.—Our San Francisco agent, Mr. H. M. Graham, a short time ago induced an operator in 195 Broadway, New York, to subscribe through him for the AGE. The office of the AGE is immediately across the street from the main office, but the money was sent to San Francisco and returned to us, and the receipt travelled over the same ground, occupying over a month's time to complete the transaction. This enterprise has never before been equalled. A few years ago we had an agent at Portland, Oregon, by the name of J. M. Spencer, who never allowed distance to interfere with securing names for this paper, and it frequently happened that in a batch of subscriptions sent us by him we would find St. Paul, San Francisco and British Columbia names among them.

Mr. Chas. L. Loewenthal, our enterprising Chicago agent and C. L. Hallett, our Port Arthur, Ont., agent, were the first to receive typewriters for new subscribers, as per our offer in another column. These gentlemen know how to "get there" every time, and they do it in such a pleasant manner as to excite the admiration of every one of their associates in their respective localities. Mr. Loewenthal is particularly a "hustler" of the first magnitude and as clever an accountant as it has been our good fortune to meet and we have met all the shining lights of the profession. We can heartily recommend him to the citizens of Chicago as a capable and upright gentleman and worthy of their confidence.

Mr. A. C. Bowser, of the W. U. Washington night force, who worked the Cincinnati quad, is sick with typhoid fever.

THE ELECTRIC AGE, 5 DEY STREET, N. Y.

THE ELECTRIC AGE, 5 DEY STREET, N. Y.

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BY THE BACHELOR.

(CHICAGO.)

"*Apropos* to 'De's' recent article on telegraphic poetry," said an old-timer to me, as I seated myself beside him on Milwaukee the other evening, "Did you ever observe that electricity is apparently a great promoter of the poetic instinct?"

"In what way?" asked I.

"Well, as soon as a man becomes identified with electrical pursuits, especially telegraphy, he begins to have an uncontrollable desire to commit poetry. I dare say there are not a score of men in this room who have not, at one time or another, been guilty of some original doggerel."

"But how do you account for it?" I asked, smiling incredulously, but with a remembrance of certain vague attempts of my own confirming his words.

"Don't account for it all?" he replied; "but I used to have an aunt who wouldn't accept any other theory or explanation of electricity beyond its being the devil, and sometimes I think she's right,—devil gets into the operators and causes them to write this so-called poetry."

"Did you ever write any yourself?" queried I, "If that's not an impertinent question."

"Yes," returned the old man, a look of deep disgust settling over his face; "I did—and may God have mercy on my soul. I'd sit for hours in the throes of composition, and then go mooning around searching for victims to read it to. I might have been going on that way yet, if I hadn't left one of my productions on my desk one morning (I was dispatching trains then), and the superintendent found it. He read the first verse, turned white, and asked who wrote it. I stepped forward and modestly acknowledged the authorship. He took me into his private office, took a seat near the fire escape, and asked me how long I had been that way, and if it was hereditary or not. When he saw that I didn't become violent, he grew bolder and said he'd be eternally blanked to blank if he'd jeopardize the lives of the people by letting me dispatch trains any longer, gave me my time, led me gently but firmly to the door, and kicked me out. That cured me."

The old man leaned back with a far-away look, and then continued: "Ever hear of Parody, sir?"

I never had, but would be pleased to.

"His name was Si Waters, but we called him Parody Si, because he would make parodies on everything that came to his notice. His productions were always in a telegraphic way. He'd stand a man off in the middle of a message, if one of his inspirations struck him, until it was put into writing. He never smiled at his own efforts, or anything else, as far as that goes, but would always hand it to his side partner to read, and then destroy it. One night we were working Washington quad together, and Si couldn't get on to the Washington man's combination. At last he stopped him, and, after a few moments' vigorous writing, pushed the following over to me:

"Break, break, break, while my side partner cuseteth,
oh, key!
And I would that my pen could scribble down
What this fellow is sending to me.
Ah, well, for the broker man that his 'rush' message has
gone through;
Ah! well, for the traffic chief, that we're clear on the
overflow;
And my numerous breaks keep sliding in,
And the sender cuseteth still.
But, oh, for a pencil that wouldn't grit, and ink that
wouldn't spill!
Break, break, break, while my side partner cuseteth,
oh, key!

But I'm certain sure that I never can take
What this fellow is sending to me."

"But couldn't you find something so complicated of construction that he couldn't imitate it?" I asked.

"Impossible. Even Poe's 'Raven' wasn't too much for him. He was working beside Charley B— one evening on this wire. Si and Charley were both a little ambitious, and Si sent a good deal of business in the first part of the evening; and when they changed over, Charley tried to beat his record. He couldn't do it, however, and Si heightened his chagrin by shoving him a blank containing the following effusion:

"And poor Charley, never shirking, still is working,
still is working,
For the telegraph talent to which I alone can soar,
And his fingers, ever flying, on the key before him lying,
And his bosom, heaved with sighing,
Shows his heart within him sore.
But the record I have raised him,
That has racked his bosom sore,
He shall break—Ah, nevermore!"

CLEVELAND, O., NOTES.—In the Oct. 16 issue of the AGE, under date of Washington, appears the following: "The AGE expects to get its work in this winter, and will keep the outside world posted, telegraphically speaking, on the doings at the National capital." As a starter, the work is gotten in in elegant shape, with another item in the same issue, telling how "Old Reliable," on Sept. 22, had gone away beyond all past records in telegraphing and sent 253 messages in three hours, or an average of 84 per hour,—a feat which certainly ought to ensure him a position with any "Celestial Telegraph Combine," whose business is all sent "collect," when he shuffles off this mortal coil. If the AGE correspondent at the National capital can't get in some different kind of work than this, he had better transfer his services to some of the occult fake concerns that make it their business to get their work in and the money out of their customers; but it can't be rammed down the throats of the readers of the AGE with impunity. But, perhaps this correspondent had forgotten that whilst there are doings at Washington, there are also doings at other points of the outside world, and I would like to disabuse his mind of the idea that 84 messages per hour were sent by any Washington operator to Pittsburg, or any other point, for three consecutive hours. I found out from Pittsburg how this wonderful work was accomplished, and it may save your Washington correspondent's making another bad break when he discovers that on Sept. 26, four days after the Pittsburg batch of 253 messages had been handled, that a batch of 274 city reds were received from Washington at this office, in one hour and forty minutes, on a single wire circuit, with some slight interruptions; or, figured by the Washington AGE correspondent's rule, at the rate of 164 messages per hour. (I don't know whether "Old Reliable" was the sender or not.) These figures look like big work to the uninitiated; but when the details are known it makes this great mountain sink into a plain, and a very insignificant plain into the bargain. If I am correctly informed, Pittsburg placed five men at the sounder to receive these 353 messages, and the Washington operator sent the entire message once for each five messages, or fifty-one times; and if I remember rightly, the message had 13 body words, and two words in the signature; allowing a total of thirty words to the entire message matter, these 51 transmissions would aggregate 1,530 words; then allow ten words each for the address of the remaining 202 messages, which required only the number of the message and the address to be sent, giving us another 2020 words, or a total aggregate of 3550 words in 180 minutes. Now, Mr. Washington, get out your little hatchet, hew up this log, and—don't

tell a lie—it makes just $19\frac{2}{3}$ words a minute, at which rate "Old reliable would have been considerably over twice three hours had he been required to send the thirty words to a message 253 times—the impression that is made by the item as printed. My estimate of 30 words to the message may be high, but if so, it simply makes the record still less. The batch of 274 messages, similar to those sent to Pittsburg, was started to Cleveland at 9 P. M., Sept. 26. The first message was sent entire, and then the Washington operator told to go ahead with the No. and the address of each. Meanwhile, any operator, who happened to be "resting," was given a chance to make up some copies, so by the time Washington had got 150 of the addresses sent, there were 125 red blanks all filled, with the exception of the number, signature, and address. These were placed before the receiver, who now put his addresses on them, and the first addressed blanks filled in by "resters" without letting usual business suffer; and by the time Washington had sent his No. 274 the whole batch of business was in the hands of the delivery department ready for copying. This does not imply that there is nothing doing in this office at that time of night, for our records will bear comparison with those of any other office of the service, and if Washington had not let loose upon the "outside world," this fake record of 84 messages per hour for three consecutive hours, you would never have heard the $19\frac{2}{3}$ word per minute version of it from—BUCKEYE.

A HANDSOME TELEGRAPH OFFICE.—The American District Telegraph Co. of Philadelphia is undoubtedly in possession of the finest office of its kind in America. The "3d" District is now back to its original location on the N. E. cor. of Broad and Chestnut sts., now the site of the monster new Girard Building. Every piece of furniture in this office is of finely polished oak. The long counter, extending the whole length of the room, is beautified by tastefully arranged panels. The switch case, into which the twelve call circuits are run, is prominently placed against the wall in the centre, being surmounted by a very large clock which will supply the time throughout the entire building. A shelf, extending from each side of the switch case, bears the registers and bells on the right and left, a portion of the right being also occupied by instruments pertaining to the protective system. These instruments are all of the latest and most improved pattern, new, handsome and sparkling with bright nickel plate, as are also the Morse and all others in use at this office. The spirit of brightness does not end here, but is reflected in the beaming countenance of Superintendent A. J. Whittingham and his staff of clever assistants. The circular department, battery room, wardrobes, toilet, and accommodations for the twenty-five messenger boys, are found in the basement.

On Oct. 31 occurred the entertainment given by Mr. M. J. Dixon, and it was unanimously voted a social success. The great hall was crowded. The programme for the evening included character songs by Mr. M. J. Dixon, recitations by Miss Lillian A. Thorpe, and a duet, sung by Messrs. Arthur F. Hurd and Mr. J. A. Rennie. Robertson's favorite comedy "Caste" followed the above, and the rendering was an unusually excellent amateur performance. Special mention must be made of Miss Jessie Wal-lack, who captivated the audience in her excellent *Polly*. Dancing was next in order, and when daybreak dawned upon the assemblage many were the regrets that the affair was at an end.

The Chicago operators express much regret over the sad death of their old associate A. W. Githens, who was run over October 14, and killed by the cars. The funeral was largely attended.

TELEGRAPHY AS A PROFESSION.

BY DR. NORVIN GREEN, PRESIDENT OF THE WESTERN UNION TELEGRAPH COMPANY.

It will interest the boys who expect to enter the telegraph business to learn that men who have risen to be managers in the Western Union Telegraph Company have had long experience in the practical operation of the telegraph. Both our General Manager and our working Vice-President commenced their work in a very low-grade position. So with all our General Superintendents; they have gone through all the gradations up to the command of their respective departments.

But there is one exception to that rule in my own case. I commenced the business thirty-five years ago at the head of a company that leased lines running from Cincinnati to New Orleans, and which afterwards bought them out and extended them into Texas, Arkansas and Alabama, under the name of the Southwestern Telegraph Company. For twelve years I was President of that Company from the start, afterwards was Vice-President of the American, in which my Company was first merged, and finally President of the Western Union.

So that I have never had a lower grade position in the telegraph business than that of executive officer, and have never been a practical telegrapher. Necessarily I have learned a great deal of electrical science and have become acquainted with electrical inventions, but have never, as my predecessor did, undertaken to make myself a better electrician than the professional electricians that the Company employ; consequently, I rely largely on their experience and advice. Sometimes I have been sorry that I did not have a classical education, but when I look back and see how the discipline I went through has been so helpful to me in the conduct of practical affairs, I am at a loss to determine whether or not I should have been the gainer by such a training.

There are two objections in these times to a collegiate education for young men; one is the fact that often boys either overstudy or they go to the other extreme and do not study enough, and the fact that much of the time spent at college is given up to pleasures which are often of a dissipated character. There is no doubt, however, that a classical education is, to many men, beneficial, because they show in their positions what good use they make of it.

I regard my success in obtaining and holding my position as being due to a talent for organization and order. As the phrenologists would say, my bump of order is large; I like to see everything done in its proper time and order. It is also absolutely essential to successful executive management that a man should have qualifications as an organizer. It is not needed that the executive head of a telegraph company of this magnitude should be either a practical operator or a practical electrician; in fact he has got more than enough to occupy all his time and thoughts in shaping the general policy and financial management of the corporation and is bound to leave the practical conduct of its affairs to subordinates.

Among these subordinates is the General Manager, who has charge of all the lines and officers. The Second Vice-President has charge of our relations with railroad companies and other corporations, and is head of the electrical department. The business is then subdivided under these respective parties into bureaus. We have three General Superintendents next in authority to the General Manager, and each of those General Superintendents has from eight to twelve District Superintendents. Some superintendents, again, have assistant superintendents. All of the positions I have named (with the exception of the District Superintendents) command high salaries, the pay running from \$5,000 to \$15,000 a year.

UP FROM THE RANKS.

Our General Manager commenced as a messenger boy; so did our Second Vice-President. Most of our superintendents began either as messenger boys or as operators in small offices, receiving at first very moderate wages. The majority of our superintendents are chosen from the operators and managers of offices and selected on account of the talent they have developed in organizing and directing whatever force they have had under them.

Our Treasurer, who has charge of from \$10,000,000 to \$15,000,000 of our securities, twenty-two years ago was a boy in the office of which he is now chief, at a salary of \$25 a month. Another point should be borne in mind: a great many telegraph men have been promoted from the ordinary service to good positions in other offices. Many prominent officials of railroad companies have been selected from the ranks of telegraphers: the Vice-President and General Manager of the Louisville and Nashville Railroad was once a telegraph operator in the depot office at Louisville.

But it should be borne in mind that the opportunities for advancement in the telegraph business are not so great in percentage as in the railroads, the express companies and many other corporations, for the reason that the percentage of officers to the whole number employed is very small.

Then, again, advancement does not come in this or any other business for many men who are very competent in the places, but who would be very incompetent for higher positions; that is, there are some men who seem to be born, as we say, to run in grooves; they do not seem to have the faculty of a wide and general comprehension of business. They may not prefer that style of disposition, but they are certainly born with it and cannot grow out of it. The phase of character is especially illustrated among Englishmen, many of whom if they come to occupy the position of bookkeeper have reached the height of their ambition.

The telegraph business has given employment to a great army of people; it is difficult to say how many, but at the present time there are recognized as in the employ of the Western Union Telegraph Company about 25,500 persons. A considerable proportion of this number, however, are paid by the railroad companies; but in the handling of telegraph messages in railroad offices they are recognized as our agents and make reports to us. A great many whose names are not known to us are more or less in the employ of the telegraph company in railroad offices. Many railroad offices have four or five operators. As they are all paid by the railroad company, we do not know any of them, except the manager, who makes the report to us; his is the only name that comes before us. So that a very considerable number that we do not get any account of on our rolls are doing service for the telegraph company under our contract with the railroad company.

GREAT FIELD FOR WOMEN.

The employment of women in the telegraph business is growing all the time and more largely in the old countries than here. In London, about two-fifths of the operators are females. I am not so well acquainted with the methods that prevail in France and Russia, but my impression is that a very large proportion of women are employed in those countries. Women are very successful as operators, yet it is very rarely you find a woman attain the skill that a large percentage of men are capable of attaining. About one-fourth of the operators in New York city are female, but I do not think probably more than twelve or fifteen of them are capable of handling what we call a "heavy" wire, or a "long circuit."

On the long circuits the sending requires a firm wrist and a strong pressure; also in the receiving of messages the sound comes faint, and it requires an acute and prac-

tised ear to distinguish the dots and dashes and spaces without making errors. On the short circuits the sending of messages requires only a light pressure, and in receiving the sounds come sharp and clear. Most of our female operators are employed on the short circuits; the city wires are altogether run by them; at such offices the operators send messages to points within the city. Wires running from New York to Newark, Yonkers, Long Branch, to points on Long Island, are called light circuits, which female operators can handle as well as men.

First class telegraph operators, whether male or female, can always find employment. There is a superabundance of poor and indifferent operators who fail to obtain positions. My opinion is that the proportion of female operators will steadily increase, until all the light wires will be operated by them. As I have already stated, the opportunities for advancement are not so great in the telegraph business as in some other occupations carried on by corporations, although a man of capacity and application who selects telegraphy for a vocation will, in time, make his way to the front.

In the future, I think, we shall have machine telegraphy. We are now introducing, largely, the Wheatstone automatic system, which we are using from New York to New Orleans, all the way through to San Francisco, and eastward as far as the cables at Cape Canso, at the northern border of Nova Scotia. This system saves wire facilities, for which there is a growing demand in the great number that are being hired for private uses. A large number of brokers are hiring private wires; almost every large newspaper has one or more; the associated presses hire a number of private wires all over the country; and although we have 625,000 miles of wire, enough to girdle the earth twenty-five times, we have not got enough.

IT WAS HIS LAST MESSAGE.

"I AM SHOT IN THE STOMACH—BURGLARS" TOLD OPERATOR SMITH'S FATE.

GUTHRIE, I. T., Nov. 7.—About 1.30 this morning, Mr. Edwards, the telegraph operator at the railroad depot, heard the instrument suddenly tick the following words:

"I am shot in the stomach—burglars."

The message came from Wharton, which is the first station in the Cherokee Strip, and immediately surmising that the operator had been attacked and shot by robbers, Edwards hunted up Dr. A. L. Smith, who is the surgeon of the Santa Fé, and the latter left on an extra train at 2.30 o'clock. Before leaving, however, word came that the young operator at Wharton, whose name is C. E. Smith, had died. He was night operator at the station; and as the place consists of only a railroad station and a section house a square away, he was doubtless an easy victim to the burglars.

DETROIT NOTES.—Quite a large-sized rumor was floating about the office a fortnight ago to the effect that an extensive reduction of force was contemplated. There was some tall figuring done, and several half-soles were indulged in by the "boys," who thought they stood a good show of walking out. However, the "lopping off" ate hasn't materialized yet and business generally continues quite brisk. Two recent arrivals are Messrs. B. H. Watson, Bay City and Harry C. Freeman, Jackson. Departure: G. P. Boas to Potterville, Mich., for the Grand Trunk.

Mr. Charles P. Bruch has resigned his position as secretary of the Non-Magnetic Watch Company. Mr. E. T. Gilliland has also severed his connection with that company.

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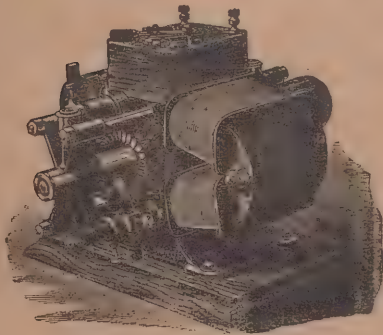
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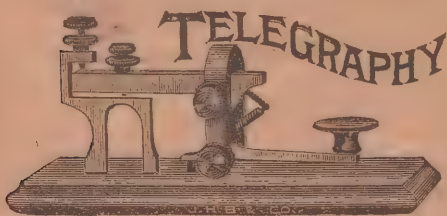
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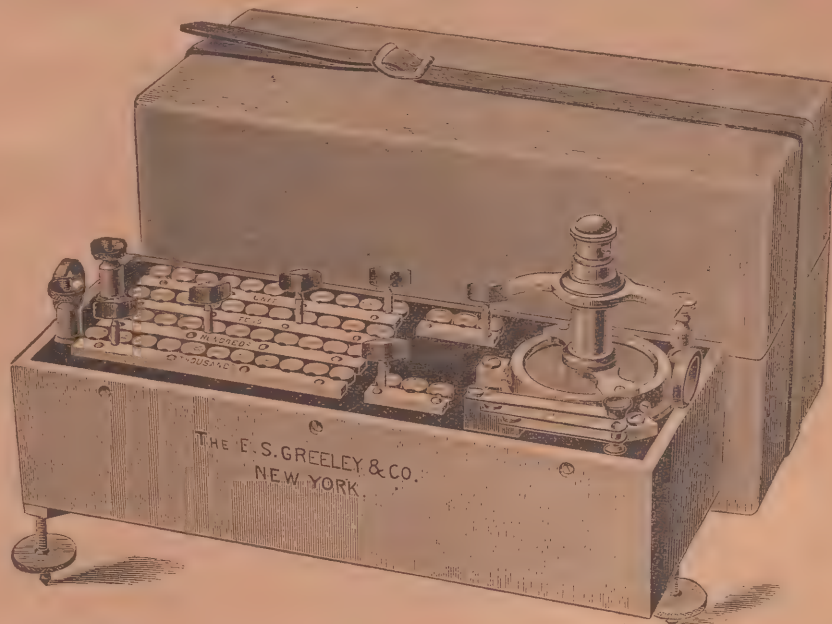
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Edison Company Sustained. Westinghouse Company Defeated.

Sawyer-Man Patent Decided by the Court to be a Fraud and Absolutely Valueless. Extracts from the Decision of Justice Bradley, Oct. 5, 1889.

Circuit Court of the United States for the Western District of Pennsylvania.

THE CONSOLIDATED ELECTRIC LIGHT COMPANY (WESTINGHOUSE COMPANY) versus McKEESPORT LIGHT COMPANY (EDISON COMPANY).

No. 5, May Term 1888. On Bill and Final Hearing.

EXTRACTS FROM OPINION OF THE COURT.

"The great question in this suit is whether the patent sued on is valid, so far as involves a general claim for the use in electric lamps of incandescing carbon conductors made of fibrous or textile substances. If it is, the complainant must prevail. If it is not, the bill must be dismissed"

"Is the patent valid for such a broad claim? The defendants contend that it is not; first, because no such invention was set forth in the original application, but was introduced more than four years after it was filed, and after the same material had been used by Edison, and claimed by him in application for a patent; secondly, because Edison, and not Sawyer-Man, was really the original and first inventor of an incandescent conductor made of fibrous or textile material for an electric lamp."

"It is very clear to us that in the original application for the patent sued on the applicants had no such object in view as that of claiming all carbon made from fibrous and textile substances as a conductor for an incandescing electric lamp. Nothing on which to base any such claim is disclosed in the original application. We have carefully compared it with the amended application, on which the patent was issued, and are fully satisfied that after Edison's inventions on this subject had been published to the world there was an entire change of base on the part of Sawyer & Man, and that the application was amended to give it an entirely different direction and purpose from what it had in its original form."

"By an adroit amendment made in 1885, they say: 'Our improvement relates more especially to the incandescing conductor, its substance, its form and its combination with the other elements composing the lamp.' The purpose of this amendment is obvious, and needs no comment."

"The fact is that Sawyer & Man were unconscious that the arc was not new, and supposed that they could get a patent for it; but, as their eyes were opened, they changed about and amended their application, and made the material of the conductor the great object—carbon made from fibrous or textile material. Compare the original with the amended application, as first stated in this opinion, and this purpose most obviously appears."

"The fact that the whole object of the application was changed is evinced by the correspondence of the parties."

"This testimony of Mr. Broadnax, which is undoubtedly to be relied on, in connection with the letter just quoted, shows that the idea of claiming carbons made from fibrous and textile materials was an afterthought, and was no part of the purpose of the original application. The amendments relating to this new and broad claim were made afterward, in February and March, 1885."

"We are of the opinion that the changes made in the application in this regard were not justifiable, and that the claim in question cannot be sustained."

"We are not at all satisfied that Sawyer and Man ever made and reduced to practical operation any such invention as is set forth and claimed in the patent in suit. Their principal experiments were made in 1878, and perhaps the beginning of 1879. The evidence as to what they accomplished in the construction of electric lamps is so contradictory and suspicious that we can with difficulty give credence to the conclusions sought to be drawn from it. We are not satisfied that they ever produced an electric lamp with a burner of carbon made from fibrous material, or any other material, which was a success."

"The application for the patent in suit was not made until January, 1880, nearly or quite a year after all their experiments had ceased, and after the inventions of Edison had been published to the world."

"The explanations made by the complainants for the delay in applying for the patent in suit fail to satisfy our minds that Sawyer & Man, or their assignees for them, have not sought to obtain a patent to which they were not legitimately entitled."

"But, suppose it to be true, as the supposed inventors and some of the other witnesses testify, that they did in 1878 construct some lamps with burners of carbon made of fibrous material, and of an arched shape, which continued to give light for days or weeks or months; still, were they a successful invention? Would any one purchase or touch them now? Did they not lack an essential ingredient which was necessary to their adoption and use? Did they go any farther in principle, if they did in degree, than did other lamps which had been constructed before? It seems to us that they were following a wrong principle—the principle of small resistance in an incandescing conductor, and a strong current of electricity—and that the great discovery in the art was that of adopting high resistance in the conductor with a small illuminating surface, and a corresponding diminution in the strength of the current. This was accomplished by Edison in his filamental thread-like conductors, rendered practicable by the perfection of the vacuum in the globe of the lamp. He abandoned the old method of making the globe in separate pieces, cemented together, and adopted a globe of one entire piece of glass, into which he introduced small platinum conductors, fastened by fusion of the glass around them, thus being able to procure and maintain perhaps the most perfect vacuum known in the arts. In such a vacuum the slender filaments of carbon, attenuated to the last degree of fineness, may be maintained in a state of incandescence without deterioration for an indefinite time, and with a small expenditure of electric force. This was really the grand discovery in the art of electric-lighting, without which it could not have become a practical art for the purposes of general use in houses and cities."

