

CANADIAN MACHINERY

AND MANUFACTURING NEWS

A weekly newspaper covering in a practical manner the mechanical, power, foundry and allied fields.
Published by The MacLean Publishing Company, Limited, Toronto, Montreal, Winnipeg and London, Eng.

Vol. XVIII—No. 12

Publication Office: Toronto, September 20, 1917

Subscription Price
\$3.00 per Year

Watch a Capable Mechanic Test a File

See him pass his thumb over the teeth.
By instinct, he knows, at once, whether a file will do its work.

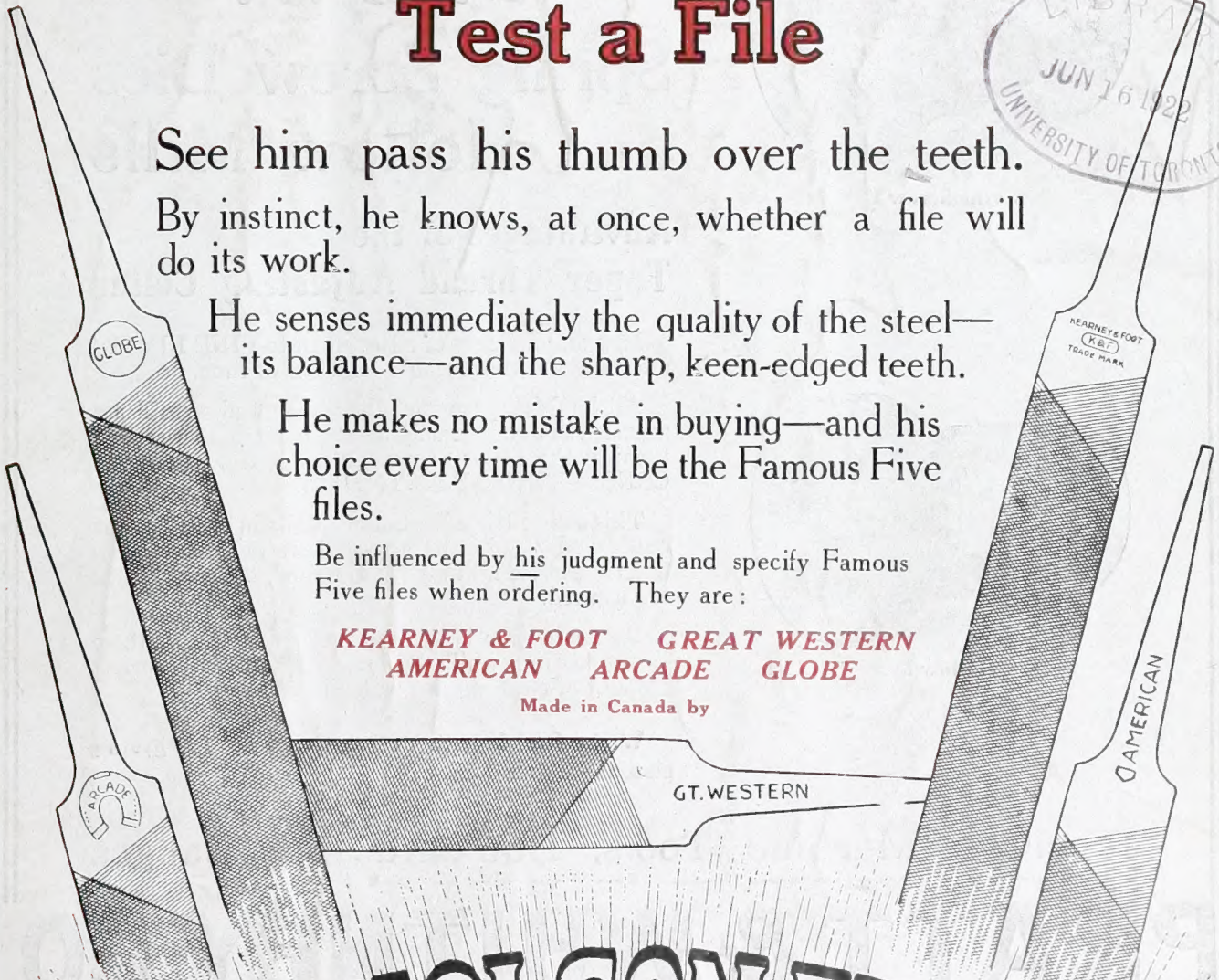
He senses immediately the quality of the steel—its balance—and the sharp, keen-edged teeth.

He makes no mistake in buying—and his choice every time will be the Famous Five files.

Be influenced by his judgment and specify Famous Five files when ordering. They are:

**KEARNEY & FOOT GREAT WESTERN
AMERICAN ARCADE GLOBE**

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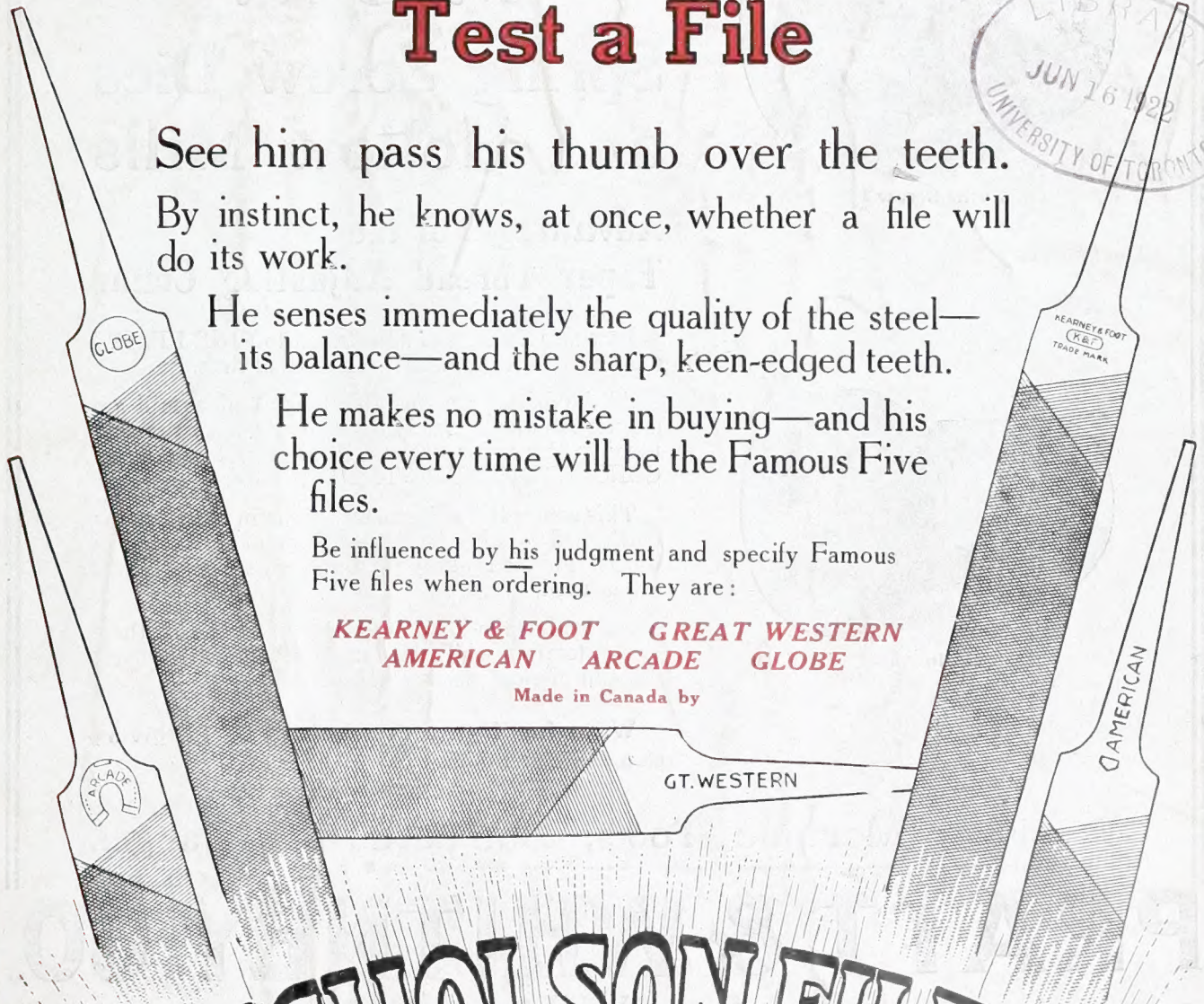
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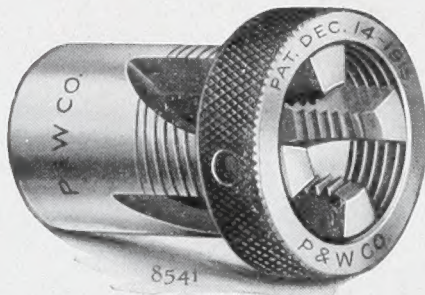
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Insures Uniform Concentric Adjustment

P. & W.

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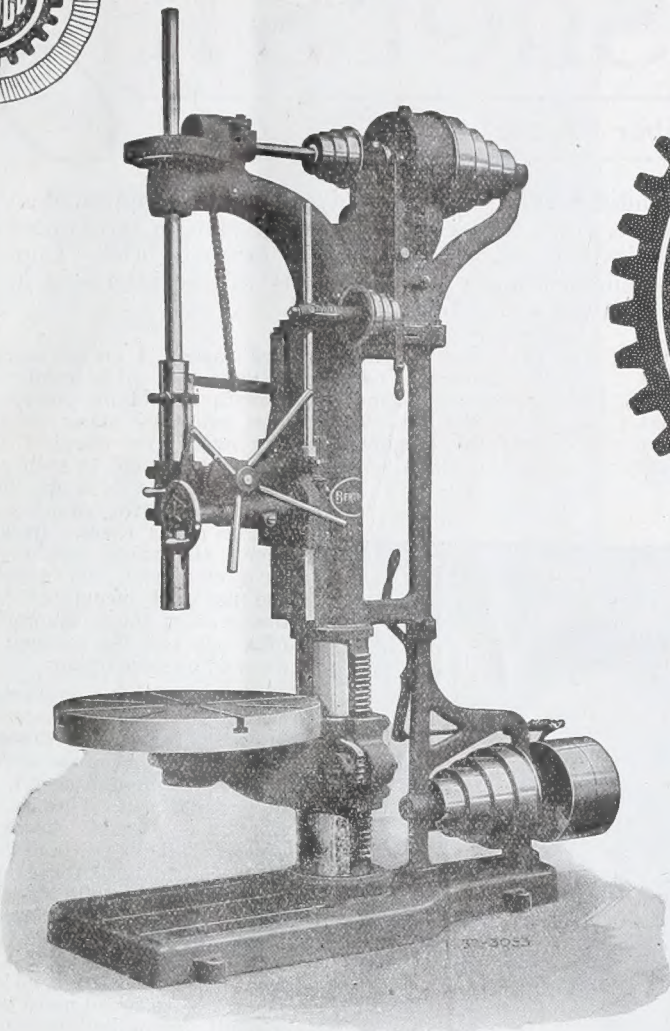
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If any advertisement interests you, tear it out now and place with letters to be answered.

The Publisher's Page

TORONTO

September 20, 1917

IN a recent issue of *Printers' Ink*, that splendid weekly journal for advertisers, there appeared an authorized interview with Lord Northcliffe, head of the British War Mission to the United States, in which "Business in War Time" is discussed. We would like to quote briefly from the article which is of considerable length, believing many of our readers will be interested in what this great business man, organizer and statesman has to say:

THE question of reconstructing markets after the close of the war is not, in Lord Northcliffe's opinion, one to be viewed with apprehension. There will be so much work needing to be done that it will not be a question of how to find a market for the goods made, but how to get goods made fast enough to fill the demand.

"Disbanding the army at the close of the war will be a slow process," he remarked. "It will be at least a year after peace is declared before the last troops are returned to civil life, and there will be little disturbance of the social structure in so gradual a step. Factories are, after all, surprisingly adaptable. Machines which are making war supplies now will not be hard to turn to peace channels. The government will take an active hand in finding places for the soldiers in the civil scheme of things and will itself be a tremendous purchaser of supplies needed in the work of reconstruction. England has in fact an official Reconstruction Department at work now on these after-the-war problems.

"It is foolish to suppose that the soldiers who have spent years at the front, living a man's life out in the open with the thrill of mortal danger in it, and knowing the pleasure of comradeships with men whom they have seen tested when the air swarmed with bullets, will be willing to return tamely to doing such 'womanish work' as clerking in department stores, acting as flunkies, or doing purely routine tasks in offices. The returned soldier will want a man's-size job, and we're going to see to it that he gets one. In England companies are being formed to buy agricultural land belonging to the great estates and sell this land in small parcels of a few acres to soldiers on the instalment plan, taking back a mortgage to secure the investment. A similar plan will be used in Canada. Army transport vessels can be kept in service to bring the soldiers overseas.

"The apprehension which is sometimes expressed as to the 'woman problem' after the war is not, I think, well founded. It is argued that the women naturally will not want to give up to returning soldiers the positions they have taken up in commerce and industry while the men have been away, and

that trouble will therefore ensue. I do not agree. So much will need to be done that with intelligent government supervision there should be plenty of work for all. Also, there are very many women usefully employed to-day who are working for patriotic motives, and who will be glad to stop and return to the care of their homes when the country no longer needs them. In any event, the more people you have employed, the greater the national income; hence, the greater the consumption of goods and the consequent demand on production.

"Some British manufacturers are protecting themselves in regard to the after-the-war market by continuous advertising, even though they have no goods to sell. This is certainly a sound business policy. I believe there will be work enough for everybody—if we win. In building alone there will be employment for vast numbers of men and great quantities of materials. At present, no one is allowed to spend more than a small sum on building without a permit, and that is granted only when it is shown that the proposed building is vitally necessary. Even repairs are not permitted unless they are really needed."

During the war, many types of industry in England have been partly or entirely socialized. Whether these will be restored to private control after peace comes is an interesting question.

"In a good many cases, government control will undoubtedly be continued," his Lordship admitted. "However, industries which were efficiently managed under private control before the war will doubtless go back to their owners. For instance, English railways were, on the whole, well and efficiently handled before the war by the railway companies, and will doubtless go back to them at the conclusion of hostilities. Their greatest weakness, in ante-bellum days, was in their handling of freight, and the government has taught them a lesson of expedition and foresight during the war conditions of complete government control, which they will not soon forget."

As I rose to go, says the author of the article, his Lordship gave me this final message for the business men who read *PRINTERS' INK*: "This war can only be won as it must be won, by going at the job of winning it hard. The man who hesitates over a question of personal profit or personal inconvenience is simply helping the Germans by so doing. If we get in and help to put the thing through, the after-war problems will, as I said, largely take care of themselves. While the war is on, it is the only real business that any of us have, and we must subordinate everything else to it. Smash the Germans first, and then talk about what's to be done next."



LORD NORTHCLIFFE

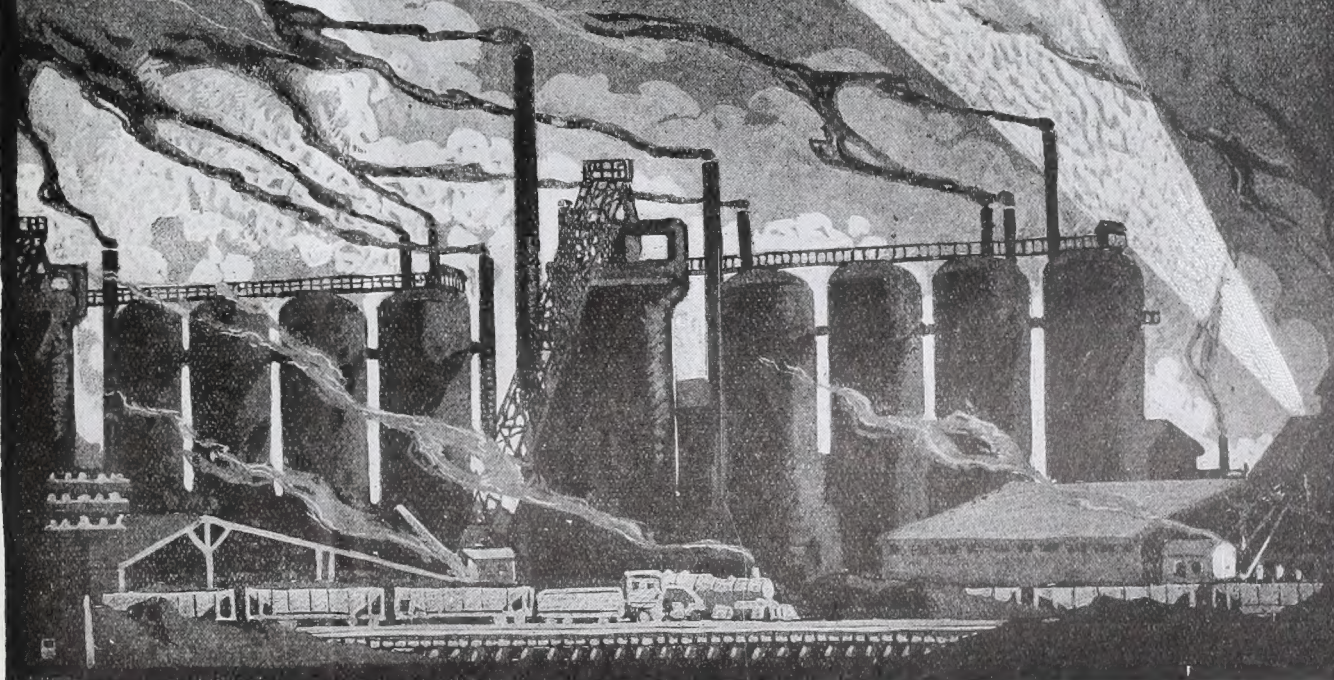
Quality

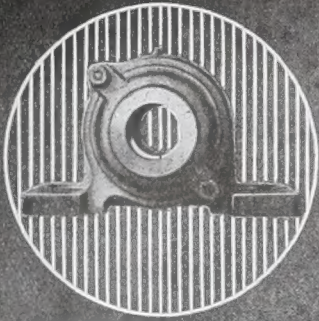
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Open Hearth Steel Billets
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Forgings
Railway Fastenings
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Wire Products
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THE STEEL COMPANY OF CANADA LIMITED HAMILTON MONTREAL

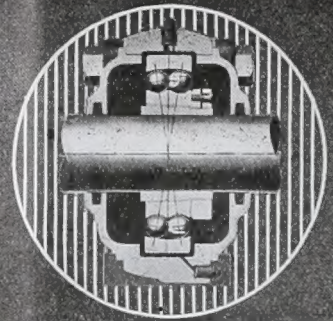




SKF Solid Rigid
Pillow Block.

SKF

BALL BEARINGS AND RIGID PILLOW BLOCKS



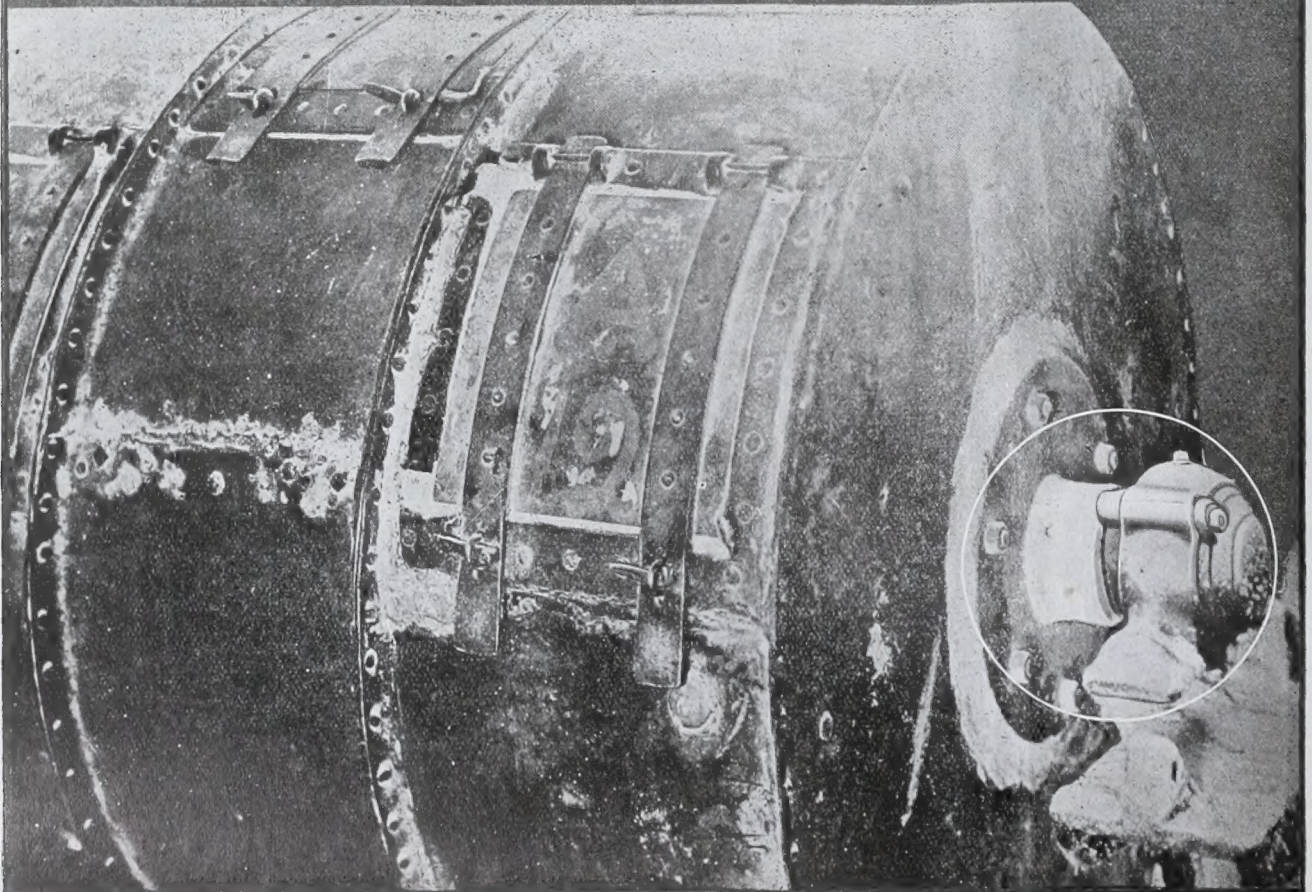
Sectional View of
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SKF Ball Bearings will solve
your bearing problem. They are compact, clean,
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and attention.

Submit your problem to our Engineering Service Department. They will prepare a suitable design for you. Try S K F and learn what bearing satisfaction is.