"The principle and great thing described is the attenuated filament and its enclosure in a perfect vacuum."

"We think we are not mistaken in saying that but for this discovery electric lighting would never have become a fact. We have supposed it to be the discovery of Edison because he has a patent for it. This may not be the case. It may be the discovery of some other person; but, whoever discovered it, it is undoubtedly the great discovery in the art of practical lighting by electricity."

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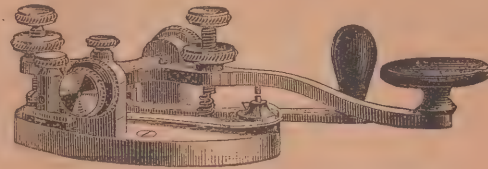
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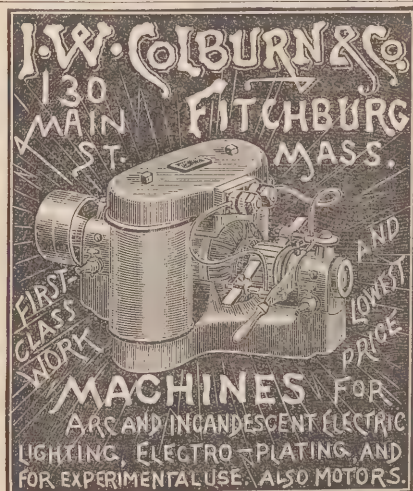
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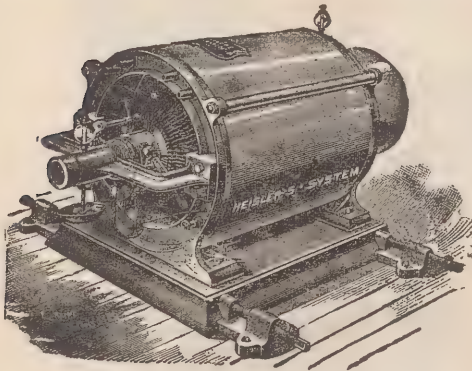
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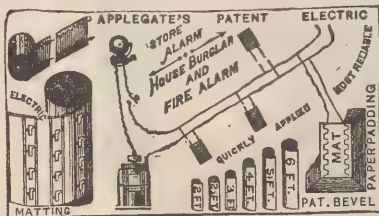
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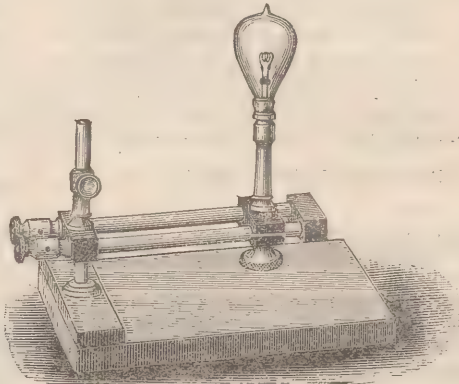
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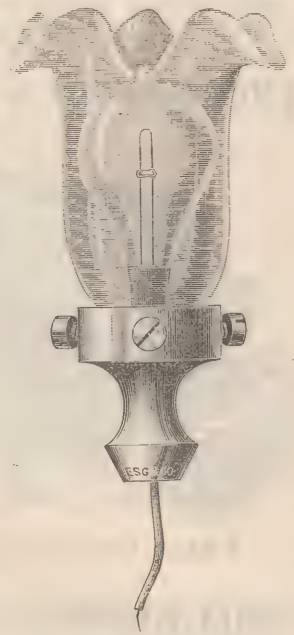
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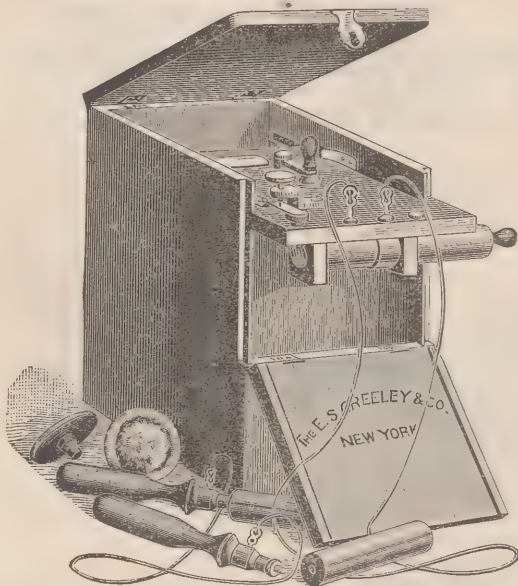
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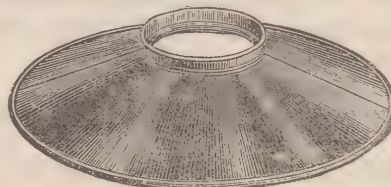
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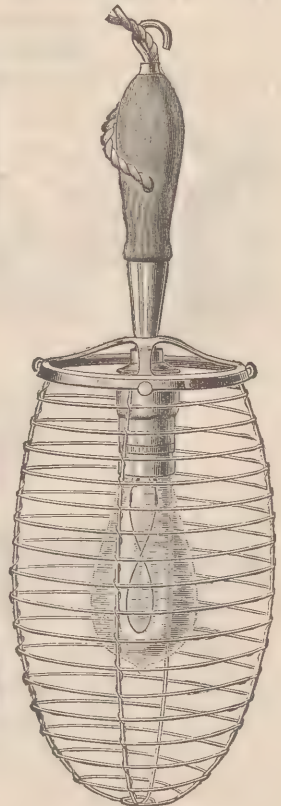
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NEW YORK, DECEMBER 1, 1889.

The telegraph profession of America, in the departure of Mr. J. D. Reid, has lost a steadfast and conscientious friend. Mr. Reid was some time ago appointed consul to Dunfermline, Scotland, for which place he left on the 27th ult. The entire craft did their old friend the greatest honor by assembling at the banquet table and recounting his pure life and his many achievements in the development of the telegraph, some forty years ago. Hundreds of telegrams of regret and congratulation were received and read during the banquet, all of which attested to the reverend respect in which he is held by the entire electrical profession. It is safe to say that no American ever before left these shores with so many kind words and tokens of good will and esteem. We commend our honored friend to the kind consideration of the Scotch people.

The Telegraphers' Mutual Benefit Association has passed its 22nd anniversary. The report of its officers, as shown on another page, justifies the greatest confidence in the present management and in the conservative policy pursued. No telegrapher or telephonist can afford, in justice to himself, to remain uninsured in this association. The fraternity should not forget that eighty-eight thousand dollars stand as a guarantee against "hard times."

Mr. E. R. Weeks, President of the National Electric Light Association, is not slowing up one iota in his efforts to make the next meeting of his association a complete success in every particular. From present indications there is no doubt of a full attendance of every one interested in the various branches of the electric lighting and electric power industry.

It is to be regretted that the injunction which stopped the Fourth avenue electric cars in this city, a month ago, is still in force.

The electric light in Brazil is making rapid strides into the popularity of the citizens of that now reported republic.

The charter of the Western Union Telegraph Co. in Missouri has been cancelled by that State.

The Mayor of Boston wants the wires of that city placed under the control of some board.

Cable communication with Brazil has been restored.

BUSINESS MENTION.

The Aluminum Brass and Bronze Co., manufacturers of aluminum and silicon, in ingots, castings sheets, rods and wire, under the exclusive rights, in the United States, of the Cowles patents, with office at 261 Broadway, New York, are opening up an extensive business; and, with the sagacity of a number of young and enterprising gentlemen lately added to the personnel, a still larger business will be conducted from this time forth.

This metal in color is white and next in lustre to silver. It has never been found in a pure state, but is known to exist in nearly two hundred different minerals; all common clays and granites are rich ores of this metal. The specific gravity of aluminum is but two and six-tenth times that of water, being only one-third the weight of iron and one-fourth the weight of silver; it is as malleable as gold, and nearly as tenacious as iron. Thus it is capable of the widest variety of uses, being soft ductile and tenacious. It melts at 1,300 degrees Fahr., and neither oxidizes in the atmosphere nor tarnishes in contact with gases.

The greatest value of aluminum is in the *wonderful alloys* it is capable of producing. These are innumerable. Alloyed with wrought iron and steel, it gives certain properties that enable those metals to be cast successfully and without blowholes; with copper, the beautiful gold bronze; with silver, the *hers argent* of the French; and with zinc, nickel, tin and manganese, it forms valuable and characteristic alloys, giving to them qualities of great tensile strength, immunity from oxidation and other advantages. The alloys are now on the market in competition with ordinary metals.

One of the prettiest and most attractive exhibits at the American Institute Fair this year is that of the Wenstrom Northern Electric Co. of New York. This company had one of their new type multipolar dynamos of 110 volts, 60 ampères, 980 revolutions per minute, which is operating 100 16-candle power Sawyer-Man lamps; also one of their new type multipolar motors of 2-horse power, running at 1,200 revolutions per minute and operated by the same dynamo. These dynamos and motors are attracting considerable attention from experts generally, owing to their unique construction, etc. The principal features of the Wenstrom dynamos and motors have the endorsement of such eminent and able scientists as Prof. Brown of Switzerland, Prof. Kennedy, Glasgow, Prof. Kapp of Germany, Prof. Sylvanus P. Thompson and others.

The Complete Construction Company has under contract over two hundred miles of underground work. They will construct a line of underground from the Battery to Fourteenth street on Broadway; from the Bowery to Eighteenth street, and through 125th street from Lenox to First avenue. The work is for the Manhattan, Mount Morris and other electric light companies.

The Easton Electric Company, whose office is at 45 Broadway, New York, has issued an excellent catalogue of their electric lighting system, which should be in the possession of those interested. The officers of the company report an increase in their business and a bright future's trade.

The City Council of Alexandria, Va., has accepted the plant established there by the Schuyler Company, and agreed to take 19 arc lights instead of an option of 117 incandescents, using 3 incandescents only at the electric works. This will give the city 84 arc lights.

The Electric Company has been organized at Connellsville, Pa., with a capital stock of \$30,000. John O. Frisbee is president; John D. Gans, secretary and superintendent, and S. T. Norton, treasurer.

SOME METHODS OF REGULATING ACCUMULATORS
IN ELECTRIC LIGHTING.

(Continued.)

While this method satisfies all but one requirement in certain classes of plants where it is convenient to employ the dynamo solely for charging the battery during a part of the day, and to use either the dynamo or battery, or both, in the lamp circuits at other times, it does not, in fact, satisfactorily permit of that splitting of the dynamo current between the lamps and battery which was incidentally referred to. More than this, it fails to provide a means of compensating for that rise and fall of the potential of the battery during charge and discharge which has been mentioned; and this is the unsatisfied requirement referred to above. The reason why the dynamo cannot satisfactorily divide its current between the battery and lamps when connected in the manner illustrated in Fig. 1 has already been pointed out. During the charging of the battery its potential will rise to 2.2 volts per cell, so that the pressure of the dynamo must be raised to 110 volts in the case now being considered, and this excessive pressure would endanger the life of the lamps. How, then, will it be possible to employ the higher pressure demanded by the battery and at the same time supply current to a number of lower voltage lamps without raising their candle-power above normal? The answer is easily given, for it is only necessary to insert a suitable resistance in the main between the dynamo and lamp circuits in order to accomplish the desired result. Such a resistance, usually called a "pressure equalizer," should be made of wire sufficiently large to safely carry the current for the greatest number of lamps likely to be required at the time when the dynamo which supplies them is to be simultaneously called upon to charge the battery, and should be made conveniently adjustable, as the fall of potential through it varies with the current. The method of regulating the working potential of the battery is equally simple, for it merely consists in adding to, or subtracting from, the number of active cells in circuit. This is accomplished by means of a multiple point switch, called a cell-regulating switch, shown diagrammatically in Fig. 2, which is so constructed that, in the act of shifting the cells in and out of circuit, it neither interrupts the circuit nor short-circuits the cells. It consists essentially of a single pivoted lever, which carries on its outer end a short metallic arm. This arm is attached to the lever by means of a block of insulating material, but is electrically connected with it by a short spiral of German silver wire. The lever and arm may be made to pass over a number of contact strips, which are so arranged that, before the lever breaks contact at one strip, the arm comes in contact with the next strip, and the reverse action takes place when the lever is moved in the opposite direction. During the brief interval, while both lever and bar are in contact with adjacent strips, the cell connected to those strips discharges a feeble current through the spiral of wire.

It is necessary to mention here, that in practice it is customary to provide for the installation of 10 per cent. more cells in each series than a simple calculation on the basis of two volts per cell would show to be necessary. Thus a plant using 100 volt lamps would require $100 \div 2 = 50$ cells + 10 per cent. of $50 = 5$, or 55 cells in each series. This allowance is usually sufficient to compensate for the fall of potential during discharge, as well as to provide for the ordinary loss of potential in the lamp main.

The method of employing the pressure equalizer and cell-regulating switch is shown in Fig. 3, this diagram being otherwise similar to Fig. 1, with the further exception that an automatic brake switch, *B S*, is inserted

in the branch wire connecting the dynamo and battery through the lower contacts of the switches *S*₁ *S*₂. The function of the automatic break switch is merely to interrupt the charging current, in the event of the potential of the dynamo becoming so much reduced from any cause as to allow the battery to overcome it, and perhaps reverse its polarity. This switch, a practical form of which is shown in Fig. 4, consists of a simple electro-magnet with a weighted armature lever carrying at one end an \cap -shaped bent wire dipping into mercury cups. The charging current passes through this magnet and from one mercury cup to the other through the bent wire. When the current becomes greatly reduced to any predetermined extent, gravity overpowers the attractive force of the magnet, its armature is released, and the bent wire being drawn out of the mercury cups, the circuit is broken. By referring to the diagram in Fig. 3, it will be seen that the pressure equalizer *P E* has been so placed that when the switches *S*₁ *S*₂ are on their lower contacts, the current from the (+) pole of the dynamo will divide at switch *S*₁, part going through the battery and part through the pressure equalizer to the lamp circuits, both currents again uniting at the *M* (-) main to return to the (-) pole of the dynamo. By this arrangement the potential of the

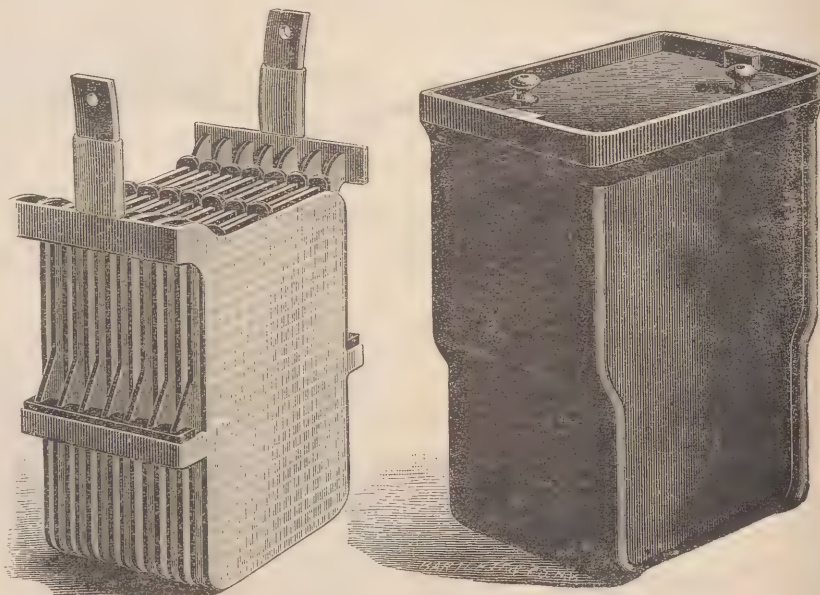


Fig. 20.

dynamo may be adjusted to the requirements of the battery, and at the same time the pressure at the lamps suitably reduced by adjusting the resistance of the pressure equalizer.

When the proper balance is once obtained, and by means of this apparatus it may be quickly and easily accomplished by one man, no further attention than would ordinarily be given to the dynamo would be necessary, for although the counter potential of the battery would gradually rise toward the end of the charge, and the current passing into the battery become correspondingly reduced, this result is even desirable, as it is somewhat advantageous to reduce the strength of the charging current as the battery becomes filled. In some installations, however, the extra or regulating cells are used to a more limited extent than the others, and thus having had less current taken from them they become sufficiently charged in a shorter time. A simple movement of the cell-regulating switch will then serve to cut out of circuit one or more of the charged cells as may be required, while the others receive current for a longer time. In some cases a further adjustment of the field rheostat of the dynamo and

of the pressure equalizer may afterward be required, and if so, are quickly effected.

The first indication that the cells have received nearly enough charge will be given by the gentle evolution of gas, which gradually increases thereafter, and which should never be allowed to become violent. At the same time the potential of the battery will approach 2.2 volts per cell, and even reach above 2.3 volts per cell when the gassing becomes marked. In order to take advantage of the indication of charge it will be sufficient to have a volt meter conveniently located and connected with the terminals of the battery, by means of which instrument, the number of cells in the battery being known, the potential per cell is readily ascertained. While this increase in potential is taking place, a similar variation in the density or specific gravity of the electrolyte in the cells also occurs, but this change, unlike that of the potential, remains fixed, even after the charging current is discontinued. That is to say, if the specific gravity of the

drop in specific gravity and potential occurs when the cells are discharged, which in degree has about the same value as the rise. This variation in specific gravity is explained by the formation of lead sulphate during discharge, which implies the absorption of acid from the electrolyte, and by the reduction of this sulphate during the charge when the electrolyte is strengthened.

While the method of installing a single series of accumulators in connection with an isolated plant, as described and illustrated in Fig. 3, fulfills most of the conditions required in small plants operating a single dynamo, in larger plants of a similar type using two or more dynamos, several series of the largest cells may be required. Although such an installation would consist mainly of an amplification of the system already described, still there exists a new difficulty not met with in that system. This arises from the fact already mentioned, that when several series of cells are charged in parallel, any essential difference in the amount of the residual charge in the several series results in their allowing different amounts of current to flow through them, although all of the series are charged at the same potential. The remedy for this undesirable result is of the same character as that employed to prevent excessive pressure on the lamp circuits, when the dynamo which supplies them with current is at the same time used to charge accumulators. In circuit with each series of cells is placed a small adjustable resistance coil, called a current equalizer, a cheap practical form of which is shown in Fig. 5. It is composed of wire large enough to carry the maximum current of a single series of cells, and usually has a resistance of from 3-10 to 6-10 of an ohm. Each series of cells is also provided with an ammeter, and upon the commencement of a charge the current equalizers are so adjusted that each ammeter shows the same amount of current to be passing through each series. In order to avoid as much as possible any loss of energy in the current equalizers, they are all turned to the no-resistance point at the start, and resistance is then only inserted in such series as may be taking more current than others.

The general arrangement of an accumulator plant consisting of two dynamos and two sets of batteries is illustrated in Fig. 6, and a simple extension of this plan only is necessary to adapt any number of series of cells to a plant having any number of dynamos. It will be seen that one equalizer circuit, and one charging circuit with its automatic cut-out, are common to all the dynamos that may be used. While this arrangement possesses all the flexibility of the method of installing a single series of cells as shown in Fig. 3, it has the additional advantage that at such times as the load is below normal, a spare dynamo can be exclusively employed for charging the cells, and thus avoid loss of energy in the pressure equalizer. As a general thing, when the current equalizers *CE* have once been adjusted at the beginning of a charge they need but little if any further attention; still if from any cause one series of cells should happen to be overdischarged, or discharged more than the remaining series, a suitable readjustment of the current equalizers will permit the undercharged series to receive current at a higher rate than the others, and thus equalize itself with the others. It may also be mentioned that both the pressure and current equalizers may be made to operate automatically by the application of a potential magnet to the former and of a current magnet to the latter, together with a simple but somewhat expensive train of gears to move their levers. This is found to be wholly unnecessary in practice, however, as an engineer is usually in constant charge of such a plant while the dynamos are running, and he can easily devote the little time necessary to the infrequent regulation required.

It was mentioned in the early part of this paper that it was possible to injure accumulators either by overdischarging them or working them at too high a rate. It is assumed that

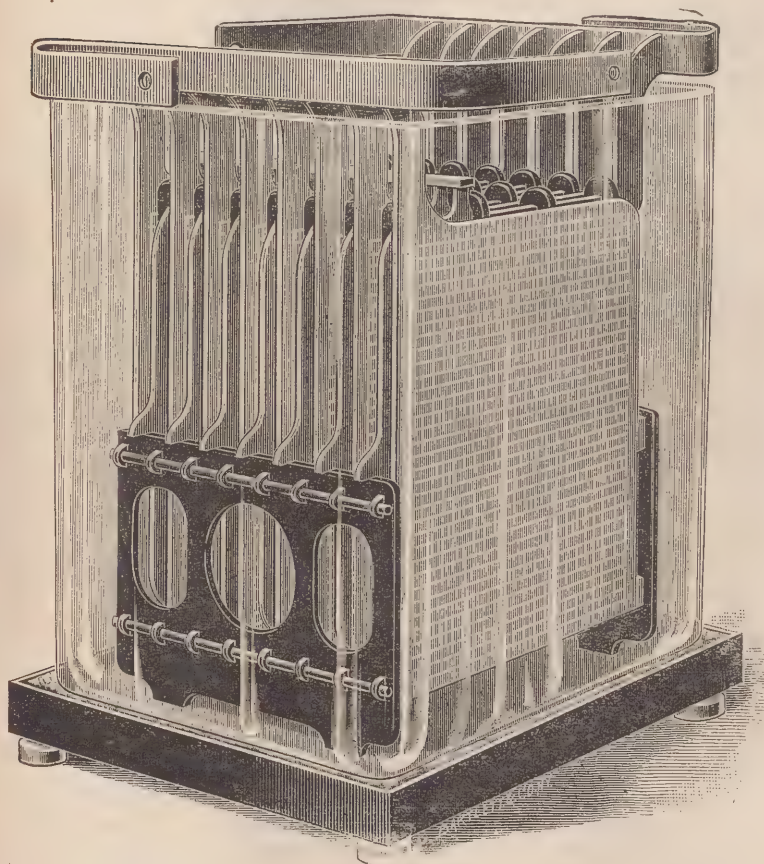


Fig. 16.

liquid was 1.160 when the cells were normally discharged, it would rise to 1.190 when they were fully charged, and would remain at that for a considerable length of time if no current was drawn from them. This rise of 0.030 in the specific gravity of the electrolyte is about the average increase in density which takes place in the common types and sizes of accumulators when 1.160 acid is used in the original charge, and when the range is from the normal discharge to full charge. It often happens, however, that charging is commenced when the cells have more or less residual charge, and in this case the rise in specific gravity will be correspondingly less; while on the other hand it will be correspondingly greater if the cells were previously over-discharged. Again, if unusually large cells enclose the piles (as the aggregation of electrodes is commonly designated) the rise of specific gravity will be smaller, and, on the other hand, larger if unusually small containing cells are employed. As heretofore stated, a similar

in the larger plants, there will be such supervision available under ordinary working conditions that occurrences of this kind will be avoided; but a simple device for preventing such abuse of the cells in smaller plants, where such supervision is not always convenient, has been devised. It is called an overload and overdischarge switch, and its operation is based on the fact that, when a series of cells is overdischarged, their potential falls below a minimum value, and that when they are worked above their normal rate the current exceeds a maximum value. The apparatus consists essentially of a pressure magnet connected to the terminals of the battery, and of a current magnet in series with the battery. When the potential of the battery falls below a minimum value, the armature of the potential magnet is released and throws an artificial resistance into the battery circuit, and thus reduces the current; and similarly, when the current exceeds a maximum value, the armature of the current magnet is attracted and performs a similar function. The connections of this overload and overdischarge switch *C* and *P* are shown diagrammatically in Fig. 7, in

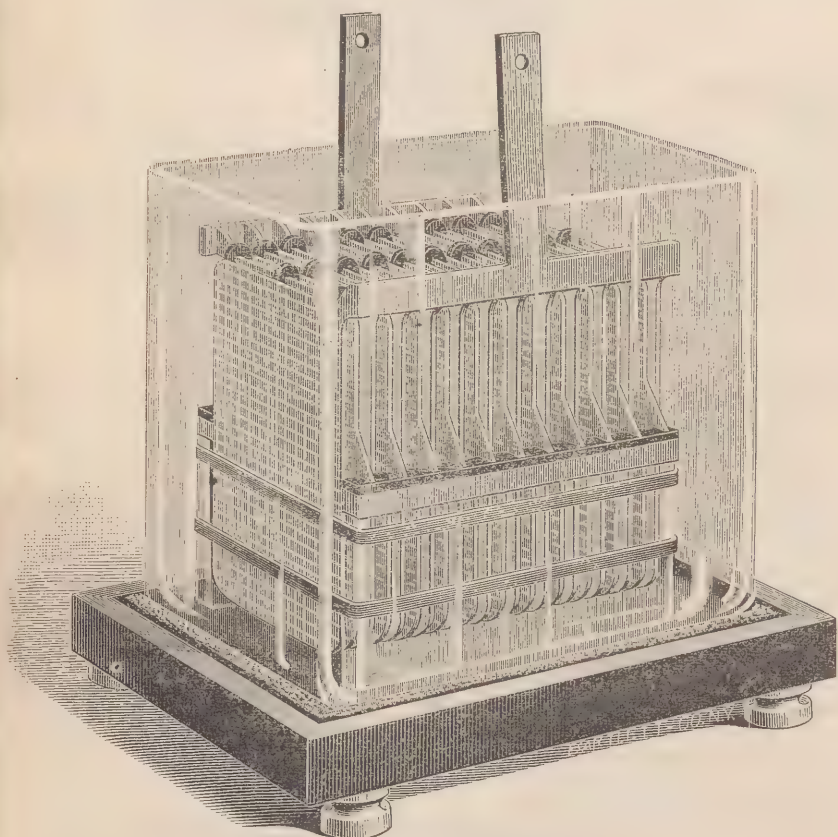


Fig. 17.

which a common resistance *R* serves for either magnet. The battery current passes from *A* to *B* through the overload magnet, while the terminals of the overdischarge magnet are, as before stated, in shunt to the battery terminals. In Fig. 8 is illustrated a practical form of a combined overload and overdischarge switch.

With the object of reducing the cost of the regulating apparatus whenever both the combined overload and overdischarge switch and the current equalizer are to be used with the same series of cells, the switch portion of the equalizer may be mounted on the resistance frame, and thus a single resistance coil be made to do service for both instruments. This combination, of which the connections are shown in Fig. 9, while allowing the current equalizer switch to control the full range of resistance, at the same time causes the whole coil to be thrown into the battery circuit upon the operation of either the overload or overdischarge switch. This, of course, diminishes the brilliancy of the

lamps, and thus indicates the state of affairs to those interested.

In applying accumulators to plants operated on the three-wire system, a simple extension of the method already described is adopted, except in the case of small stations requiring only one series of accumulators, and where the working circuits can be multiplied during the light load, so that the ordinary method will suffice. In larger plants the batteries are installed in pairs, each series having the same apparatus as before; and as this has already been fully explained, it will only be necessary to add that in adapting two series of cells to the three-wire system, the two batteries are connected in series in the same manner that the dynamos are connected. The general plan of this arrangement is shown in Fig. 10, from which unimportant details have been omitted. At the top of this diagram the three horizontal lines *M* (+), *M* (−), and *M* (−) represent the omnibus wires in the dynamo room, from which the feeders *L* are led. The three vertical lines *O* (+), *O* (−), and *O* (−) are extensions to the omnibus wires to which the dynamos are directly connected in the usual manner when the levers of the switches *S*₁ are on their upper contacts. The batteries are also connected with the omnibus wires in a similar way, so that when the switches *S*₂ are closed on their lower contacts the batteries will also discharge into the lamp circuits in parallel with the dynamos. Now if the switches *S*₁ are turned to their lower contacts, and the switches *S*₂ to their upper contacts, the current from the dynamos will divide at the switches *S*₁, part going into the lamp circuits, and part through the batteries, which thus receive a charge. As in the multiple arc system, the potential of the dynamos being assumed to be raised above the normal to meet the requirements of the batteries, in order to suitably reduce the pressure on the lamp circuits, it is only necessary to adjust the resistance of the pressure equalizer *P E*. In central stations, where the feeders are already provided with pressure equalizers, the connections are still more simple, for the batteries are merely connected to the omnibus wires, while all other connections of the ordinary three-wire station are unchanged. In such cases, the increased pressure at which the dynamos are operated during the time the batteries are charging is reduced at the lamps to the proper point by the usual adjustment of the feeder or pressure equalizers. During the charging period all regulation of the accumulators may be dispensed with by opening the switch *S*₁, when both batteries will be connected in a single series to the full pressure of both dynamos. In addition to the apparatus shown in the diagram, each series of cells is provided with a double plug switch and sockets suitably disposed, by means of which the relative positions of the batteries on the two sides of the system may be changed by simply transposing the plugs from one socket to the other. The object of this arrangement is to provide means for compensating for the unequal discharge of the batteries when the two sides of the lamp system are unbalanced; and the transposition is never made oftener than once each day. In all other respects the manipulation of accumulators when applied to three-wire systems is practically the same as when they are operated on the multiple arc plan. To increase the accumulator capacity of three-wire stations, double batteries are added in parallel to the first set, just as additional dynamos would be.

It was explained further back that the extra, or regulating cells in each series often become charged sooner than the remainder of the cells, and required to be removed from the circuit before the others. This operation, of course, calls for some labor; and, little as it is, it would still be desirable to have the number of cells in a series remain fixed both during charge and discharge. By the use of what are called counter electromotive force cells, this re-

sult may be effected, and at the same time the pressure equalizer be dispensed with. These very simple cells are made like an ordinary Planté accumulator of plain sheets of an inoxidizable lead alloy and without active material. When a current is passed through them they act as gas voltmeters, and while they instantly oppose a counter electromotive force of about two volts, they are incapable of producing a current of any appreciable amount of duration on account of their inoxidizable property. The use of counter electromotive force cells in place of equalizers is advantageous in several ways, for not only may their internal resistance be made so small as to be practically negligible, but their counter electromotive force is as effectual in reducing excessive pressure as a dead wire resistance, while possessing the unequalled advantage that the fall in potential of the current passing through them is unaffected by any variation in the strength of such current.

The method of using these counter electromotive force cells is shown in Fig. 11, which represents a single series of accumulators installed in connection with a direct lighting plant operating one dynamo, as first described, and for simplicity and effectiveness this method cannot be well exceeded. The dynamo is connected to the lamp mains, as before, through an ammeter on one side, and through the upper contact of a two-way switch *S* on the other; while the battery *B* is similarly connected to the lamp mains on one side, but on the other the circuit is completed through several counter electromotive force cells *K*₁, the number opposed being governed by the position of the cell-regulating switch *C.S.* When the lever of switch *S* is on its lower contact, the charging circuit is completed in the now familiar manner. The action of a plant arranged in the above way is as follows: Assuming the lever of the cell-regulating switch to be turned off or open, as the expression goes, and that the dynamo switch is on its upper contact, the dynamo alone supplies current to the lamp circuits. If, now, the lever of the cell-regulating switch is turned to its left-hand contact plate, the battery will be similarly supplying current to the lamp circuits in conjunction with the dynamo, or alone if the dynamo switch is opened. If the dynamo switch is now turned to its lower contact, the dynamo current will divide at the point where it connects between the battery and counter electromotive force cells, part going through the battery and back to the dynamo through the (—) lamp main, while the remainder will pass through the counter electromotive force cells to the lamps. Thus, while the full pressure of the dynamo current will be effective at the battery terminals, its pressure at the lamps will be less by 2, 4, 6, etc., volts, according as 1, 2, 3, etc., counter electromotive force cells are opposed to the passage of the current into the lamps by the position of the lever of the cell-regulating switch.

When the battery has been fully charged and it is desired to stop the dynamo, the latter may be disconnected by opening the switch *S*₁, when the battery alone will maintain the lamps. As previously explained, the potential of the battery will be a maximum immediately after it has received a charge, so that in this case, if the battery has the usual allowance of extra cells, its potential will be higher than the lamps require. More or less of the counter E. M. F. cells may now be inserted in the lamp circuit, however, until the potential is suitably adjusted. Although during the greater part of the discharge the E. M. F. of the battery will remain fairly constant, if discharged to its limit the potential will slowly fall toward the end and this fall must be compensated for by removing one or more of the counter E. M. F. cells from the lamp circuit.

It is to be noted that by means of the above method the number of cells in the battery proper is fixed and unalterable during both the charge and discharge, and that

whenever the dynamo is supplying current to the lamps, its surplus current is always available for charging the batteries; moreover, only one adjustment of the counter E. M. F. regulating cells opposed to the lamp current will be required. It is obvious that counter E. M. F. cells may be substituted with equal effectiveness for the equalizers and regulating cells employed in all of the previously-described systems, and it seems unnecessary to go into any further particulars to illustrate the practicability of such systems when properly installed and operated.

We have now to consider another branch of the electric lighting business, in which accumulators also claim a share of attention, viz.; the supplying of currents to lamps located at a considerable distance from the source of power.

The first method to be considered is known as the half-direct plan, in which one or more series of cells are installed in any number of sub-stations conveniently located near centres of lamp consumption. The charging station may be situated wherever economy dictates, without any special reference to the location of the batteries, for although the expense of the charging wire and the cost of the energy wasted in it cannot be neglected, both these factors must be offset by the saving effected from locating the power station in the most desirable situation. This half-direct system is so called because during the period of maximum load half the current is supplied by the charging dynamo, and half by the batteries. At other times the dynamo may be simultaneously charging the batteries and supplying lamps, or the battery alone may be in operation. Each sub-battery station is, in fact, a small central station by itself, and it may contain one or several series of cells, the number, of course, depending upon the amount of lighting to be done in its vicinity. A common charging main, like an arc light circuit, passes through each sub-station, and each battery may be inserted in the main or withdrawn from it at will, exactly as arc lamps are cut in and out of circuit. The charging dynamo is usually of high voltage and of moderate current capacity. Machines of 500 volts and 15 ampères to 1,200 volts and 40 ampères may be employed in small stations, while in larger ones the latter machines and their circuits may be multiplied. For charging purposes shunt-wound dynamos are preferable on account of their non-reversibility, but even series and compound-wound machines may be used if suitable precautions are taken. The arrangement of the accumulators and regulating apparatus in each sub-station on the half-direct system is essentially the same as the method adopted in the last described multiple arc system. The connections of two sub-stations installed on this plan are shown in Fig. 12, in which station 1 is shown with its switches in position for both its battery and lamp circuits to receive current from the charging circuit; while station 2 is disconnected from the charging line, which is closed outside of it, and the batteries alone supply the lamp circuits. The switch which is employed to throw the batteries into, and out of, the charging circuit is of the snap action type, and is sometimes called a consumer's switch. It maintains the integrity of the charging circuit when the batteries are removed from it, and is provided with a spark coil which prevents the opening of the charging line and the consequent formation of the injurious arc which results on the interruption of high potential circuits. A modified practical form of this switch is illustrated in Fig. 13. As shown diagrammatically in the sketch, it consists in the main of four terminal contact springs, which bear against an insulated cylinder in which are imbedded two rows of metallic contact strips. In one position the two left-hand and the two right hand springs are brought into electric contact, but if the cylinder is rotated slightly the two middle springs will be brought into electrical contact, while the two outer ones are left free, as

shown respectively in R and R_r . As before stated, this change is effected rapidly and without breaking the circuits. These switches are usually operated by hand at the beginning and end of a charge, at which time whatever inspection of the cells is necessary is also generally made. By applying the polarized magnet principle to this switch it can be made to operate automatically from the central station through a momentary reversal of the charging current, a principle which has already been applied.

While the method just described of locating the batteries in sub-stations near the lamps to be supplied reduces the resistance of the supply wires to such an extent that the variation of potential with changes in current strength is unimportant compared with what it would be were all the lamps operated from one central point, under ordinary conditions, still a similar variation does occur from a different cause. We have already seen that the potential of a battery is higher while it is being charged than at other times, and that the greater the charging current the higher the potential of the battery becomes. It is evident that if charging commences when only a very few lamps are burning in a given battery only a small part of the charging current will be required by the lamps, while the greater part will pass through the battery. This will raise the potential of the battery considerably, and as the lamp mains are permanently connected to its terminals, the lamps will receive an excessive pressure. As the number of lamps increases, however, more of the charging current will pass to them and less through the battery, the potential of which thus becomes gradually reduced until it reaches a minimum, when the number of lamps burning becomes so great that the whole output from both the dynamo and battery is required to maintain them. The variation is in the opposite direction, of course, when the lights are diminishing in number. It is evident from the preceding facts that during the period when the charging dynamo is running and the lamp loads are varying some regulation of the pressure at the lamp mains at each sub-station is required. This regulation is automatically effected by means of the apparatus shown in Fig. 14, in which a solenoid magnet, $A R$, and a polarized magnet, $P M$, are inserted in the battery circuit. In all other respects the relative positions of the battery, lamps and charging circuits remain unaltered from the arrangement shown in the last diagram. The operation of the apparatus in this sub-station will be as follows: Assuming the charging dynamo to be delivering a current through the charging main M , and the consumer's switch is in the position shown in the diagram, the charging current will pass from $M (+)$ to the point Q , where it will divide, part going through the lamps and the opposed counter electromotive force cells K to the point L , and thence to the line again, the remaining part of the current passing from point Q through the magnets $P M$ and $A R$, and out through the battery to point Z and line. When the current is flowing in the direction of the arrow, as in the case just cited, the armature of the polarized magnet is moved to its left-hand contact, as shown, and the plunger of the solenoid magnet is more or less drawn down, according to the strength of the current. This action of the solenoid magnet causes one or more counter electromotive force cells to be inserted in the lamp circuit in such a way as to oppose their electromotive force to that of the charging current, while the full pressure of this current is available at the battery terminals. If now the number of lamps is increased to such an extent that not only all of the charging current passes through them, but also that more or less current from the battery joins in parallel with it, then the current from the battery will traverse the polarized magnet in the opposite direction from that previously taken by the charging current, and its armature will be moved against its right-hand contact, thus short-circuiting the solenoid magnet and the counter electromotive force cells, as indicated

by the broken line. For, as the sketch shows, the lever of the solenoid magnet is so balanced that when no current is traversing the magnet, its metallic contact rods all dip into their respective mercury cups, and so shunt around the counter electromotive force cells with which the latter are in electrical connection. When the lamp load becomes reduced and the charging current is discontinued either by the stoppage of the dynamo, or by its being shunted past that particular battery by a movement of the switches to the right, the battery alone works into the lamp circuit, and the counter electromotive force cells are short-circuited.

While the automatic regulator just described, when applied to the half-direct system, maintains the pressure at the lamps sufficiently uniform for practical purposes, whether the charging dynamo is operating or not, and although the proximity of the battery to the lamps it supplies prevents undue variation of potential when the load changes, yet a perfectly automatic method of maintaining a constant potential at the lamp circuits, even where the resistance of the loads is great, would be generally useful. Such a method is illustrated in Fig. 15, in which the battery, counter electromotive force cells, lamps and charging circuits, occupy the same relative positions as before. The solenoid magnet of the regulator is no longer in series with the battery, however, and is, in fact, entirely disconnected from it, while the polarized magnet is replaced by a second solenoid magnet, $P M$, wound to high resistance. The armature lever of this second solenoid is so mounted that when its core is attracted or released this lever moves over a series of contact strips which are insulated from each other. Connected with these contact strips are coils of wire of suitable resistance, the whole constituting a simple rheostat, more or less of the wire of which is included in a local circuit, according to the position of the lever, which acts as a movable contact. The solenoid magnet of the regulator $A R$, and one or two cells of accumulators, are also included in the local circuit referred to, the strength of the current flowing in this circuit depending upon the amount of resistance inserted by the movement of the lever of the pressure magnet $P M$. The latter magnet is connected directly with the battery terminals, and as the potential of the battery rises and falls, the current flowing through this magnet varies correspondingly, causing a similar variation in the current in the local circuit. Thus an increase of pressure at the lamps which are connected to the battery terminals indirectly causes the armature of the regulating magnet $A R$ to be attracted, and this in turn opposes one or more counter electromotive force cells in the lamp circuit until the pressure again becomes normal. If the pressure at the lamps falls below normal, the regulator acts in the reverse way, cutting out the counter electromotive force cells until the normal pressure is again restored. If in connection with this method the polarized consumer's switch, previously mentioned, is substituted at S , the operation of such a sub-station will be entirely automatic.

It is proper to mention that the pressure magnet must be very sensitive and requires a delicate adjustment, besides being somewhat costly on account of the excellence of the workmanship required. Although I have only seen the instrument used in an experimental way, its practical application to similar purposes has given satisfactory results.

Under certain circumstances, as, for example, when a lighting station is worked to its full capacity at night, but during the daytime has ample surplus power, the all-accumulator system may often be applied to increase the capacity of such a station with satisfactory results. In such cases the sub stations of accumulators are located at distant points in the usual way, the cells being charged during the day and discharged on the lamp circuits at night while the power plant is doing its regular work. The arrange-

ment of the accumulators and regulating apparatus in the sub-stations of the all-accumulator system is practically the same as when the half-direct system is employed, except that a single transfer switch, which transfers the battery from the lamp circuit to the charging circuit, and *vice versa*, is used instead of the consumer's switch.

It is needless to say that all of the methods which have been described of employing accumulators in long-distance lighting may be adapted to existing lighting plants, and that when so adapted the earning capacity of such stations may be considerably increased without extending the capacity of the power plant. For this purpose there will usually be required a special dynamo at the central station, a charging circuit taking in the territory outside of the regular lighting limits, and one or more sub-stations with accumulators.

There are, of course, numerous other ways of utilizing accumulators in central station supply systems, such, for example, as the double battery method now operated in England by the Electrical Power Storage Company, in which the dynamos are kept running for 24 hours daily, duplicate sets of accumulators being alternately inserted in the charging and supply circuits at uniform intervals of time, by an automatic mechanical device. But I have limited this paper to a description of some of the simpler methods of accumulator regulation which may be readily adapted to ordinary lighting plants, and, in concluding, can only hope that I have succeeded to some extent, at least, in showing that when so applied in an intelligent manner accumulators do occupy a useful place in the industry of electric lighting.

Through the courtesy of the Electrical Accumulator Company I am enabled to present to the Institute this evening the first proofs of some cuts of a new line of standard accumulators recently brought out by that company. The cells referred to are shown in Figs. 16 to 21, inclusive.

POSSIBILITIES OF THE PHONOGRAPH.

Edward Bellamy, the author of "Looking Backward," has just written a fanciful sketch entitled, "With the Eyes Shut," in which he describes an approaching phonographic age. The uses which are found for the phonograph are novel and amusing. Passengers on the railway trains are supplied with phonographic literature so that their eyes are not injured by reading in a jolting coach. The names of the stations are announced by phonograph in clear tones which form a striking contrast to the incomprehensible gibberish of the ordinary brakeman. Mr. Bellamy describes a night experience in a hotel. He was startled from his dreams by the sound of a voice. He continues: "What had startled me was the voice of a young woman who could not have been standing more than ten feet from my bed. If the tones of her voice were any guide she was not only a young woman but a very charming one. 'My dear sir,' she had said, 'you may possibly be interested in knowing that it now wants just a quarter of three.'" His terror vanished when he discovered that the voice issued from a clock which was equipped with a phonographic announcing apparatus.

As a remedy against "electrical sunstroke," as the affection is called that attacks men exposed to the intense rays of the electric arc by means of which metals are fused and welded, is a veil or mask of glazed taffeta, supported by a wicker head-piece and provided with goggles of gray glass.

The Great Northwestern Telegraph Company's system is being extended considerably and the old lines rebuilt this season in the western part of Canada.

One of the most remarkable instances of electrical transmission of power has only recently been accomplished in the State of Nevada, on the world-famous Comstock lode, and in the almost equally famous Sutro tunnel. At the Nevada mill there is a ten-foot Pelton water-wheel, which receives water through a pipe-line delivering water from the side of Mount Davidson under a head of 460 feet, giving 200 horse-power. Here the water is again caught up and delivered into two heavy iron pipes, and conducted down the vertical shaft and incline of the Chollar mine to the Sutro tunnel level, where it is again delivered to six Pelton water-wheels, this time running under a head of 1,680 feet. Each of the six wheels is but forty inches in diameter, weighing 225 lbs., but with a jet of water less than five-eighths of an inch in diameter, they develop 115-horse power each. On the same shafts, which revolve 900 times a minute, are coupled six Brush dynamos, which generate the current for the electric motors that drive the stamps in the mill above ground. The result is that where it formerly took 312 miners' inches of water to operate thirty-five stamps, but seventy-two inches are now required to run sixty stamps. This is the most enormous head of water ever used by any wheel, and by itself constitutes an era in hydraulic engineering. A solid bar of iron thrown forcibly against this tremendous jet rebounds as though it had struck against a solid body instead of a mobile fluid.—Alvan D. Brock, in October *Overland*.

VICTORY FOR THE TELEGRAPH COMPANY.—Judge Butler of the U. S. Circuit Court, Philadelphia, has filed an opinion in which he reverses the verdict of the jury in the suit of the city of Philadelphia against the Western Union Telegraph Company. The verdict was for some \$14,500, covering interest and license fees for the years 1885, '86, '87 and '88, at the rate of \$1.00 per pole per year, and \$2.50 per mile of wire. Judge Butler decides that this is excessive, and that it interferes with the Interstate Commerce law. He decides that it is a tax and not a police regulation.

Builders are erecting three more telegraph lines between Macon and Atlanta, Ga., two for the Central railroad and one for the Western Union. New wires are also being erected between Macon and Savannah. The business of the Western Union at Macon has increased so largely the past two years that ten additional wires have already been built.

The Ocean Grove Camp Meeting Association, Ocean Grove, N. J., have arranged to greatly enlarge their electric lighting plant between now and next spring, and have contracted with the Heisler Electric Light Co., of St. Louis, for two of their largest dynamos. The previous orders of this association covered four Heisler dynamos.

The Western Union Telegraph Company have purchased the telegraph line of the Georgia Pacific Railroad, extending from Columbus to Atlanta. They took possession last week and will at once put up three or four additional wires, and open offices at all the principal stations along the line.

Mr. Chas. Selden has been re-elected member of the city council of Baltimore for two years, and is the only Independent-Fusion-Citizen Democratic member of that body. Jolly Fellow. It makes little difference whether Charles was elected on the right ticket or not, he got there just the same.

The French cable now connecting at North Eastman will be landed at Rockport, Mass., in a few weeks. It will be run into the cable house at Cape Hedge, and new instruments will be put into the Commercial Cable Company's office, the companies, having combined.

The Heisler system of long distance incandescent lighting has received from the Texas State Fair and Dallas Exposition first premiums for the best system of incandescent lighting, and the best incandescent dynamo and regulator.

ANDREW CARNEGIE.

ONCE A TELEGRAPH MESSENGER, NOW THE LARGEST IRON MASTER.

Andrew Carnegie, of whom thousands in every English nation have heard and whose steady, upward course has challenged wide admiration, was born in Dunfermline, Scotland, in 1835, and is now in the very prime of life. Coming to America at a very early age, and while still a small boy, he earned his living in the humble duty of firing the boiler of a small stationary engine, in a dark cellar in Pittsburgh, Pa. The surroundings of his daily life were distasteful and severe, but behind the rough garment, which covered him, hope spoke to the faithful lad of brighter and better days.

In 1847 the telegraph was making itself felt as a vast stimulant in civilized life. Its messenger boys flitted through the busy streets with nimble feet.

Young Carnegie saw and felt the stirrings of a power within him, which since then have borne so brilliant fruit, and soon joined their ranks. He was small, but observing and faithful. Day and night, in all sorts of weather, cheered by a bright, hopeful spirit, he served the people of the great city, which now looks up to him as one of its chief citizens, and in which he has achieved wealth and honor.

Finding in the superintendent of the telegraph company a countryman and friend, Carnegie soon learned to operate. As messenger he had been prompt, obliging and thoughtful. There was just that kind of responsibility connected with his duties which stirs honor and inspires devotion. His superior saw and appreciated the quiet steadfastness which marked his work. Facility for learning the telegraphic art was given him, and from what to him had been a paradise he soon entered another. At 15 he was a telegraph operator abreast of older and experienced men, and although receiving messages by sound was at that time forbidden by authority as being unsafe, young Carnegie quickly acquired the art, and can still stand beside a ticker and understand its tongue. As an operator he delighted in full employment, in the prompt dispatch of business, and a big day's work was his chief pleasure. And so it happened that when the Pennsylvania Railroad Co. needed an operator, "Andie" was at once chosen to fill the place. Here he first developed those peculiar qualities of mental acumen and intuition, which have since made him the natural manager of men, and the director of broad and useful enterprise. In the busy duties of his new post he soon mastered the details of train despatching, and showed how vastly the telegraph ministered to

railroad safety and success. The marked ability thus developed led to his removal to the headquarters of the Company, and soon afterwards, though still a mere lad, to the appointment to the responsible duties of the superintendent of the western division of the Pennsylvania Railroad. His peculiar faculty in the mastery of detail, in quick and vivid comprehension of the thing to be done and the method of its doing, quickly developed forces hitherto dormant and made him a power, and gave him deserved and appropriate prominence. Careful and economical in his habits, with a fund of strong, native sense and judgment, Mr. Carnegie gradually found himself allied with brainy men in outside enterprises, and in laying the foundations of his large fortune.