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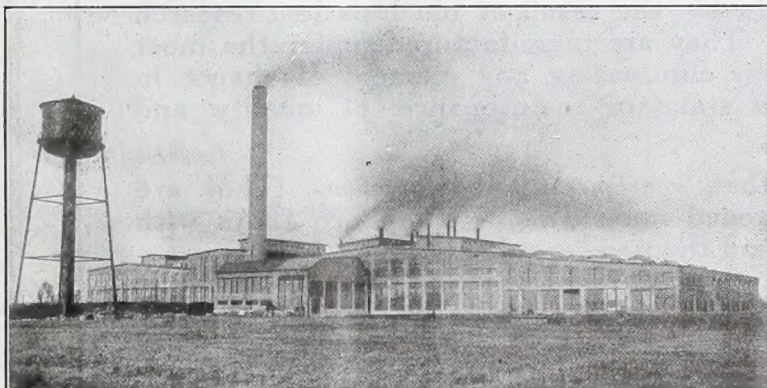
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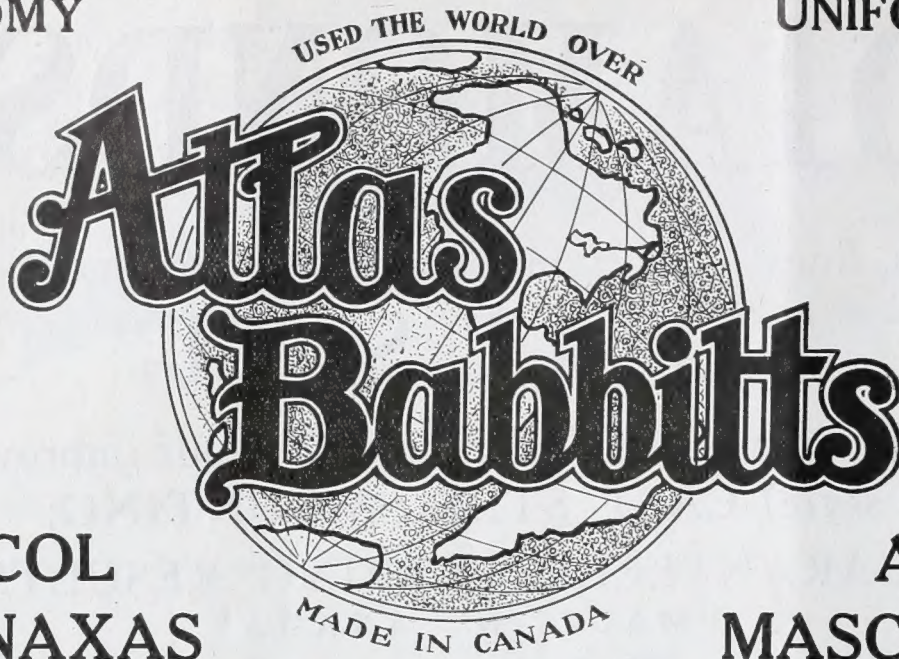
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We guarantee shipment
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"Extra"
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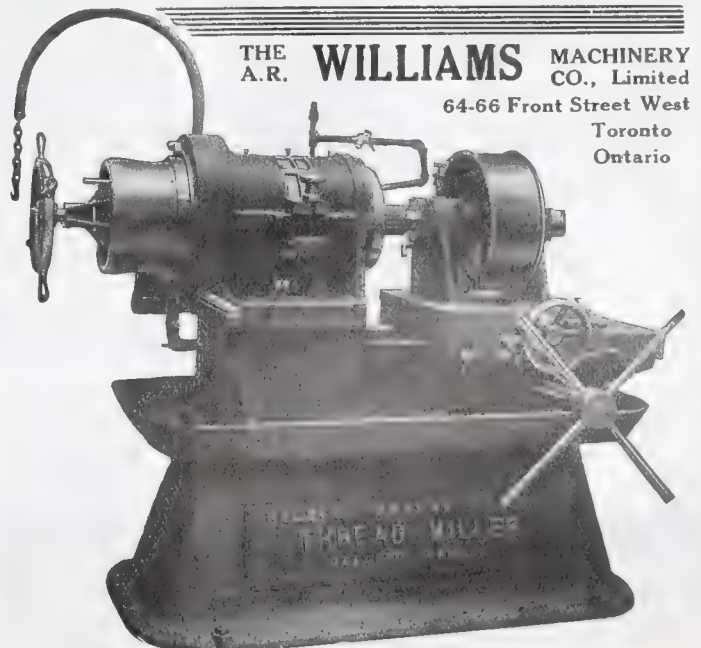
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We also carry in stock
Solid and Hollow Drill
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The Life of a Thread Miller

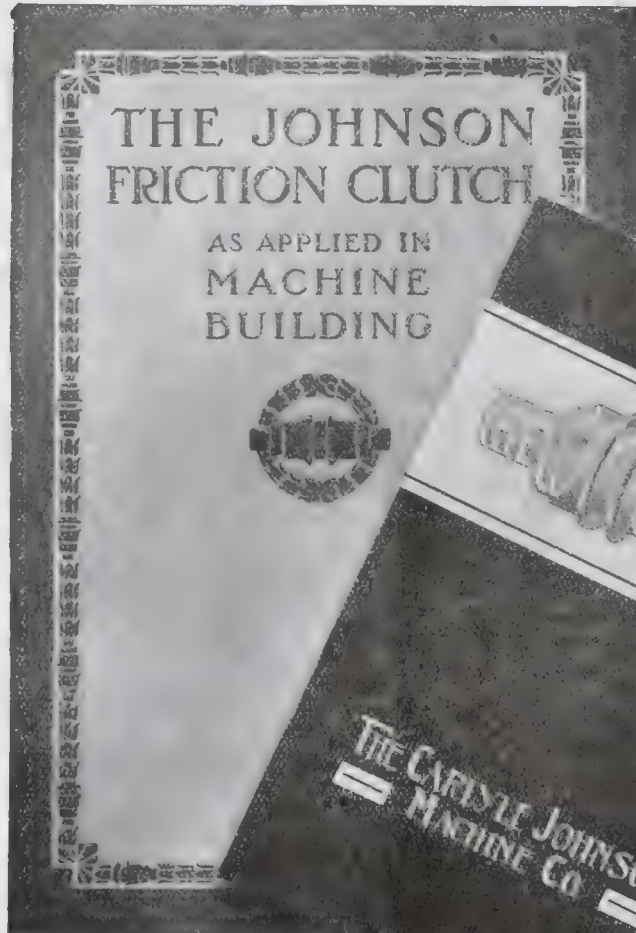
Depends not upon the amount of work it does, but the ease and thoroughness with which the work is done. These Thread Millers are noted for these qualities. Its quality of work is unrivalled. Our Service Department will give you all the particulars. *Write us!*



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THE JOHNSON FRICTION CLUTCH

Two Interesting Books You Ought to Write For



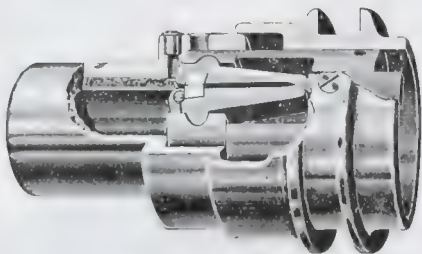
Drop us a line and we'll send you copies.

The larger of the two books shows typical installations of Johnson Friction Clutches as applied in machine design. Representative manufacturers in all lines are adopting these clutches as a necessary part of their machines. How they are doing it and what they say about results is something you ought to know about.

The other book is our **YELLOW DATA SHEETS**. Write for free copies, to-day.

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Section broken away, showing clutch disengaged.

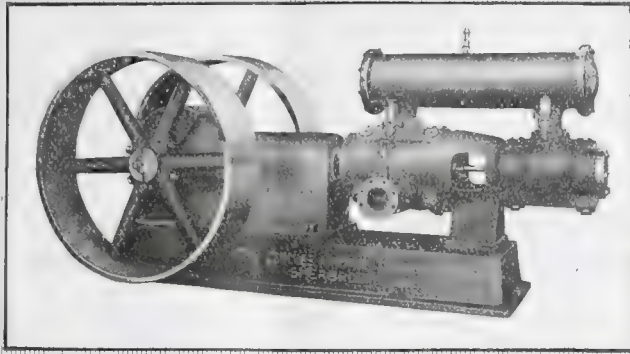


Double Clutch—Exterior.

CANADA—Williams & Wilson, 320 St. James Street, Montreal; The Canadian Fairbanks-Morse Co., Ltd., Toronto.
ENGLAND The Efadem Co., 159 Gt. Portland St., London W. Sole Agents for British Isles.
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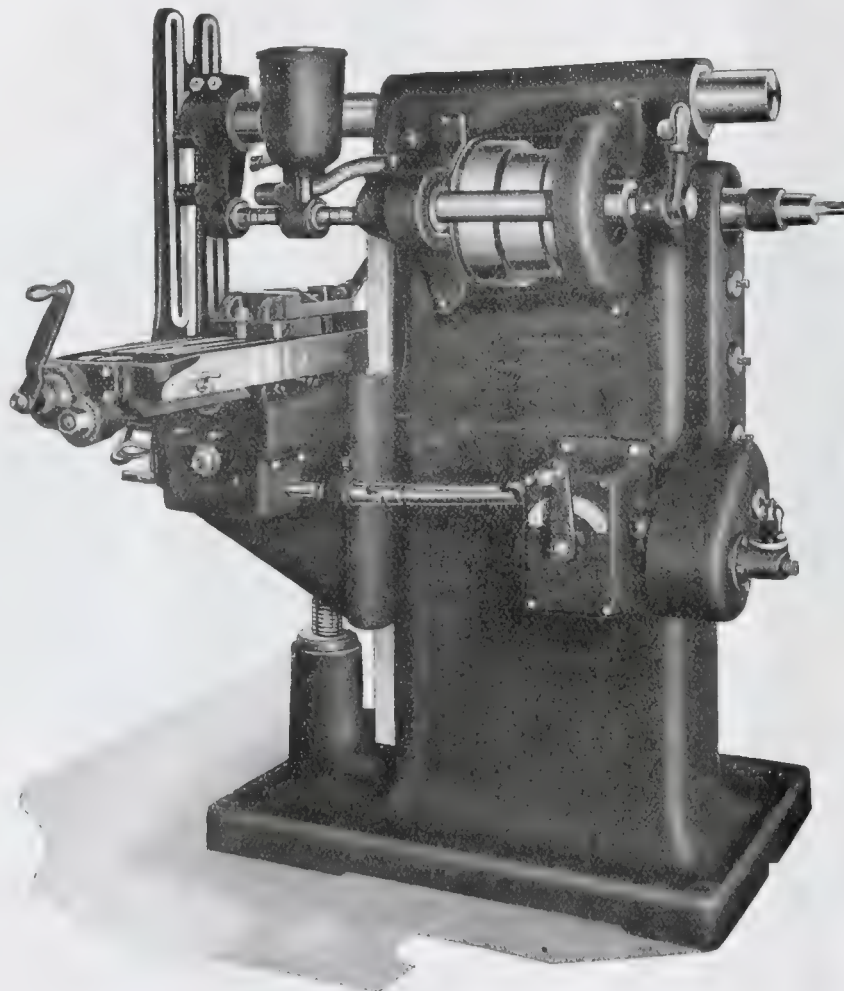
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BEARINGS: One of the most important points in any miller, and at this point we have placed only bearings of the best materials—with accuracy a feature.



It does not pay to attempt to use cheap material in place of the proper and proven best material—and purchasers will find our machines bear out this statement. **At present our deliveries are interesting.**

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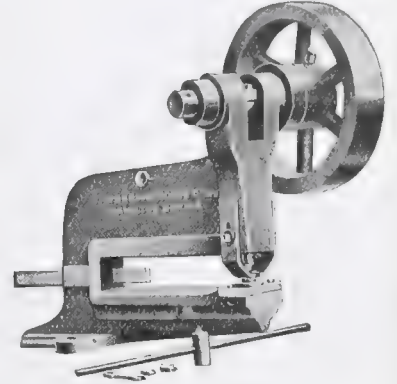
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NO 7 SCREW PRESS

For

Quality Efficiency
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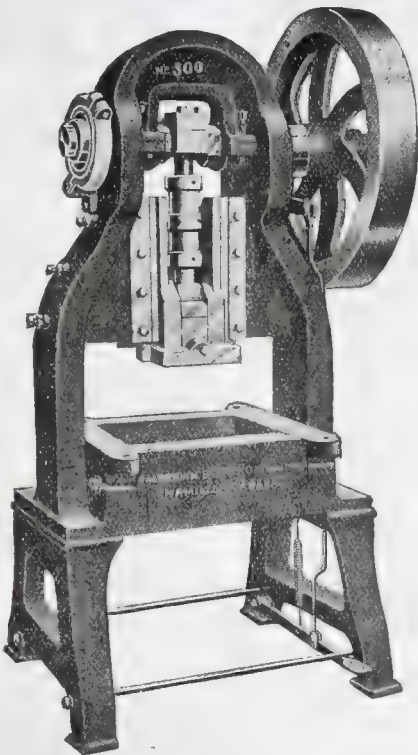
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POWER PUNCH



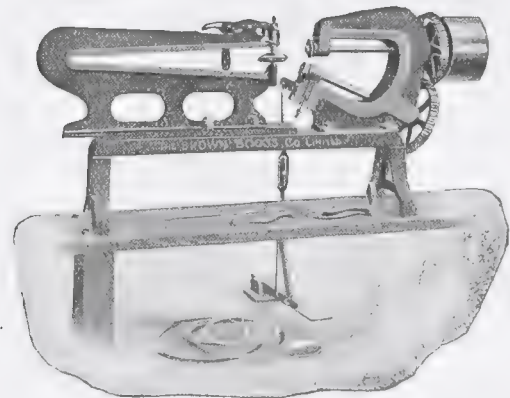
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NATIONALLY KNOWN

OUR Country requires the extreme limit of production from every lathe, planer, miller or other machine tool.

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"Red Cut Superior"

The Nationally Known First Quality

HIGH SPEED STEEL

Will enable you greatly to increase your output

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Electric Furnaces, Automatically regulated, produce inevitably similar results at every melt.

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Made from the **BEST** Materials
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FINISHING the profile of 8-in. Howitzer shells made from rolled steel forgings.

The cut starts at a speed exceeding 200 ft. per min. and machines the surface 9 in. long in 1 min. 24 sec.

The tool is given a feed of $\frac{1}{8}$ in. per revolution and imparts a highly finished surface to the work.

An output of 55 shells per grinding is maintained easily.

An instance of extreme conditions which Stellite is meeting successfully every day.

Stellite is harder and tougher than steel. Cuts longer and 25 to 300% faster. Requires no forging, and cuts as well when running at red heat as when cold—does not lose its temper. Convince yourself that STELLITE stands behind bigger production and tool economy by giving it a try-out.

STELLITE

High Speed Tool Metal

Deloro Smelting & Refining Co., Limited,

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Stellite Sales Dept.
DELORO, ONT.

Montreal, 315 Craig Street, West

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TRADE MARK



Reliance Steel Works
SHEFFIELD, ENG.

TRADE MARK

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“WACO”

Brand

High Speed Steel and Twist Drills



“DOUBLE WACO” Quality

Specially Adapted for all kinds of
MUNITION WORK

“Turtle” Brand
High Class Tool Steel, Files, etc.
of all descriptions.

*For particulars apply to our
Sole Representatives for Canada*

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FOR SHRAPNEL SHELLS AND SHELL BLANKS

We are the only company in Canada producing steel ingots by the "HARMET" Liquid Process, a process that makes these ingots vastly superior to the ordinary kind, improving the physical properties and reducing the waste of ingot.

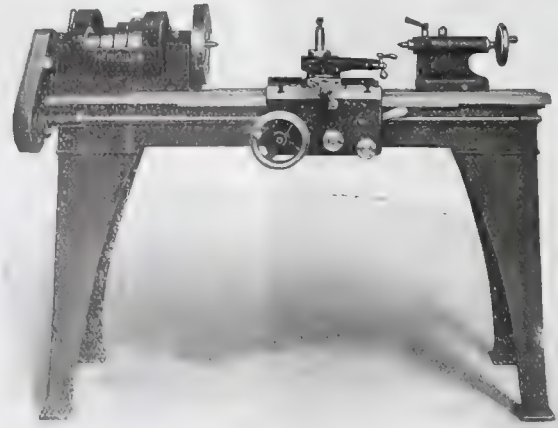
We can supply forgings of all shapes and sizes made of ordinary or "HARMET" Fluid Compressed Open-Hearth Steel on the Shortest Notice.

Nova Scotia Steel and Coal Company Limited

Head Office: NEW GLASGOW, N.S.

Western Sales Office:

Room 14, Windsor Hotel, MONTREAL



LATHES

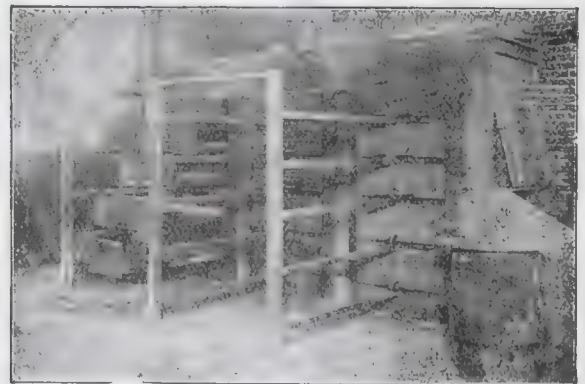
12", 16", 18" and 21" swing

Strictly modern in design, rigidity
and accuracy guaranteed.

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Perfect cores are a big item in cutting foundry costs.

Use Whiting Ovens and obtain uniform heating and regulation. Years of experience are back of our designs.

Send for catalog 121

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Foundry
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of all
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to a customer who first purchased 14", then 16", and comes back for *more*. Is he *satisfied*? We think so.

Now these were beautiful machines. Just the right length to set off the *heavy, powerful durability* of the machine. And *accurate*? Well, *not within .001* in 18" but.

BETTER THAN .0005 IN 18"

That's *going some* for a *big machine* like that. They will prove *money-makers* and *time-savers*, too, and there are no *complicated* levers or *intricate* operating parts. Don't have to study a chart to run a CISCO.

Have you bought a "LATHE WITH THE PULL?"

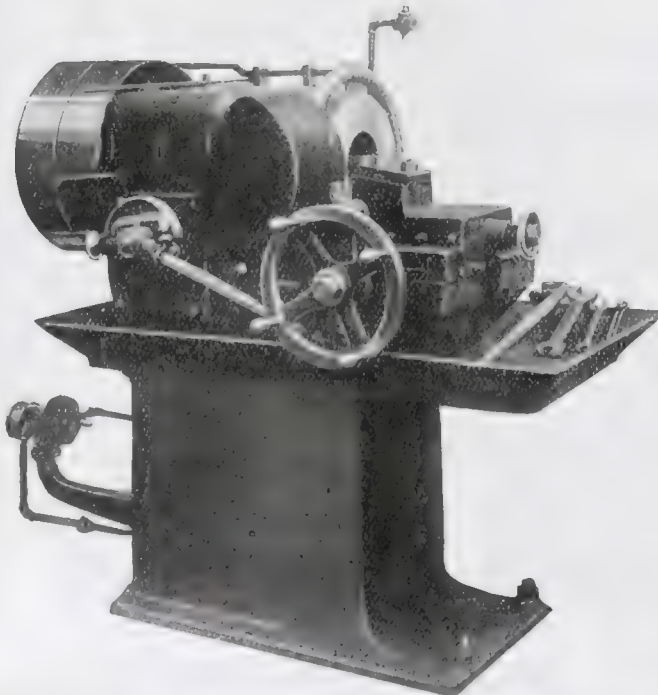
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Base Facing
Machine



Another Worthy Victoria Product

THIS machine has proved itself a first-class investment.

Well-Designed
Carefully Built
Sturdy and Efficient

IT is a conclusive argument in favor of special purpose machines.

Space required 4x7 feet.
No countershaft required.
Approximate weight, 2000 lbs.

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ONTARIO

Roelofson 6-in. Banding Machine

YOU couldn't imagine a more sturdy, compact, serviceable machine than this! A glance at the illustration will show you for yourself. It has been used in Canadian munition plants since the munition business started, and is still giving absolute satisfaction. It's the machine you need if you make shells.

Look over the following outstanding features of its construction:

Integral (en bloc) construction assures perfect rigidity, permanent accuracy and desirable compactness.

Chucking with spring collet chuck insures accurate and speedy checking.

Graduated feed dial, two cutting tools, and ample belt power insure output of accurate work in least possible time.

Machines are built for 15, 18, 60-pdr. and 6" shells.

Roelofson Machine & Tool Co., Ltd.

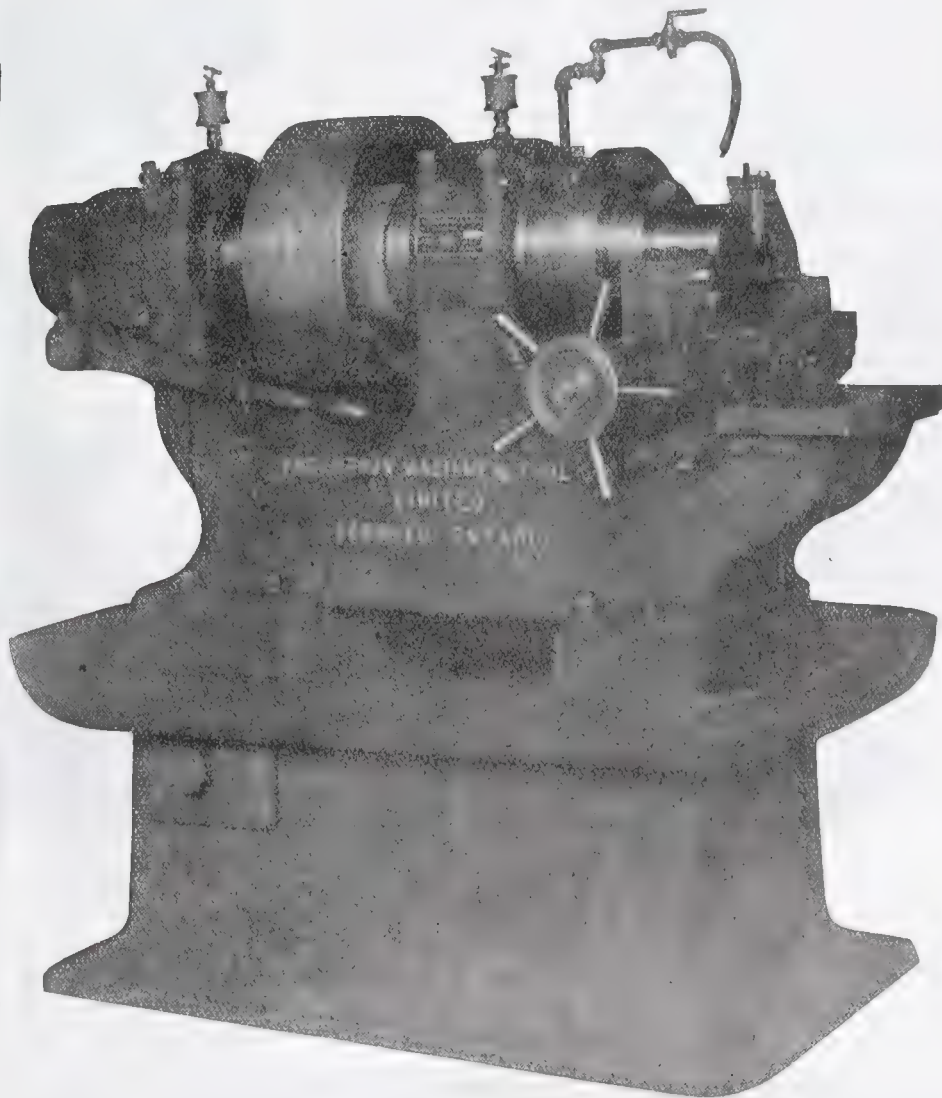
Head Office: 1501 Royal Bank Building, Toronto, Canada

Works and Warehouse: Galt, Ont., Canada

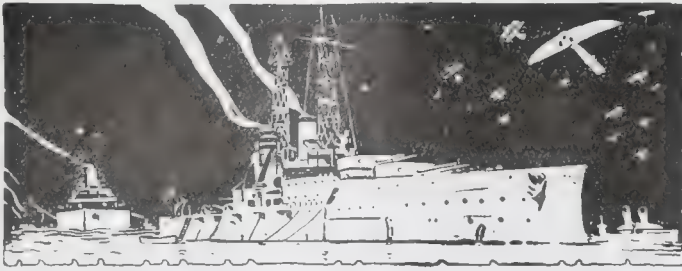
Immediate Delivery

To shell plants changing over from the manufacture of the larger sizes to 6" shells, our ability to make **immediate delivery** should be of especial interest.