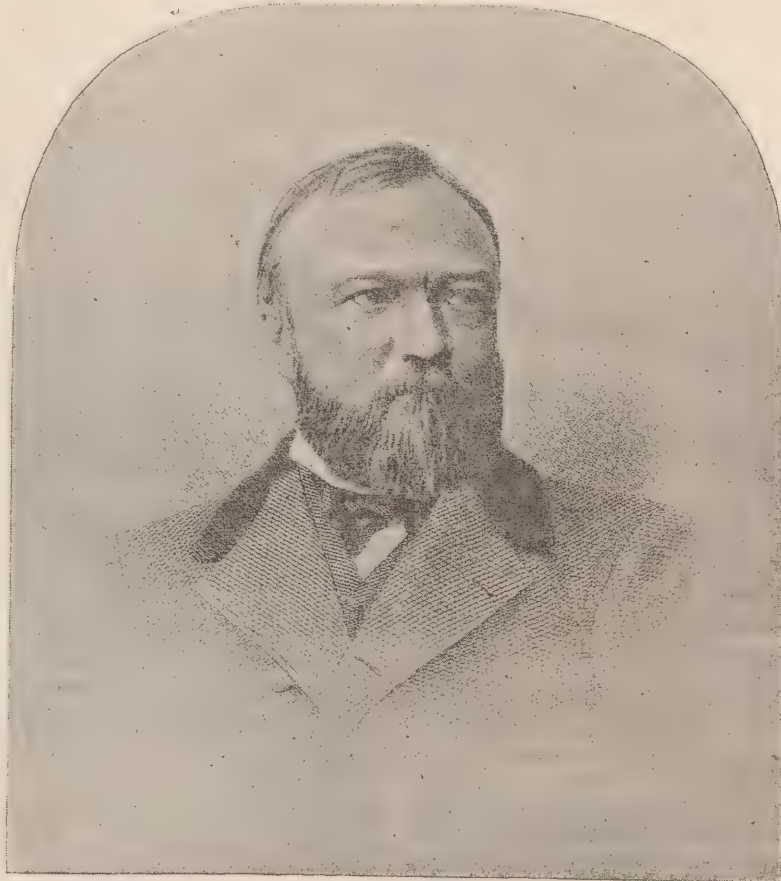
From that time on Mr. Carnegie's history is well known. The little Scotch lad who blessed his stars when he became a messenger boy, by favorable investments in oil lands, by est-

ablishing a system of sleeping cars, and other enterprises, soon became rich. He soon after acquired the ownership of the Edgar Thompson Steel Works, the Homestead Iron Works, the Union Iron Works and the Keystone Bridge Works of Pittsburgh, and is to-day the largest manufacturer of pig-iron, steel rails and coke in the world.

Mr. Carnegie's education at school was brief but good. His life since then indicates persevering acquisition of useful knowledge in the midst of all his engrossing occupations. Not unfrequently invited to lecture, we find him oftener with easy and graceful pen furnishing articles of high quality for the advanced literature of the day. Both his writings and addresses show careful culture coupled with that curiously trenchant philosophy, which has always been characteristic of men of Scottish antecedents or

Mr. Carnegie has illustrated his idea of the responsibilities of great wealth, by large gifts for the advancement of general knowledge. His recollection of his yearning for books when young has

already led to the endowment of many a noble library which will make his influence in society felt long after he himself has passed from the ranks of living men. Mr. Carnegie has, however, been successful in nothing so great as when, two years ago, he called to his side Miss Louise Whitfield, of New York, to be his companion and bride. By nature and by culture few women can be found so pure of heart, so refined in manner, so simple, so charitable and so kind. She was needed to give the strength of beauty and affection to the otherwise noble trend of her husband's life, and hereafter Mr. Carnegie, under her influence, cannot help becoming a broader and better man.

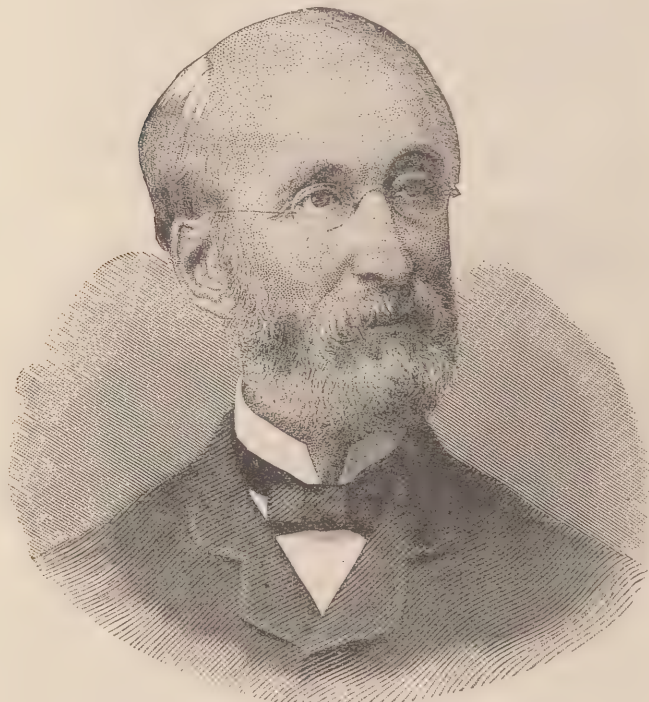


Andrew Carnegie

JAMES D. REID'S FAREWELL RECEPTION.

When the announcement was made a month ago of the appointment of Mr. James D. Reid to be Consul at Dunfermline, Scotland, the Magnetic Club immediately arranged for a dinner and reception to the "Father of the Telegraph." The New York Telegraph Club united with the Magnetic, and the date was fixed for November 20th, in order that the delegates to the annual meeting of the T. M. B. Association could also be present. Circulars were issued by all organizations. The members of the New York Telegraph Club subscribed to present Mr. Reid with a handsome souvenir in the shape of a gold medal, as a token of the esteem in which he is held by his fellow members of the Club.

A circular was also mailed to all old-timers and signed by Wm. J. Dealy, Thos. T. Eckert and A. B. Chandler, the two latter offering the facilities of their respective companies free to those desiring to send messages to Mr. Reid. It is needless to say hundreds of telegrams were received during the evening.



JAMES D. REID, THE FATHER OF THE TELEGRAPH.

At 6.30 P. M., the time for which the dinner was called, there was a line of telegraphers in Fifth avenue, in the vicinity of Martinelli's, that for a time almost blocked the sidewalk. The large dining hall was soon filled to its utmost capacity, and when all were placed around the bountifully laden tables, Mr. C. P. Bruch, President of the Magnetic Club, in his usual happy way, called the meeting to order, and in a few well chosen remarks, introduced as the Chairman of the evening Mr. W. J. Dealy, who, after expressing his thanks, and while all present were still standing—said:

"Among the ruddy, bright-faced telegraph messenger boys at 145 Broadway, New York, some fifteen or eighteen years ago was one whom I take pleasure in now introducing to you as the Rev. Father C. A. Meredith and from whom we would like to hear before the dinner.

Father Meredith's response was from the heart of the boy—the messenger's tribute of love to the first Superintendent of the Telegraph. After "Grace" the following menu was discussed:

Oysters, Blue Points on Half Shell; Relishes, Olives, Celery, Gressini; Soup, Ox Tail; Fish, Blue Fish a la Maitre d'Hotel; Pommes a l'Espagnole; Entrees, Beef Tenderloin a la Jardiniere, Sweet Bread Croquettes with Spinaches; Roman Punch; Roast, Philadelphia Chicken; Salade, Laitue; Dessert, Fancy Form Ices, Assorted Fruits; Assorted Cakes; Roquefort; Coffee.

Mr. Dealy then called upon the following in the order named:

Overture, Prof. Carl Levinsen. Address, W. J. Dealy.

Introduction of Mr. Geo. E. Holbrook, President of the N. Y. Tel. Club, who made a few pleasant remarks and suggested that the gentleman whose name was next on the programme was the orator of the club.

Address, T. W. Greene; Reply, James D. Reid; Old Times, T. P. Scully; Humorous, T. Ballantyne; Address, S. S. Garwood; A Story, E. C. Cockey; Address, R. C. Edwards; Song, Prof. Carl Levinsen; Address, F. W. Jones; Address, G. H. Usher; Address, W. L. Ives; Auld Lang Syne, after which all shook hands with Mr. Reid.

One of the features of the programme was the pipers, L. D. Robertson and P. Bowman, in kilts.

The Western Union and Postal Co's. had wire connections to the banquet table, and all through the evening messages were being received and read. Mr. Dealy said:

MR. PRESIDENT AND GENTLEMEN:

Kissing the cross hilt of his sword, the soldier of old saluted, and at the same time and by the same act, swore allegiance to his king. To-night we grasp the hand of this honored veteran, Mr. James D. Reid, that by the connection he may feel the thrill of an impulse from all along the line of an army, the grandest that the world has ever known; and that he may receive from every member of its rank and file in the electric signal which he gave us over forty years ago, the salute that now is known as the magnetic "73." Our allegiance is manifested by love. Where is the king whose crown is as jewelled as his. As Americans, we are proud of the statue in New York Harbor, Liberty enlightening the World, but as telegraphers, we are prouder of the invention that civilized it. Trace backward to the dawn of the wires; call up the struggles of the pioneers; stare if you will in admiration of the character of the man who was Superintendent No. 1. Note how he charged the old timers with the faith that was within him, and how by his wit and tact and story he removed every cross that interfered with their comfort or interrupted their march to success. The very mention of his name among them brings up from memory's joyous fountains the sprays of life's elixir, to make them "just as young as they used to be." Were I to report the good that Mr. Reid has done, I would be but repeating what illuminates every page of telegraphic history. Look at the organizations represented here to-night, the Telegraphers' Mutual Benefit Association, the oldest of them all. His certificate No. 1, and so on down to the youngest. The New York Telegraph Club, its book shelves bending with donations from his library. And now he is about to temporarily leave us. And while we congratulate him upon the honor of his appointment to represent in his native land his adopted country, we congratulate also those who selected him, and more than all, those into whose midst he is about to enter. And yet we would have been glad if the transfer had not been made. But although an ocean may separate, he will still be with us; he cannot forget "what God had wrought" nor the forty-five years of his service on circuits that have proclaimed it; nor can we forget, nor shall we, the kind words the cheery greetings, the timely lessons and the christian acts of Mr. James D. Reid, whose heart was never known to throb but for the welfare of his fellow man, and who was the bosom friend of Morse.

Mr. T. W. GREENE spoke as follows : Mr. Chairman and Gentlemen : We are adding not a few notable pages to the history of the Telegraph of America when we assemble to do honor to one of its most venerable and distinguished patriarchs ; and when the future historian of the electrical phenomena of America shall take up the thread of narrative laid down by his predecessor in telegraphic literature he shall, if he would a true historian be, touch feelingly upon the occasion so happily conceived, and join his heartfelt tribute with ours to the man whose life lent lustre and grace to a calling, not the least of those potent agencies of civilization, in this great age, in the march of human progress. That our honored guest had given stimulus, to the full measure and strength of his capacity, to the development of the vocation of his choice and of ours, needs no word of confirmation from me. That he had relinquished his grasp on the lever of telegraphic engineering in his early life was not because of the lack of energy or that others there were more competent to fill the position which he did not care to occupy. His ambition fed more upon those hidden springs of benevolence, tender human instincts of modesty and retirement, the development of which gave charm and contentment to his life, rather than upon those instincts which so often mark the character of men who seek to possess more than a needful share of the material things of the earth, for the gratification of a sordid desire for ostentatious display.

It would be well, perhaps, to confine the second chapter of the story so admirably opened by our good friend, the chairman, to events near at hand, as well as in consideration for those who will follow and who, I trust, will review the earlier days of intimate relationship with the gentleman whose association with the telegraph brethren is about to come to a close. You will permit me, therefore, to occupy the brief space of time allotted to me, and address ourselves more particularly to that feature of these ceremonies in which a large number of his later and not less enthusiastic friends are interested, and whose sympathy with this association is not the less diminished by their absence.

The inception, the primary steps, the gradual development and the ultimate triumph of that institution known as the New York Telegraph Club received, upon the evening of its opening, the benediction as it were of the Grand, if not the Grandest Old Man of the telegraph fraternity the world over. Those of us who nursed and watched its growth from its earliest stages felt the glow of conscious pride at having done a good work well, by the cheering words of our friend, on that occasion ; our courage to continue on the lines laid down was renewed by his approbation, and has been aided by his generous and material offerings ; no less than forty-three volumes of the choicest literature have been deposited with our club for the use and edification of its members, by the man whom we delight to honor.

It has been said that "a prophet is not without honor, save in his own country ;" we may believe as much or as little of that as we choose, but no coiner of phrases, axioms or parables can convince us that the father of the telegraph is without honor among his own flock. I wish to modify that latter statement a trifle for the sake of historical accuracy, and add, that our honored guest bears more of the relationship of the step-father of the telegraph, not wishing to rob the real parent of his well-earned laurels. It is, however, comforting to say that the mantle of the immortal Morse could not have fallen upon more deserving shoulders.

Despite the differences that exist, which must and should exist in the capacities, the environments, the social, moral and financial positions of the members of the great human family, there always shall exist,

running through its every strata, a divine enthusiasm which needs but a touch to cause it to blaze to the highest flights of passion when an appeal is made to do honor to one of its noblest species ; believing therefore that we have at hand an instance which justifies the fullest expression of that sentiment, and acting under its impulse I, on behalf of the members of the New York Telegraph Club, and in the name of those of our profession everywhere whose spirits are with this occasion, and whose hearts are with you, Mr. Reid, I have the exceedingly proud honor of presenting to you this emblem of esteem, exemplifying the high appreciation of the members of the club of which you are an honored member, and in recognition of your noble character among men. [Mr. Greene here handed Mr. Reid the testimonial medal.] Not that it were necessary to crystallize that sentiment around a base product of the earth, a mere piece of gold ; but when that material shall have received the sanctifying engrossment of, and becomes the outward symbol of that invisible love and affection which we have for you, it becomes a gem as rare and priceless as your life has been pure and sweet. When you shall have assumed the duties of the high position to which you have been called in your native land, this will ever be a token of our appreciation of you, and when we, on this side of the water, shall turn the pages of your valuable gifts, the commingling of remembrances will perpetuate that bond of friendship which began forty-four or forty-five years ago, and which will cease only when those of us who live to-day shall shift to that bourne from which no traveller returns.

Mr. Reid spoke as follows : Last March I passed the boundary which marked my three score years and ten. Not unfrequently since then I have sat down at even-tide and wondered, if after all my life had been in vain. Looking back over these many years they sometimes seemed to me a vast void in which I had caused no green or fragrant flower to bloom. But to-night as I gaze on this sea of faces every one of which seems looking to me with the radiance of affectionate esteem, I cannot restrain the belief that in some way or other unknown and inscrutable to me, I have secured a large share of human esteem which must have some foundation in my own life, and yet what that is I do not know. My life has been a simple and an unobtrusive one. I have been an enthusiastic worker in the development of a grand industry and held at all times my associates in high and brotherly esteem. I have also consciously and designedly infused into telegraph administration, so long as I held the power, the idea of mutual help, respect and kindness. But in this I merely carried out an early formed idea of the law of kindness as a force in human affairs. The great forces of the universe are silent. The electrical currents of the world travel on their mystic ways unheard. I would prefer being silent to-night, for words cannot convey the language of the heart. Yet I cannot be dumb in such a presence ; so let me now express to you all my deep gratitude and my hearty esteem.

This occasion relieves me from a curious apprehension which I must briefly explain. Four years ago our good friend Senator Ives, as you call him, seemed to become possessed with the vehement and strange desire to deliver an oration over my remains, and seemed to expect me to gratify him by shuffling off my mortal coil. I am an accommodating man and willing in all reasonable ways to gratify my friends, but when it came to a question of becoming a thing inanimate, my spirit rose in protest. I want Senator Ives to know that I am to-day four years younger than I was then, and it may be that after my four years service abroad and the people of this great land follow the great cry of every succeeding four years, "turn the rascals out," I shall come back again still younger

than I am to-day. As it is I go to represent this dear land with all the energy of my early youth.

I have been much inclined to regard this wonderful demonstration as more due to accidental circumstances associated with my early connections with the telegraph than any merely personal qualities of my own. For example I was—

1. The early associate and intimate friend of Prof. Morse. This I regard as no small honor. He was much more than an inventor. He was a true, amiable Christian gentleman.

2. I was the only man who ever learned to telegraph before I saw an instrument.

3. I opened the first commercial office and was the first telegraph superintendent outside of the government experimental line.

4. I was the first to use iron wire.

5. I invented the first protector from lightning, receiving a medal therefor from the Franklin Institute of Philadelphia.

6. I manipulated the first President's message ever sent over the wires, and finished up the second after my wearied operator had given up exhausted, interpolating in the joy of reaching its close with the Mexican pronouncement, "God and Liberty," James K. Polk, greatly to the surprise of the editors, but which they all inserted and howled over afterwards.

7. I was the first to put in operation a system of combined circuits by which a message manipulated at Philadelphia was dropped at Pittsburgh, Cleveland, Buffalo, Detroit, Louisville and St. Louis.

8. I was the first to appoint a woman to the management of a telegraph office, Miss Emma Hunter, of Westchester, Pa.

Many other things incidental to the early life of the telegraph were connected with my early history. Perhaps one of the most serious was the first exhibition I afforded of what the electric current could do under certain circumstances.

While operating the wire between Philadelphia and Norristown, Pa., the wire was found broken and Sam K. Zook, afterwards Gen. Zook, who fell at Gettysburgh, was sent to repair it. He was directed when he arrived at a certain point to test the wire, and to secure a good ground connection to find a puddle of water and stand in it, putting the wire to his tongue to receive the answer to his call. This he did, but when my hand closed the key there was first a sublime silence and then such a volley of oaths as rarely proceed from mortal lips. I had knocked him into the mud, and he returned to Philadelphia a very dirty and ill-tempered man.

All these things grew out of the infant condition of things and connected themselves with my name, as they did with many others associated with me.

But now comes to me a period of mingled joy and sadness. I stand here to-night amazed and awed before this wonderful demonstration of your love and esteem. I cannot help suspecting that it is largely undeserved. My life has been for many years simple and obscure. In my intercourse with men I have endeavored to be kind and sincere. I now go to the land of romance and of song to represent this beloved country near the place of my birth. It will be my chief endeavor to honor it, and to prove as best I may that the confidence and esteem shown me to-night in this wonderful gathering, of the flower of the telegraphers of the American Continent has not been unworthily bestowed.

Mr. F. W. Jones read extracts from the first issue of the *Journal of the Telegraph*, over twenty-two years old, of which Mr. Reid was editor. His character was clearly portrayed in all his writings in that paper, and it has never since changed one iota. His writings showed the

make-up of the man and his steadfastness for the craft at large. Mr. Jones showered many well deserved compliments on the guest of the meeting, which were much appreciated and applauded.

Mr. W. L. Ives, in his usual humorous style, kept the audience splitting its side with laughter, for some ten minutes. When he settled down to stern reality he addressed Mr. Reid as follows:

"May the eve of your well-rounded life be crowned with as pleasant memories as that of your morn and noonday. You will carry away with you from this banquet hall such assurances from the New York Telegraph Club, the Mutual Benefit Association, the Magnetic Club, and from all the boys as well as the ladies of the profession, happy remembrances that will, I doubt not, hold a precious spot in your memory from this night until the inevitable moment shall arrive when you shall lay down your work, and bow to the will of Him who doeth all things well.' Good bye from all of us, but not farewell; we hope to see your genial face again upon America's welcome shores. Go to your Scotland with your honors. We bid you God speed. Come back to us when you may, and your boys that are left will greet you as at this hour, with lasting and fraternal friendship."

Mr. Geo. H. Usher, the recently appointed manager of the N. Y. Postal main office, eulogized the character of Mr. Reid, and referred to him as the grand old man. His remarks were very appropriate and generously applauded.

The remarks of Mr. T. P. Scully, S. S. Garwood, E. C. Cockey and R. C. Edwards were also received with enthusiasm, as were also the humorous renderings of Mr. Ballantyne and the musical selections of Prof. Levinsen.

The following dispatch was ordered forwarded to the President:

NEW YORK, Nov. 20, 1889.

To the President, Washington, D. C.: The New York Telegraph Club, and the Magnetic Club, with their friends of the telegraphic profession and the Press, who have met to-night to do themselves honor by entertaining Mr. James D. Reid at dinner, hereby tender their thanks to you for his appointment as Consul to Dunfermline, and in behalf of the telegraphic profession at large, express their pride that a man so eminently qualified to reflect credit upon your administration has been selected to represent his adopted country in the land of his birth.

The Telegraphic Club, By Geo. E. Holbrook, President. The Magnetic Club, By Chas. B. Bruch, President. The United Press, By Walter P. Phillips, General Manager.

The following comprises the telegrams received during the evening:

EXECUTIVE MANSION, Washington, Nov. 20, '89.

George E. Holbrook, President, Telegraph Club, New York.

My Dear Sir: The President directs me to acknowledge the receipt of the telegram of the 20th inst., signed by yourself and others. He is glad to know that the appointment of Mr. James D. Reid has been so pleasantly received by his friends,

Very truly yours, E. W. Halford, Private Secretary.

Please accept compliments, kindest remembrances and God speed.

J. J. Dickey and L. H. Korty,
Dillon, Mont.

Mr. A. B. Cummings and myself send greetings and a wish for a *bon voyage* to James D. Reid.

David Brooks, Philadelphia.

Offer heartiest congratulations and invoke Heaven's choicest blessings in your behalf. Old Timers may also congratulate themselves that they are to be so well represented abroad.

D. P. Shepherd, Houston, Tex.

The hearts of scores who were once poor, struggling boys, without friends, money, or influence, but encouraged by the kindly, fatherly counsel of old J. D. R., and, thanks to the "grand old man," have been successful, go out warmly to-night as he is being entertained.

The honor he has secured by being appointed Consul to grand old Scotia at Dunfermline, or any honor this world can bestow, is nothing to be compared with the knowledge he has of the great good he has done the world by the many poor boys he has helped to make a record. Great warriors are honored by their victories, causing the loss of many lives: old J. D. R. is honored by the many lives he has made useful to the world. God bless old J. D. R. I fear he is the last of his kind.

Robert Pitcairn, Pittsburg.

I heard with infinite satisfaction of Mr. Reid's appointment as Consul. I rejoice with you all that our Government has recognized his abilities and integrity, but, however gratifying the appointment, his crowning honor must ever lie in his splendid life and character—an heritage for all, regardless of legacies and bequests.

As President of the Society of the U. S. M. T. Corps, the members of which look upon Mr. Reid as one who has taken holy orders in the telegraph service, I for them bespeak for him the benedictions he himself has so oft pronounced at our banquet boards.

Fraternally yours,

William R. Plum, Chicago.

Absence prevented my joining the fraternity in greetings last night. I now desire to assure you of my high appreciation of the continuous and brilliant service you have rendered, through nearly half a century, in developing the telegraph in America, and my regret that the connection so long kept bright is now to be broken. May the return to your native home, carrying the commission of the Citizen King of your adopted country, keep green in your memory the many Americans who will sorely miss you.

R. B. Bullock, Atlanta, Ga.

The Old Time Telegrapher, who suggested the operators' testimonial to Professor Morse, sends kindly greetings to the friend whose energy and labor made the Central Park statue a success. May the waves that cover the cables of the Atlantic deal gently with you and bear you safely to Bonnie Scotland. May the last hand shaken and the last wave of the kerchief be from some loyal telegrapher, whose united wishes will follow you evermore.

Robt B. Hoover, Springfield, Ill.

One of your New York, Albany and Buffalo boys sends you affectionate greetings, with the wish that you may live many years to enjoy the loving regard of your old employees.

H. B. Chamberlin,

President Chamber of Commerce and Board of Trade, Denver, Col.

Forty years ago I first took the key. Our old boys have nearly all crossed to the other side. Until called by the Great Chief Operator, may your days be filled with peace and joy.

Old comrade and friend, hail and farewell!

D. Wilmot Smith, Breckenridge, Minn.

Take with you the best wishes of one of your many children. The vacuum caused by your departure will ever remain a void. *Hinc ille lachrymæ!*

H. A. Bogardus, New York.

Congratulations on your new honors. May many more follow as fast as messages travel. God speed on your journey.