And remember that the Roelofson is one of the few banding machines that have stood up from the first of the munition game and are still doing duty.



If any advertisement interests you, tear it out now and place with letters to be answered.



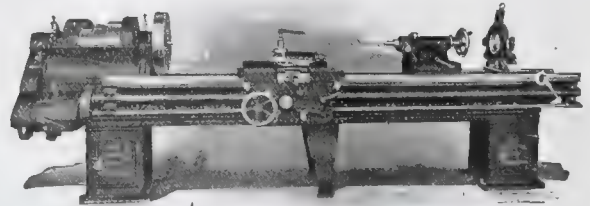
PUTTING PEP IN PREPAREDNESS

Preparedness is a continual process. It doesn't stop with the shipment of the first ammunition abroad. It involves "getting ready" for whatever the future may contain. Just now it is preparing for MORE war and the peace that will follow. "Sidney for Service" Lathes put "pep" in preparedness. They speed production. They minimize spoiled products. They permit men to do maximum duty. They put zip and go into industrial plants. Write for Bulletin 30.

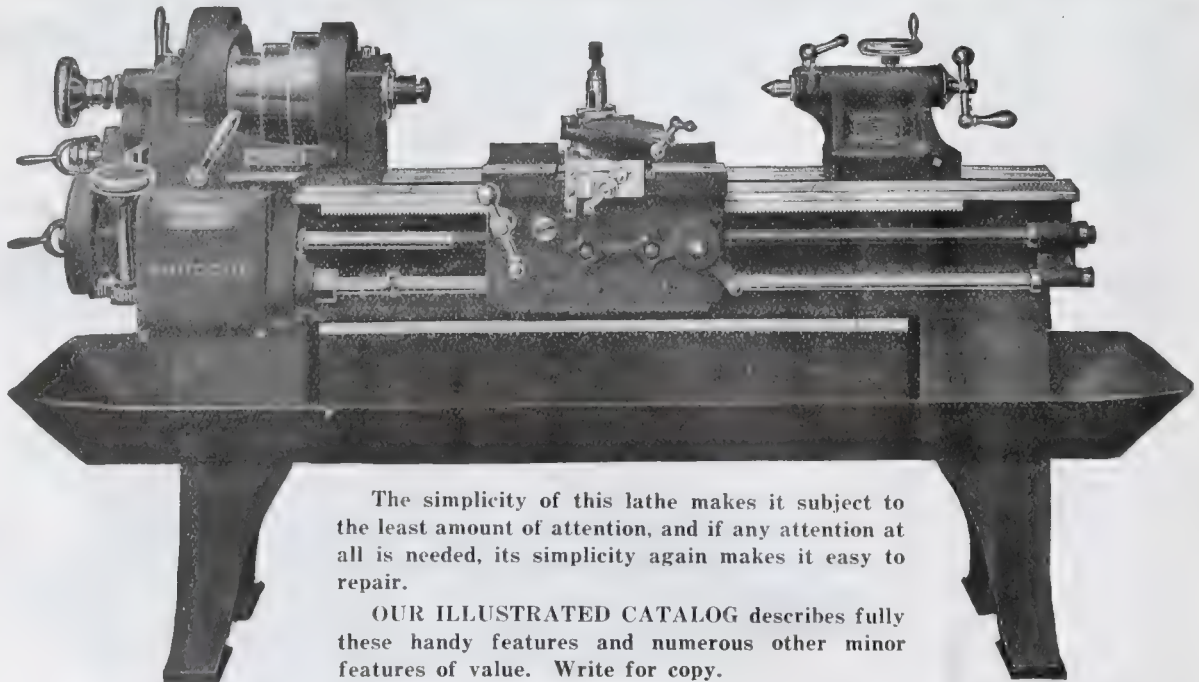
The Sidney Tool Co.

SIDNEY, OHIO, U.S.A.

Represented in Canada by:
Foss & Hill Machinery Co., Montreal, Que.
H. W. Petrie, Ltd. - Toronto, Ont.



The Whitcomb-Blaisdell Tool Room Lathe



The simplicity of this lathe makes it subject to the least amount of attention, and if any attention at all is needed, its simplicity again makes it easy to repair.

OUR ILLUSTRATED CATALOG describes fully these handy features and numerous other minor features of value. Write for copy.

Whitcomb-Blaisdell Machine Tool Company

Engine Lathes

WORCESTER, MASS.

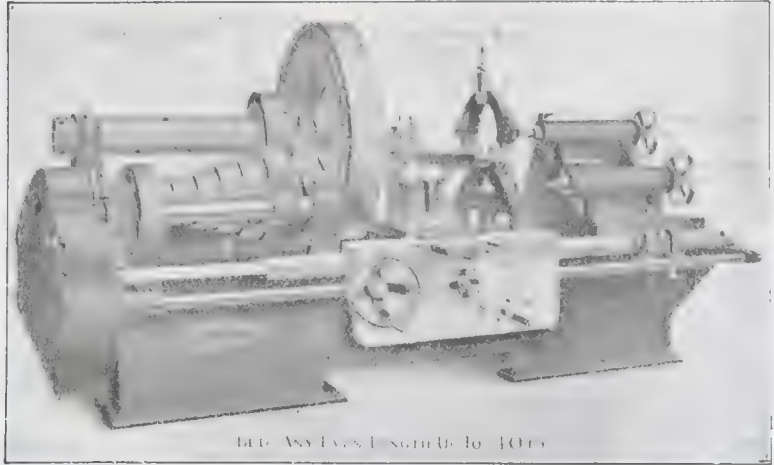
Metal Planers

If what you need is not advertised, consult our Buyers' Directory and write advertisers listed under proper heading.

One Ship-building Plant

wrote to six different Lathe-Builders

and bought McCabe's "2-in-1" Double-spindle Lathe—on a 30-ft. bed—because it was "different" and built especially for such a wide range of work.



McCABE'S "2-in-1" Double-Spindle Lathe—26-48 inch Swing
As a 48 inch Triple-Geared Lathe

What other big Lathe can you get, and have full use of your Lathe, whether you have big or small work?
What Lathe Manufacturers except McCabe could make such a low price possible?
No other Lathe builder turns out 48-inch Lathes in such big lots at a time, making the parts all duplicate and interchangeable.
And in addition to the 48-inch Triple-geared Lathe, the 26-inch is the "Lathe plus" feature McCabe offers you at no extra cost.
DOUBLE service—convenience and capacity—all described in Latest Bulletins.

J. J. McCABE, 149 BROADWAY, NEW YORK

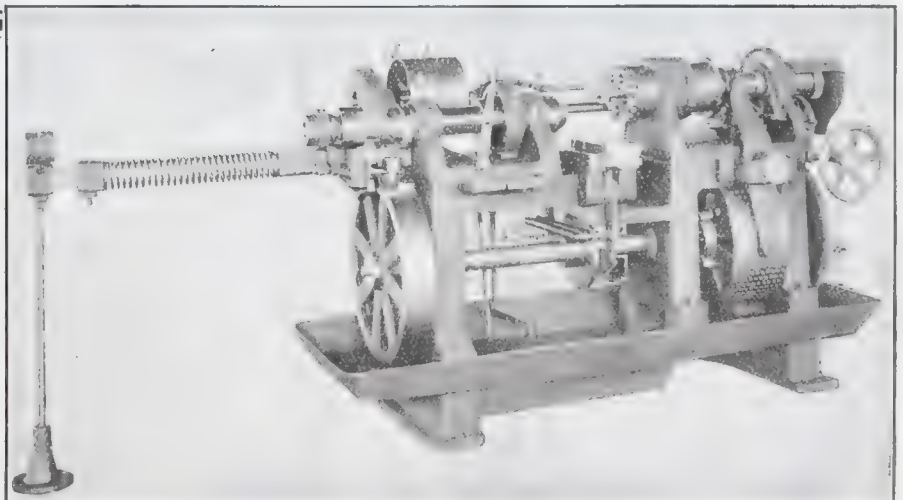
The Chicago Automatic Screw Machine

TEN YEARS OF EXTENSIVE MANUFACTURE OF ONE PRODUCT — AUTOMATICS — STAND BEHIND EVERY MACHINE.

No complicated mechanism or a system of cams that are difficult to determine and arrange on this machine.

The rigidity of the machine has not been sacrificed for the flexible features which are embodied in the Chicago Automatic. Alignment is correct and there are no parts where excessive wear takes place—therefore, accurate production is assured during the long life of the machine.

Spindle speeds suitable to different sizes and kinds of stock within the capacity of the machine are obtained by changing two gears on the spindle head.



In less than six weeks we can place Chicagos in your plant ready for production.

They must satisfy you before we consider them sold. Write us about all the features now.

THE JOHN MACNAB MACHINERY COMPANY
NEW YORK CITY, U.S.A.

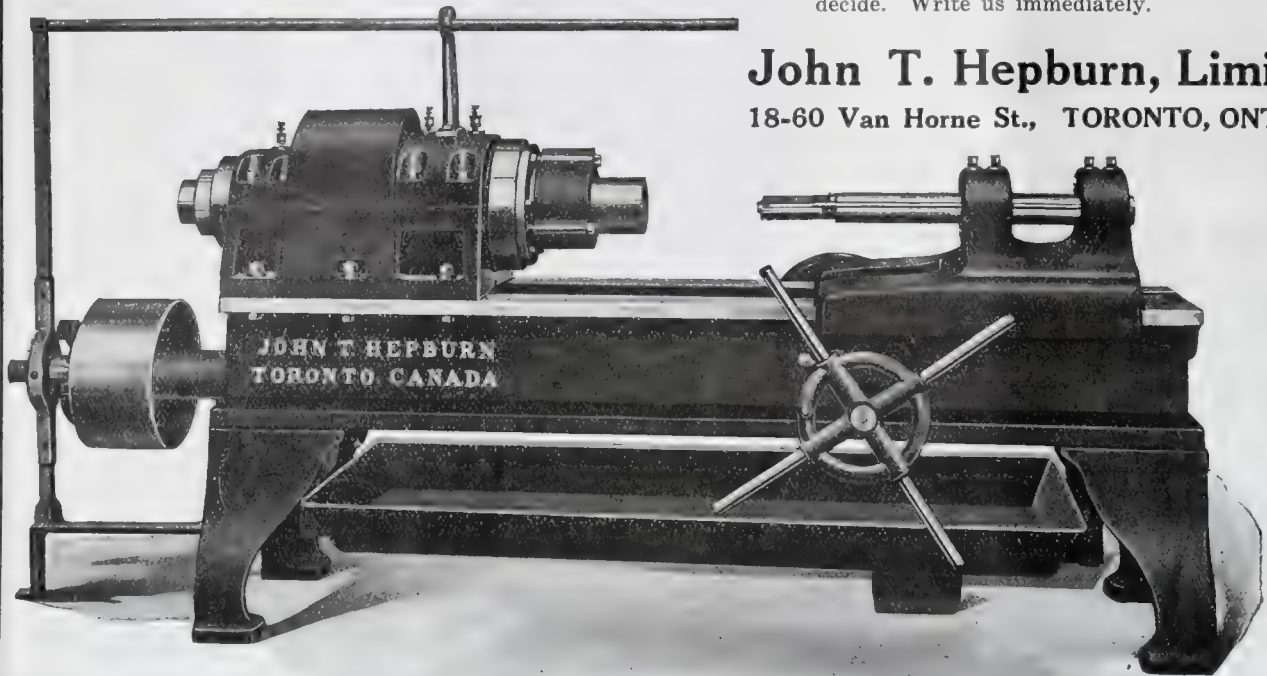
European Representatives: John Macnab, Hyde, England

If any advertisement interests you, tear it out now and place with letters to be answered.

Renew Your Old Lathe

Not necessarily by securing a new one but take advantage of our thoroughly equipped machine shop. We repair lathes, plane the lathe beds. We build lathes and in our repairing the same care is exercised. If you intend securing a new lathe, get a list of the Hepburn line before you to help you decide. Write us immediately.

John T. Hepburn, Limited
18-60 Van Horne St., TORONTO, ONTARIO



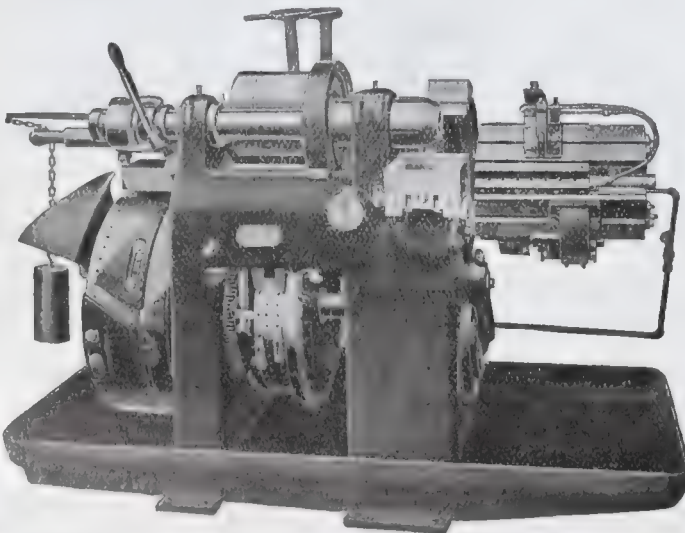
It Is PRODUCTION That COUNTS

Rapid and accurate production of duplicate parts at a low operating cost has always been a feature of the Gridley, as well as the maintenance of a uniform output during the longest runs.

The reason is found in the construction of the machine—rigid frame—spindle supported in two large bearings—tools held and advanced in slides on turret which is held in bearings in both ends of headstock—positive cam action.

Simplicity of construction throughout makes set-up easy and little attention necessary when in operation.

That is why GRIDLEY SINGLE SPINDLE AUTOMATIC TURRET LATHES have satisfied their users and caused an increased demand for the machines.



Four sizes of machines. Chuck capacity up to 5". Length of feed 13½". Handles bar or single-piece chucking work. Let us quote on **your** product without obligation.

The National Acme Company
WINDSOR, VERMONT

General Offices: Cleveland, Ohio.
Canadian Screw Plant, Montreal

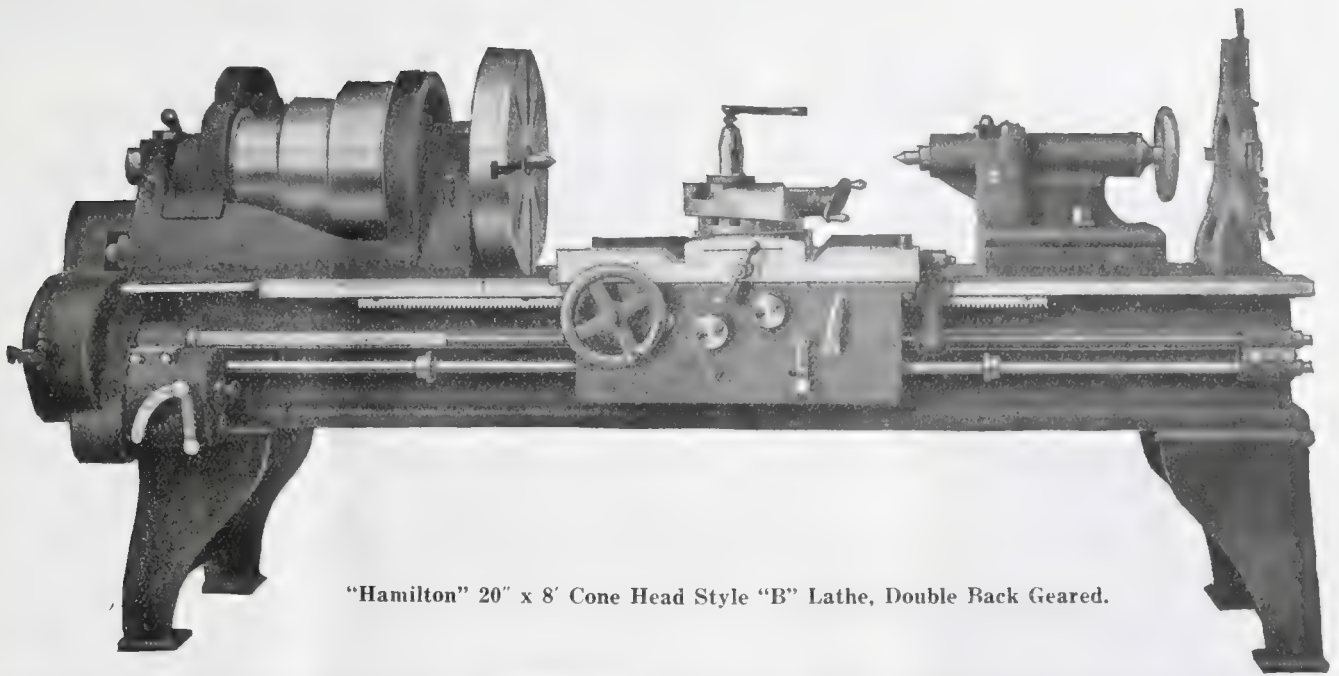
Branch Offices:

New York Boston Chicago Detroit Atlanta
San Francisco

Warehouses: New York and Chicago

REPRESENTATIVES IN FOREIGN COUNTRIES.
Makers of Gridley Single and Multiple-Spindle Automatics at Windsor, Vermont, and Acme Automatics, Threading Dies, and Screw Machine Products at Cleveland, Ohio.

If what you need is not advertised, consult our Buyers' Directory and write advertisers listed under proper heading.



"Hamilton" 20" x 8' Cone Head Style "B" Lathe, Double Back Geared.

MERIT

Year after year "HAMILTON" tools have been building their reputation—it has long since been established. To-day it is maintained just as it was built—through merit alone.

HAMILTON

LATHES

Hamilton Machine & Tool Co. mechanics have combined their skill in the construction of this Lathe, and in it have achieved a distinct triumph. Turns out work with unrivalled rapidity and it turns it out to finish style—work that you may well be proud of.

It is a most modern lathe, substantially constructed—built to meet the conditions of to-day for speed and reliability.

You make no mistake when you buy a Hamilton Lathe.

It will Produce.



For 25 Years Makers of fine Machine Tools

The Hamilton Machine Tool Co.

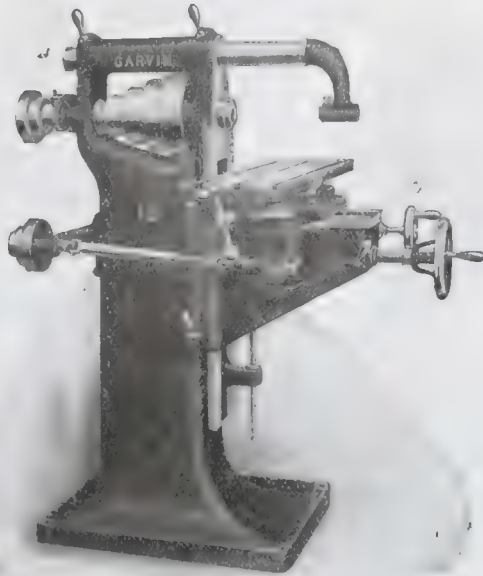
HAMILTON, OHIO

Sole Agents for Ontario:

■ H. W. PETRIE, Limited - Toronto, Ontario

GARVIN

NO. 12 PLAIN MILLING MACHINE FOR ALL LIGHT MANUFACTURING



No. 12 Plain Milling Machine—Use Code Abrade

This machine is built especially strong and substantial for a tool of its capacity, and has many valuable features worthy of special mention. The slide is fitted with a quick pitch screw, giving one inch per turn. This combines the rapidity of a rack feed with the steadiness of the screw feed. The table has an oil pan all around it, with finished edges—automatic feed, trip and reverse—adjustable nut on the feed screw to take wear—the Feed Screw is hardened.

Adjustments.....18 x 6 x 15 in.

For Further Information **ASK YOUR DEALER**
or **WRITE US DIRECT**

IMMEDIATE DELIVERIES

Send for Complete Catalog

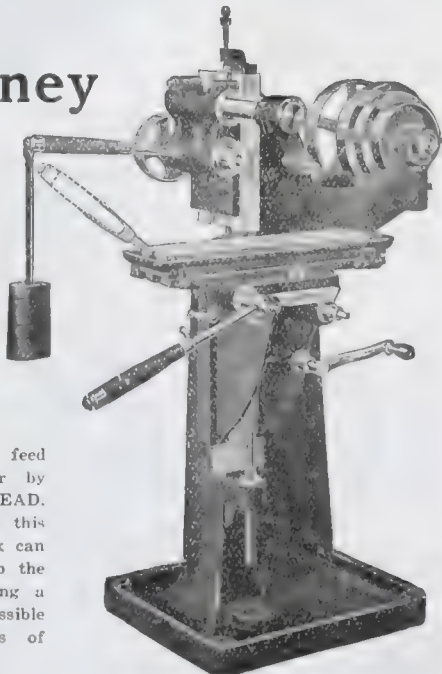
Manufactured by

THE GARVIN MACHINE COMPANY
Spring and Varick Streets (Visitors Welcome) 50 Years New York City

THOUSANDS IN USE

The Whitney

Hand
(Feed)
Milling
Machine



The vertical feed is provided for by the SLIDING HEAD. On account of this feature the work can be held close to the table, thus giving a rigidity not possible on other types of Hand Millers.

Send for Catalogue A.

The Whitney Mfg. Co.
Hartford Conn. U.S.A.

Chains—Keys—Hand Milling Machines.