J. F. Beatty, Philadelphia.

"Father of the Telegraph," your adopted sons honor themselves by honoring you. Accept personal greeting.

T. B. A. David, Pittsburg, Pa.

One of your boys who never knew so sweet a master desires to mingle his cordial greetings with the hundreds which will reach you to-night from all quarters of the land. He congratulates you upon having won the best prize that human life has to bestow, for honor, love, obedience, troops of friends are yours; the friends of your early days being the friends of your age, who pour in upon you their tributes to-night. Absent you may be from us in the flesh but never from our kindly thoughts, which will attend you all the days of your life. "73" to the latest representative of the Republic.

Andrew Carnegie, Washington.

Hail, Brother Old Timer. I yield the palm to you at both ends, and in the middle as well. My time 1847 to 1866; yours 1845 to 1889. What progress made in Church and State and in the spacious field of art and science; marvels great have been to men revealed, and ye have surely done your part, been faithful to your trust, life's service with mind and heart. Success is yours and just. Now grow in honor with increasing time approved, beloved, revered, sublime. With my best 73.

W. G. Fuller, Gallipolis, Ohio.

Please accept the regrets of the New Orleans telegraphers on the eve of your exit from the active telegraphic field, after nearly half a century's service. The struggles and hardships endured by you in the early days, preparing the way for a livelihood now enjoyed by many thousands of wire workers, have repeatedly been memorized by us, and will always shine as a bright example of perseverance and devotion to a noble art and an honorable profession. Near your old home in "Bonnie Scotland" may your thoughts often revert to your Southern experiences.

W. D. West, Chief Operator, New Orleans.

The fraternity of the Pacific slope send greetings and congratulations to our old friend. May the sight of the banks and braes of your own Bonnie Scotland with their blue bells and heather, prove to be the elixir to perpetuate the long life and happiness which every member of the telegraph this day wishes you. May the benign goodness which you have ever extended to the fraternity be rewarded by love, distinction and prosperity in your future walks of life.

Frank Jaynes, San Francisco.

Telegraphers at Uncle Sam's southernmost dominion send warmest greetings to you this day and trust the boys will give you such a send-off that you can only remember it as one of the happiest events of your long and useful telegraphic career.

M. L. Hellings, C. M. I. O. T. Co., Key West, Fla.

Success and prosperity go with you. May your crosses ahead be as easily adjusted as those in the past and your connection with us as perfect as heretofore. 73.

Geo. W. Railton,

Old Timer and U. S. M. T.,
Sacramento, Cal.

Second only to Morse in his achievements, whose triumphs are marvels greater than the conquest of war. May his new associations be pleasant, and the good he has accomplished attend him throughout eternity, is my humble prayer.

A. H. Bliss, Chicago.

Please accept most hearty congratulations and best wishes from your Indiana friends. In memory of Old Timers, the portrait of J. D. R., taken in 1850, still occupies a place in Madison, Ind., office.

J. F. Wallick, Indianapolis.

Place me with the pioneers under your kindly management thirty-six years ago. What changes, and what progress! Much of the great improvement and fraternal feeling now existing are due to you.

F. A. Armstrong, Cincinnati.

BOSTON, Nov. 20, '89

My congratulations for your preferment to honorable office and for your ripened but well preserved years.

You antedate me by four years in the telegraph business, but while you have grown gray in the service, I have not a gray hair in my head, and scarcely one of any color.

It will be happiness indeed if, at the end of my telegraphic life, I leave the honorable record and multitude of friends you do.

May success attend you in your new field of labor.

Suel Smith, Boston.

Graybeard to Graybeard, 46 to 45: May your "current" be ever strong, your "adjustment" ever perfect and the inevitable "30" come only when your hooks are clear and you are weary enough to long for rest beneath the daisies.

Yours,

J. C. Vanduser, Escanaba, Mich..

Your Cleveland friends send you greetings and good-bye, with the respect and regard of each and all.

E. P. Wright, G. T. Williams, T. W. Hill, C. W. Douglass, C. F. Stumm, T. J. Higgins and others, Cleveland, O.

Three hundred telegraphers of Kansas City, old and young timers, extend a hearty greeting and wish you the fullest measure of health, honor and happiness during your stay abroad.

D. E. Martin, Kansas City, Mo.

The Old Timers and Later Ons, through their Young representative, who is one of the oldest Hams in the service, send congratulations to you. Hoping you may live long and prosper.

Washington Telegraphers.

Please accept congratulations and best wishes of a retired telegrapher whose acquaintance covers more than forty years, and whose esteem and love has grown every year without a break.

J. H. Wade, Cleveland, O.

I very much regret that I am not able to be present to contribute my share in giving you the honor you so truly deserve. May God ever bless you. Good bye.

D. Doren, New London.

My first superintendent on the old Cleveland and Pittsburgh stage road, four strand wire, 1848. May you enjoy a long, peaceful, happy autumn on your native heath.

L. F. Sheldon, Sedalia, Mo.

Accept a word of greeting on this notable occasion from one who gratefully remembers your kindness to him 29 years ago at Niagara Falls.

John Lapey, Buffalo, N. Y.

We lend you to diplomacy on condition that you are to be safely returned to us.

Geo. C. Maynard, Washington.

Scotland is to be congratulated and Dunfermline should pop her corks.

Billy Barr, Washington, D. C.

The individual telegrams were from :

Henry A. Hall and C. W. Jaques, Ashtabula, O.; S. C. Rice, G. C. Thompson, Patrick Kelly and John F. Collins, Albany, N. Y.; R. B. Bullock, S. M. Wall and Members Atlanta Agency T. M. B. A., Atlanta, Ga.; Thomas A. Laird, John Lapey, N. Hucker, Madison Buell and Peter C. Doyle, Buffalo; John J. Wickham, Beaver Station, Pa.; C. J. Sheehan and Sml. Smith, Boston; D. Wilnot Smith, Breckenridge, Minn.; Mat Gordon, Bellaire, O.; E. I. Bush, Brownsville, Tex.; John F. Ludwig, Burlington, Ia.; H. Y. Brezee, Binghamton, N. Y.; J. E. Zeublin, S. M. Dunlap and Geo. Cole, Columbus, O.; E. P. Wright, G. T. Williams, T. W. Hill, C. W. Douglass, C. F. Stumm, T. J. Higgins, J. H. Wade, L. A. Somers and others, Cleveland, O.; I. Newton Crittenton, W. D. Gentry, William R. Plum, A. H. Bliss, W. J. Lloyd, Joseph Uhrig, C. S. Loewenthal, and A. J. Long, Chicago; F. A. Armstrong, P. Whelan and

I. N. Miller, Cincinnati, O.; Fred. Smith, Cairo, Ill.; D. H. Fitch, Cazenovia, N. Y.; J. S. Lyle, Covington, Ky.; J. J. Dickey and L. H. Korty, Dillon, Mont.; Crosby J. Ryan, Detroit, Mich.; H. B. Chamberlin and G. F. Woodward, Denver; C. H. Spellman, Danville, Ill.; Jno. A. Townsend, Sam. J. Gifford and Geo. Stillman, Dunkirk, N. Y.; Geo. J. Goalding, Erie, Pa.; J. C. Vanduser, Escanaba, Mich.; Chas. E. Taylor and Chas. Newton, Frankfort, Ky.; W. G. Fuller, Gallipolis, O.; D. P. Shepherd, Houston, Tex.; J. F. Wallick, Indianapolis, Ind.; Geo. M. Dugan, Jackson, Tenn.; D. A. Williams, J. D. Cruise, W. A. Shuman and D. E. Martyn, Kansas City, Mo.; S. S. Martin, Keene, N. H.; M. L. Hellings, Key West, Fla.; J. B. Gibson, Maysville, Ky.; W. Patterson, Muncie, Ind.; John Lonergan, Marysville, Kan.; Jas. Bellows, Mandan, N. D.; W. F. Snyder, North Sydney, C. B.; W. D. West, New Orleans; T. G. Kennedy, A. B. Cornell, A. E. Sink and H. A. Bogardus, New York; D. Doren, New London, O.; T. H. Fonda, Omaha; C. O. Rowe, T. B. A. David, Robert Pitcairn, J. W. Boyd, Marion H. Markle, T. D. Williams, J. A. Munson, T. E. Moreland, G. M. Eitemiler, W. H. Maize, George Morris and W. M. Munson, Pittsburg; J. F. Beaty, David Brooks, J. D. Maize and W. B. Wilson, Philadelphia; C. W. Hammond, Sidney B. Fairchild and L. C. Baker, St. Louis; J. W. Thompson, San Diego, Cal.; S. B. Gifford, Syracuse; Frank Jaynes and J. McRobie, San Francisco; L. F. Sheldon, Sedalia, Mo.; Geo. W. Railton, Sacramento, Cal.; Wm. L. Gross, W. W. Ketchner and Robert B. Hooper, Springfield, Ill.; R. B. Gemmell, Topeka, Kan.; W. A. Beach and C. O. Brigham, Toledo, O.; C. L. Whelpley, Billy Barr, Jesse H. Robinson, George C. Maynard, Andrew Carnegie and E. W. Halford, Private Secretary, Washington; Isaac W. Hallam, Wilmington, Del.; J. H. Finks, Waco, Tex.

THE SISTERHOOD ALSO HONORS THE GRAND OLD MAN.—At 1 p. m. on Saturday afternoon, Dr. Norvin Green gave up his office to the ladies of the American District, the Western Union and the Postal Companies, all departments, who there called upon Mr. J. D. Reid. Mrs. M. E. Randolph introduced the ladies singly to Mr. Reid. Each one of the sixteen check girls handed the father of the telegraph a bouquet as a token of their esteem. The flowers filled an immense basket and were placed on board the steamer Lahn, on which Mr. Reid sailed.

About five hundred check girls, lady operators and clerks, affectionately kissed the gentleman who had the pleasure of appointing the first of the gentler sex to a position in a telegraph office, some thirty years ago. The entire sisterhood of the metropolis called on Mr. Reid, and that gentleman was kept busy bidding them all farewell until 5 o'clock. The picture was a memorable one. Each caller also handed Mr. Reid a card bearing her autograph.

DINNER OF OFFICIALS TO J. D. REID.—Dr. Norvin Green presided at the second banquet given in Mr. J. D. Reid's honor, and which occurred at Delmonico's, Nov. 21st. Among those present were, Andrew Carnegie, J. Van Horne, T. T. Eckert, J. D. Rockefeller, Gen. Swayne, A. B. Chandler, G. G. Ward, W. P. Phillips, D. Brooks, C. F. Wood, W. H. Humstone, H. H. Ward, W. A. Gill, J. Merrihew, W. B. Somerville, C. C. Hine, C. A. Tinker, W. G. Hunt, the veteran, and some seventy-five other well-known telegraph officials and friends of Mr. Reid. Letters of regret from Col. Clowry, C. W. Field, E. Wiman, S. B. Gifford, A. B. Cornell and others were read. Speeches, eulogistic of the guest of the meeting, were made by Gen. Swayne, Dr. Green, Andrew Carnegie, D. Brooks, L. M. Lawson, J. D. Rocketteller, J. A. Bostwick, O. D. Baldwin and others.

Mr. C. P. Bruch is now connected with the Empire City Electric Co., with headquarters at 15 Dey street, this city.

THE JENSEN ELECTRIC BELL AND SIGNAL SYSTEM.

The most unique idea in the line of electric bells, and at the same time the most attractive of anything we have yet seen is the Jensen electric bell. These goods are a radical departure from the ordinary form of bells, and they are so attractive that they at once command deserved praise from all who examine them.

The novelty in this bell consists primarily of its form. It is a real bell in shape, and the electro-mechanism is placed inside. Reference to the accompanying illustration will show how the bell is hung. The cross-section of the bell is also given, showing the internal mechanism and the electrical connections. It will be observed that the electro-mechanism differs from that of the ordinary form, in that only one magnet is employed instead of two, and that by the use of extension pole pieces at each end of the core the attractive force of the magnet is exerted on a line parallel to its axis. In the ordinary form, the armature acts at right angles with the axis of the magnet. This new device, owing to its compactness, is peculiarly adapted to this form of bell, and this style of

which is pleasant and grateful to the ear. The great advantage of this invention, in its application to locomotive bells, is quite obvious. Instead of the fireman spending half his time pulling the bell-cord, and oftentimes when the fire requires his attention the bell by this new method would be placed at the command of the engineer, the same as the whistle or brake, and would be instantly sounded and the alarm made continuous by simply turning the switch. This adaptation alone makes the invention valuable, to say nothing of the numerous applications, such as street cars, mills, factories, private dwellings and public buildings; in fact, wherever a bell is needed. These bells may be made to vibrate or make single strokes, as desired, and taking it altogether, we feel safe in making the assertion that they cannot fail to win for themselves great favor.

The invention is extensively used in Great Britain, and it is very highly spoken of by those who are using these bells. There is no people in the world quicker to appreciate anything that has merit, particularly if it is some-



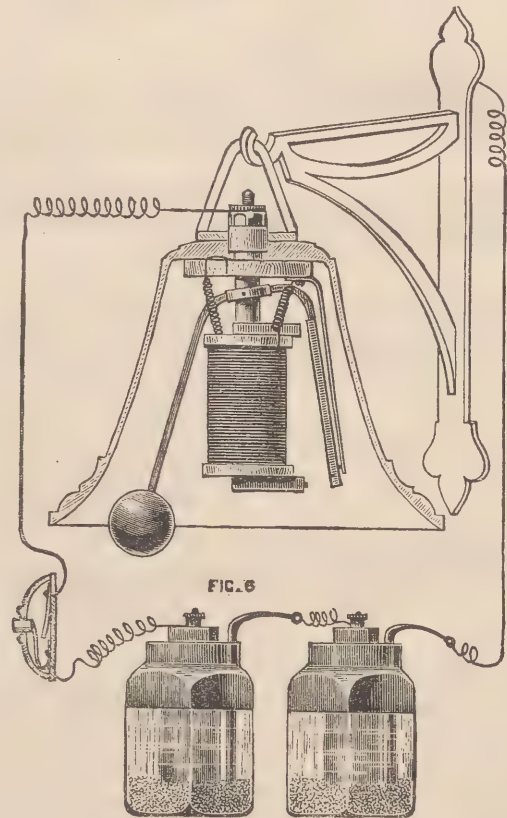
JENSEN ELECTRIC BELL.—EXTERIOR VIEW.

magnet gives a powerful magnetic field, insuring quick and vigorous action. It will be readily seen that these bells may be hung anywhere wherever the wires can be taken to make the connections. A bell of this sort, hanging in the hall or parlor, for instance, would be very ornamental as well as useful. But we cannot say the same of the ordinary patterns, at least as far as adornment is concerned.

By reference to the sectional illustration, it will be noticed that the method of hanging the clapper is novel and very ingenious. Advantage is taken here of gravitation, to an excellent purpose.

This form of bell admits of its being used in many places where it would be impracticable to put bells of the ordinary kind. For instance, it can be hung to a clock, and with the use of proper appliances made to strike the hour, or oftener, if desired. It is also adapted to church chimes, which can be rung on this principle as easily as playing on a keyboard of a pianoforte.

Another point in favor of this form of bell is the tone,



JENSEN ELECTRIC BELL.—INTERIOR VIEW.

thing attractive in appearance, than Americans, and for this reason we believe that this invention will meet with great success in this country.

We understand that the patents covering this invention for the United States are for sale, and further information can be had by addressing Charles M. Lyman, care Eureka Electric Co., 18 Broadway, New York.

The Westinghouse Electric Company has added to its regular list a 5,000-light machine, which is by far the largest manufactured. The new machines will soon be ready, and will each require 500-horse power engines.

It is said that the difference between horse power and the electric motors on street cars is \$4.62 each car per day.

The telephone companies still continue to complain of the trouble caused by induction from electric traction.

ELECTRICAL PATENTS GRANTED NOV. 6, 1889.

- 414,191. Electrical regulating apparatus; Henry J. Conant, Watertown, Mass.
- 414,220. Electric battery; Chas. A. Hussey, New York, N. Y.
- 414,222. Tower wagon for electric street car service; Thos. L. Johnson, Cleveland, Ohio.
- 414,245. Ring armature for electric generators; Gustave Pfaunkuche, Hartford, Ct., assignor to the Schuyler Electric Light Company, same place.
- 414,266. Iron card induction coil for alternating current transfer. Elihu Thomson, Lynn, Mass., assignor to Thomson-Houston Electric Company, of Connecticut.
- 414,288. Machine for the manufacture of secondary battery slates; Hiram H. Carpenter, Denver, Colorado.
- 414,289. Switch for electric motor trolleys; Will Christy, Akron, Ohio, assignor of one-half to James Christy; same place.
- 414,295. Electric signal and brake device; Jos. F. Cox and Chas. A. Cox, Louisville, Ky.
- 414,308. Electric burglar alarm; Albert A. Goucher, Euclid, Pa.
- 414,310. Electrical resistance indicating device; Chas. D. Haskins, Brooklyn, N. Y., and Chas. E. Scribner, Chicago, Ill., assignors to Western Electric Company, of Chicago, Ill.
- 414,317. Battery carbon. 414,318. Electric battery; Chas. A. Hussey, New York, N. Y.
- 414,327. Conduit for electric wires; John W. Richards and Joseph B. Hall, Newark, N. J.
- 414,339. Time recording device for dynamo electric machines; Hollon G. Spaulding, Boston, Mass.
- 414,418. Electric train brake system; Harry W. Leonard, Chicago, Ill.
- 414,422. Galvanometer; Joseph E. Lockwood, Detroit, Mich., assignor one-half to Chas. B. Larned, same place.
- 414,438. Secondary battery; Harry G. Osborn, Chicago, Ill., assignor of one half to Eugene H. Hill, same place.
- 414,511. System of electrical distribution by alternating currents; John Hopkinson, Westminster, County of Middlesex, Eng., assignor to the Westinghouse Electric Company, Pittsburgh, Pa.
- 414,575. Brake for electric car trucks; Louis Pflingst, Boston, and Sumner A. Bemis, Springfield, Mass.
- 414,583. Trolley for electric railways; Joseph M. Reams, Meriden, Conn., assignor to the Daft Electric Light Company, of New York.
- 414,595. Meter for alternating electric currents; Oliver B. Shallenberger, Rochester, assignor to the Westinghouse Electric Company, Pittsburgh, Pa.
- 414,612. Electric bell; Edward Cox Walker and Allan A. S. Swinton, Westminster, County of Middlesex, Eng.
- 414,626. Induction coal apparatus. 414,627. Electric battery; John A. Barrett, Brooklyn, N. Y.
- 414,645. Electric railway signal; William P. Kookogey, Brooklyn, N. Y., assignor to Kookogey Electric Company.
- 414,659. Dynamo electric machine; William Seafert, Chicago, Ill., assignor to Frank M. Staples.

TALES OF EDISON.—About Orange you can hear numberless stories of Edison. Everybody likes him. One man, who had been for years in his employ as an experimentalist, told of a visit of a number of capitalists, including Jay Gould, Sidney Dillon, Sam Sloan and Cyrus Field, paid to Edison at his laboratory one day, to inspect the workings of some induction experiment in devising the scheme for telegraphing to moving trains. Edison came out of his workroom, where he was busy, and shook hands with Mr. Field. At that instant something popped into his head apropos of the experiment he was at work on. He never gives an idea time to escape him. Without a word of excuse to the four magnates he turned on his heel and hurried into his den again. They waited and waited, and by and

by, tired out with delay, wended their way down-stairs. Shortly afterwards Edison came out and asked, "Where did those paupers go?"

"Down-stairs."

"Did they walk?"

"Yes."

"That's right. I don't want 'em to wear the oil off my elevator." Then he stood around for an hour and swapped stories with the men in the shop. He is the greatest man living for stories, and it is a tradition among his employees that they can tell him the same story every day for a week and he'll never tire of it, nor in fact show any sign of having heard it before.

ELECTRICITY BETTER THAN SAND.

A series of experiments with a new electrical appliance for increasing the tractive power of locomotive engines has just been successfully concluded by Elias E. Ries, of Baltimore, on the Philadelphia and Reading Railroad. The trials were made on the Frackville grade, one of the steepest on the Reading system, and were pronounced eminently satisfactory in every respect. The apparatus consists of a small dynamo and engine mounted upon the locomotive, and furnishing an electric current, which is passed forward to the rear driving wheels, through that portion of the track rails lying between them. The passage of the current into the wheels and back causes an increased friction between the wheels and the rails, which is claimed to be far superior to that obtained by sanding the tracks, and enables the locomotive to draw a much heavier train, without regard to the condition of the track, than is at present possible. The Frackville grade averages 185 feet to the mile, and with the dynamo running and a train of forty-five cars attached to the locomotive the ascent was made in twenty-eight minutes, while without the current a trip over the same ground with the same train behind required fifty-five minutes. The current used is what is termed a low tension current, and the increased traction obtained is under complete control by the engineer.—*Scientific American*. [Last August we mentioned paragraphically a similar arrangement in use on the P. & R. road.]

FUSED JOINTS.

I was anxious to construct a somewhat complicated network of conductors in such a manner that the system might (as far possible) be free from Peltier effects, says a correspondent in the London *Electrical Review*. When solder is used we know that such effects exist. In order to avoid this source of trouble I have used joints made by fusing their ends of copper conductors together by means of the oxyhydrogen blowpipe. As many old joints, on which a current has been acting during the usual hours of house lighting, have now been tested and found as strong as when first made, I venture to suggest the method to some of your readers to whom, perhaps, it may be of interest. It is as follows:

A V-groove is cut in a piece of dry fire brick, or a piece of hard quick lime, the ends of the wires to be joined are placed side by side in the groove, and then the flame of the blowpipe is brought down upon them; in the case of a joint made in No. 12 wire the ends were fused together in 32 seconds. Care must be taken not to prolong the heating after fusion is complete; if the heating is prolonged much after fusion the copper is suddenly converted into minute spheres, which scatter themselves about and leave a thin place where the joint should be. No flux was used in making any of the joints, nor were the ends cleaned previous to their being heated.

WHAT HAS BEEN DONE IN UNDERGROUND WORK.

RESUME OF EXPERT OPINIONS.

In a letter from General Superintendent J. H. Vail, of the Edison Electric Light Company, speaking of the Edison tubes, he says:

"In a line so constructed the contained continuous cable, of jointed sections, is completely surrounded by a tough, adhesive, elastic, water-proof, insulating compound. This complete filling of all spaces with solid insulation is made possible by the method of manufacture in short sections, whilst from the comparative frequency of the joints so necessitated, and the method of making them, it results that at practically any point in a district the set of service connections for any building may be readily reached."

But in the Edison tubes the wires are not removable, and are evidently not adapted to high potential currents. Engineer Raymond, of District of Columbia, in summing up after an exhaustive investigation of underground methods says:

"Conductors for conveying high potential currents ought not to be laid and operated in solid conduits. In such methods the chances are greatly against success, and the difficulties of repair and replacement are much greater than with open conduits."

Mr. Thomas A. Mercein, manager of the Badger Electric Illuminating Co. of Milwaukee, estimates that in a well built conduit system a good cable should last five years and says:

"I also believe that all underground cables must be so placed as to be easily and promptly taken out, inspected and replaced."

Mr. A. S. Brown, writing for the Western Union Telegraph Co., says that a result of twelve years' experiments "proves that there is no form of underground cable and conduit which can be depended upon to give more than four or five years' service, under the most favorable circumstances."

Referring again to Engineer Raymond's report, he concludes that electric light and telephone wires cannot be operated successfully on the same side of the street. We quote:

"It is claimed that telegraph and arc light conductors have been operated simultaneously and successfully in the same conduit. There is no doubt that this can be done under favorable circumstances. The satisfactory establishment of such a system, however, on any extended scale, would, to say the least, be extremely difficult; and the experiment should not be tried unless absolutely necessary, which is not the case in Washington. Even if this can be successfully accomplished with continuous currents, it can not be done with alternating currents without great difficulty and expense, and the rapid increase in the employment of alternating systems for electric light and power both in this country and in Europe, is a conclusive argument against such an arrangement."

Now as to what has been accomplished. For low potential, continuous current electric light distribution, the Edison pipes seem to answer the purpose fairly well.

For high potential electric light, Mr. Sunny, of Chicago, concludes that the best-known system is a lead-covered cable, having a paraffine insulation six thirty-seconds of an inch in thickness, without any reference to the form of conduit. At a meeting of the Electric Light Association, he remarked:

"Now, while we do not feel that we have solved the underground problem, we feel that the last six months has indicated that we are on the right track, and we are very hopeful that we have succeeded in finding a cable that will carry the current and give us permanently secure service."

Mr. Norment, of the United States Electric Co. at Washington, D. C., has finally adopted Lake's glazed conduit to protect a well insulated cable, but is by no means sanguine of future success as Mr. Sunny.

The Badger Electric Illuminating Co. of Milwaukee (high tension), has concluded to be content with sixteen thirty-seconds kerite insulation and five years' life.