For Rapid Production and Accurate Work

USE THE
“BRIGGS”

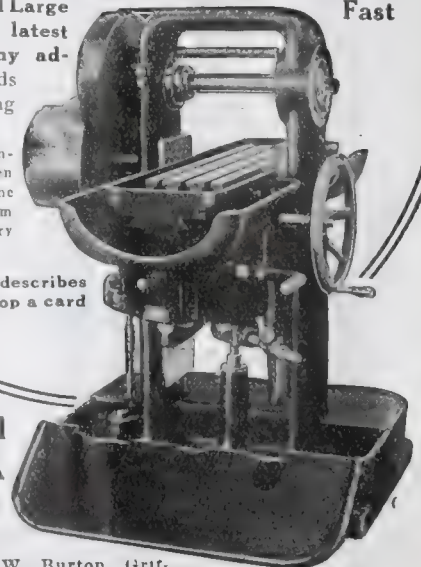
The Briggs Miller handles work no other machine of its size can touch. It is a manufacturing machine. On account of its rigid construction it will produce accurate work when running at a high rate of speed and feed.

The Base Tank and Large Gear Pump is the latest addition to its many advantages. Tank holds 20 gallons of cutting lubricant

Pump never requires priming and will deliver ten gallons per minute to the cutters, keeping them cool when run at very high speed.

Our booklet describes fully. Drop a card for it.

Fast



Gooley & Edlund
Inc.
Cortland, N.Y., U.S.A

Foreign Agents: Allied America, France, Belgium, Italy, Switzerland, Machinery Company of Russia, Scandinavia, C. W. Burton, Griffiths & Co., London, Manchester and Glasgow, Barandiaran, Metivier, Gazeau & Cia, San Sebastian, Spain.

B

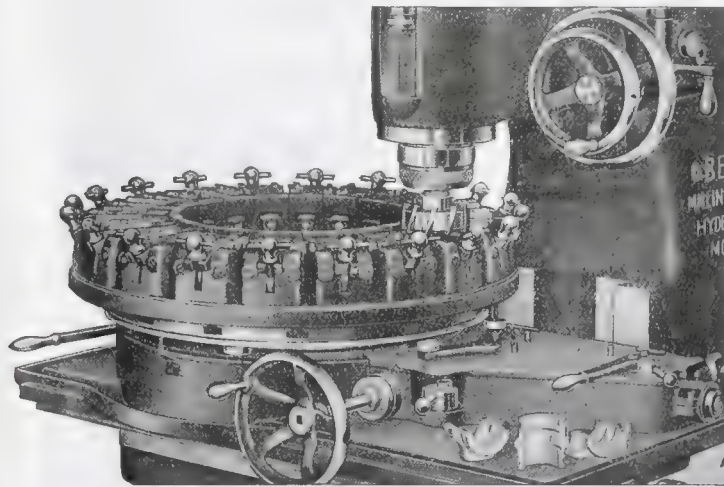
PRODUCTION

B

BY comparative tests the *Becker* method has far outstripped any competitor. Quantity production was the goal aimed at. We got there. On small parts it is quantity that will make the operation a success or a profit-eater. The method illustrated below can be applied to any work. We make a specialty of co-operating with clients to solve and overcome their milling problems.

The illustration below shows a **Becker** fixture holding 20 castings. The output by this method is 140 per hour. The manufacturer doing this work originally obtained 100 per hour. By this you can see the economic value of this Becker.

We invite your inquiries. If you are contemplating installing a milling machine, why not have one to suit your needs? Our organization and equipment are ready to co-operate with you. You are greatly losing if you do not get in touch with us.



Becker Milling Machine Co.

HYDE PARK, BOSTON, MASS., U.S.A.

Agents:

THE A. R. WILLIAMS MACHINERY CO., LTD.
TORONTO and HAMILTON
WILLIAMS & WILSON, LTD.
MONTREAL, QUE.



Consolidated Presses

appeal to discriminating users because of the massive construction of all working parts, the generous crank shaft bearings, the increased diameter of crank pins, liberal crank cheeks, long and carefully fitted slide bearings, abnormally large connection screws, powerful gearing, and above all, the skill and care exercised in their construction.

These are features which should be considered when purchasing.

Consolidated Press Company

HASTINGS

LARGEST EXCLUSIVE MANUFACTURERS OF POWER PRESSES IN U.S.A.

MICHIGAN

Canadian Representatives: A. R. WILLIAMS & MACHINERY CO., Limited, Toronto, St. John, Winnipeg, Vancouver

Speed

When the quality of the work is the best obtainable, the next item is speed. For upon speed depends your costs.

One rivet per second is the speed this machine will maintain indefinitely. Adapt that speed to your requirements and find out the value the Grant Riveter would be to you.

Write for our catalogue. It will give you complete information.

Grant Mfg. & Machine Company

Bridgeport, Conn., U.S.A.

Triple Purpose "METALWOOD" COMBINATION

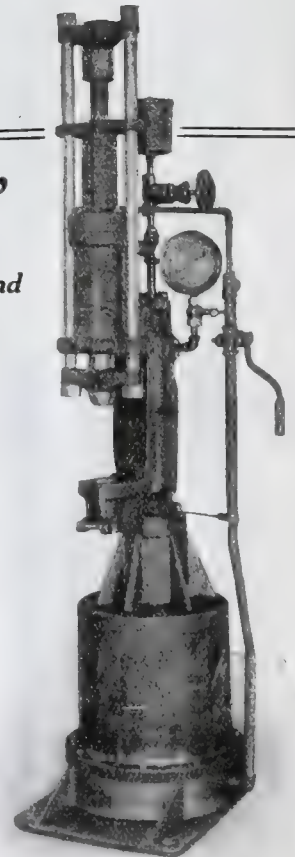
Forcing, Broaching and Straightening Press.

Its value is in the many uses to which it is adaptable. Auxiliary tables and fixtures add greatly to its usefulness. It is not "encumbered" with a single excess part. Built for production.

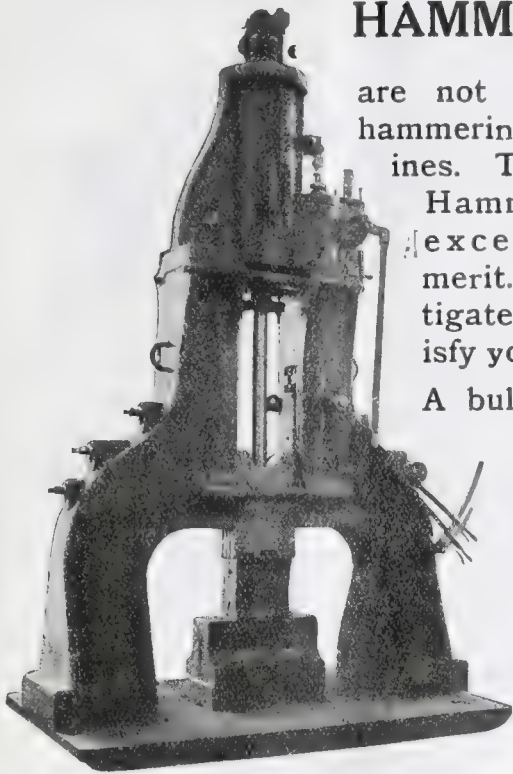
Metalwood Mfg. Co.

**Leib & Wight Sts.,
DETROIT, MICH.
U.S.A.**

For Great Britain and Continent address Gaston E. Marbaix, Coronation House, 4 Lloyds Ave., London, E.C., England.



"ERIE" STEAM FORGING HAMMERS



are not ordinary hammering machines. They are Hammers of exceptional merit. Investigate and satisfy yourself.

A bulletin for the asking.

ERIE FOUNDRY COMPANY
ERIE, PENNSYLVANIA, U. S. A.

Universal Gear Hobber

The machine which completes our lines to cut all types of small gears except internal, within 10" dia. 8 Pitch.

The Bilton Gear Hobber will cut spur spiral gears, worm gears, also various special shapes of teeth. It can cut a spiral gear on end of a shaft 1 3/8" diam. 24" long.

SPECIFICATIONS

Capacity Gears: 10 Diametral Pitch
10 in. Outside Diameter
10 in. Width of Face

Range of hob feed 50-250 R.P.M.

Range hob feed to each rev. of worm .010 to .125

Drive: 3 Steps Cone Pulley; 2 1/2 in. Belt

Weight 2,100 lbs.

A machine of latest design, introducing new features which increase production without sacrificing accuracy. The hob is cutting continuously; operation of machine entirely automatic.

DELIVERY

A few of these machines are now available for October delivery.

Send for copy of new catalog No. 30, and bulletin describing this machine.

The Bilton Machine Tool Co.
Bridgeport, Conn.

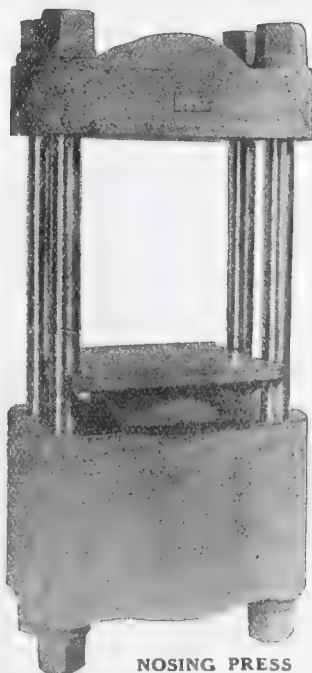
Foreign Agents: Alfred Herbert Ltd., M. Mett Engineering Co., Chas. Churchill & Co.

PRESSES

Pumps
and
Accumulators

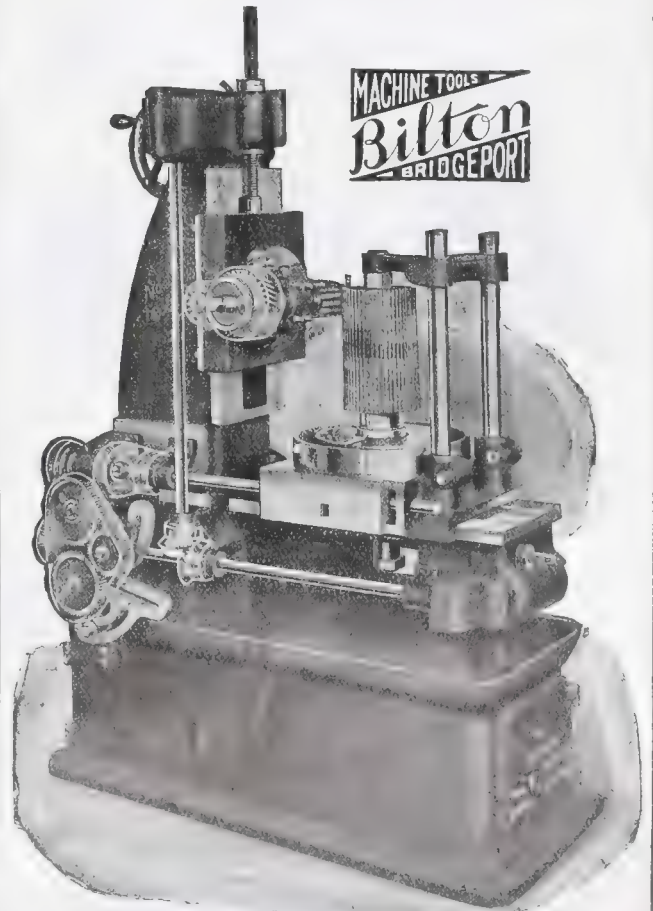
FOR ALL
PURPOSES

Made in
Canada



NOSING PRESS

WILLIAM R. PERRIN, Limited
TORONTO



The Way to Greater Production—Use



**1/4-in.
Tapper
Vertical**



Tap Breakage ceases to be an annoyance and a retarder of production where the *R-S Tappers* are in use—cut breakage down to a minimum. Along with this asset they have exceptional speed and do a high-class of work.

We have a range of tappers for tapping of all kinds—from 3-16" to 5/8". Our range includes the Bench, Vertical and Horizontal types.

RICKERT - SHAFER COMPANY

ERIE, PA., U. S. A.

This is Our Address—How Can We Serve You?

ALFRED HERBERT, Foreign Agent.
COVENTRY, ENGLAND



**Column
Type
Horizontal
Tapper**



**The New "West"
Banding Press**

For 9.2" and 8" shells

12 Cylinders; Ample Power; Ample Strength; Reasonable Price.

NO ACCUMULATOR REQUIRED.

The West Tire Setter Co.

255 Mill Street, Rochester, N.Y.

ELMES

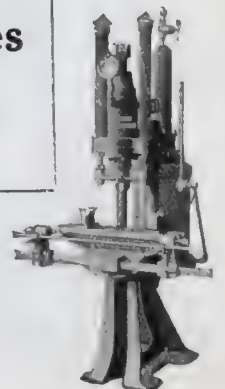
**Combination Hydro-Pneumatic
Forcing, Broaching and
Straightening Press**

with or without auxiliary tables, can be used for a variety of purposes.

Built in sizes to suit your needs.

Charles F. Elmes

Engineering Works
217 N. Morgan Street
Chicago, U.S.A.



*Get our catalog
describing our
complete line*



More Work, Fewer Men, Quality Maintained

The same demands that are now filling our factories with orders are taking away the very men who could do the work. Those men who remain must do more work. But accuracy cannot be sacrificed to speed.

Accuracy is more important than ever. Each step in a process must be made sure. In maintaining high standards

Starrett Tools

have played a large part. The finest mechanics the world over use them and know them to be reliable.

To meet every need there are 2100 styles and sizes of micrometer calipers, vernier height gages, depth gages, caliper squares, rules, squares, calipers, test indicators and many others.

All are described in our free catalog. Ask for Catalog No. 213.

The L.S. Starrett Co.

*The World's Greatest
Tool Makers*

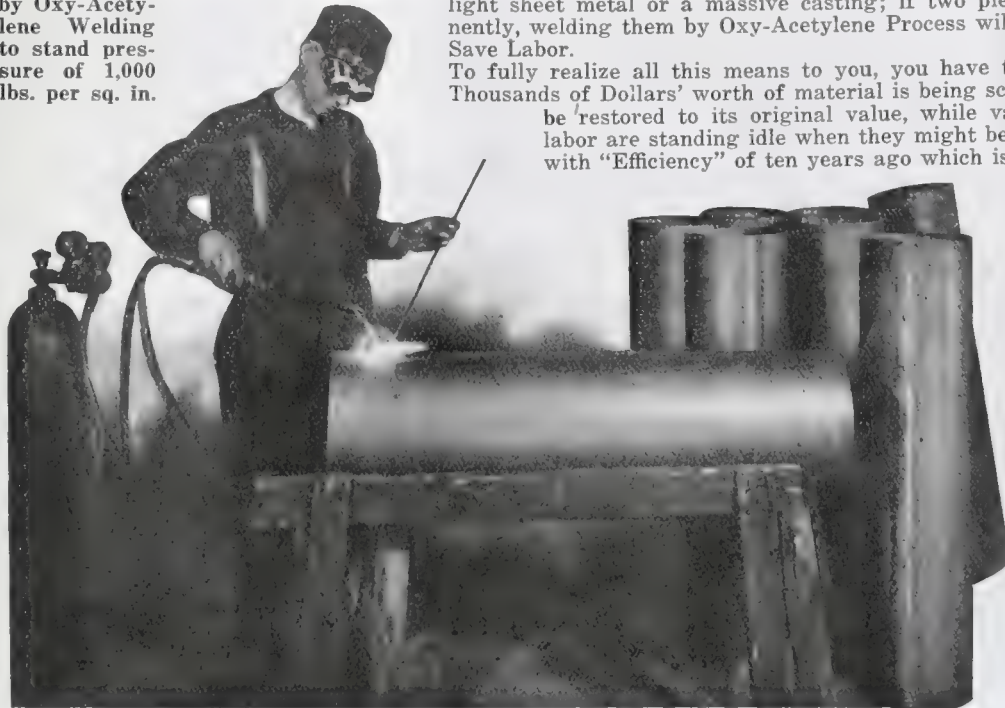
ATHOL - MASS.
NEW YORK LONDON CHICAGO



42-723

Oxy-Acetylene Welding for All Metal Constructional and Repair Work

Cylinders made
by Oxy-Acetylene
Welding
to stand pres-
sure of 1,000
lbs. per sq. in.



No matter what metal it is, if in general use, or what test it has to stand; whether light sheet metal or a massive casting; if two pieces have to be joined permanently, welding them by Oxy-Acetylene Process will Save Time, Save Money and Save Labor.

To fully realize all this means to you, you have to investigate its possibilities. Thousands of Dollars' worth of material is being scrapped that can be and should be restored to its original value, while valuable machinery and skilled labor are standing idle when they might be producing. Are you satisfied with "Efficiency" of ten years ago which is "Inefficiency" to-day?

IS YOUR PLANT FULLY EQUIPPED

for coping with machinery "breakdowns," which are inevitable: for the reclamation of broken parts; or joining metals by welding instead of the old "less efficient" and "more expensive" methods?

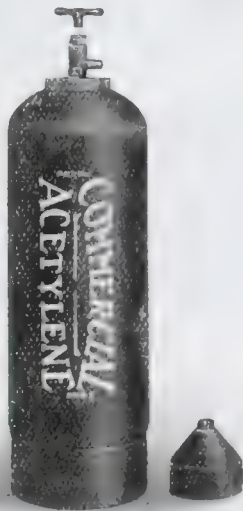
Let us tell you what the Oxy-Acetylene Process will do for you in your Industry, either in manufacturing or repairing.

Write to-day for particulars—no obligation.

L'Air Liquide Society

**MONTREAL TORONTO
WINNIPEG**

Halifax: Factory under construction



Quality Quantity Guaranteed

Write US About Your
Acetylene Supply

Commercial Acetylene Welding Co., Inc.

ATLANTA, GA.
AURORA, ILL.
BOSTON, MASS.
BOUND BROOK, N.J.
EAST DEERFIELD, MASS.

103 Bay Street, Toronto

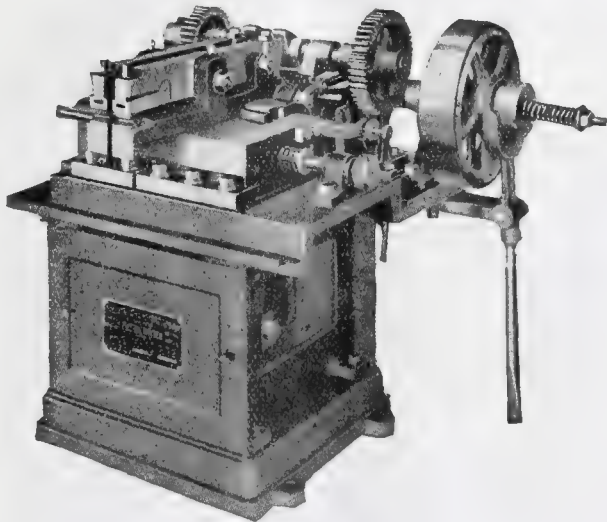
Main Office

80 Broadway, New York

TORONTO, ONT.
SAN FRANCISCO, CALIF.
MOBERLY, MO.
W. BERKELEY, CALIF.

Thomson Process
Electric Welding

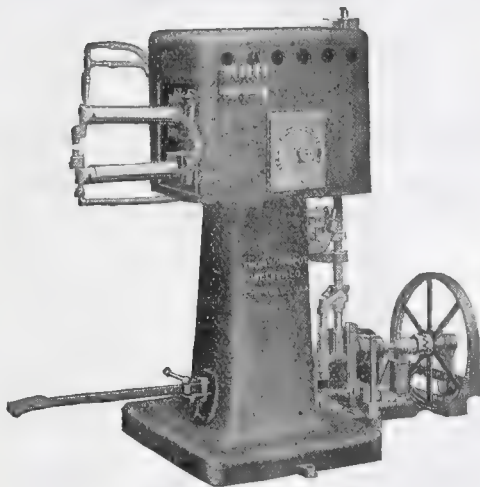
One Operator Merely Feeds This Machine



This type of Thomson Electric Butt Welding Machine takes care of welding of small duplicate pieces, such as rings, buckles, etc., from the moment the operator places the piece in the clamping die until after the weld is made. A power-driven cam shaft tightens the clamps, turns on the current, applies the welding pressure, cuts off the current and releases the clamps after the weld is made. It can turn out 900 to 1000 welds per hour.

Send for Bulletin B-4

Noise Doesn't Always Mean Speed



When you hear the rattle and bang of a riveting shop—you think it means speed—but does it? Notice carefully how long it takes to rivet a small section—then go into a shop using the Thomson Spot Welder—no noise, no dirt, no danger, just quiet, efficient work that means speed. You will see one man at a Thomson Spot Welder doing five times as much work as by the old method, and the welds hold better than the rivets.

We will prove the efficiency and speed of our machines any time you say. Our catalog fully describes our entire line of spot welding machines. Where shall we send YOUR copy?

Send for Bulletin S-4

Thomson Electric Welding Co. Thomson Spot Welder Company
 Lynn, Mass.

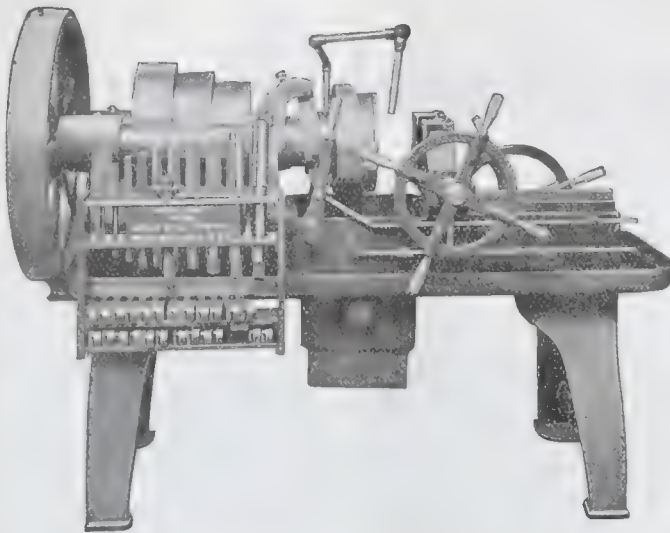
Canadian Sales Offices, 311 Falls Street, Niagara Falls, N.Y.

Thomson Process
Electric Welding

If any advertisement interests you, tear it out now and place with letters to be answered.

Threading Machines

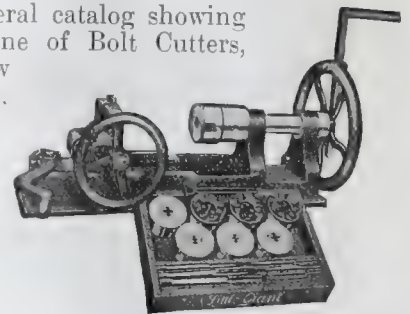
Little Giant



threading machines are free from time-consuming complications. Any shop employee can set them up in a few minutes. They are very easily operated. Any length of thread can be cut with the power machines, as they are fitted with hollow spindles.

The Little Giant line includes a complete range from the power machines with Automatic Opening Die Heads to the small bench machines with Solid Die Heads.

Send for general catalog showing our complete line of Bolt Cutters, Taps, Dies, Screw Plates, Gages, Reamers, etc.

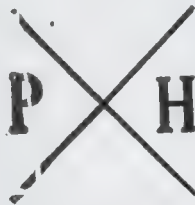


Wells Brothers Co. of Canada, Limited
GALT, ONTARIO

Sales Agents: THE CANADIAN FAIRBANKS-MORSE COMPANY, LIMITED,
Montreal Toronto Vancouver Winnipeg, St. John, Calgary.

May We Repeat

THAT



TRADE MARK

QUALITY FILES

are the only files made in Canada using BEST CRUCIBLE CAST STEEL exclusively in their manufacture. What does that mean to the user?

IT MEANS a keener cutting edge to the teeth, and longer life to the file. IT MEANS the stock has that "pep" in it so beloved of metal workers. IT MEANS that after a long and honorable career on the bench, there is still fine steel in the file which warrants the users in having it re-cut and put on the job again on less "fussy" work.

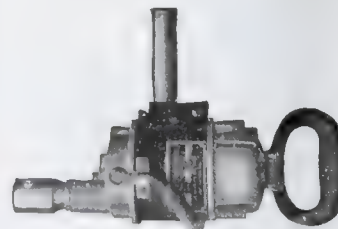
THAT IS TRUE ECONOMY.

PORT HOPE FILE MFG. CO., LIMITED

Port Hope, Ontario
"Ask your jobber"

U. S. Electric Drills and Grinders

Save Time, Labor and Money



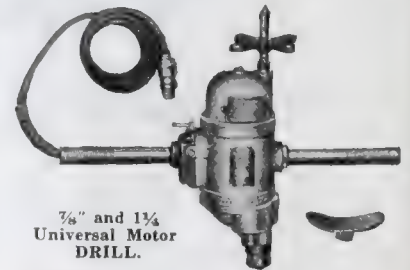
3 SIZES

- 3-16 in., W.G.T., 6 lbs.
- 1/4 in., W.G.T., 9 lbs.
- 3/8 in., W.G.T., 12 lbs.

All motors wound for 110 or 220 volts.

Direct or alternating current.

Try a few of our Electric Drills and Grinders and you'll send us an order for more. Our guarantee protects you.



7/8" and 1 1/4" Universal Motor DRILL.

For Sale By

The Canadian Fairbanks-Morse Co., Limited

Montreal, St. John, N.B., Toronto, Winnipeg, Calgary, Vancouver

THE UNITED STATES ELECTRICAL TOOL CO.
CINCINNATI, OHIO



THE CANADIAN FAIRBANKS-MORSE COMPANY LIMITED



It's the Rigid Construction of B & S Grinding Machines That Makes Fast Production with Accuracy Possible

THE WHEEL STAND

is massive and strongly proportioned with a foundation of heavy walls of metal directly under each spindle bearing and extending to the floor. Vibrations that would affect the accuracy of the work are thus prevented. Firm support is assured for the heaviest of wheels while taking the deepest cuts at the fastest speeds and coarsest feed. The ruggedness of the entire machine is in keeping with this massive wheel stand. May we tell you of the many other features?



**BROWN
&
SHARPE**
*Plain Grinding
Machines*

Send for Catalog

**Brown & Sharpe
Mfg. Co.**

Providence, R.I., U.S.A.

Canadian Representative:
Canadian Fairbanks-Morse Co.,
Ltd., Toronto, Montreal, Win-
nipeg, Calgary, Vancouver,
St. John, Saskatoon.

McDougall Shapers

These are up-to-date Shapers, designed for modern shop production.

They are plain in design, yet embody all essential features necessary for efficient work.

Every adjustment is convenient for the operator and fine for the most accurate work.

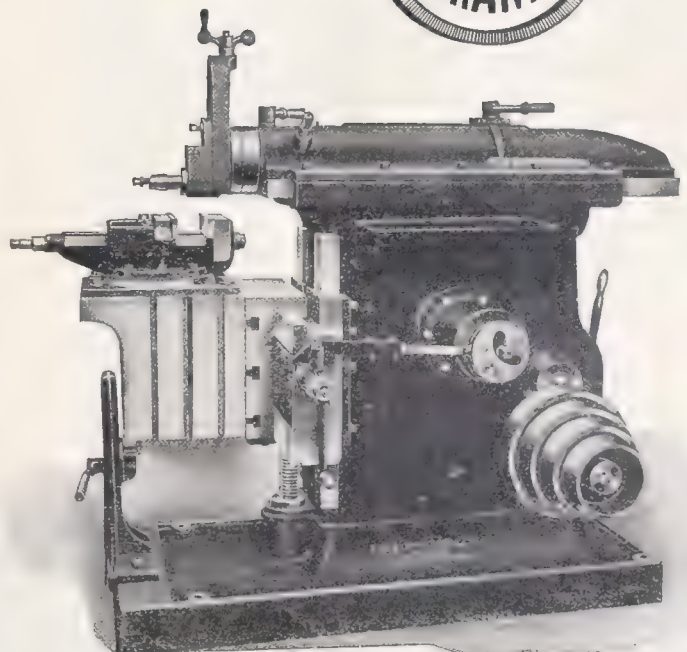
Let us have your inquiry.

**The R. McDougall Company
Limited**

Manufacturers

GALT, ONTARIO, CANADA

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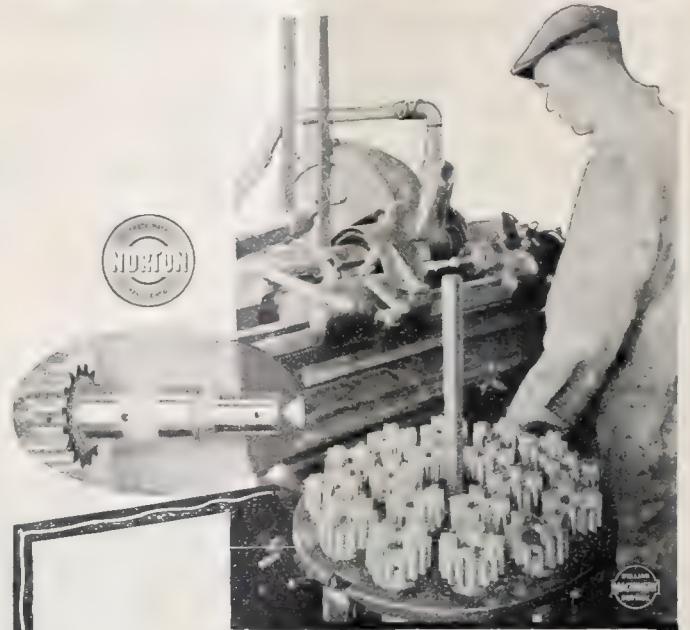
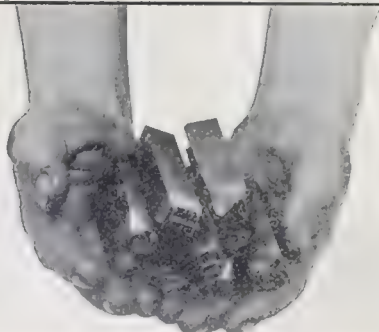
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GRINDING BASE
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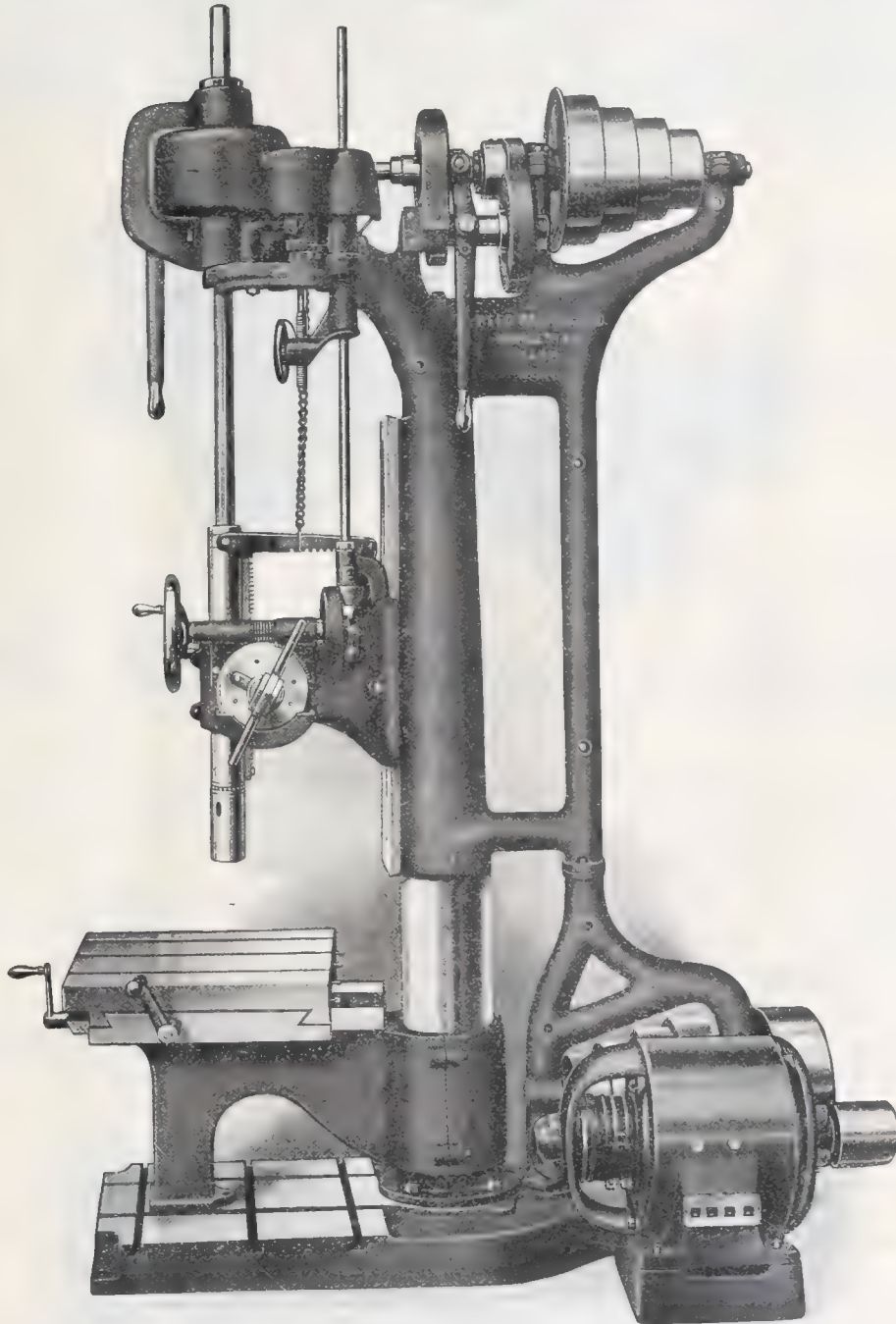


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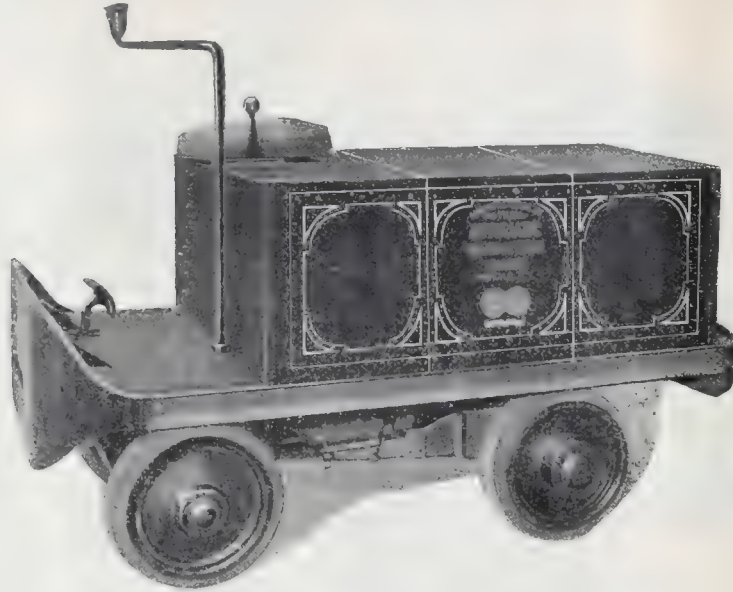
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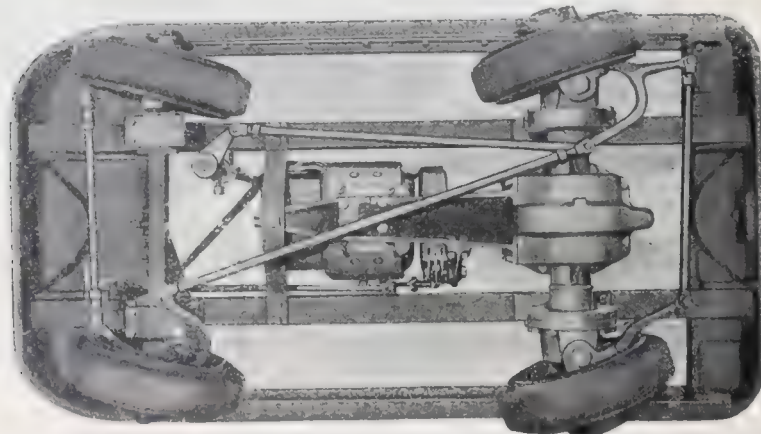
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VIEW FROM UNDERNEATH.



EXTXERIOR VIEW OF FACTORY.

Abrasive Wheel Manufacturing Plant and Equipment

Staff Article

The progress which has been made in the manufacture of abrasive wheels in recent years is due to the more general adoption of grinding in our machine shops, and also to the variety of abrasives that have been introduced for a wide range of application. The grinding wheel is employed extensively, particularly where superior finish and accuracy, and time and labor-saving constitute the end in view.

THE growth of the Dominion Abrasive Wheel Co. business is typical of many Canadian industries, and the new plant now in operation at Mimico, Ont., emphasizes the development which has taken place in the manufacture of grinding wheels.

The demand for artificial abrasives during the past year or two has been stimulated by the scarcity of emery, due to supplies of the latter being cut off on account of the war. The best quality emery is found in Turkey and Greece; but as this material is practically unobtainable, artificial abrasives are now used almost exclusively. The use of artificial abrasive wheels has been steadily increasing for some years, but owing to its lower cost, the emery wheel has always found a ready market. The fact, however, that the artificial abrasive is more efficient will tend to make it more popular than the emery product and the cost will doubtless be reduced in course of time.

Abrasives and Their Origin

Before proceeding with a description of the Dominion Abrasive Co. plant, a brief reference to abrasives and their origin will assist in a better understanding of this concern's product and method of its manufacture. The

principal natural abrasives are emery and corundum, while the principal artificial abrasives now on the market include carborundum, alundum, crystolon, and carbolite. Emery is similar to corundum, but is not so hard, and is not as pure. Corundum is found principally in Ontario, and is much in demand by makers of grinding wheels. It is an ideal abrasive for most kinds of grinding, as the grains keep their sharp points longer than emery and the absence of impurities is also an important feature. The corundum deposits in Ontario contain at least 90 per cent. crystalline alumina. Carborundum, carbolite and crystolon are artificial abrasives, and products of the electric furnace. They are each different formations of the same substance—carbide of silicon.

Carborundum is a crystalline forma-

tion of the elements carbon and silicon produced by subjecting a mixture of coke and sand in an electric furnace to an intense heat of 7,000 degrees Fah. for 36 hours. Alundum is oxide of alumina in crystalline formation. It is made by fusing bauxite to an intense heat in an electric furnace. Bauxite in its natural state has the appearance of clay, and it has to be dried and prepared in the form of gravel before being put in the electric furnace. The best bauxite mines are found in the southern part of the United States.

Vitrified and Silicate Processes

The choice of abrasives for grinding wheels and the process employed in their manufacture depend upon the purpose for which they are to be used. The Dominion Abrasive Co. employ two processes—vitrified and silicate, the majority of wheels being made by the former method. The vitrified process is of much longer duration than the silicate, both in regard to the manufacture and also as to the baking operation. Wheels made by the vitrified process are those mostly used on cylindrical and surface grinding machines. They are free cutting, well balanced, porous and wear well. The majority of wheels



MIXING DEPARTMENT, SHOWING MIXING KETTLES AND GRINDING WHEEL MOULDS DRYING ON BENCHES. DRY-ROOM IN THE BACKGROUND.

used are made by this process. Vitrified wheels take about ten to twelve days to manufacture, while silicate wheels can be produced in about 24 hours. An important feature in the manufacture of grinding wheels is the selection of the correct grain and suitable bond to produce a graded wheel. It is essential that wheels of a certain grade should all be alike and care must be taken in manufacturing to obtain this result so that wheels can be duplicated any time. The bond is a mixture of a special kind of clay and crushed quartz for a flux.

Plant Layout.

When the company was formed, the factory was located at New Toronto, but in time the premises became too small for the increasing business, so a move was made to Mimico, where a site covering three acres was purchased adjoining the Grand Trunk Railway main line, Toronto to Hamilton. A new factory was built on the site and manufacturing operations started on August 5, 1917, under E. W. Sawyer as general manager.

The plant comprises two wings each 150 feet long by 50 feet wide, lying at right angles to each other, with a kiln room 90 ft. by 64 ft. connecting them. One wing contains the mixing and shaving department, and also a dry room, while the other wing contains the finishing department, store room, shipping department and the silicate process department. The entire building is of brick construction, with steel sash for the windows. The roofs of the two wings are of wood sheeting covered with roofing material and supported by steel roof trusses. The roofs are monitor type, with windows opening the entire length and operated from the ground by chains. The roof of the kiln room is made of reinforced concrete with skylights. The office building is also of brick construction, 29 feet square and built separate from the factory. A siding from the G. T. R. runs along one side of the plant.

Mixing and Shaving Departments

Manufacturing operations begin at one

end of the mixing department and the description will be in the meantime, confined exclusively to the vitrified process. The abrasives, of which there are several kinds, are received at the plant in barrels and are arranged in order according

ed round the periphery by stout paper. The moulds are laid on boards for the preliminary drying which occupies from 18 to 24 hours. Very small wheels and sticks are made up in plastic form in moulds. The moulds are then taken to



SHAVING DEPARTMENT, SHOWING SHAVING MACHINES AND EXTERIOR OF DRY ROOM.

to size of grain. The clay for making the bond and the feldspar for the flux are also assembled at the same end.

The process consists in mixing suitable clays and fluxes in certain proportions with the grains of abrasive. The materials are mixed in certain pre-determined proportions with water in a mixing kettle. This is known as the wet process. In preparing the mixture before the water is added, great care is taken to get the correct proportion of abrasive and different clays so that wheels made from a certain mixture may be uniform and that they can be duplicated at any time. Orders issued from the office specify the grit and grade and the wheels are thus made to a standard formula. The possibility of wheels varying in quality from the desired grade is obviated by the use of improved methods, and care in weighing out the correct proportions of abrasives and clays.

After being thoroughly mixed, the mixture is made up into moulds support-

the drying room to be dried out again, which makes them hard enough to be handled. The drying room contains several rows of racks upon which are laid the moulds, and is heated by steam heat, being maintained at a temperature of about 100 degrees Fah.

The next process consists of shaving the wheel. The wheels are moulded larger than the size required and are shaved off on a machine resembling a potter's wheel. There are six of these machines each being driven independently from a motor-driven line shaft running in Chapman double ball bearings and located below the machine. A Crocker-Wheeler motor operates the line shaft, while the shaft hangers rest on the floor. Briefly, the machine consists of a horizontal revolving plate located in an open box. The moulds are placed on the plate and the shaving is done by a vertical steel cutter operated by hand on a cross slide above. The wheels are left large enough to allow for shrinking in the kiln and truing up when baked. The hole is also put into the wheel on the machine while it is in its semi-finished state.

Burning or Baking Process

The wheels are now ready for the baking in the kilns. There are four brick kilns at this plant, each being 12 feet diameter inside and 19 feet diameter outside. They are about 11 feet high inside. Each kiln is built up of 22,000 red brick and 11,000 firebrick. They have seven fire holes and are fired with coal. The kilns are constructed so that the heat inside can be regulated by means of a damper placed in the centre at the top of the arch or roof. The heat comes up from the fires inside and passes down through holes in the floor to the flue.

The wheels are stacked up inside the kiln, each wheel being placed on a fire-clay tile with sectional fireclay saggars around. The wheel is covered all over with quartz sand which keeps the flame from the wheel and helps to maintain



KILNS FOR BAKING GRINDING WHEELS. TILES AND SAGGERS CAN BE SEEN ON THE FLOOR TO THE RIGHT. NO. 1 KILN IS READY FOR BEING DRAWN.

an even temperature. There is a tile on top and bottom of each sagger, thus forming a kind of box. The kiln holds several hundred wheels, the number varying according to the sizes. Each kiln hold approximately \$2,000 worth of

number of machines installed in the finishing department. Some of these are very similar to facing machines, but others are converted grinding machines and incidentally they are very suitable for the job. The wheel is held in a

age of this process is that wheels can be made in a comparatively short time. Larger wheels can also be made by this process than is possible by the vitrified process. The silicate wheel gives very satisfactory results for many purposes, but is not used to the same extent as the vitrified wheel.

For silicate wheels the same abrasive materials are used as for the vitrified process; a different bond is, however, employed. Silicate of soda or water-glass is the principal ingredient in the bond for these wheels. After it has been thoroughly incorporated with the abrasive grains in a special mixing machine, the whole mass has a thick adhesive quality. In this condition it is rammed into moulds. This part of the work requires considerable skill, and the uniformity and balance of the wheels depends largely upon the skill of the moulder. The moulds are fixed on tamping tools, which have a revolving plate on the top so that the mould will revolve readily while being tamped. A wire web is put in the mould during the tamping process. There are six tamping stools.

When the tamping is finished, the top and bottom plates of the mould are bolted together and the mould placed in an oven for the baking process. The oven is heated by a coal fire, but the fire gases are excluded. The baking causes a chemical reaction which hardens or sets the bond, and after sufficient cooling the wheels are ready for the finishing room. The oven is equipped with a Thwing Pyrometer and the maximum temperature attained is approximately 800 degrees Fah. The moulds are kept in the oven for about 24 hours. Many shapes and sizes of wheels are made by this process and the product is very regular and clean in appearance.

All wheels have a sticker giving the grade and number. The company does a considerable export business and ships a large number of wheels to the Old Country. They make any grade required by their customers, while wheels of almost any shape can be manufactured. This



SILICATE PROCESS DEPARTMENT SHOWING TAMPING STOOLS, WHEEL MOULDS AND OVEN IN BACKGROUND, 4¾ IN.

wheels when rated at prevailing prices. The kiln is started with a slow fire, is worked up for 72 hours, and attains a maximum temperature of 2,300 degrees Fah. The kiln is then allowed to cool down gradually for a period of five days, when the charge is drawn. This baking process is a delicate one and the utmost skill is required to successfully burn a kiln, every possible device being used to bring the operation under perfect control. If the temperature is allowed to change too quickly, the wheels will be cracked. If they receive too much heat they will be harder than intended, and if not enough, they will come out too soft. The heat has to be sufficient to vitrify or partially melt the clay so that the bond may fulfil its function. As a precautionary measure, tests are taken to make sure that the wheels have been baked to the correct degree of hardness. Trial pieces covered with the actual material or mixture used for wheels are inserted into the kilns and samples are taken at certain intervals until the condition of the test pieces shows that the wheels have been baked the proper length of time. This method has been found to be very reliable for this particular class of work.