In New York City, the latest experiment is to place iron pipes

in hydraulic cement and compel the electric light companies, by legal proceedings, to place lead covered cables in them.

The India Rubber, Gutta Percha and Telegraph Works Company of Silvertown, England, probably the largest foreign manufacturer of underground cables, claims that it can perfectly insulate a wire carrying a 2,000 volt alternating current with india rubber and tape over all, in an iron pipe. It admits, however, the great difficulty of persuading customers to undertake the first cost.

In the United States, India rubber insulation has been uniformly unsuccessful.

Telephone cables present less difficulties than electric light. Both Brooklyn, N. Y., and Washington, D. C., declare in favor of lead-covered cables drawn into a creosoted wood, open (*i. e.* drawing in and out) conduits. The lead-covered cable seems to be generally approved by companies, but creosoted wood conduits are not regarded favorably.

In New York City, the lead-covered cables are drawn into iron pipes, which combination it is asserted by Mr. Thomas A. Edison will decompose the water of condensation and liberate hydrogen gas, which will probably ignite frequently and blow up the streets.

Major Raymond's report also speaks of the probability of voltaic action between iron and lead injuring the sheathing.

The telegraph companies' experience is sufficiently summed up in Mr. Alfred S. Brown's report previously quoted. They must renew their cables every five years. Their principal difficulty is from retardation, which interferes in proportion to length of line, and increases inversely as the thickness of insulation.

The telephone companies insist that their wires must be separated by at least the width of a street from all electric light conductors, and they are not at all partial to the proximity of telegraph.

Briefly, there is no generally comprehensive system. The telegraph, the telephone, the continuous current, the alternating current, the arc light conductors, are all pursuing different plans for underground work which will soon bring about the wildest confusion.

Mr. A. R. Ledoux, in an article in the *New York Evening Post*, says:

"The whole situation to-day in Europe, including Great Britain, may be summed up as follows:

Telephone service overhead, small copper wires on neat standards upon housetops, owners compensated for use of roof. Poles only allowed where roof service is impossible.

Telegraph service largely underground in England, and on housetops elsewhere.

Electric (arc) light service practically all overhead.

So complex and intricate a tangle as the subway problem in New York is not even dreamed of in Europe, much less solved. With our growing electric light service, our district messenger calls, and, above all, our great telephone system; with our network of gas, water and steam pipes in the street, we have a problem that we must work out practically alone, unaided by European experiences. Already there stretches a network of wires, along which throb impulses of our commercial life. We think the problem of our location difficult to-day; what will it be when every man has a telephone in his house; when gas-lights within as well as without gives way to the electric light; when our streets must yield yet more room for fuel, gas-pipes, larger water-mains, etc.; what shall then be done?"

Dr. Henry Morton, an eminent electrician, speaking as to New York, says:

"The only solution of the electric wire question seems to be that which lies in the direction of a systematic arrangement of subways, which can accommodate not only all sorts of electric wires, but also all water, gas and steam pipes."

An estimate of such work in New York City, under General Newton's instructions, showed the enormous expense of \$430,000 per mile, and the conclusions reached were that such a scheme as Dr. Morton suggests was entirely impracticable.

NEW ENGLAND LETTER.

BOSTON, Nov. 25, 1889.

The city of Boston is far in advance of New York, and in fact of most large cities in the matter of the application of electricity to purposes of street railway travel, and the system is now quite generally employed on many of the principal lines running out of this city to points in the suburbs. One of these electric lines has been in operation upward of eighteen months, and has given universal satisfaction, and the present season is witnessing a rapid extension of the system. During the past fortnight a large number of cars have been equipped with the Thomson-Houston Company's system and put on to the recently-wired lines running out to the suburbs on the west of the city.

While the general public is benefited largely by the introduction of the electric system, individuals in many cases are seriously inconvenienced, and in some cases considerable financial loss results to corporations and firms whose business is in one way or another interfered with.

Especially is this the case with the telephone companies and the subscribers thereto. The overhead electric system is generally employed by the railway company in lines running to Cambridge, and the trouble arises from the induction of the current into the telephone wires, the usefulness of the telephone service being in many cases seriously impaired thereby. Both the railway company and the telephone companies use the ground for the return current, and the stronger current of the former is inducted into the telephone wire, often throwing the drops in the telephone exchanges and causing no little confusion, the noises often rendering the telephone service practically useless for the time being. Naturally there is considerable indignation among subscribers to the telephone companies, and in Cambridge meetings have been called to protest against this intrusion upon their rights. The only remedy for the difficulty is, for one or the other of the conflicting interests to surrender its use of the earth for the return current, and employ a complete metallic circuit. The expense involved to the party taking this step would be very large, and hence neither is willing to make the change. The telephone companies certainly could not remedy the defect without increasing their rates, which are already high enough, and the subscribers will not submit to a raise without making a vigorous protest against it.

The matter seems, therefore, to rest with the railway companies, and sooner or later the change will have to be made. In the meantime, subscribers to the telephones will have to submit to more or less inconvenience.

The Boston Electric Light Company has petitioned the city government for a permit to erect a boiler-house and maintain boilers of 500-horse power in the Roxbury district, and if the decision is favorable, will at once erect a large plant in that quarter for lighting Roxbury and the districts adjacent.

The amount of business which the Thomson-Houston Company is handling at present is something enormous. Scores of new contracts are taken each week, all involving thousands, and many of them hundreds of thousands of dollars, both in lighting and street railway. The popularity of their system is demonstrated by the fact that many plants of other companies are being taken out in different quarters, and the Thomson-Houston substituted, while a case where the reverse has been done is yet to be heard from. Among recent large lighting contracts taken by them we mention the Ottumwa Railway, Electric and Steam Co., Ottumwa, Iowa, 1,300 arc lights; the Charles block, Denver, Col., 800 incandescent; the City of Athens, Ga., 650 arc; Somerville, Mass., 650 arc; Elizabeth, N. J., 650 arc; Tuscaloosa, Ala., 650 arc; Huntington, Pa., 650; not to mention many more of 400 and 500 lights or less.

Through the efforts of Mr. Robert Paine, the prominent philanthropist, a series of popular free lectures on the science and application of electricity has been instituted at the Lowell Free Course. The first lecture in the course was delivered

Thursday evening, Nov. 14, by Prof. Cross, of the Massachusetts Institute of Technology, who chose for his subject, "The Generation of Electricity." Last Thursday evening Mr. W. W. Jacques, president of the Phonographic Toy Co. of this city, and assistant electrician of the Bell Telephone Co., delivered the second in the course. Mr. Geo. W. Mansfield, of the Thomson-Houston Company, will lecture Dec. 4th and 12th on "Electric Railways;" others to be announced later.

The Boston Electric Light Co. has brought suit against the Walworth Co. to prevent them from doing business outside of the blocks or buildings in which their apparatus is situated. The Walworth does a local lighting business, and the laws of this State prohibit the owners of isolated plants from furnishing lights outside the blocks in which the plant is situated without having been granted a special charter to do so. The matter has been placed in the hands of the Attorney-general, and the decision is awaited with considerable interest, as it will seriously affect the business of the Boston Company, if adverse to their interests and will open up an endless field for owners of small, local plants.

The city of Bangor, Me., has always kept well up with the times in adapting electricity to its public service, and during the past week a new organization has been formed there under the name of the Public Works Co. The capital stock is \$250,000, and the company will construct and maintain water and gas works, electric light plants and electric railways.

NOTES.—The Thomson-Houston Company have now between 300,000 and 400,000 lamps in constant use, distributed in nearly every section of the globe where electricity is known.

The Holtzer-Cabott Electric Co. are doing an immense business in supplying hotels, corporations and firms with plants, and in introducing the Eddy electric motor, for which they are the agents in this section. They are wide-awake, progressive young men, and the growth of their business in the past year has been phenomenal.

A number of small electric supply companies have recently opened stores in various sections of the city outside of the trade centres, and all seem to be thriving.

The Mansfield Electric Co. of this city is a progressive concern, and is building up a large trade by the enterprise and business sagacity of its officials.

The New England Electric Co., of which Mr. F. J. Sawyer is president, and Mr. Edward Blake, treasurer, are sole New England agents for the Sprague electric motor, and they are introducing it very generally in this section. Mr. W. H. Austin is their representative, and he is rapidly extending the business of the company by his enterprise and popularity with the trade.

W. F. M.

NEW CABLE PROPOSED.—The French Cable Company, operating lines in the West Indies, has made a proposition to the French Cable Company, now operating between New York and Paris, for the latter company to lay a cable from Charleston, S. C., to Hayti, there to connect with the South American lines, the Postal Telegraph-Cable Co. to furnish the connection between New York and Charleston over their new land lines. The project may go through.

THE ESSICK PRINTING TELEGRAPH CO.—This company has leased a wire from the Empire and Bay State Telegraph Co. to Boston. This wire will be used temporarily for experimental purposes. A branch of this company has been organized in Boston, with a capital of \$1,000,000, and with headquarters at 113 Devonshire street, where exhibitions of this system are seen daily.

The Wenstrom dynamo and motors have received the award of a medal for their exhibit at the American Institute Fair. The jury of experts was composed of Dr. O. A. Moses, C. O. Mailloux, Prof. F. B. Crocker, A. A. Knudson and J. G. Case.

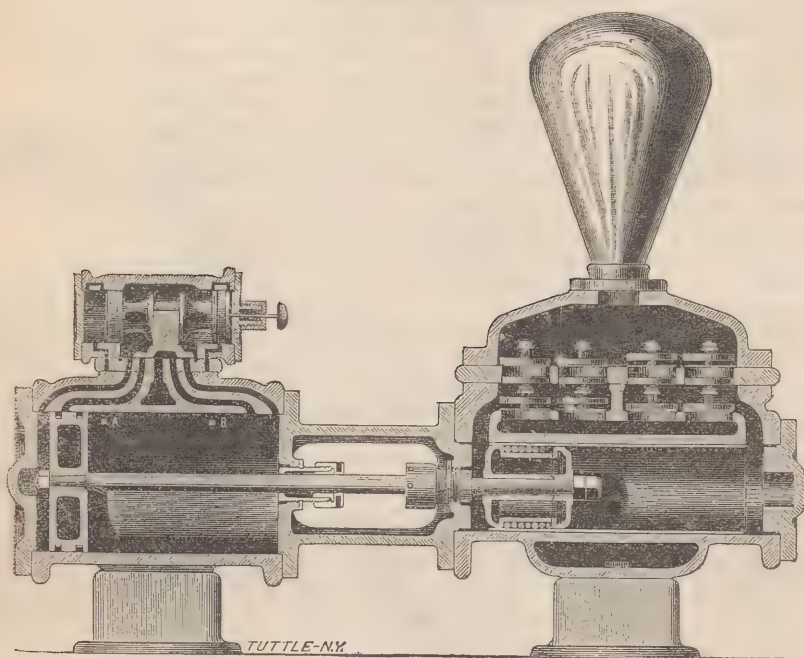
Mr. A. O. Tate, Private Secretary to Mr. Thos. A. Edison, is the proud father of a little girl born to him November 21.

DUPLEX STEAM PUMPS.

The Hall Steam Pump Company, whose New York office is located at 91 Liberty street, on November 15 moved into its large new factory, located in Pittsburgh, Pa., which is the best fuel and iron district, central for shipments and surrounded by an army of excellent mechanics.

Every department of this great enterprise is fully equipped with new machinery of the very latest and best make, with numerous special tools designed to turn work out rapidly, economically and satisfactorily. Experienced and competent men are in charge of the factory facilities, which are ample to turn out large work as well as small work.

The main building is 60 x 250 feet, of brick and iron, built especially to suit the requirements of a first-class machine shop. Connected with it is the brass and iron foundry. At considerable distance from the machine shops is another fireproof building for the storage of patterns, etc. All are located on a large plot of ground, giving ample yard room.



DUPLEX STEAM PUMP.

The pumps of this company have met with marked success, and for several months, though working into late hours of the night, they have not been able to accept all orders tendered them.

The invention of the Hall Duplex Pump proves that a decided improvement has been made of the steam and of direct-acting pumps. In fact, this is the only improvement of genuine importance made in a long period.

These pumps are designed for moving all liquids either under high or low pressure; lifting them by vacuum or suction vertically, nearly up to the limit of atmospheric pressure and of discharging them at any height or distance, within the limits of the size of cylinders and strength of material used. They are equally well adapted for moving or compressing the lighter substances, as air or ammonia gas, as well as handling efficiently heavy oils and thick syrups, etc., and driving hydraulic presses at high pressures.

When it is stated that this type of pump has from 50 to 75 per cent. less of movable pieces than any other, its simplicity can best be realized. Of course this fact, too, accounts for the considerably increased speed at which the

pump is operated. The pistons cannot strike the head; they are positive under any pressure and the pumps occupy less space than any other.

As there are no mechanical devices whatever to operate the steam valves, there can be no derangement of valve gear from sudden starting, high speed, or from continued rough usage. To compensate for wear and unequal expansion of the steam chest, the valve drivers are fitted at each end with spring ring packing.

The water ends have a small amount of clearance, and are of the latest and most improved design. The valves are also of simple and approved form, being plain, flat disks of composition, or hard or soft rubber according to duty, working with a low lift upon a composition seat and stem.

All parts are made to gauge so as to be interchangeable.

The large number of these pumps that have been for several years in successful operation have demonstrated their peculiar excellence and the positive disadvantage of all forms of auxiliary devices and attachments to operate the steam valves of pumps of the duplex type.

For economy of steam, renewals and repairs; for compactness, simplicity, quietness, speed, efficiency, reliability and durability, it is said that this type of pump is unequaled.

While the office and works are in Pittsburgh, branch offices are located in Chicago, St. Louis, and Wilmington, Delaware as well as in New York.

BROOKLYN POLICE SYSTEM.—The Brooklyn Police telegraph bureau on election night beat all previous records for receiving election returns from the various precincts. On the night of Nov. 5th eight operators were on duty from 5 P. M. until 12.30 A. M. During that time complete returns from the entire city, 375 election districts, were received by telephone, without an error or correction of any kind. Police Commissioner Bell was very enthusiastic over the good work accomplished and the following morning issued a "General Order" highly complimentary to Superintendent of Telegraph F. C. Mason and his operators and linemen.

The annual report of the department recently issued and sent to the various superintendents and police commissioners throughout the United States seems to have attracted a great amount of attention in police circles, especially that part in reference to the police patent telegraph system, as the department is in receipt of letters daily from police officials seeking information. Superintendent Mason has also been called upon to escort several visiting police committees on a tour of inspection of the several new station-houses, completed during the last year; among them being Police Commissioner B. P. Cardwell, of Portland, Oregon; Wm. Y. Douglass, Captain of Police, San Francisco; Police Commissioners of Trenton, N. J.; Committee of Aldermen from Camden, N. J., and Mayor Haines, Chief of Police Hopper and the Police Commissioners of Newark, N. J.

Ten of the twenty precincts are now fitted up with the Patent System. In the First Precinct, where they have 16 street booths, the following calls were attended to during the past year:

Hourly reports, men on post	114,205
Wagon calls for prisoners	2,493
Fire alarms	104
Ambulance calls	156
Orders sent to men while on post	1,460

The removal of wires from poles has not been overlooked during the past year, for during that time 2,500 feet of No. 25 conductor cable has been placed underground in Court street; 3,200 feet No. 10 conductor cable on Fulton avenue, and 3,500 feet No. 10 conductor cable on Myrtle avenue; also several shorter sections of cable in various parts of the city.

ARTESIAN WELLS FOR ELECTRIC LIGHT PLANTS.

The Pierce Artesian and Oil Well Supply Co., of 80 Beaver Street, New York, make a specialty of Artesian Well Machines and Tools specially adapted to the use of electric light companies. Nearly every electric light plant requires an unlimited supply of good, pure water for boiler purposes.

In the majority of cases it is much cheaper to use the water from an artesian well than to pay the exorbitant price charged by water companies in many of the cities.

In many locations an abundance of water can be obtained at a depth of 100 to 300 feet, and it would be an exceedingly rare case where it would be necessary to drill as deep as 1000 feet in order to obtain an abundant supply of water.

The Pierce Company manufacture a machine



Fig. 1.—PORTABLE HORSE POWER MACHINES.

specially adapted to drilling in earth, such as sand, clay, gravel and boulders; the same machine being also specially adapted to drilling in the hardest rock. These machines are made in sizes suitable for drilling artesian wells of all depths, 50, 100, 200, 350, 500 and 1000 feet. They are portable and low in price. Where a well is required, it is very often much cheaper to purchase one of these portable machines and drill the well than it would be to let the work out by contract.

These machines can be operated by an electric motor, or by a belt from a pulley on a main shaft.

Full instructions are sent with each machine, so that it is not necessary to employ a skilled or experienced workman. The Pierce Company have furnished a large number of these machines to electric light companies, both in the United States and in foreign countries. It is the oldest firm in the United States who make a specialty of artesian well machinery and tools.

Fig. 1 represents a Portable Machine for drilling wells 100, 200 and 300 feet. It can be operated by a span of horses, as shown, or a pulley can be attached to a shaft on the side of the machine, in which case the machine is operated by a belt.

Charles D. Pierce is the consulting engineer and expert, with headquarters at 127 Pearl Street, this city.

Fig. 2 represents a Portable Steam Drilling Machine mounted on four wheels. This machine is made in sizes suitable for drilling wells 200, 500 and 1000 feet. The same machine will be furnished not mounted on wheels and without boiler and engine; suitable pulley and shaft being furnished so that the machine can be operated by a belt, as stated above.

Fig. 3 represents a machine such as is used for drilling the deepest wells for water, oil or gas to any depth from 1000 to 4500 feet. The derrick, walking-beam and other portions constructed of wood are usually made from rough, native lum-

ber that can be obtained near the site of the proposed well. The illustration represents a derrick 75 feet high, 20 feet square at the base. The walking-beam is 26 feet long. This apparatus can also be operated by an ordinary steam engine of 12 to 15 or 20 horse-power, ordinarily with 15 horse-power, and can be driven by steam from a boiler 20 horse-power. Wells have been drilled in New York City as deep as 1500 feet and over. Other wells range from 100 to 600 feet deep, and yield from 100 to 300 gallons of water per minute, while some wells that have been drilled outside of the city flow from 50,000 to over 1,000,000 gallons per day.

An illustrated catalogue containing a large number of engravings will be sent free on application. Persons who write for catalogues should state exactly what they want, giving depth of well required.

The telephone interests in large cities, and small ones too for that matter, where electric railways are in operation, are suffering from induction. Here is a subject for our brilliant electrical experts to grapple. Something must be done very soon or the two interests will occupy the attention of courts throughout the entire country. It is certainly preferable to have electrical than judicial experts solve these problems. They are questions which should not be carried to the courts at all, but rather settled on a scientific basis.

A thief, a few nights ago in Augusta, Ga., stole an electric light.

Cranford, N. J., has secured the electric light, Westinghouse system.

Letters-patent have been issued incorporating the Gananoque, Ont., Electric Light and Water Company (limited), with a capital stock of \$40,000.

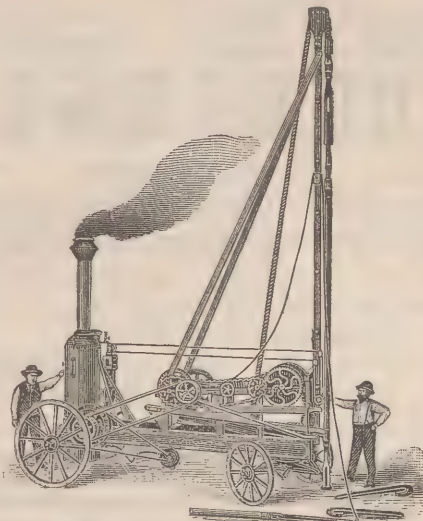


Fig. 2.

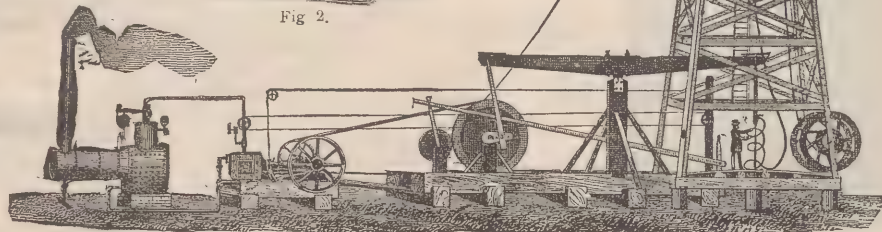


Fig. 3.

Lineman Melville, of Boston, a few evenings ago was severely shocked by removing an electric light wire which had fallen across the trolley wire of an electric street railway.

FRANKLIN S. CARTER, CHARLES M. WILKINS. E. WARD WILKINS,

TRADING AS

PARTRICK & CARTER,

Manufacturers and Dealers

ELECTRICAL SUPPLIES

Sole Proprietors of the Patent Needle Annunciator.

114 SOUTH SECOND ST.,

ESTABLISHED 1867.

PHILADELPHIA.

Patent Needle Annunciators, Burglar Alarms, Electric Bells, Bronze, Nickel and Wood Pushes, Door and Window Springs, Electric Matting, Automatic, Ratchet, and Hand Light Burners, Spark Coils, Keys (Wood and Nickel), Compound Pushes, etc., Door Pulls and Attachments, Automatic Drops, Magneto Bells, Buzzers, Batteries (all Kinds), Foot Pushes, Pear Pushes, Desk Pushes, and all Supplies for Electric Bell Work, Telegraph Instruments, Registers, Relays, Keys, Sounders, Learners' Outfits, Medical Batteries and Appliances, Induction Coils, Motors, Storage Batteries, Hydrometers, Bluestone, Salammonic, Zinc, Copper, Climbers, Pliers, Screw Drivers, Bits, Augers, Vices, Tool Belts, Tool Bags, Splicing Irons, Clamps, Electro-Plating Outfits, Electric Light Supplies, Wires of all kinds, Tape Insulators, Cross Arms, Brackets, Pole Steps, etc., etc.

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THE
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ELECTRIC BELL

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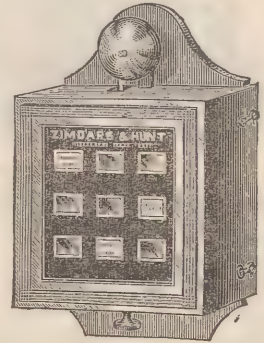
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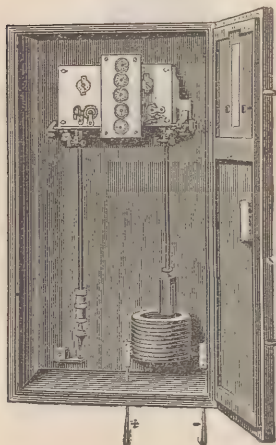
PROF. H. ARON'S ELECTRIC CURRENT COUNTER.

PATENTED.

GOLD MEDAL AWARDED AT MELBOURNE EXHIBITION, 1888-89.

The most reliable and simplified Electric Meter ever invented. Guaranteed correct for small and large currents.

Built for Direct Two-Wire, Three-Wire, Five-Wire to Nine-Wire, and all Alternating Systems, in sizes from 15 up to any number of ampères. Every counter measures correctly the amount of current consumed from a fraction of an ampère up to its full capacity.



Adopted by Siemens & Halske, Berlin, Germany; Edison Company, Berlin, Germany; Municipal Electric Lighting Works, Berlin, Germany, and others. Exclusively used in Paris, Vienna, Constantinople and other European cities.

In use by European Central Stations measuring over 60 million watts. Unquestioned superiority. Indispensable for Central Station work. Amount of current consumed may be ascertained at a glance, the dials being constructed on the same principle as the gas meter dials.

OPINIONS OF AMERICAN ELECTRIC LIGHT COMPANIES.

DOVER, N. H.
We have tested the Aron Counter and have no reason to doubt its reliability. We beg to enclose order for a few counters of 75 to 100 ampères.

H. W. BURGETT,
Treasurer Dover Electric Light Co.

SAN FRANCISCO, CAL.
The Aron Counter is the best instrument we have ever seen. We have thoroughly tested the Counter for alternating current and are satisfied that it will work correctly.

GEO. H. ROE,
Secretary San Francisco Electric Light Co.

BROOKLYN, N. Y.
We have four Aron Counters in use for some months, during which time no trouble has been experienced in re-

gard to care of same, and satisfactory readings have been attained.

Yours very truly,
C. J. FIELD,
General Manager Edison Illuminating Light Co.

MANCHESTER, CONN.
We find that the Aron Counters register as accurately as is necessary for the purpose to which such meters would be applied. We have perfectly satisfied ourselves of their adaptability.

WM. A. ANTHONY,
Mather Electric Light Co.