The fire clay rings or saggars as they are termed in the trade, are made in sections and are moulded from fireclay in the mixing room. After being moulded, they are dried out on curved wooden racks. The fireclay tiles are also made in the mixing room. The fireclay is mixed in a clay mill, a certain proportion of used crushed material being mixed with the fresh clay. The saggars and tiles are baked before being used. The wads for making the joints for the saggars are made in the mixing room, a wad machine being used for this purpose.

Finishing Department

The wheels when taken from the kiln are sometimes found to have warped during the baking process. These wheels have to be trued up, which is done on a

chuck and the steel cutter is carried in a tool post on a slide. Both the face and periphery of wheel can be trued up with the one cutting tool at one setting. Some of these machines were built by the Safety Emery Wheel Co. of Springfield, Ohio; and others are converted Ford-Smith grinding machines. The line shaft runs in Chapman double ball bearings and is operated by a Crocker-Wheeler motor. A system of galvanized ducts connected to each machine is installed for carrying away the dust. A Sheldon motor-driven exhaust fan is installed for this purpose. The atmosphere is consequently quite clear and the men suffer no ill effects from operating the machines.

Silicate Process

Up to this point, the manufacture of vitrified wheels only has been dealt with. The company, however, have a separate department for producing wheels by the silicate process. The principal advant-



FINISHING DEPARTMENT, SHOWING TRUING WHEELS WITH DUST EXHAUSTING SYSTEM. WHEEL STORAGE IN BACKGROUND.

company, as in the case of other grinding wheel manufacturers, have for the past year or two experienced great difficulty in obtaining an adequate supply of abrasive material, but in this regard, the situation is improving and as a result a material increase in output is anticipated. The company have a well equipped and up-to-date plant with ample room for extensions when necessary.

ONTARIO'S METALLIFEROUS PRODUCTION

RETURNS received by the Ontario Bureau of Mines from smelters, refining works and metalliferous mines of the Province for the six months ending June 30, 1917, are summarized in the table below which gives comparative figures for the corresponding period in 1916.

SUMMARY OF METALLIFEROUS PRODUCTION, SIX MONTHS, 1917.

Product.	Quantity.		Value \$	
	1916.	1917.	1916.	1917.
Gold	235,060	228,673	4,822,740	4,586,941
Silver	10,267,743	10,073,787	6,188,269	7,584,439
Cobalt (metallic)	121,817	162,250	103,677	237,004
Nickel (metallic)	13,933	45,864	5,899	19,073
Nickel oxide		(5,495)		(1,648)
Cobalt oxide	410,408	(153,498)	204,638	(175,308)
Other Cobalt and nickel comp'ds.		(122,076)		(15,879)
Molybdenite	12,631	36,777	13,075	47,942
Lead		912,934		114,953
Copper ore	922	1,543	14,368	45,688
Nickel in matte	20,651	20,230	10,325,766	10,115,000
Copper in matte	11,426	10,381	4,207,620	4,152,400
Iron ore (exported)		24,332		85,135
Pig iron		40,968		715,912
			25,886,052	27,897,322

It will be noted that above figures are for pig iron produced from Ontario ore only. Export figures for 1916 are not available for iron ore. Nickel and copper in matte have been valued at 25 and 20 cents per pound, respectively, whereas copper was valued at 18½ cents per pound in 1916.

Gold.—It was anticipated that the production for the half year would show a decline as compared with the same period in 1916, owing to labor troubles and labor shortage at the Porcupine camp. Nearly all the mines, including the Hollinger and Dome, have been developing their ore bodies and increasing milling capacity in preparation for the time after the war when labor will be more plentiful and operating costs decreased. In the meantime, production and dividends have been curtailed. New producers are Gold Reef and Tommy Burns at Porcupine, Teck-Hughes at Kirkland Lake, and Miller Independence at Boston Creek. A single stamp is dropping at the Rognon on Wabigoon Lake, District of Kenora. Mines, in order, producing 5,000 ounces or more gold were Hollinger, McIntyre, Dome, Porcupine Crown, Tough-Oakes, Schumacher and Porcupine V. N. T.

Silver.—High prices for silver, which averaged 75.44 cents for the half year as compared with 62.53 cents for the same period in 1916, have stimulated production from the Cobalt camp. The lowest New York price was 71.75 cents on March 27, and highest 78.64 on February 15. This advance in value has offset increased mining costs. If the

Miller Lake O'Brien continues shipping at the same rate throughout the year, Gowganda will show a record production for 1917. The increase is attributed to the high grade vein discovered in the summer of 1916. The Hargrave mine is now shipping regularly. A new shipper this year is the National, formerly the King Edward mine. The Mining Corporation of Canada (Cobalt Lake and Townsite-City mines) shipped over 2,000,000 ounces in the half year. Shippers of 500,000 ounces or more were as follows: Nipissing, Kerr Lake, O'Brien, Beaver and Coniagas mines. Silver recovered from gold ores totalled 38,492 ounces and from copper ores 646 ounces.

Nickel-Copper.—The production of nickel-copper matte at Copper Cliff and Coniston shows a small decrease as compared with the same period in 1916, due

to shortage of labor. Assays of samples of nickel-copper matte for their precious metal contents were made for the Royal Ontario Nickel Commission by Ledoux and Company of New York. Platinum and palladium were found in quantities varying from 0.32 ounces to 1.97 ounces per ton of matte. These metals are quoted at \$100 per ounce. The British American Nickel Corporation have announced that their new electrolytic refinery will be located at Murray mine, and will have an initial capacity of 5,000 tons of nickel per annum. The Port Colborne refinery of the International Nickel Company will produce 7,500 tons of nickel, and provision is made for quadrupling the capacity.

Copper.—Shipments for the half year came from three sources, the Tip Top mine near Kashabowie, the Hudson Copper Company at Havilah, and the Kenyon Copper Company of Massey. The last mentioned operates the Massey mine where a 100-ton Callow flotation mill is producing 20 per cent. concentrates. Shipments from Bruce Mines are included under nickel-copper. The Port Arthur Copper Company at Mine Centre is erecting a concentrator and will be shipping soon.

Iron Ore and Pig Iron.—Shipments of ore were from the Helen and Magpie mines of the Algoma Steel Corporation, and a small shipment from Moose Mountain. Helen ore is shipped to the Magpie mine for treatment. In all, 61,796 tons worth \$231,937 were marketed, of which 24,322 tons were exported to the United States. Pig iron pro-

duced at Sault Ste. Marie, Hamilton, Port Colborne and Deseronto totalled 347,190 tons worth \$6,067,050. Out of a total of 577,773 tons of ore smelted only 77,202 tons came from Ontario, and in the table the quantity of pig iron produced and value of the same is figured on a pro rata basis.

Molybdenite.—The production of this ore is increasing rapidly. Concentrators are now in operation at Renfrew, Mount St. Patrick and Ottawa, and in the half year treated ore from thirteen different mines. At Orillia and Belleville, 80,334 pounds of ferro-molybdenum worth \$200,835 were produced.

Lead.—Smelters at Galetta and Kingston produced 912,934 pounds of pig lead worth \$114,953 from Ontario ores. The Kingston Smelting Company also treated 1,895 tons of lead ore from the United States. Ontario ore came from the Galetta and Frontenac mines.

Export of Coal to Canada.—A despatch from Washington, D.C., states that continued export of coal to Canada in large amounts through Great Lakes ports at the expense of the Northwestern States will be checked immediately by the Fuel Administration. Dr. H. A. Garfield, the Fuel Administrator, has requested the Exports Administration Board to permit no more coal to be shipped from the country except under license restrictions, and asked that no licenses be granted unless they are approved by the Fuel Administration. Coal heretofore, along with other American products, has gone to Canada under blanket licenses issued by Collectors of Customs. "The Fuel Administration," said Dr. Garfield, "does not intend to cut off Canadian exports, but with this supervision it will be able to equalize the distribution of coal, and see that the Northwest and Canada both get their fair shares."

A writer in the Blast Furnace and Steel Plant observes that with all its advantages, such as convenience of handling and absence of shock, the press has two failings. In the first place it is harder to get rid of scale, which is dislodged by the impact of a hammer, and it cannot strike in a mould as large a forging as a hammer its equivalent in other respects. The Midvale Steel Co. consider a 500-ton press as the equivalent of a 2¼-ton hammer, a 1,200-ton press as equal to a 10-ton hammer, and a 2,500-ton press as equivalent to a 25-ton hammer. Nevertheless, a 4½-ton hammer can make drop-forgings beyond the capacity of a 1,200-ton press, which in this respect is about equal to a 2½-ton hammer.

Jones—"Say! When a fellow calls on a girl, should he leave his hat in the hall or take it into the parlor?"

Mudge—"Well, if the girl is living in a boarding house, and the hat is worth anything, I think he had better hang on to it."

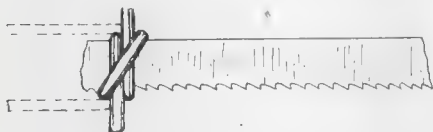
PRODUCTION METHODS AND DEVICES

A Department for the Interchange and Distribution of Shop and Office Data
and Ideas Evolved from Actual Practical Application and Experience

EMERGENCY HACKSAW REPAIR

By J. E. McCormack.

SCENE—Out of town on a repair job. Circumstance—Only brought one hacksaw blade and broke it before done using it. Remedy applied—"Stove pipe iron wire wound once around the blade, crossed on top (back of blade), passed around



EMERGENCY HACK-SAW BLADE REPAIR.

again and the end shoved under the lap, thus forming a clove hitch.

The wire was then passed back around the rear pin of the frame, then brought forward and the ends joined by twisting. Though a bit wobbly, this served the purpose and it successfully cut in two a 1 1/4" iron shaft, thus proving the idea to be practicable in case some repair of the kind becomes necessary.

When a suitable drill is at hand and a good blade breaks near one end, the writer has often wound a strip of wetted flannel or other cloth a number of times around the blade near the broken end, and heated that end in a suitable flame to draw out the temper. This makes drilling of the hole easy, and the wetted cloth prevents damage to the remainder of the blade, which can then be used in an adjustable frame, or if in a solid frame, pass a wire through the hole and around the pin and fasten.

STILL ANOTHER LATHE

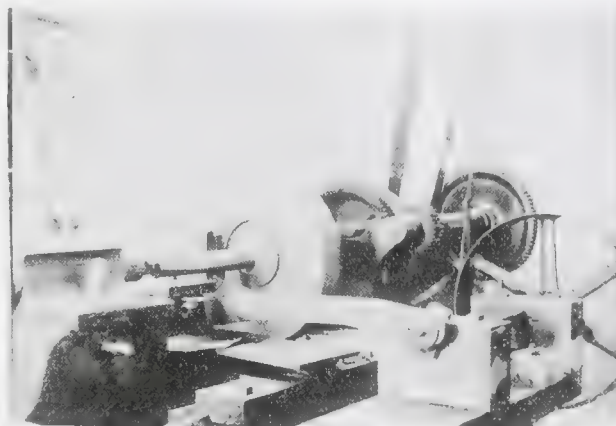
By D. A. H.

THE accompanying photo shows still another lathe that is doing its part in the present warfare, at work that is anything but lathe work. The machine, while a rather old one, is in good condition but had been set aside in preference for a more modern tool but when the pinch came it was belted up again and put to work as a grinder.

As will be seen, an emery wheel is held between flanges on an arbor that is placed on the centres just as a regular job. The wheel itself has a depressed centre and a broad working face against which the work pieces are pressed. The pieces are forgings and have a pad or two to finish true with three locating points on the back. They are dropped in a holder of right angle shape which may be seen fastened on top of the cross slide. A considerable amount of stock has to be ground off some of the pieces to go in the gauge and this variation is very nicely taken care of by the carriage movement:—a stop is set on the lathe bed for sizing and another to prevent the operator from losing time in running the carriage too far away. The

pieces are dropped in the holder and a "kicker" throws them out, so there is no danger of personal injury.

The grinding pressure, or thrust, is taken by the hand feed of the carriage as has been told. There is another feature of the rig which relieves the workman of some labor, saves the wheel from becoming grooved, and is an important factor in producing first-class work and lots of it. This is the crank motion, belt driven from the countershaft, that imparts a constant back and forth movement to the cross slide. A hickory pitman and supports and bearings for the "crankshaft" of wood also are attached at the back of the lathe. In practice this inexpensive arrangement on this old lathe has been a good one, having turned out over a million pieces at a most satisfactory rate.



SHOWING HICKORY PITMAN OPERATING CROSS SLIDE OF OLD LATHE ARRANGED FOR DISC GRINDING.

FACTS AND DIRECTIONS REGARDING MODERN GRINDING PRACTICE

IN the early days of the grinding machine there was no "roughing cut." Whether much or little material was removed it was a finishing operation throughout. In a review of facts and suggestions as prompted by long experience, C. H. Norton, writing in *Grits and Grinds*, says: The grain of the wheel was always fine, so that "nice finish" could be obtained with rapid work revolution, with any depth of cut, and regardless of whether the wheel face was true or smooth. Wheel truing at that time was done with a diamond hand tool. The wheel was seldom, if ever, true, and never parallel with the work slide.

Cylindrical grinding is usually done by what we term "roughing and finishing" cuts. These cuts sometimes are made by two operations, the work is then handled twice. In many cases, however, the roughing and finishing cuts are merged one into the other by practically one operation, and the work is not removed from the machine until completed. When

completed it may or may not have a fine finished surface, depending upon the nature of the work and where it is to be used. By fine finished surface is meant a finely ground surface, not a finely polished surface. The cylindrical grinding machine is what its name implies—a grinding machine, not a polishing machine.

The dividing line between a finely ground surface and a polished surface varies according to the mind and eye of the critic. A perfect surface to one is a very imperfect one to another. A commercial finish, however, is very generally recognized, and it is the commercial finish that is considered here.

Fine or Coarse Wheels

When the work is of such size and weight that the operator can quickly place it in the machine and remove it without effort, a special roughing wheel is used for the first operation. This wheel may be very coarse. For finishing operations a relatively fine wheel may be used, but when tried in the modern way and relatively slow work speeds used, it can be as coarse as 30, while by the older method it must be as fine as 80 to 100; in fact, in some cases 200 was used.

When the two cuts are merged into one handling, i.e., when the work is too large or too heavy to quickly place in the machine and remove without effort, or when but few pieces of a kind are to be ground, we then use a wheel so coarse that a finish can be obtained by making a temporary surface on its face by the use of a relatively smooth diamond. We then use the same wheel for both roughing and finishing. The diamond is traversed slowly across the face of the wheel. The wheel is then used with light cut for the finish surface. It resumes its coarse cut when it is made to cut deeply again. In this way we secure the rapid cut of the coarse wheel when taking the roughing cut, and yet obtain a commercial finish with one and the same wheel. This method is especially adapted for grinding large and heavy work.

The whole question of grain of wheel depends largely upon the manner in which the wheel is used, but grains from 24 to 46 are those used mostly to-day. Some prefer several sizes of grain, mixed to secure strength, but the latest experience indicates that the single size from 30 to 36 is the best for nearly all

work with a commercial finish, while from 46 to 60 is used for a finer finish. These last are not used when any considerable material is to be removed.

Depth of Cut

The depth of cut must depend upon the grain and grade of wheel and speed of work surface, as well as the power available at the wheel spindle. While some classes of work are rapidly produced, only by relatively deep cuts, in most cases the maximum production width of wheel face that the machine will carry, and the maximum traverse speed for that width of wheel, in order to cover the work with the maximum number of cutting particles per minute. The greater the number of cutting particles per minute, the less depth of cut necessary for a given amount of material removed.

Width of Wheel Face

The wheel face for the cylindrical grinding machine can be any width from $\frac{1}{4}$ " for special shape work, to the widest that a cylindrical grinding machine is designed to utilize. If users of machines desire to pay the necessary price there is no limit to the width of face a machine can be made to carry and no limit to the width that can be made to grind, both precision work and commercial work, if the work is of such size and shape that it will not be distorted by the wheel pressure and temperature changes. Wheels 10" wide are now used in every day work. The widths now used are 2, 3, 4, 5, 6, 7, 8, and 10 inches.

In many cases work ground with 5" and 10" wide face wheels does not traverse. In such cases the width of the wheel face is slightly wider than the length of the surface being ground, and in some cases with 2", 3" and 4" wheels the work does not traverse.

Finishing

Finishing may be done with rapid work revolution and also with very slow work revolution, as well as with any work speed between. It may be done with wide wheels and with narrow wheels. It may be done with very fine wheels and also with very coarse wheels, and with all grains between.

Good finishing depends upon the skill of the operator, whatever speeds or wheels he may use, but ordinary commercial finish on steel is perhaps best obtained by using a medium coarse wheel, about Grade L, carefully trued, and with work revolution at a suitable speed for that particular wheel and that particular piece of material. In case of hardened steel the grades should be K, J, and I, according to the hardness, shape and nature of the object being ground.

When finishing, an artist operator will succeed with any wheel from I to L, and any grain from 16 to 60. But when well acquainted with the particular work in hand he will select some one wheel as giving the most production and best results. What wheel he would select for any piece of work cannot be foretold, because his success depends upon his skill. Different artists select different wheels for finishing the same work.

Traversing Work Table vs. Traversing Wheel

Some cylindrical grinding machines are so constructed that the wheel traverses, while others are so constructed that the work traverses. There is much useless discussion as to which is best—to traverse the work or to traverse the wheel. The answer is plain: that so far as the grinding action of the wheel is concerned there can be no difference, whether the wheel traverses or whether the work traverses.

When selecting a grinding machine the quality of its workmanship, convenience of operation, degree of precision to which its various parts can be moved, set and maintained, and the general rigidity and durability of its design and construction should be considered, and not simply the fact that the wheel may or may not traverse.

A wise designer will use work traverse when that shall best serve to secure convenience, durability and accuracy with the kind of work to be ground, and wheel traverse when that shall best serve the needs of the kind of work to be ground.

HANDY HOLD DOWNS FOR SHAPER WORK

By F. Brewer

THE accompanying sketch shows a pair of "hold-downs" which the writer made for use when shaping or milling strips and plates. This extremely handy and effective pair of articles are, as will be seen by the sketch, simple in design

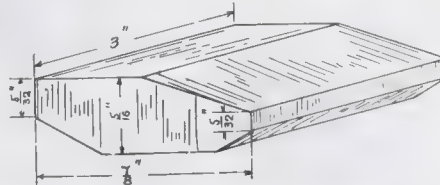


FIG. 1. HOLD-DOWN FOR SHAPER WORK.

and easy to make. Care, however, should be taken to see that the sides are square and parallel with one another, also that the side which touches the vise is above and the side which touches the "job" is below the centre of the "hold-down." Having respect for the boss' steel, I selected an old flat smooth file and annealed and shaped it to the dimensions shown in sketch, Fig. 1. The "hold-downs" were then tempered and ground on the sides, and were then ready for use. Their value is readily shown by sketch, Fig. 2. The job can be held low in the vise, thus relieving the vise from a great deal of strain, will take heavy cuts without shifting, and will come out absolutely true and parallel. The shape

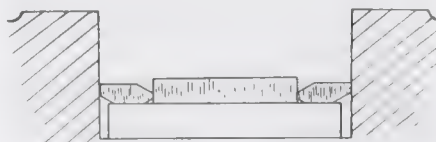


FIG. 2. METHOD OF USING HOLD-DOWNS.

of the "hold-downs" creates the tendency to force the job down firmly on the parallel strip. When shaping long strips or plates, use two pairs of exactly the same width.

EFFICIENCY AND CHEAP PATTERNS

By D. Street.

EFFICIENCY in the pattern shop, which is the key to cheap production, depends upon the number and condition of the machines, the organizing ability of the foreman, the initiative of the craftsman, and the quality of the timber used in the construction of the work. All pattern shops, however small they be, ought to have a saw, a band saw, a trimmer, a sand papering disc, a lathe and a grindstone. The idea that because a shop has only a few men no machines can be afforded is wrong. It is because the patternmaker has realized this truth that he can turn out work cheaper than many firms. It is often possible for the power in a large works to be on all the time, because there is always one or other of the machines in use, but in a small works it is essential that the power be cut off when no machinery is in use. It is possible for an ingenious foreman to improve adjustments which will make the machines more serviceable, such as gluing a sheet of sandpaper on a lathe surface and making a small table to fix into the ordinary tee-rest.

Ill Treatment of Machines

Machines are more abused in the pattern shop than in any other shop. Carelessness is often the cause, but it is not always possible to foresee the exact finished shape, with the result that the saw "finds" screws and nails. It is cheaper, if need be, to change the saws several times a day than work with blunt saws, which latter practice necessitates much bench finishing and probably spoils work. A common cause of spoilt work is a slack band saw; a tight band saw is more subject to greater strain, and is more easily broken, but the danger of a slack band saw uncutting is very great. A very useful machine is a set of emery wheels for grinding gouges. They must be kept in good condition. If they are not, the outside edge of a true running grindstone is better. A soft stone carefully attended to is a sine qua non of the pattern shop; without it tools cannot be kept in good order, and good tools are necessary for good work.

Wood Lathe Features

Much time is often wasted in turning work; the lathe ought to be provided with several chucks and face plates of different sizes and rests suitable for concave and convex surfaces. The slide rest is occasionally useful in a wood-turning lathe for long straight barrels, but generally it is not of much use. If a workman has to turn a concave surface with a straight rest he has to be either continually stopping the lathe to move the point of the rest nearer to the work, or he takes the risk, which is a considerable one, of the tool dipping, and probably breaking, if there is the slightest vibration owing to the overhanging of the tool when turning at the centre of the rest.

In shops where there is much turning it ought to be done by one man. Turning work is more expensive than it ought to be, because only a specialist can acquire a high degree of dexterity in the

lathe. A patternmaker is a better pattern turner than a professional wood turner, because the latter is not accustomed to working to accurate sizes. It is an essential to have a man do the turning for the whole shop as it is for one man to be told off for a patternmaking machine. As little work ought to be turned as possible. The sandpapering disc can do much of the work that was formerly done in the lathe.

Division of Labor

There is not enough division of labor in the majority of pattern shops. Some jobs are peculiarly suited to boys. It is waste to have a highly skilled man making prints and flanges or building segmental work. Prints ought to be stocked in various thicknesses and sizes, and the youngest apprentices ought to make them. It is obvious, if an apprentice builds a segmental body, and a specialist turns it, the finished price is much lower than if one man made it throughout.

The kind and quality of the timber used has a considerable bearing on the finished cost of patterns. For general patternmaking yellow pine is the best timber. It is easily worked and, besides not warping readily, takes a good finish. Cypress and spruce are sometimes used, but are never satisfactory. The former warps, and is too brittle, and it takes more time to shape than yellow pine. Spruce is too open-grained, and changes its shape too readily. It is false economy to provide a bad quality timber to the pattern shops. Apart from the large proportion that is scrapped, cheap timber takes longer to work up. A foreman ought to consider it an important part of his duty to see that when men are breaking out timber they do not cut to waste. Carelessness or lack of skill in drawing off is responsible for this.

Re Setting Down

Too much time is usually spent in setting down work. Unless the drawing board is to be sent to the foundry, the metal need not be painted in. Three or four views are sometimes set down, when only one is necessary. It is often possible, indeed, to make a pattern direct from the blueprint without setting down. It is advisable when doing this, if there is a core box, to prepare it, first drawing the shape of the pattern as well as the core on the joint, when it can be used for taking sizes for the pattern. There is one important advantage of setting down work, and this is that the craftsman sees it full size, and thus it is easier for him to decide on the methods of construction he will adopt.