LYNN, MASS.
Dear Sir:—The Aron Electric Counter works very satisfactorily.
Yours, etc.,
THOMSON-HOUSTON CO.

FOR PRICES AND PARTICULARS, ADDRESS:

W. HACKENTHAL, Sole Manufacturer and Importer, 21 BEEKMAN STREET, NEW YORK.

SOME DRAWBACKS IN THE CYCLONE BELT.

BY JOSEPH HURLEY.

A few months ago I accepted a call from the parishioners of a Kansas town to copy night report. Let me say right here, parenthetically, this is not a patent medicine testimonial. I was a little timid about taking such a long trip, as I have never been much of a hand to move around. Crazy visions of settling down and in time getting elected on the prohibition ticket induced me to go. Upon my arrival, I found that the manager's name was "Cleaver." Now I am not superstitious, but there was something in that name which struck me as a standing menace.

In a short time my connection with the office was suddenly severed. The battery man got full, so they let me go. I protested, but it was explained that he was a married man, etc., and somebody had to be guillotined. I have since declined a position under a manager named "Axemaster," not desiring any more of the snicker-snee business.

The newspaper people of the place were too particular anyway. For instance, I gave them a good item dated Niles, Mich., stating that a passenger on the express train near there put his hand out of the car window to feel if it was raining, when a loose rafter from the bridge struck his arm, tearing it from the body. This item read all right, but the editor returned it as unsatisfactory and incomplete, because it did not state whether the man found it raining or not.

The town was pretty and quiet, but situated directly in the "cyclone path." This undoubtedly accounted for the number of tramp operators who blew in there. I had ample time to study the peculiarities of this species, and can authoritatively report that they do not carry any baggage. The only exception I met to this rule had 53 pieces, namely, a pack of cards and one collar.

The place suited me. I was stopping at a very high-toned boarding-house, in front of which I was cultivating a flower garden; in fact had one foot in society, when "Rocky" — appeared on the scene, wearing slippers and no shirt. He marched up to my villa, shadowed by a policeman, and enquired for me, as an old friend. Rocky is a New Yorker, a star of the second magnitude. He was on Grant's telegraph corps at Vicksburg, and honestly he looked as if he had walked direct from the battle-field. To my knowledge, he has not worked in nine years, and must be waiting for another war. I gave him money, which I had no difficulty in ascertaining was the prime object of the interview. Tried to draw him out on the subject of work and his intentions thereto; he carelessly assured me, in his slangy way, that he would have "his feet on the sand" before the snow flew. I've no doubt he had, unless, well, unless he improved on those slippers. He disappeared as noiselessly as he came, and must have gone South, as he was humming an original song, entitled, "I am going where the climate suits my clothes." 'Twould have been suicide to have faced Winnipeg.

But his memory remained, and it was hard work to make the landlady believe that he was one of the unfortunates from the Johnstown debris; that the poor man's home was under the water, etc. Her cold, aristocratic smile had about as much feeling in it as if I were describing a beaver or a muskrat. I gradually lived down the visitation, was asserting myself again and venturing to use the piano, when "Jack" — rushed in from Mexico, with four shirts on. He had secured two weeks' subbing nights at the Santa Fe depot, but fussed around as if he had a charter to lay an electric railway plant before morning. I was at a church social when he reached my residence, where he mentioned my name, and asked to see a room; it suited, and he was in bed and asleep before the lady got down stairs. When I returned, he was up, had his laundry under his arm and was introducing himself.

As I neared the house, I heard him tell a dude friend of mine, dressed with spiked shoes, that no one but darned fools played lawn tennis. At dinner, a lawyer's comment on a Judge's

decision reminded him that he had met "Jimmie" at Saltillo, Mexico, hoofing it; and when we were calling each other Mr. and Miss So and So, and I was explaining the peculiarities of the petals of the clematis and other floral plants, the conversation was suddenly stopped by a question like this: "Say, Joe, how in blazes did Terry — ever brace up so?"

That night he took in one commercial message, and with the rake off got a shave, hair cut and straw hat. He must have charged the customer storage. This sudden cleaning up turned out to be a bad move, as it brought out his features and the bumps in his head so clear, that the lady asked me to please get him board away down near the depot. On the way down I spoke to Jack plainly, and told him straight that if he had learned to play lawn tennis twelve years ago instead of 15 ball pool, that he would have a much whiter nose to-day, and he retorted just as frankly; "and if you had bought a velocipede in 1870 you could get over the country much quicker now." This proved to me that he was sensitive about his nose, so I made a mark of it.

"Fatty" — passed by the town hermetically sealed in a pig iron car, and had got 54 miles East when he came back to change vests with me. I did not wish to swap, but in consideration of his leaving town immediately, I agreed, and then I presented his garment to the battery-man for an office coat.

I unwittingly offended Fatty by a suggestion as to how he could make better time, for I felt sorry to see a big, stout man like him travelling in this manner. You see, out west the railways, in consideration of getting the right of way, permit the Indians to jump on and off the trains whenever they choose. Well, I offered to loan Fatty a blanket.

One night I found a strange operator laying for me. He poured into my ear about 400 words a minute without even sending me a "query." The gist of it was that he had not eaten or slept for three days and had no prospects. This moved me. So I gave him a dollar, and he immediately went out and bought a knife with it. This is a fact. The merchant told me next day that he jewed him down from \$1.25 to \$1.00, and remarked on leaving that he "felt lost" without a knife. And thus it is, who can discern the real needy and deserving? The question which presents itself as a moral is, whether it is best to let one man go hungry or furnish the ninety-nine with knives.

During a lull on report in the silent night I heard a far-off Kansas railroad operator slowly report, "os, os, os, 'Billy' passed 1:15 a. m. bound East, light." That settled it. Next evening after dark I shook hands with the night yardman at the depot and left the cyclone belt.

OLD TIMERS AND MILITARY TELEGRAPHERS.—On Thursday last a large committee composed of the two societies, "U. S. M. T." and "Old Timers" met at Mr. W. H. Woodring's office, Kansas City, Mo., to talk over the local work of the two societies. A large amount of work was mapped out; from what is learned already, the gathering of the two societies in September, 1890, will be one of the greatest and most interesting ever held. Some of the plans discussed for entertaining all who attend next year's "Reunion" were fine; there is a rich treat in store for the members and their wives and daughters. It is a part of the plan to encourage the ladies to visit Kansas City with their husbands and fathers at the next reunion. Preparations for about two thousand guests will be made, and if more than that they will be royally entertained.

DES MOINES POSTAL NOTES.—Mr. F. K. Holtzinger, who has been manager of this office since its opening, about a year ago, has been transferred to Kansas City, where he assumes charge as manager for this Company. Mr. E. A. Hawkins, our former chief operator, has been appointed manager in place of Mr. Holtzinger. The appointment of chief operator has not been made yet. Mr. Holtzinger has built up the patronage of this line at this place by his untiring efforts to please the public and give good service. Our best wishes go with him,

TELEGRAPHERS' MUTUAL BENEFIT ASSOCIATION.

TWENTY-THIRD ANNUAL MEETING.

The twenty-third annual meeting of the Telegraphers' Mutual Benefit Association was held at 195 Broadway on November 20. President James Merrihew in the chair. Geo. F. Fagan was elected as Secretary of the meeting. The report of the President is as follows:

"It gives me pleasure to welcome you to the twenty-third annual meeting and to congratulate you upon the result of the year's work. The reports of the Secretary and Treasurer will explain to you in detail what that work was. I might mention, however, that there were 27 deaths reported—less than 9 per 1,000—and among them were some of our oldest members. In the Johnstown calamity we lost one member, Mrs Ogle, of whose bravery and devotion to duty you have all heard. Notwithstanding the heavy loss by lapse, the reports will show a good increase in membership. On December 20th last, Mr. C. P. Bruch, who held the office of Secretary for four years, resigned, and the Executive Committee, acting under the power given them by the by-laws, appointed Mr. T. E. Fleming as his successor. Mr. Fleming has filled the office of Secretary to the entire satisfaction of the Executive Committee. You all know my avowed belief in the necessity of a reserve fund, and in the proper maintenance of such a fund. It gives me pleasure, therefore, to inform you that this year we have passed to the reserve fund account \$14,350, which brings the total of that fund, at this date, to \$87,050, which is about 2½ per cent of our liability. I desire to thank the agents and the gentlemen of the Executive Committee for their cheerful co-operation during the year."

The report of the Secretary stated that a net gain of fifty-five members had been made during the year; one hundred and thirty-four members had lapsed and two resigned; twenty seven deaths were reported, of whom eight were also members of the Second Division. Thirteen new agents were appointed during the year.

The Treasurer's report showed a saving in the amount disbursed for death claims, and also in the general expenses as compared with last year. The par value of the reserve fund is \$87,050, and the market value \$88,500.

The following resolution was offered by Mr. W. J. Dealy:

Whereas, As shown by the reports of the Secretary and Treasurer of the Second Division, the membership has fallen from 476 to 409, and the amount of benefit from \$433 to \$372 60 (the latter amount having been paid since the closing of the books for 1889), be it

Resolved, That this meeting strongly recommends the abolition of the Second Division, and, to secure that end, advise its members to resign their membership in that division.

The resolution was seconded by Mr. S. S. Garwood.

After some discussion, Mr. Young requested the decision of the Chair as to the resolution being out of order, and the Chair so ruled.

On motion of Mr. Sabine, the subject of the condition of the Second Division was referred to the Executive Committee.

The following named gentlemen were elected as officers for the ensuing year:

President, James Merrihew; Vice-President, W. H. Young; Secretary, Thomas E. Fleming; Treasurer, G. W. E. Atkins; Executive Committee, James Merrihew, New York; G. W. E. Atkins, New York; W. H. Jackson, New York; W. B. Gill, Philadelphia; S. C. Mason, Chicago; W. H. Young, Washington; Joseph L. Edwards, New York; C. W. Hammond, St. Louis; Thomas E. Fleming, New York; Auditing Committee: S. S. Garwood (chairman), Philadelphia; M. J. O'Leary, New York; Wm. J. Dealy, New York.

The Delegates present were: W. H. Young, Washington, D. C.; H. E. Rawson, Columbus, O.; J. W. Tillinghast, Buffalo, N. Y.; S. C. Mason, Chicago, Ill.; M. M. Prescott, Pittsburg, Pa.; S. S. Garwood, Philadelphia, Pa.; F. W. Griffin, Philadelphia, Pa.; H. V. Shelley, Albany, N. Y.; John W. Porter, Owensboro, Ky.; Chas. H. Baeny, Providence, R. I.; E. L. McDonald, Vincennes, Ind.; S. K. Rupley, Poughkeepsie, N. Y.

Resident members: G. F. Fagan, William Holmes, J. J. Barry, J. B. Taltavall, A. S. Brown, J. L. Edwards, W. J. Dealy, J. B. Sabine, E. F. Cummings, E. C. Cockey, P. J. Tierney, M. J. O'Leary, W. J. Hamilton, J. N. Faulkener, F. C. Halstead, L. S. Jones, J. F. Shorey, W. L. Ives, G. W. Eatkins, C. P. Bruch, T. R. Taltavall, G. W. Logan, Mr. Classback, J. P. Phelan, D. C. Sullivan, W. H. Baker, W. D. Schram, H. Smith, W. J. Morrison, E. E. Brannin, Lewis Dresdner, T. E. Fleming, G. Irving, T. A. Brooks, Mr. Tuthill, Mr. Wohlrabe, James Merrihew.

The following agents contributed five or more applications during the fiscal year ended Oct. 31st, 1889:

Agency.	Name.	No.
General	N. Y. Agency	20
Birmingham, Ala.	F. D. Squires	15
Boston, Mass.	S. W. Eldridge	13
Augusta, Ga.	John W. Brown	12
Kansas City, Mo.	H. M. Scholes	10
St. Louis, Mo.	J. H. Topliff	9
Jackson, Tenn.	G. M. Dugan	6
Baltimore, Md.	J. W. McLean	6
Philadelphia, Pa.	F. W. Griffin	6
Chicago, Ill.	R. W. Chapman	5
Columbia, S. C.	W. R. Cathcart	5
Montreal, Que.	W. B. Rivet	5

Since the annual meeting some ten resignations of membership of the Second Division have been handed in to the secretary. The First Division will now have the undivided attention of all the officers and agents, and the increase in membership will necessarily be greater than ever before. Mr. P. J. Tierney spoke at some length on the subject of increasing the membership. He referred to the fact that but 6,000 certificates had been issued since the association was organized, and believed if the young men took hold of the work, the present membership would soon be doubled.

TWO PAPERS IN ONE.—The ELECTRIC AGE will hereafter consist of a complete electrical journal and a thorough telegraph paper combined. This should be incentive sufficient to induce every member of the craft to subscribe. This is how our efforts are appreciated in Kansas City, from which place Mr. B. C. Elder writes: "It's with pleasure we note the increase in size, as well as in worth, of the AGE in last few issues. Surely no operator, who is alive to the needs of the hour, can fail to see the importance of subscribing, and keeping abreast with the times, as the AGE contains all the new inventions in the electrical field. I am urging on non-subscribers, the value to them of the electrical department of the AGE. Success to it, is surely the wish of every wide awake telegrapher."

There is a pleasant ring in this expression of appreciation, which, we hope, is shared in all quarters of the country alike.

When Mr. J. S. Backus, of Garland, Pa., subscribed, a few days since, it was with the desire to receive the AGE until he is a year older. May you never grow old, Mr. Backus!

An elegant Christmas Present.—A copy of Terry & Finn's 2nd edition, Illustrations and Descriptions of Telegraphic Apparatus.

It is proposed to erect a monument to the late Dr. Joule.

KANSAS CITY, Mo., POSTAL NOTES.—Mr. Frank K. Holtzinger, formerly of the Postal, Des Moines, has been appointed manager of this office, taking effect November 16th. Mr. A. B. Richards, who has been acting as manager since Mr. Cloney's resignation, resumes his duties as chief operator as heretofore. Mr. Holtzinger has the reputation of being one of the most energetic business men in the West, having at different times been connected with prominent railroads in the capacity of superintendent and assistant superintendent. It is fair to presume the patronage of this Company will be well cared for. We are sad to note the death of night chief Fairo's little boy, who was injured by being run over by a cable car a few days since. Lock-jaw set in, and despite the efforts of the physicians, he died on Saturday morning last. We all deeply sympathize with Mr. Fairo in his loss. WESTERN UNION NOTES.—Arrivals since last letter: Tracy, from Denison, Texas; Miss Mattie Van Ansdall, W. U., at Arkansas City, Kansas. Departures are as follows: Tracy, to Lajunta, Colo., as dispatcher for the Santa Fe Ry. Co. Mr. Lacey, chief operator for the W. U. at Topeka, Kas., paid us a visit a short time since, and was shown around the office by assistant chief operator Scholes. Wire chief Redline has a very sick babe; at last accounts it was improving slowly. He has our sympathy and wishes for its recovery. There have been several changes made lately; Miss Dale has been assigned to the packing house district, Mr. Ferris now working "D" city wire; Miss Shields works Sedalia wire. Miss Van Ansdall works Junction City wire. "Major" McConaha, who works the stock yards wire, is a gifted caricaturist. Some of his sketches are very fine, and would grace the columns of *Puck*.

LONDON NOTES.—On account of loss of notes, my article of Aug. 31st was incomplete. Since then I have had pleasure in gathering new items that may interest your readers. Arriving in London early in September, my inclination led me very strongly to again call on the Western Union force, situated in The Royal Exchange, and where I was so pleasantly received the year before. On entering the little office, I soon caught sight of the pleasant features of Mr. H. Parsons, who is the efficient counter clerk, who worthily fills the position, and by his agreeable and accommodating spirit has doubtlessly gained and kept many customers for his company. Upstairs I found the genial Harry E. Robson; still occupying his nice, comfortable chair as superintendent; the right man in the right place. From his healthy appearance I would judge he will remain in service of the W. U. away into the 20th century. "May his shadow never grow less." He is ably assisted by Mr. J. D. Butt, who is his chief operator, or "clerk in charge," as the chiefs are called, and the following staff of operators, who do fine work: T. Bacon, G. Braggs, G. Crighton, C. A. Wilson, J. Kaddie, E. C. Bowes, W. C. Haysey, E. J. Elliott, G. T. Budden, G. Dove, P. O'Neil. These gentlemen have to work with clumsy old instruments, that from their rickety adjustment and general ancient appearance should have been pensioned by the English Government long since and relegated to the corner shelf, where all telegraph instruments should go when their day of usefulness is past. They work a polar set of instruments, which I partially described in my notes of Aug. 31. Their pole changer is on the back of their great, clumsy keys, that makes a poor contact at its best, and which allows very little wrist motion, the whole arm having to be lifted from the table. They have in circuit a key, sounder, register, relay and galvanometer. Their messages are received by sound, but are at the same time run off on register, and the slip kept to trace any "bulls." Their method for quick work in getting out their cables is good. They use a carbon sheet and a pencil to receive by, and the carbon copy is delivered, thus saving time of copying or ink impression that we use, though I think it is done at the expense of their copy, and very little if any time is saved. They send a slip along with messages to be signed, which is returned with time boy starts, delivers, address, etc., of message, which is pasted to the copy and filed away for reference.

The Western Union representative for Europe is Mr. G. Von Chauvin, whose headquarters are at the Giesham House, on Old Broad street. His assistant is Mr. Sandon, and Mr. G. E. E. Murrey, their popular traffic accountant, and a staff comprised of Messrs. R. F. and E. A. B. M. Nab, W. F. Ward, S. L. Clarke, F. W. Ranson, J. Haines, H. Weeks, W. C. Swain, W. S. Scott, J. W. Geddes, R. Bromfield and N. Y. Bell. During my stay in London it was unfortunately the case that the second cable of the Western Union became interrupted, the first having failed some months previous. Superintendent G. R. Mockridge had started on a little vacation from Penzance when this occurred. Having arrived in London at about six days previously, he of course had to return immediately, and this being the second occasion on which he had to curtail a proposed vacation, he meditated deeply. Mr. Robson had gone from London to Bristol to prospect for an office which the W. U. propose opening there. He was first apprised of the break by a telegram from "Mock," reading: "Traveling by mail, meet me and I will teach you a new language in one word." Mr. Robson met the mail, and was assured that Volapuk is in its infancy. Now I don't like to doubt Mr. Mockridge's word, but if he could confine the pent up indignation he undoubtedly felt into one word, that word was undoubtedly a long one, the length, the breadth and depth of which who can measure! As a matter of economy, I would advise the W. U. officials to so increase Mr. Mockridge's salary that he may so enjoy Penzance life as to be willing to forego his inclination for a vacation, and save the Company a large sum for repairs. To have one's vacation spoiled twice in a few months is rather trying to the nerves. Mr. Mockridge is the superintendent of the third W. U. office in England, which is situated on the Cornish coast, at Penzance, the terminus of the two W. U. cables. He works with Canso, Nova Scotia, by cable, and his two land lines, which are leased from the English Government, work to London and Liverpool, with a repeater at Bristol on the Liverpool circuit. He relays all cables, sending London and cities near to "L. D." (Liverpool), handling for Ireland and Scotland and the provinces, which business is transferred to the Postal Telegraph. Mr. Mockridge is assisted by Mr. E. Chambers, his chief operator or "clerk in charge," and the following staff of first-class men: Messrs. J. Brock, T. N. Wood, S. Matton, J. F. Loam, A. J. Amar, C. O'Donoghue, G. E. Adson, W. Stevens, W. E. Hutchison, R. Brown, J. C. Truscott, T. A. Marshall, W. E. Robson, G. J. Smith, F. Wickins, A. G. Ashley, T. D. Taylor, W. H. Potter, W. Walton, P. Pitts, J. Mitchell, W. Matton, N. Nicholas, A. A. Amar and G. Baird. I did not have the pleasure of meeting these gentlemen, but from the very flattering accounts I heard of them I regret this fact very much. I hope a great many of the English W. U. staff will become regular subscribers, and tell us more of their country and profession. I close with a hearty "73" to them all, and with many kind remembrances of the English employes of the W. U. Company I was fortunate to meet.—W. E. PERCE.

NEW YORK, LAKE ERIE & WESTERN NOTES.—Beginning at Jersey City General Superintendent's office, also W. T. Boyd's office, division operator for Eastern Division, is Robt. Corson and Frank J. Rogers, days; Mr. Hurty and C. Frank, nights. In "Jy." dispatcher's office, D. Halliday, M. J. Maloney and Paul A. Lord, dispatchers, days; B. E. Moodey, chief dispatcher; Wm. F. Casey, chief night dispatcher; assisted by Thos. H. Pindle and W. A. Sturms. Operators: N. Coleman, M. C. Roach, M. Nolan, F. Evers, Wm. Mapes, W. Gramlich and Mr. Yost. At Secaucus is F. T. Russell, first trick; Ed. O'Neil second, and Robt. Parks, third trick. Burt Buys, who formerly worked first trick at Secaucus, is now at Rutherford, N. J., superintendent of the electric light plant at a good salary. So much for perseverance. At Hackensack Tower, "Q X," is Geo. Tonkin, days; Mr. Feeney, nights. Mr. W. J. Slingerland and Mr. Scowcroft work each alternate week at Erie Junction. Messrs. Smith, Harvey, and Owen work at East end Bergen Co. R. R., respectively first, second

and third tricks. At Passaic Bridge is Tom Clark and Ed. Murphy. Mr. Conolly is manager at Passaic, with Mr. Hallenbeck and W. L. Hammond operators, respectively day and night. W. Warner is manager at Clifton, at Clifton Junction; Jno. Dunn, days, J. Noxon, nights. Emergency man George Washington Doell is now at East Paterson, with S. Washer and Wm. J. Garvey, days, and Fred. Cramer, nights, at Paterson and manage to hold down that lively little place. Jack Gahrien and J. N. Van Nortwick are at West Paterson. W. F. Coleman, first trick at Ridgewood Junction, Frank Kelly on second and E. Horton on third trick. At Ridgewood, Wm. J. Tonkin, days; Wm. J. McAuliffe, nights. Geo. Eisenhauer and Henry I. Ackerman are at Hohokus. At Allendale, Sam. Hunter and J. W. Quackenbush; Wm. Winter, days, and J. Cullen, nights. Geo. E. Remsen and Mr. Utter at Mahwah. At Suffern, J. Keegan, T. Smith and W. Whritenor. Messrs. Pew and Wilson at Ramapo. At Sloatsburg, J. E. Ward and P. Donolly. Mat Thompson is subbing for a time at Ramapo. Wm. Mathews, who has been at Ridgewood and who came here from the P. & R., has returned to that road and is now working at Bound Brook. Mr. Bolan, from N. Y., N. H. & H., is a late arrival, and is now working at Clifton Junction. Tom Driscoll is now at Rutherford. Fred. W. Burns and J. G. Earl are at Aden. Messrs. Lancaster and Hall at Newburgh Junction, and Tom Doyle at Turners. J. E. McVeigh has taken the agency at Hampton, also a wife, *nee* Miss Lizzie Clark of Arden.

A MANIAC AT LARGE.

HE WANDERS INTO A TELEGRAPH OFFICE—A TERRIFIC STRUGGLE WITH THE NIGHT OPERATOR.

Telegraph operators, especially those who work at night, have many strange and sometimes thrilling and dangerous experiences. Thomas Clark, the night man at the telegraph office in Berlin, between two and three o'clock last Saturday morning, says a despatch from Hartford, Conn., had a battle, which nearly cost him his life, with a lunatic, who attacked him in his office. The maniac's name is William Kearns, and he is one of the most desperate lunatics in Connecticut.

Kearns wandered around for some time until attracted by the light in the telegraph office. He entered it quietly, and without any warning grappled with Thomas Clark, the operator. Clark is a rather slightly built man, but very wiry and muscular, and above all no coward. Though taken by surprise he fought desperately, realizing full well the peril of his situation. For a long time he stood in danger of his life, but desperation lent him strength. He cried out unceasingly for help, and a trainman, assisting at some switching a short distance below the depot, finally heard his appeals for assistance. He ran at the top of his speed to the depot and rushed into the telegraph office. Without hesitation he took a hand in the fearful combat, and with Clark grappled with the maniac. The latter's struggles as he realized that he was being overpowered became fearful, and he howled in his rage. With the utmost difficulty, and after a long struggle, he was mastered, bound hand and foot, and tied into a chair in the waiting-room.

We advise every reader of the AGE to remit \$1.50 for a copy of the second edition of Terry & Finn's "Illustrations and Descriptions of Telegraphic Apparatus," which is intended to post every telegrapher in the proper handling of wires and instruments. Knowledge is the only road to promotion. First-class electricians are always in demand.

J. C. Talmage, who killed operator Tidd at Brunswick, Mo., January 9, 1888, received 10 years in the penitentiary as fit punishment for his crime.