Prohibit Trading With Enemy Firms.—

A supplement to the "Canada Gazette" of recent date has been issued containing a proclamation giving effect in Canada to the prohibition by the Imperial Government of trading with firms and persons in various countries of enemy nationality or association. The names of the firms and persons included in the list number several thousand, the majority belonging to countries of South America.

TEMPORARY REPAIRS TO GAS ENGINE GOVERNOR

By J. E. McCormack.

IN a gasoline engine governor of the type shown in section in Fig. 1, the arm A, broke at the hinge pin. Weights DD were connected by springs, as indicated in Fig. 2. Before the engine stop-

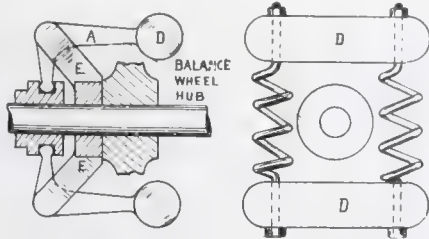


FIG. 1.

FIG. 2.

ped, one of these springs became badly stretched, but was put back as well as possible later. For a temporary quick repair, a piece of wood was cut as in K, Fig. 3, the side projection being shaped to fit down against the balance wheel hub and into the space between the spokes and was then attached to the yoke E, Fig. 1, by means of a suitably bent carriage bolt shown in Fig. 4. Smaller bolts were dropped into the springs FF (one into each spring), and a washer slipped between two coils of each spring and above the ends of the aforementioned small bolts. These bolts were then passed through the washers and through the wooden piece K, and washers and nuts put on these. The washers in the springs were large enough to hold the springs to K, yet small enough that the bolt heads did not pull through them.

After being planned, the repair did not require much time for its accomplishment, and the engine was again started. According to the speed indicator, it ran about eight per cent. slower than normal when first started, which was not considered bad, considering the stretched condition of the springs. They were,

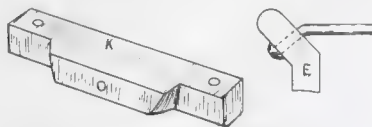


FIG. 3.

FIG. 4.

however, tightened a little more and operations continued; although the engine did not run quite so steadily as formerly, it was considered much better than shutting down to await new parts. The one weight acting alone against K, instead of against a duplicate of itself was much like one pulling on a rope tied to a post as compared with his pulling against another man on the same rope. The two pulling equally merely balance each other, the strain would be equal to the pull of one and the same as though the other end were fastened to something solid.

I might also add that with this engine a cord was passed from the ignition switch up through a pulley and across to where the operator of the driv-

en machinery could easily reach it and thus cut out the ignition and so stop the engine whenever he wished. Also the priming bottle used was decorated with a large diamond shaped red label to prevent anyone mistaking the contents for kerosene or other liquid.



THE SHOP BUILT IN THE WOODS

By D. A. Hampson.

"MR. MACKEY, what kind of a shop is this to learn the trade in?" Johnny, the apprentice, asked the question of his foreman some fifteen years ago just after he had worked his first three weeks, and was beginning to think he should be "shoved ahead" faster. "Well, Johnny my boy, the kind of a shop this is to learn the trade in depends on the kind of men it turns out—you'll have to wait and see," was the reply. And after all wasn't that the very best answer that could be given?

The shop was located in the woods of Herkimer County and was started to make a couple of electrical specialties which the owner had invented. There were a planer and two lathes and three drill presses and a miller—all second-hand, bought that way because the inventor was true (financially) to his class. But the business was founded on merit and at the time of Johnny's question boasted a score of tools—second-hand—and had a force of ten, though it was only two years old. The business continued to grow slowly and to-day is housed in its own building, employs thirty-five men and is a shop worth going into to visit. Not marvellous growth—but substantial, a first grade credit rating, everything paid for out of earnings with no inflated capitalization, and with a demand for the product country wide.

The Boys Come Home.

Last fall they had an Old Home Week in Herkimer County and a particular effort was made to get all the old boys that worked in the shop to come back for a day or two. Most of them did and accounted for themselves in a creditable manner. Dick and Harry came down from Maine where one of them has charge of the assembling in a lathe plant and the other is superintendent of machinery for a firm of shipbuilders. Fred and "Dutch Bill" are master mechanics in auto factories in Detroit and couldn't be away long enough to come. Johnny, the same one, is in control of the tool-making at a central New York typewriter plant and his erstwhile pal Will left his \$70 per week shell making job in Brooklyn long enough to shake hands anyway—Will is one of the prizes in the plant, a man that doesn't have to throw a bluff to hold the job. Herbert is a subway contractor's right hand man, has charge of a line of machinery far removed from the class that Hank works on as an expert tool-maker in a Pennsylvania watch plant. Mr. Mackay, the old foreman, left his own business on Long Island to drop in and greet his successor in the home shop, one of his own boys grown up in the business.

Based on his own rating, that shop must have been a good one to learn the trade in, for these boys went out from "the woods" into some of the most particular shops and made good from the start and there were others equally as successful as those named. The reasons why the shop turned out such good men are not hard to find. First, it selected good boys; but that was not all of the first part, for after six months' service the boys were frankly asked if they cared to continue in the trade or if they showed little aptitude, they were dropped. Second, the shop was located in a region where machine shops were not numerous and when a boy did land a job in the shop he considered himself fortunate and stuck to the job often for years after his apprenticeship was over.

A Final Reason

And thirdly is that old, old reason—the shop where the men cannot become specialists. For in the slack times the shop took in job work to help out on the pay roll and the boys got that most valuable experience of outside work—erecting, engine work, babbitting—all with makeshift, whatever-you-find-at-hand equipment. Inside the shop, some special machinery work was taken on. This necessitated a pattern shop and a small foundry; and lucky is the machinist who gets the benefit of work in these two branches along with his other training. Then the specialty business expanded and manufacturing in quantities was an important part of the business—really its financial backbone. With manufacturing of course came the machinery peculiar to it—punches, screw machine, turret lathe, and Lincoln millers and the equipment of jigs, tools, gauges, micrometers, etc., that goes with them.

So that the shop up in Herkimer County was well qualified to turn out good men and the men were not afraid to travel in fast company, mechanically speaking. And this lack of specialization was what gave the men this wider outlook—just as does the study of trade papers—and prepared them for the next job higher up.

TUNGSTEN FILAMENTS

By L. E.

A NEW preparation of tungsten filaments has been enquired into and adopted by some German firms, and in brief the process necessitates the mixing of the metal powder with 2 per cent. of thoria, which is kneaded into a paste with the addition of some binding agents, through which a thread is then squirted. The thread is first preheated, and then rapidly heated to 2,400 or 2,600 degrees C., the object being to make the crystallization of the metal more rapid than the passage of the wire through the heat zone. The first apparatus used for this delicate operation had the dimensions of several metres, the actual apparatus is only a few centimetres in height. The resulting wire is said to consist of crystals several metres in length though only a few hun-

dredths of a millimetre in thickness, the cross-section of the wire coming out octagonal rather than circular. There are very few joints in the wire, whilst the first tungsten wires were really thin rods built up of very short sections. A recrystallization of the filament after long continued use of the lamp is said not to occur.

NEW METHOD OF SMELTING POOR IRON ORE

ACCORDING to the "London Times," two young Norwegian engineers have made an important discovery within the realm of steel smelting, which will probably have far-reaching results. The discovery has been patented and consists of a new method of smelting poor iron ore by electric energy into first-class steel at a very low cost and with less fuel. The smelting will be done by assistance of coal oxide gas and water gas, and the new important factor of the discovery is that the coal gas by passing through a flame oven is reduced to coal oxide, which can be utilized again.

The well-known metallic expert, Dr. Groendal, welcomes the new process, and has put his different metallic patents at the disposal of the young engineers. Practical people are sanguine of the success of the new smelting process, which will specially suit a country like Norway with only poor iron ore deposits, but plenty of cheap water power at disposal. The Norwegian mining trade journal, "Bergverksflyt," referring to this new discovery, says: "We welcome this discovery with sincere pleasure, and hope it will make our naturally poor country rich and mighty."

SCREW CONNECTIONS

ALL screw connections exposed to considerable heat or to moisture are liable to become very difficult to undo, if proper precautions are not taken. The unions on the generator of a steam car or the union on the exhaust pipe of a petrol car are, remarks the Autocar, good illustrations of this. The brake pins and nuts, the nuts on spring clips, etc., are also very likely to become rusted on. Whenever any such connection is removed, a little pure graphite mixed with oil to a paste of the consistency of cream should be applied to the threads. The nut or union can then be unscrewed without difficulty, as although the oil may be burned off, the graphite never leaves the metal, so the threads cannot seize nor oxidize and give trouble. Why, adds our contemporary, makers do not adopt this system with new cars, is not easily understood, as it costs practically nothing. Those who have struggled with nuts firmly rusted on somewhere underneath the car—such as an axle spring clip—will appreciate this point.

IN San Francisco a firm of engineers is designing a ship with a length of 330 ft., a beam of 44 ft., and a depth of 31 ft., with a capacity of 4,500 tons, to be built

of reinforced concrete. As far back as 1898 a concrete schooner is said to have been employed for some years in the North Atlantic coasting trade.

PALAU is the name of a new alloy of gold and palladium which has recently undergone tests at the United States Bureau of Standards, having been originated by a Californian metallurgist as a substitute for platinum in laboratory crucibles. The loss in weight on heating to 1,200 deg. Cent. is intermediate between that suffered by crucibles of platinum containing 0.6 and 2.4 per cent. iridium respectively. The melting point of the alloy is 1,370 deg. Cent., which corresponds to that of an alloy of 80 per cent. gold and 20 per cent. palladium. In resistance to most of the chemical reagents to the action of which such ware is ordinarily exposed, palau compares favorably with ordinary platinum ware.

THE behaviour of silicon-iron alloys under the action of various acids was discussed by Prof. O. L. Kowalke recently before the American Electro-Chemical Society. The author's conclusions are that silicon-iron alloys of about 3 to 5 per cent. silicon are attacked very readily by sulphuric, hydrochloric, acetic, and citric acids. These alloys are not excessively brittle. Silicon-iron alloys of about 16 to 18 per cent. are exceedingly resistant to action of sulphuric, hydrochloric, nitric, acetic, and citric acids. These alloys are so brittle that they must be ground; they cannot be machined. A solid solution of FeSi in iron near 20 per cent. silicon is resistant to mineral acids. Search is in progress for a third metal which can be added to the iron-silicon alloys to improve their strength and still retain the resistance to the action of acids.

THE dependence of the Swedish iron and steel industry on foreign supplies of coal has resulted in the prices of these products rising to such a point that they are quite out of the British market. Swedish pig iron, if bought to-day, says the "Ironmonger," would cost the British consumer about \$225 per ton, compared with \$30 per ton before the war. The cost of rough bar iron for making crucible steel, and of steel billets, averages \$325 per ton or a little more, compared with \$52 and \$60 in ordinary times.

A 6-hr. working day was recently advocated by Lord Leverhulme in an interview printed in a British paper. He would run the machinery 12 hours with two shifts of operatives, expressing the belief that the human machine would do as much in 6 hours as in 8, except in a few industries where exceptional conditions prevail and that the extra number of hours worked by the mechanical machines would enable such an increased output as to allow possibly for the same wages now paid for 8 hours. Incidentally, he expressed faith in co-partnership rather than in profit-sharing.

PNEUMATIC DOOR CONTROL FOR STREET CARS

FROM the earliest days of tramway or street railway service, engineers have been striving to maintain the highest standard of efficiency, not only in the mechanical operation of the equipment, but also in that which is equally if not more important—the safety and convenience of the travelling public. While

inches lower than that in the body of the car; this provides a commanding position for the conductor over the heads of the passengers. A seat is supplied for the conductor's convenience, being so arranged that it can be tilted back out of the way when so desired; suitable stops maintaining it in either position.

closing of the doors by the small handle A situated to the right of the cage. The railings of this cage are of ordinary gas pipe, which provide a suitable and protected means of supporting the vertical connecting rods and necessary wiring. On the lower end of the rod B to which A is secured, is the small lever C connected to a similar lever D on the



FIG. 1. GENERAL VIEW OF REAR VESTIBULE.



FIG. 2. EXTERIOR VIEW. SHOWING DOORS CLOSED.

the progress in street railway systems may not have been phenomenal, many remarkable improvements have been developed since the operation of the old horse car, or even the more recent ancestor of the modern electric tram car—the "Tonneville Trolley." It is in the larger cities, however, where heavy traffic is encountered, that modern cars are more extensively equipped with many of the latest innovations of the inventors' or engineers' art.

The Montreal Tramways Company operate their system on the pay-as-you-enter plan, where the conductor is located in a suitable position in the rear vestibule to collect fares from the incoming passengers, and observe when the entrance and exit are clear for the next movement of the car. Previous to the changes and address here described, the body or interior of the car was separated from the rear vestibule by a partition, containing a hinged entrance door, and a sliding exit door, both hand operated; the latter being adjacent to the street opening. Similar facilities are provided at the forward end for outgoing passengers. The alterations consist of the removal of the intervening partition, rearranging the conductor's cage, and equipping the street opening with air-operated folding doors and lower step. Fig. 1 illustrates a general view of the rear vestibule, showing the central cage and doors fully opened. The cage platform is on a level with the car floor and extends about two feet into the vestibule. the floor of which is about 6

Mechanical Details

The control and operation of the folding doors can be better understood by reference to the line drawings. The doors and step are jointly operated by the action of a small double piston, single cylinder pneumatic engine, located in a suitable compartment directly above the folding doors. The conductor has absolute control over the opening or

upright rod E, by means of the cross rod F; the rod E being in turn connected to the operating lever on the valve of the engine G. The engine is so designed that when air is admitted into one end of the cylinder the air on the opposite end is exhausted, but in such a manner that a cushion action is attained just before reaching the extreme position in either direction. This action is obtained by means of two exhaust openings. A large one permitting rapid release for the greater proportion of its travel, and the remaining air as it exhausts through a pin hole opening, allows the doors to gradually close to a fixed position. This action results when handle A is in the extreme position either way; the doors may be held stationary in any desired midway location by placing the operating handle in a neutral position after operating. As before stated the small engine is of the double piston type, these pistons being rigidly connected by a central shaft, the upper portion of which is in the form of a rack; this rack engaging the teeth of a gear sector, the axis of which extends to the outside of the casing, and carries the lever H. Connected to this lever are the two rods I and J, the opposite ends of which are secured to the levers K and L, these being threaded pieces for providing accurate adjustment. It will be noticed that the lever K is directly connected to the door support, while L is fitted to an auxiliary gear section that in turn engages a similar one on the door support; this being necessary for uniform and opposite control.

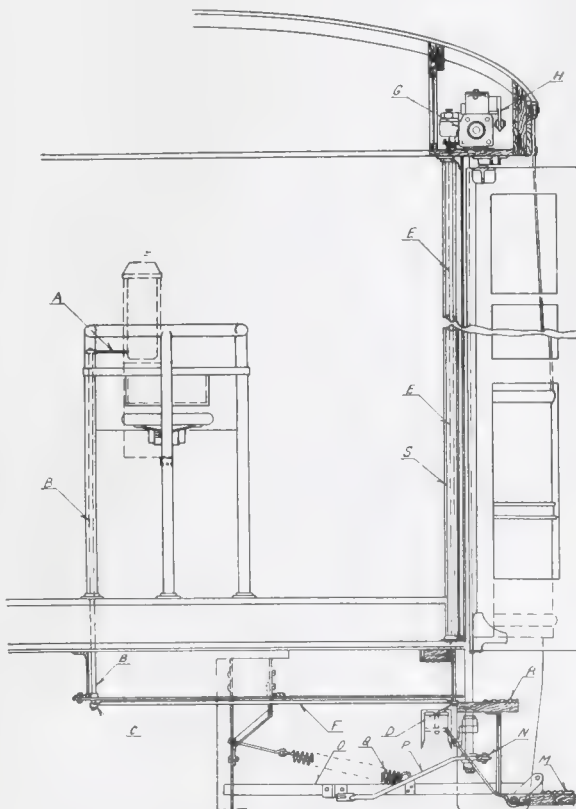


FIG. 3. END ELEVATION OF OPERATING MECHANISM.

The step M is simultaneously controlled with the action of the doors by means of underfloor connections. Secured to the lower end of the front door shaft is the lever N that operates the step rod O by means of the connecting rod P, this being freely supported in suitable framing. The spring Q is to assist in keeping the step up when the doors are closed, and when in this position the lower step folds up and under the top step R.

Safety Features

Several safety features are incorporated in the design of these doors that aid in eliminating possible injury to passengers. With anyone standing on the lower step it is impossible to close the folding doors, and when passengers are upon the vestibule floor the movement

Stopping the machine at quitting time—any old way to get it shut off—is disastrous to tools. The reasons are many:—a drill may be half way in a hole and when the machine is again started the supply of lubricant does not start instantly, perhaps not until the drill has reached its depth which it has to do dry; the same is true of the cut off tool whose edges may be ruined by cutting just that 1/16 in. before the flood is on. The best way is to watch and shut off the machine just as the cut off tool has severed a piece—then during the idle movements following, the lubricant has ample time to flood the work before a tool comes in contact with the bar.

Whenever it can be arranged, it is better to use a centering tool before starting a drill. With small drills, it is

to feed a little farther or is made with the inside bevelled or rounded, there will be a corresponding part turned on the bar each time before it is fed. This "breaking down" of the blunt, square end saves the tool from the sudden heavy cut and prolongs its life.

As far as possible, set up the tools by measurements and "shadow" movements before putting in the bar. This saves many a broken tool and drill.

Setting the chuck too tight only strains the machine. If the bar slips under normal cuts, look for trouble (poorly ground or dull tools, chips clogging, a loosened screw, etc.) elsewhere before setting the chuck any tight. Because it strains all the parts concerned, a too tight setting is worse than none and is a source of future trouble. Because the bar is cold drawn, it does not follow that it is perfect in size—it is not unusual to run across bars in the same shipment that vary .005 inch.

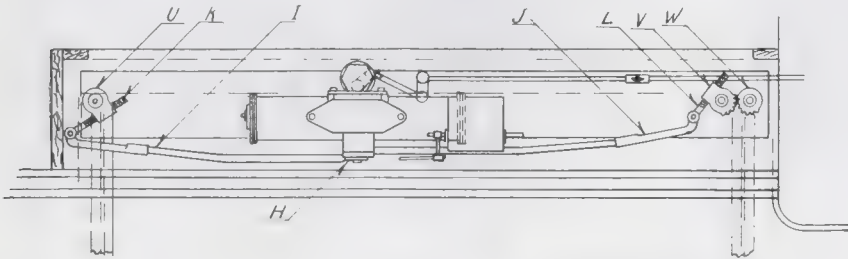


FIG. 4. PLAN OF DOOR OPERATING MECHANISM.

of the closing doors does not interfere with the convenience of the passengers. An interesting feature in connection with these doors is the arrangement of hollow rubber cushions on the contact edges of the two folding doors. These are so designed that should anyone outside inadvertently take hold of the central stanchion S—which is located about four inches inside and directly opposite the center of the closed doors—when the doors are closing, no injury will result, as the doors can be entirely closed and yet allow the hand to be withdrawn with a little effort. This method of contact has the additional advantage of providing a perfectly weather-tight joint. In conjunction with the operation of the doors there is an electric signal system that tells the motorman at the front end when the doors are closed. When the doors are just about closed contact is made that lights a small lamp contained in a perforated case located directly in front of the motorman, so that he can tell, without removing his eyes from the street in front, when the rear is clear. This light remains lit all the time the rear doors are closed.



SOME SCREW MACHINE POINTERS

By D. A. Hampson

MAKE sure that the cut off tool is not narrower at the point than it is further back. If the point, or end, is narrower the tool will not cut freely but will crowd and bind, making a rough cut and breaking the pieces off. A tool that is dull acts the same way for the corners are the first to dull and after that the actual cutting edge is narrower by just so much.

well nigh impossible to do good work unless a centre is put in first. An advantage of the centering tool in any case is, that the cut off tool does not have to be so perfectly set as without it, for the centre removes a burr or tit that may have been left.

Drill holders of the "floating" variety are a great help. They take care of misalignments of the machine and save drill breakage. Floating holders for reamers are an essential if straight holes are to be produced.

Don't try to drill holes too deep. A depth of three times the drill diameter is about the limit for ordinary, everyday work that is "pushed." If the limits will allow it, grind the drill so it cuts larger than itself and if it can be arranged on the turret, divide the hole into sections and use two or more drills, the second a few thousandths smaller than the first.

The best steel is the cheapest; even if the speed isn't great enough to warrant high speed steel, the latter will wear much longer between grindings and effect a saving that way. If the time it takes to grind and set a tool is noted and the number of times it is done each week is noted also, there will be no doubt as to what kind of steel will be used.

Half a minute sighting over a bar to see if it is bent will save half an hour looking for trouble with the feed.

When a box tool is used on a heavy cut, the cutter itself can be made to stand up much longer if it is fed against a bevelled end rather than a square end on starting the cut for each new piece. Normally the tools leave a square end on the bar after each piece is made but if the cut off tool or the box tool or the forming tool as the case may be is made

THE TEXTILE MILLS OF BRAZIL

By F. J.

THERE are parts of Brazil which may some day become the Lancashire of South America, so far as manufacturing enterprise and development are concerned, for some of the mills in the vicinity of Rio de Janeiro and S. Paulo are amongst the most finely equipped for spinning and weaving cotton. From many of these places and others many textile workers, who had gone out there from Lancashire, had to return home on the outbreak of war, and up to that time cotton spinning and weaving had made good progress. Of course, with the outbreak of war, all calculations as to the money market were upset and work on mills then in course of construction had to be abandoned. During the past twelve months, however, there has been a better trade in the Brazilian markets, though the Lancashire manufacturers do not yet understand that they must fulfil the requirements of the customer. Nearly all the spinning and weaving rooms in the Brazilian textile mills are laid out on an elaborate plan and furnished with Oldham, Manchester and Bolton machinery, and in regard to the manner in which the machinery has been planned, particularly as to the space allowed between each machine, there are few mills in Lancashire to compare with them. Attached to the factories are houses and schools for the families of the workpeople, laid out, in some cases, on a model plan. This is especially the case in regard to the mills of Penedo, in the State of Alagoas, the Bangu mills and the concerns of the Confianca Industrial Company at Rio de Janeiro. In most of the developed States of Brazil the spinning and weaving of cotton already form the principal industry and the greater part of the machinery has been supplied from the Lancashire textile firms.



The man who is well paid for working twelve hours a day is better off than the one who is poorly paid and works eight.

EDITORIAL CORRESPONDENCE

Embracing the Further Discussion of Previously Published Articles, Inquiries for General Information, Observations and Suggestions—Your Co-operation is Invited

UTILIZATION OF OIL POWER

By L. E.