BALTIMORE NOTES.—Postal, Mr. J. Vogt, our drygoods district manager, gave a reception to the boys on November 1st, in honor of his wife's return from London. Music and refreshments were the order. On election night the entire local force was pressed into service, so heavy was the business, which is still on the increase.

BIRMINGHAM, ALA., NOTES.—There has been numerous changes here since our last personal. Business has wonderfully increased in this "burg," necessitating an increase in force of three first-class men. The personnel of the W. U. is as follows: E. E. Williams, mgr.; Frank Ross, day chief; W. J. Phelan; Richard McMullen, S. C. Tugo, D. K. Stevenson, Rufus Mitchell, T. D. Ryan and H. A. Tradewell comprise the day force, with Daniel Minihan and D. L. Culver on nights. Mr. Minihan is taking night report *vice* Culver departed for Jacksonville. Mr. J. W. Sutphin is night chief. The Postal has opened up an office here and are doing "tolerable" well. C. A. Garland, formerly mgr. of W. U., Selma, is mgr. with Messrs. Scattergood and Ludwig, formerly of W. U., this city, on days and nights respectively.

KANSAS CITY NOTES.—Mr. W. E. Jones, our all-night man, was lately married to Miss Flora Thrower, of this city, and immediately afterwards started East on a bridal tour. Congratulations are extended. Mr. Wolfram has returned from his two weeks' vacation much improved in health. He reports a good time while away. The operators in the West have seemingly taken a great hold of politics lately. In the recent election in Kansas, S. J. Bear, for many years Manager of the W. U. at Topeka, Kan., was elected Register of Deeds (a good, paying position) at that city. He appoints Mr. Lacey, for a long time his Chief Operator, as his Deputy Register. R. S. Ayres, for many years Agent at Garnett, Kansas, was elected Sheriff of Anderson County, Kan. Chas. E. Bruce, an operator in Kansas City W. U. office, was elected County Clerk of Wyandotte County, Kan. (his home), with headquarters at Kansas City, Kan. Mr. Bruce has been in the employ of the W. U. at Kansas City, Mo., for many years, and made many friends, who "saw him through." At the Postal we find Mr. Roche has transferred to the W. U. office; Mrs. B. C. Elder has resigned on account of illness. J. D. Coleman from Leadville is a new arrival. Applicants for places are numerous, superinduced by the fact that this is the best-equipped and most pleasant office in the city.

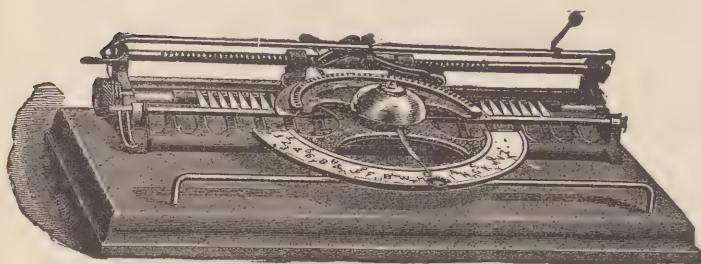
PHILADELPHIA W. U. NOTES.—Arrivals: J. A. Bartley Brynmawr, L. D. Harris, Atlantic City; Miss Jessie Henderson, city. Departures: C. W. Morris, Jas. Quinn, A. C. Crawford, E. W. Rigby. Mr. Clem. Congdon, for many years night manager of Continental Hotel office, has resigned and is now in Penn Yan, N. Y.

RALEIGH, N. C., NOTES.—The force here in Western Union office has been increased, and now stands: N. R. Young, manager; P. H. Hughes, chief operator; W. C. Richardson, J. S. Jones, P. H. Atkinson, operators, and Miss S. Banks, clerk.

Mr. Sarbadhicary, the East Indian telegrapher, left for London, Nov. 13, where he expects to resume his studies during the winter. He has for some time been employed by the Postal Company at their main office and at 91 Wall street. Before leaving he had an interview with ex-President Cleveland and discussed Irish politics with that gentleman. Mr. Sarbadhicary is endeavoring to pass an examination known as Roman civil law examination. It is to be hoped Mr. Sarbadhicary will succeed in his endeavors.

You can always gauge a man's enterprise by the work he accomplishes. If he says he cannot find subscribers to this paper, he merely acknowledges that he lacks the fine diplomacy to "induce" or to "persuade." There is no one interested in the business who cannot be induced in one way or another to subscribe for this paper.

THIS TYPEWRITER FOR TEN NEW YEARLY SUBSCRIBERS.



The World Typewriter will be given to any person who will secure ten new yearly subscribers to this journal. This is the greatest premium offer ever made by any paper and the offer no doubt will result in our friends everywhere putting forth their best efforts to earn a machine, which will prove of much assistance to them at all times. We guarantee that the commission on the ten new subscribers by securing this typewriter is \$10, or within one-third of the entire amount collected. In allowing this unusually large commission, of course, we expect new subscribers, and in fact this liberal offer is solely based upon this idea.

The World Typewriter was placed upon the market a little more than two years ago. Although then in a somewhat imperfect state compared with the World of to-day, its success from the start was remarkable, and it has steadily gained in favor. The World of to-day is the result of practical ideas, experiments, and improvements upon the original acceptable machine. The World is offered as the best machine for letter writing. It is practicable, durable, simple, and speedy, and will do as good work as any typewriter upon the market. It is intended as a legitimate companion to the telegraph and other office or professional desk, the stenographer's table and for any other place where the pen or pencil is used. During the two years that the World has been before the public nearly fifty thousand have been sold. The compactness of the machine gives it advantages not possessed by large and weighty typewriters. It is but 12 inches long, 6 inches wide, and 2½ inches high, and weighs but 3½ pounds; consequently it can be easily placed in a convenient position on the desk or in the drawer, not necessitating an extra table and change of position whenever a letter has to be written.

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REORGANIZATION OF THE POSTAL TELEGRAPH-CABLE CO.—A few days ago the following officers were elected to shape the destinies of the Postal Telegraph Cable Co. for the ensuing year: Directors—Geo. S. Coe, Hector de Castro, Albert B. Chandler, Richard V. Dey, Edward C. Platt, John O. Stevens, Geo. Gray Ward. Executive officers—Albert B. Chandler, President and General Manager; George S. Coe, Vice President; William H. Baker, 2d Vice President; Edward C. Platt, Treasurer; J. O. Stevens, Secretary; Geo. R. Williamson, Auditor; Theodore L. Cuyler, Jr., Asst. Secretary and Asst. Treasurer. Executive Committee—George S. Coe, Hector de Castro, George G. Ward, Albert B. Chandler, *ex officio*. General Officers—F. W. Jones, Asst. General Manager and Electrician; J. H. Emerick, General Superintendent, Eastern Division, New York; L. D. Parker, General Superintendent, Western Division, Chicago; J. W. Kates, General Superintendent, Southern Division, Richmond; R. H. Robbins, Purchasing Agent and Superintendent Supplies; R. S. Guernsey, Office Attorney; J. H. Southard, Superintendent Tariff; Superintendents—E. G. Cochrane, New York; W. J. Pettingill, Boston; Charles C. Adams, Philadelphia; Edwin S. Patton, Chicago.

BOSTON NOTES.—Our item in the AGE, a few weeks ago, in regard to reading in the office while on duty brought forth a few vigorous statements from one or two of the chiefs, who claim that the rule is never enforced, except when the privilege of reading is abused. It is also claimed that reading would be allowed but for a certain few who allow messages to accumulate on their hooks while they read the morning paper. Consequently the many must suffer for the few. Some of the ladies sew and study short-hand during their leisure moments and are never prevented from so doing. It is newspaper reading only that comes under the ban.

Speaking of reading the morning paper, it is amusing to see how some operators resort to the practice of borrowing a paper, year in and year out. The trials of the possessor of a paper are exemplified here every morning of the week. The superintendent's department in our building here is the busiest in the country, being the only office of the Western Union where two large and important districts are under the supervision of one superintendent. We cannot see that the force has been materially increased since the change took place some years ago. The two districts were "rolled into one," but unlike "Pooh Bah" in the "Mikado," no official received any financial benefit. Requisition time is about the busiest season in this department, and the lists from the various offices in the districts, before they are forwarded to the supply department in New York, have to be revised and trimmed down as the case may demand; otherwise we fear the managers of supplies would be sincerely shocked at some of the things called for; gold pens, for instance. The W. U. hardly supply a *suitable* grade of pens of the ordinary kind, let alone gold ones. We notice very few operators use the pens supplied by the company, but buy a special brand of their own at wholesale, in order to keep up the standard of their workmanship; and they will doubtless continue to do so until pens are supplied them which are fit for the constant scratching of telegraphic work, and which will not wear out after a half an hour's use.

Photographic copies of the gold medal presented to Mr. James D. Reid, at the banquet, Nov. 20, by the New York Telegraph Club, can be had for 35 cents each, by applying to Mr. J. C. Watts, Secretary of the New York Telegraph Club.

Mr. Prank Eastman, one of the Western Union chief operators at 195 Broadway, has taken charge of Mr. W. J. Howey's insurance business. Mr. Eastman's address is 881 Butler St., Brooklyn, N. Y.

C. P. R. WESTERN DIVISION NOTES—Transfers: H. M. Wormworth, Parrywood to Brule; F. C. Saunders, Despatcher's office, Port Arthur, to "X" office; A. A. Marllatt, "X" office to Rat Portage; D. Gignac, Rat Portage to Kalmar; R. Beattie, Kalmar to Regina; H. A. Purchase, Brule, is on leave of absence. Resigned—A. McQueen, Keewatin; Sutherland, Rat Portage. C. P. R. EASTERN NOTES—A. Fraser, Trudeau, has just returned from a visit to Port Arthur. New Arrival—W. D. Nix, Sudbury, Ont. to Trudeau. A. Jeffries, White River, has resigned.

The second edition of Terry & Finn's Illustrations and Descriptions of Telegraphic Apparatus is now being delivered. It is the most complete telegraph work extant, and should be in the hands of every telegrapher who desires to know something of the instruments he operates daily. Simple language is used, so that any one who can read English may be able to solve the problems therein. It is a fit companion and text book for the craft, and the price has been made so reasonable as to permit of all interested purchasing a copy. Where there are three or four operators in a small office, the amount necessary to purchase a book should be divided equally among them. It will make an excellent Christmas gift, and should meet a hearty welcome by those interested in holiday presents. Price, \$1.50. Address Electric Age Publishing Co., 5 Dey St., New York City.

Mr. Charles Doughty, of Harrisburg, Pa., has secured one of our typewriters, as his commission on \$15 worth of new subscriptions, the result of a few minutes work each day for a week. We extend our friend our hearty congratulations. Mr. Doughty's accomplishment proves what can be done when one attempts in the right spirit to gain an object. Harrisburg was pretty well canvassed, but Mr. Doughty found no trouble in locating ten people, whom he induced to subscribe. We hope other friends around the country will take a hint from this successful effort and duplicate the list many times. This is the time of the year when people expect to make expenditures for literature for the ensuing year, and it only requires a word or two to persuade any member of the profession to invest in the professional journal.

The following testimonial speaks for itself: Received the "World" typewriter on 18th inst., and consider it a splendid premium for so little work. I find I can write about 25 words per minute with it, and it is, I assure you, a great convenience to me, more especially in letter writing. C. L. Hallett, Port Arthur, Ontario. Mr. Hallett sends us two communications written on his machine and two prettier letters never reached our office, not excepting those written on \$100 typewriters. We hope our friends in other sections will at once secure new subscriptions sufficient to earn one of these typewriters.

Stoughton P. Hill, a well-known telegrapher, familiarly known as "Jersey," committed suicide by shooting himself through the head, while lying in a hammock in his room at the Central Hotel, Alleghany, Pa., Nov. 21.

J. R. Stanford, of Atlanta, Ga., now with the Remington Typewriter, gave us a call a few days since, when in this city.

We are in receipt of a piece of music the composition of Mr. E. E. Todd, and dedicated to Mr. E. Perkins, both well-known operators.

MARRIED.—Frank W. Lake, of Syracuse, N. Y., to Miss Julia E. Frazee, of 195 Broadway, in New York, Nov. 26.

E. L. McLean has been appointed manager of the Postal, Oswego, N. Y.

Mr. William L. Ives, of the 195 force, was in Syracuse, N. Y., last week.

MILWAUKEE NOTES.—Since our last communication several things worthy of note have taken place in this ranch. Day Chief Maher, who has been sick nearly all summer, is again among us, to the great satisfaction of all, especially the day force. Miss Mattie Edgerton has been obliged to quit work in the office on account of ill health; she has the sympathy and best wishes of the entire fraternity for a speedy recovery. Owing to a desire of the management to do away with extra service the force has been considerably increased and some few changes made. The new lights are: Frank Barr, from Kansas City; Louis G. Grosh, Frank Patt, and Archie Rainey, Iowa; and Ed. Lee from the *Seebote*. Night Chief Grange is enjoying a much and long needed rest. Charlie Warth heads the force till his return. Instead of an hour for dinner, as heretofore, the day force is given only half an hour, but getting off so much earlier. Another change in their favor is the abolition of the two hours' extra service two nights a week, without extra pay. Henry Saefke has been transferred from the main office to "GO" office, relieving Will Williver, who has gone to the *Seebote*.

NEW YORK WESTERN UNION NOTES.—Mr. Heidemark, recently appointed assistant to Chief Willis Jones of the Chicago division, has been transferred to the south to assist Mr. Waycott. Leslie Miller is with a theatrical combination in the East. "Say?" said an operator down East a few nights ago after hearing the stereotyped figure "8" snapped out with more or less viciousness following a succession of calls, "who's 8?" Wilson Barrett accompanied by Mr. George J. Gould recently visited the operating room and was escorted through by Assistant Manager Thomas Brennan. The celebrated actor seemed greatly interested in what he saw and heard and departed evidently highly pleased with his visit. Miss L. J. Calver, after an illness of more than a month, has resumed duty. Mrs. Florence Falkenbury, a new arrival, has been assigned to the 8 to 5:30 truck. Messrs. Guest, Richardson and Crary have been transferred to the split truck and Messrs. W. H. Newman, Kuttner, Shay, Harrington, Brant and Malone to the regular day force. Mr. Grady to 7:30 to 5. One hundred and seventeen friends of Joe Van Cura sent greetings by letter and postal card on the attainment of his —th birthday, which occurred a few days ago, and as a result two-thirds of the boxes in the post-office here were filled with his mail. The fire which broke out in the 10th story of the building about 4 o'clock on the morning of Nov. 21st, did \$1,500 damage. The flames were confined without much difficulty to the room in which they were first discovered. Considerable trouble was experienced by the firemen in their attempt to haul hose to the roof, but they were eventually successful and soon had the fire under subjection. The lunch room had to be closed for a day or two in order to remove the debris. Almost before the fire had been got under control there appeared at the door of the operating room a reporter on a morning newspaper, in search for the man who first discovered the fire. "I have looked all over for him," said he, accosting Mr. Tobin, "but he's nowhere to be found." "Who?" blandly inquired the all night chief. "Mr. McGinty," said the scribe. "One of your boys told me he was upstairs." "No," said Mr. Tobin, "he's not come up yet." "Up from where?" queried the reporter. "Why, from the bottom of the sea." Then the scribe hastily rolled his notes and placing them in his pocket slid down stairs one time in two motions. The sympathy of the office is extended to Miss Sarah Dougherty, whose mother's illness, mentioned in a previous issue, terminated fatally a few days ago. William Moffatt, one of the most popular men on the east, has resumed work after a month's serious illness.

CHICAGO NOTES.—The winter season has fairly settled in on us, and with it come the usual quiet affairs. Changes are few. Some of the force expect to return from their vacations during the next fortnight, which will close a lively and busy season for the second-largest office in the country. Among those who

have "settled down" are Ben Morrow, who was married to a Miss Gotshall, of Miles, Iowa, on Nov. 6th, and the fraternity extend him their many congratulations and best wishes. The arrivals are: Dayhoff, Sioux City; W. Tweedy, New Orleans. Departures: Mr. Bellman, to be chief operator at Cedar Rapids; A. H. Burke, to a lumber firm; Mr. Walker, to a pool room. Messrs. Gibson and Kendrick are on the sick list. A. W. Graham is helping Loop Chief Crowell on the loops, *vice* Mr. Walker, resigned. Mr. Dixon, formerly of "Ex" office, has been promoted to the B. & O. board as wire chief. The Board of Trade have just put in 10 arc lights on the Exchange floor, which add greatly to the comfort of the fraternity, especially on dark and cloudy days. The first reception of Morse Council No. 347, National Union, to its many friends occurred Saturday evening, Nov. 16th, at the hall in the National Union Building. The hall was filled with the telegraphers of Chicago, their ladies and friends, nearly 300 in number, who were entertained. The Electric Quartette, consisting of Messrs. Meany, Anderson, Westrope and Delavan, rendered several vocal selections. Miss Tottie Thomas and Mr. Geo. C. Mason favored the audience with solos and received well-merited applause. An address by Mr. Chas. J. Kavanaugh, the vice president of the Cook County Cabinet upon the National Union and its objects, was given close attention by the audience. Mr. Walter Omeliah, a well-known telegrapher of this (W. U.) office, and who is a promising pupil of the Chicago Conservatory of Art, rendered a selection from "Richard III." and another from "Virginius" in an eloquent and thrilling manner. His efforts were applauded to the echo and won many encomiums. The drama entitled "Colleen Bawn" was placed upon the stage at Apollo Hall the evening of Nov. 18th by the Chicago Dramatic Club. Several of the force of Chicago office were in the cast. Mr. W. J. Lloyd, our assistant superintendent, represented Danny Mann, and made the part a success. The part of the Hardress Creegan was assigned to Thos. P. Lloyd, manager of the Western Union restaurant, and was handled with remarkable ability, as also the part of "Anna Chute," which was taken by Miss Sara Loyd. The part of Eily O'Connor, or the "Colleen Bawn"—the heroine of the play—was taken by Miss Tottie Thomas, of the Wheatstone department, and too much praise cannot be given her for the manner in which she acted her part. The climax reached by her during the taking of the oath administered by the Priest was well acted, as was also the climax reached at her supposed drowning by Danny Mann. Messrs. Frank B. McLoraine and J. J. O'Brien also filled their parts well indeed. The play was a complete success and was presented to an audience of not less than twelve hundred people.

THE NEW YORK TELEGRAPH CLUB NOTES.—Just prior to Mr. Reid's departure, he presented the club with a magnificent steel engraving of himself. It is needless to say it is one of the most valued pictures in the possession of the club. The members feel highly indebted to the editresses of the *Woman's Illustrated World* for a magnificently-bound volume of music, entitled the Musical Prize Album. Prominent among those elected to honorary membership at the last meeting are Messrs. W. J. Lloyd, James E. Pettit and W. R. Plum of Chicago; Charles E. Taylor, of Frankfort, Ky.; James Merrihew, Albert E. Sink, Thomas Brennan, E. F. Cummings, John Emerick, Denis Doren, E. C. Cochrane, E. C. Cockey, Jesse H. Bunnell, E. S. Greeley, John Van Horn, William Maver, Jr., Geo. B. Prescott, T. D. Lockwood, Frank L. Pope, of New York; Messrs. C. A. Terry and Wm. Finn, of Buffalo.

DIED.—Mr. A. W. Cain, who was at one time assistant night chief at New Orleans, died at Kokomo, Ind., a few days ago.

Mr. A. H. Inglee, for many years with The Associated Press, New York, is now with the *Journal*, Providence, R. I.

The credit of originating the Reid Testimonial Medal belongs to Mr. Frank Eastman, of the W. U. night force.

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The *ELECTRIC AGE* will give \$10.00 to the lady telegrapher who composes and sends us for publication the best original telegraph story. A second prize of \$5.00 will also be given to the lady telegrapher sending the second-best story.

The conditions are: 1st. The lady must be a subscriber to the paper; 2d. The story must not exceed 500 words in length, and *one* side of the paper only should be written on.

A nom de plume may be used if preferred.

Two stories from the same author will not be admitted in the same contest. The prizes will be awarded when not less than ten stories have been printed, and at least two of the stories will appear in each issue until that number has been reached. The judge will be announced in our next issue.

[Owing to the crowded condition of our columns this matter has for this one issue been overlooked.]

TORONTO NOTES.—The coming social event in telegraph circles will be the Canadian Pacific Railway and Commercial Telegraphers' Annual Ball, which will take place in Toronto about the date of Friday, January 10th, 1890. There will be some five hundred invitations sent to telegraphers throughout the United States and Canada. A very large assembly of the fraternity, and one of the most pleasant events of the season is anticipated. Many visitors will be present, representing various sections.

Mr. Jas. D. Reid left this port on the steamer Lahn promptly at 9 o'clock. An immense gathering of telegraph people was present on the pier, and all united in giving him and his beloved wife a hearty send-off. In addition to the telegraph fraternity, which was represented by fully 100 people, his numerous other friends were seen in large numbers. Mr. W. de la Motte, the W. U. telegraph signal operator at Sandy Hook, N. J., sent the following dispatch to Mr. Dealy: "10.22 A.M. Steamer 'Lahn' now passing out this point. If Mr. Reid wore a cap and was accompanied by a lady, they were on deck and I could see them watch the stars and stripes as they were lowered and raised from the flagstaff on our tower. Wind, east-southeast, 36 miles per hour. Heavy sea outside." Mr. Reid wore a cap, which verifies the identification. The ladies, before the sailing of the steamer, presented Mr. Reid with a box containing a token of their esteem, but it was not to be opened until he was three days at sea. Some kind friend had a gold-headed cane handed to Mr. Reid by a stranger, and the donor is, of course, unknown.

It is claimed that the sales of the Samson Battery now reach over a half million cells per year. Prof. C. F. Brackett of Princeton College, after thoroughly testing and examining the "Samson" Battery, in the course of his report, a copy of which may be seen at our office, among other things of a more scientific nature, says, "I have carefully measured and compared the "Samson" Battery with the Leclanché (Gonda Disque). The plotted curves show at a glance, when understood, the relative superiority of the "Samson" to the Leclanché. Careful reference to the figures and the curves which represent them will show that where the two batteries are tested in competition, being fresh, the difference in favor of the "Samson" is about 30 per cent. It is not quite as much at the end of the first hour of continuous working, but is very decidedly in favor of the "Samson."

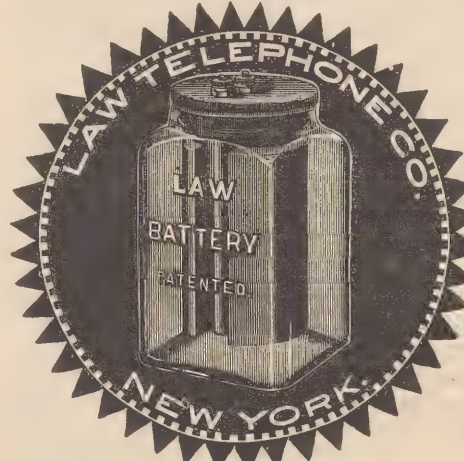
Mr. C. F. Schroeder, chief operator P. R. R., Frederick, Md., was on Nov. 13 married to Miss Hattie Young.

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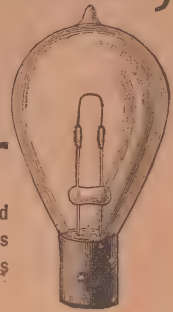


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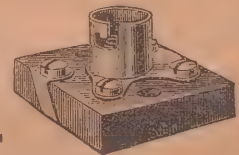


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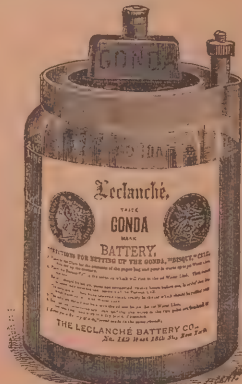
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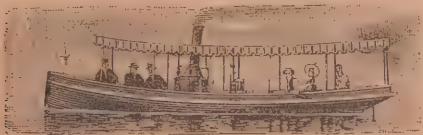


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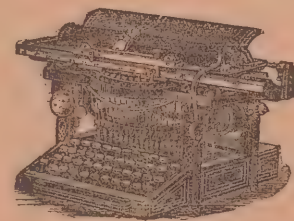
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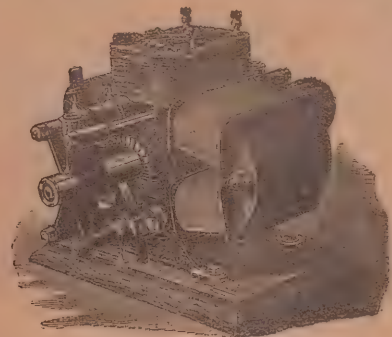
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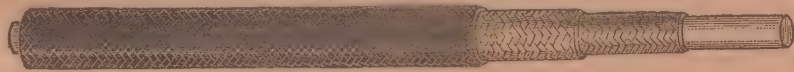
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