IN certain quarters the subject of oil fuel is receiving a good deal of attention, and it seems probable that after the war oil will be more largely used for power purposes than has hitherto been the case. Oil fuel, liquid oil fuel and fuel oil are interchangeable terms for the same product, and the term "crude oil" in this connection is a misnomer, as the latter contains a number of fractions such as petrols and paraffins, which can be used for power purposes after they are extracted by distillation from the crude oil before it becomes fuel oil. Generally speaking, the term "oil fuel" is applied to the heavy dark-colored oil which remains after certain of the lighter fractions are removed.

A comparison between the best steam coal and the highest grade oil at pre-war prices shows a decided balance in favor of the latter in equal heat-raising quantities. Not only is oil superior in this respect, but it is far more portable, weighs less, and occupies less space than coal for equal heating values. It is decidedly more convenient in every way for ship use, as it can be more easily stored both on the wharf and on board. Less time and labor are required in transshipping, and its use sets free for other duties a number of men who, under a continuance of the present system of firing, would be employed in the stokehold. For both industrial and general purposes also the use of oil power is likely to become increasingly popular, as the oil engine using ordinary grades of paraffin has demonstrated its value in a number of situations and for a variety of uses. More particularly is this the case in country districts, where the great majority of private electric light installations are driven by oil engines, and pumping, sawing, chaff-cutting and similar operations are almost invariably carried out by means of oil power. Even in towns where coal gas is available at a low cost and coal can be obtained cheaply and in plentiful quantities the oil engine has gained a firm footing, and to the engineer it is evident that the use of oil for power purposes will show a steady increase in the future.

Effects on Coal Consumption

Whilst this will have a considerable effect on coal for steam-raising purposes, it will have little or no effect on the amount of coal used in the country; the only difference will be that more coal will be subjected to destructive distillation than has formerly been the case. For some years to come it is probable that the after-effects of the war will militate against the importation of mineral oils, and many of the products of coal distillation, amongst which may be particularly

mentioned the benzoles, will take their place. The distillation of shale oil will also be developed to a considerable extent. Shale oil has been extracted in Scotland for over half a century, but at the moment the Scotch supply is of relatively little importance. When mineral oils are heated in a retort the highly inflammable vapors, as petrol, benzoline, or naphtha are first driven off, followed in order by illuminating oils, intermediate and lubricating oils, leaving petroleum refuse, technically known as astaki. All those products can be used for the economical production of power, but they must, of course, be used in differing ways.

Methods of Using Oil

It is not generally known, except in engineering circles, that there are four separate and distinct methods by which power can be obtained from oil. The first and most common is that in which the more volatile constituents, as petrol, or gasoline, are made use of as in the ordinary motor car, launch or aeroplane. Engines worked with these light oils require a carburetter, in which air is mixed with the vapor in order to form an explosive mixture. In the second method, ordinary illuminating oil is used, the oil being vaporized by means of heat, mixed with a due proportion of air, and exploded behind a piston. In the Diesel modification of this, heavy oils are used, and are compressed with air to so great a pressure that the heat generated by the compression explodes the mixture and drives the piston. There is a great future for engines of this type on account of the great power they develop, the simplicity of their action and the comparative cheapness of the fuel they require. The third method, which is seldom adopted in Great Britain, is that in which the petroleum is distilled in a separate retort until it is given off in the form of a rich gas. This can be used for illuminating purposes, but in power work it is mixed with a large proportion of air and introduced into the cylinder of an internal combustion engine designed for use with gas, and not oil or petrol. The fourth method combines the cheapness of oil with the flexibility of coal firing. The mineral oil is used in the form of fuel, and burned under a boiler in order to produce steam. In this, the heavier and more common oils give the best results. The oil is blown, usually by means of steam, on to a bed of burning embers, consisting generally of cinders and chalk, when it is ignited and burns with great heat. A system used on certain railways makes use of the refuse from shale distilleries, green oil, tar from oil gas, creosote, and other heavy fuels. This method has proved reliable in practice, and has been widely adopted in marine

work and will no doubt come extensively into use in the future.



ACCIDENT PREVENTION

By C. T.

THAT the importance of "Safety First" is recognized is shown by the fact that its progress is being watched and its principle observed by the majority of large manufacturing concerns. It is interesting to note the close relationship which exists between it and operating expenses. In one British public utility company employing 2,000 hands, during the period beginning January 1st, 1913, and ending December 31st, 1915, the time lost by employees on account of injuries received whilst attending to their various duties, amounted to no less than 22 1/3 years. As the average salary of the men injured was \$75 per month, the company paid out during that period over \$20,000 in salaries, for which it received no return in work. At the end of 1915 the company extended its business and increased its pay-roll, and it would naturally be thought as the number of workpeople increased the number of accidents would rise proportionately, but at that date the attention of the concern was directed to the "Safety First" movement, and an accident prevention campaign inaugurated. The immediate result was a great decrease in the number of workers receiving injuries, and at the end of the year the firm found out that they had paid out \$5,000 less than during the preceding twelve months for accident pay. This shows plainly enough that the results of the care taken were quite sufficient to justify a continuance of the new policy from a financial standpoint alone.

Co-operation Pays

There is no need to mention the relationship existing between output and accident prevention. The wasteful effect of substituting a comparatively unskilled workman for one who has been injured will be apparent; and, further, if the experienced worker has been injured the chances are that the unskilled man will be still more liable to injury. If safeguards are provided and the workman knows that the guard offers him complete protection, his speed naturally increases, and with increased speed comes an increase in output.

The good feeling which is developed between employer, employee, and the public where the "Safety First" principles are observed is an important item. A good deal of "industrial unrest" has been attributed to a failure on the part of the firm to study the safety of their employees sufficiently. A plant which runs along smoothly, with everyone

working in perfect harmony, is not only one of the aims of safety work, but also one of the essential factors in ensuring the proper results. Accident prevention work certainly pays, because it cuts down the operating costs, increases the output of the plant and saves needless expense and suffering to workmen and their families, and develops a spirit of good-will between the parties concerned, which has a great financial value to the employing firms.



UNIQUE HIGH TEMPERATURE ALLOYS

By Mark Meredith.

THERE are two metals worth attention in most places where there are facilities for making and casting them—one being what is called "Mitis" iron, which, if properly made, is a homogeneous form of wrought iron which, without annealing, can be bent or forged either hot or cold, and very well takes the place of mild steel—it can be case-hardened—and the other is a form of bronze containing anywhere up to 60 per cent. of iron, but probably most usefully about 20 per cent, and which can be rolled and otherwise worked whilst it is practically in-errodible. Both of these to be successful must be made from carbon free iron, and both must be quickly melted in closed crucibles to prevent absorption of carbon in a gaseous state so far as possible; the successful results in each case being conditional upon the absence of carbon, phosphorus and sulphur. Only the best Swedish iron can be used in the work, and in the case of the iron only a small proportion of scrap arising from the casting processes can be utilized a second time, for which reason there must be an outlet for the scrap metal for cupola use. The bronze can, of course, be remelted if properly made with as pure commercial metals as are obtainable.

Relative Costs

In the case of the iron castings, there is little or no saving in cost over ordinary annealed malleable castings, whilst it is possible that even a higher cost may occur, the chief advantage being that time is saved, the castings being ready as soon as made; this not being the case with the ordinary annealed malleable iron castings, which often take a month or more for delivery. With the bronze the metal can be produced for 13c per pound or less, ready for pouring into the moulds, whilst machined castings are practically in-errodible when exposed to the air. There is nothing to prevent these things being made anywhere so long as the appliances are in existence, but this is just where the trouble comes in.

In making iron castings the iron should be melted in, roughly, 75-lb. lots (net), and it should be fluid in about 2 to 2½ hours; the crucibles are then opened and aluminum up to 0.5 per cent. added in the form of ferro-aluminum with an Al content of from 8 to 10 per cent., the actual amount being determined in the laboratory according to the iron used.

The melting point of the iron will be somewhere between 1,500 deg. and 1,600 deg. Cent., or from 2,700 deg. to 2,900 deg. Fah., and it takes about 160 lbs. of really good furnace coke to melt each 100 lbs. of iron in a good furnace.

In making the bronze, the iron has to be melted as for the iron castings, and to this is added the copper at a red heat and with a melting point of about 1,050 deg. Cent., or 1,925 deg. Fah.; this being followed by the tin or zinc, both of which melt at a low temperature, and if added in as hot a state as possible, by the reactions caused, no additional heat is necessary. The alloy when made melts somewhere between 1,050 deg. and 1,200 deg. Cent., according to content, or, say, from 1,900 deg. to 2,100 deg. Fah., which is about the range for cast iron.

Crucible Consumption

As there must be the greatest freedom from carbon possible, clay or other crucibles free from carbon must be used, and, as such crucibles can rarely be used again after being cooled down, as many successive melts as possible must be secured for the sake of economy, this meaning that in practice either single or multiple pot furnaces must be provided with forced draught to ensure that the carbon of the fuel is reduced to the highest state of combustion—carbonic acid—and it also means that the heat must as far as possible be held in the furnaces and not sent up the flues. Of course, crucibles for this kind of work are stood on stands to keep them steady and in position, this assisting in the arrangement of the blast, and as this should not, as a rule, exceed 3 in. on the water gauge, there should not be excessive fusing of the walls of the furnaces, provided dry, or possibly preheated air is sent in.

To secure high rates of combustion large volumes of air at just sufficient pressure to cause it to penetrate to all parts of the fuel should be carefully arranged, while it is also desirable that the fuel should be broken to a moderate size to expose as much surface as possible. The physical structure of the coke has much to do with both the volume and pressure of the air used, and can only be determined by actual trial at the furnaces being operated.

Various forms of furnace can be used, but in every case the object aimed at should be that of concentrating the heat on the crucible or crucibles, which the particular form of furnace is made to contain, the mere burning of fuel not always being equivalent to heating power. There are many furnaces working well in various places for both single crucibles and for three and four crucibles in each fire, for which reason there should not be much difficulty in selecting a suitable form. Only the best workmanship in erecting and the best material will stand the intense heat for any time, which in general practice confines the choice very largely to fireclay bricks, which in the best forms will stand up to approximately 1,700 deg. Cent., and magnesia bricks up to 2,150 deg. Cent., whilst chromite

bricks will stand up to 2,000 deg. Cent. It is really advisable to use the magnesia bricks, irrespective of cost; however, with a well constructed and carefully fired furnace the walls are not the hottest part, and a good fireclay brick will stand very well; but all depends on the bricks, in some cases the method of manufacture not being all that can be desired, quite irrespective of the content of the fireclay.

The tools used in connection with furnace work must be well made and of sufficient strength, particular attention being paid to the lifting tongs, which must fit the crucibles and grip them right round in two or three places, owing to the fact that the crucibles, whether of clay or plumbago, become more or less plastic at high temperatures, although they do not really reach a state of actual fusion. All stirring of metals should be done with fireclay rods or stirrers, and not with iron, as in the usually adopted manner, because carbon must not be introduced in any way, either in a solid or gaseous state. High temperature and freedom from carbon being necessary, it is quite possible that electric furnaces would answer better than fuel furnaces, and investigation in this direction is certainly worth some amount of investigation where facilities exist.



THE MARCH OF PROGRESS

By C. I.

THE development of any particular branch of industry generally divides itself into three separate parts, which are sufficiently well-defined to enable the stages to be marked with exactitude. The first stage is that in which the process of trial and error predominates. The machine or engine produced is the product of experience. Continued observation in working, alteration of detail and rearrangement of elements constitute the methods by which a degree of perfection is obtained. So-called theoretical considerations play no part in this stage of development, the instinct or experience of the designer or operator being the deciding factor in all changes. In the second stage, the whole subject is minutely examined from a purely technical standpoint, and the reasons which underlie the various peculiarities in construction or operations are critically scrutinized so that some rational basis for future work may be arrived at. In this stage of development the product of experience will be found to be developing on wrong lines, and in defiance of certain truths which can be scientifically demonstrated. Or it may be that these truths are ascertained for the first time as a result of these investigations. The third stage of development is that in which the work of the pure scientist is turned to practical account, and in which designs and processes are modified to bring them into agreement with the results of scientific investigation. It is in this third stage that the great competitive race is run, and where firms and individuals who refuse to be guided by the most up-to-date scientific factors must come to grief.

There are many fields of labor in which

the first machines are based on exact scientific facts and where, therefore, there are but two chief stages of development, but on closer investigation it will be found that in the thousand-and-one different branches which constitute one field of labor the three stages of progress are continually taking place. Thus, in the realm of machine tools, the first machine produced was one that would stand up to its work and give fair results in accuracy and quantity of production. Then when high-speed steel forced an investigation of the question of cutting power, and the forces at work during cutting, it was found possible to improve the design of the machines, increase speeds and also production. As the late Professor Nicholson once wrote: "The necessity for any serious application of theory or calculation in the design of machine tools was probably never felt until the universal adoption of high-speed steels, which rendered the reconsideration of the kinematical and dynamical principles governing design a matter of careful and of vital importance. A careful study of machine tool design from the theoretical side can be of substantial assistance to the successful designs. A complete knowledge of the forces operative, and the power required in performing a given piece of work, and of the most economical rates of cutting and feeding, taking into account all the factors which contribute to the total cost, must certainly be obtained and made use of, if the design is to stand absolutely secure in subsequent successful and useful employment."

Steam Generator Developments

In steam generator practice, the use of big flues and slow speeds of gases has been used so long, so as to allow a long period of contact of gas and plate, that it seemed as though this practice must be based on correct scientific facts. Many forms of spiral retarders were devised to increase this time of contact, and gave good results, but probably not for the reasons conceived by the inventors. Most probably for the very opposite reasons which the investigation revealed, namely, that the rate of heat transmission increased with the increase of gas speed, and that what was required was not a large volume of gas having a small surface area of contact with plate and a large control core which transmitted heat to the plate only by radiation, but a large volume of gas broken up into small streams drawn at very high speeds over the metal so as to yield all its heat by convection and do away with a slowly moving film in contact with the plate which acted as a heat insulator. The spiral and other retarders inserted in fire tubes had this effect in part, for they split up the gases and prevented the formation of a central core of gas, giving off heat by radiation only. So far theory has not found much practical application, but prejudice will be broken. The Lancashire type of boilers has advantages, and men are naturally reluctant to alter such an old friend; similarly in other fields. In agriculture, the farmer's idea

of the action of his manure has been critically examined and found to be less promising than the new theories based on the action of nitrifying bacteria, with the result that new products, such as bacterized peat, are finding their way into service. So in all branches, including sewage treatment and water filtration, steam turbine engineering and air pump construction, the results of the second stage of the march of progress are always being brought forward for attention.

The necessity, therefore, for a thorough grounding in the theoretical side of the subject of one's life work, and the great value of a technical scientific training for the evolution of new inventions of merit, is one of the facts that these present days of the world's history are making increasingly evident.



PREPARING HEATING BOILERS FOR SERVICE

AS the winter season approaches, householders and other owners of heating boilers begin to make plans for placing the boilers in service. Persons who earnestly desire to obtain the best results from their heating plants, and who give careful thought to securing economy in operation and obtaining maximum length of service from their equipment, — in other words, all thrifty and methodical managers,—will have had their boilers well cared for at the time their operation was discontinued in the spring, so that in restoring them to service there will be little to do except to close up the various openings, supply the necessary water and start the fires.

The precautions that should be observed in laying up boilers, in the spring, were outlined in the Travellers Standard some three years ago. Commenting on the preparation of boilers for service, it says: If these have been faithfully observed the boilers should be in good condition in the fall, both internally and externally; but if they have been neglected, the delay has doubtless affected the heating equipment detrimentally, so that any defects that existed in it have probably grown worse, and deteriorating influences of various kinds have doubtless produced notable results during the period of idleness. In such cases, therefore, it is important to look the heating plant over with special care, to remedy the effects of neglect as far as possible. Some of the advice that is given below is based upon the assumption that the boiler was not properly cared for in the spring, and other parts of it should be heeded, whatever was done at that time. The reader will have no difficulty in distinguishing the parts that apply to his own case.

Before filling the boiler with water, clean every accessible part of it thoroughly, both internally and externally. Take down the smoke-pipe and remove the soot from it, and in the case of tubular or flue boilers thoroughly clean out the tubes or flues. When the smoke-pipe has been replaced, examine the

joints carefully and make sure that they are tight, and give attention also to the supports for the pipe.

An equal amount of care should be exercised in cleaning the external surfaces of the boiler itself. All soot, dust and ashes should be removed from the setting, boiler and grates. See, also, that the brickwork of the setting is in good repair.

Do not forget that the gage-cocks and the connections to the water column may have become filled up. Make sure that they are free, even if it is necessary to remove them from the boiler for the purpose; and in the subsequent operation of the boiler do not rely upon the water glass to implicitly for determining the height of the water, but confirm its indications by the frequent use of the gage-cocks.

Steam Generator Developments

If the water was drawn off in the spring without drying out the boiler afterwards, or if the feed valve has leaked during the summer, small quantities of water may have remained upon the boiler surfaces for a considerable time. In this case corrosion and pitting have doubtless occurred to some extent. All areas affected in this way should receive special attention. If possible, the water should be removed, with a mop or otherwise, and the metal allowed to dry. The plates should then be scraped, or thoroughly cleaned with a stiff wire brush, and it is often well to paint the affected places with red lead and oil, or with some special protective preparation, after the dirt and oxide have been entirely removed. When this has been done, and sufficient time has been allowed for the paint or other protective substances to dry, the boiler should be filled with water and drained off again at least twice; and if the construction will permit, a hose should be used to wash out any sediment that may remain. In filling the boiler leave a vent open somewhere, for the escape of the air it contains. Opening the upper gage-cock suffices for this purpose, if the boiler is to be filled only to the working level; but if it is to be completely filled, the safety-valve should be eased from its seat, or some other opening should be left at or very near the top of the boiler to prevent the trapping of air in the upper part of the boiler.

Whenever it is feasible to do so, the safety-valve should be tested by hydrostatic pressure before the boiler is placed in service, to see that it operates at the pressure for which it is supposed to be set.

Look over the boiler accessories and attachments with special care. Raise the safety-valve from its seat, and if it does not work freely, or if any part of it is in need of repair, see that the trouble is made right before firing up the boiler. The diaphragm of the automatic damper regulator also requires a critical examination. See that it is soft and pliable, and if it is found otherwise, have it removed and replaced by a new one. See, also, that the diaphragm, with its connections and the dampers that it regu-

lates, works smoothly, easily and positively.

The fire should be run very low at the start, to permit the boiler and its contents, and the various other parts of the system, to become heated up gradually. The supply and return valves of the heating system should be opened so that the steam, as soon as it is generated (or the hot water if the system is of the hot-water type), will warm up the pipes gradually. Pounding in the pipes will be averted in this way, and the danger of rupturing the cast-iron fittings by rapid and unequal expansion of the piping will also be diminished. As soon as steam has been raised, the safety-valve should again be lifted, to see that it is free and in good working order. It is also well to run the pressure up to the point at which the safety-valve is supposed to blow, in order to make sure that it will operate properly under regular running conditions.

Skilled Examination Necessary

The boiler owner or attendant who has faithfully complied with the foregoing suggestions, may feel reasonably confident that his boiler is in condition for safe and efficient service, unless the deterioration that it has experienced during the summer season has been very marked. It will probably give no trouble if it is in charge of an experienced and trustworthy attendant, who will see that it is properly supplied with water, and that the safety-valve, damper regulator and other accessories are kept in good working order. It is important, however, to have the boiler examined by a competent inspector, who will look over the entire equipment thoroughly, to make sure, so far as possible, that everything is in good condition, and to test and regulate the safety-valve and the steam-gage. The Travelers Indemnity Company renders service of this kind to its policy-holders, free of charge; and it gives valuable expert advice on all matters relating to boiler management. The counsel that is given in this article will prove helpful in promoting safety and economy, but no article could be written that would make it wise to dispense with the services of an experienced inspector. One might as well dispense with his family physician, after reading a little of the elements of physiology and materia medica.

A considerable number of second-handed heating boilers will doubtless be installed at about this time, and many that are in poor condition, or even positively dangerous, may be accepted by inexperienced persons, upon the representations of unscrupulous or misinformed salesmen. A coat of paint often makes a poor boiler look good to a novice. Here, also, the services of Travelers inspectors are valuable, because their training enables them to detect weaknesses and defects that would easily escape the attention of persons with less experience.

SPELTER AND SULPHUR

IN a paper published in England by the Society of Chemical Industry, H. M. Ridge points out that the main source

of spelter today is zinc blende, which, when pure, contains 67 per cent. zinc and 33 per cent. sulphur, but generally contains also some sulphide of iron and other impurities.

The utilization of the zinc contents of the deposit of argentiferous zinc and lead ore at Broken Hill presented unusual difficulty, because of the presence of garnet and rhodonite of about the same specific gravity as zinc blende. This was first overcome by the use of the Wetherell electro-magnetic separator with an intensely strong magnetic field. The process, however, was too expensive to be able to compete permanently, and was superseded by the modern methods of flotation. To-day the whole of the zinc concentrates at Broken Hill are produced by flotation, but these methods have not, up till now, proved effective for separating fluorspar or carbonates from blende.

The usual method of separating the sulphur from blende is to roast the ore with a sufficiency of air to form zinc oxide and sulphur dioxide. If the sulphur has to be used for technical purposes the fumes must not be contaminated and diluted with fire gases. Constructional difficulties were encountered in the design of furnaces for this purpose. Muffled furnaces have to be used, in which the fire gases do not come into contact with the ore, and the heat units have to be passed through firebrick in order to maintain the heat while the last units of sulphur are being oxidized, and while any sulphates which may have been formed are decomposed.

QUEBEC MINERAL PRODUCTION

THE annual report of the Mines Branch of the Department of Colonization, Mines and Fisheries of the Province of Quebec has just been issued. It covers the calendar year ending December 31, 1916.

This report, which is addressed to the Honourable Honore Mercier, the head of the Department, shows that the mining industry of the Province is in a healthy condition. The mineral production for the year in question amounted to a value of \$13,287,024, which is the highest ever recorded, being an increase of nearly \$200,000 over the previous banner year, 1913.

These results are all the more gratifying if we consider that the increase is wholly attributable to the products of the mines proper, such as asbestos, copper, cromite, magnestite, molvdenite, zinc, and lead, whereas the building materials, as stone, brick, lime cement, show decreases. Yet the total shows a marked advance as compared with previous years.

Besides the technical review of the mining operations the report goes fully into the statistics of accidents in mines, and the measures to be taken to prevent them. There has been a shortage of labor in the mines of the province which has been keenly felt and which has re-

sulted in a very notable raise of the average wages.

The report also gives a full account of the results of an investigation of the mineral resources along the line of the Transcontinental Railway, between Hervey Junction and Doucet. The volume is carefully edited and well illustrated, and will be much appreciated by the interested public.

GOLD PRODUCTION IN CANADA

COMPARATIVE figures of the world's production of gold in 1916 shows that Canada improved her position slightly as compared with other countries. In 1914 Canada came seventh in the list with a contribution of \$15,925,044, or 3.4 per cent. of the total output of all countries for the year; in 1915 the figures rose to \$18,977,901, which represents 3.9 per cent. of the total and placed Canada in fifth place. That place was retained in 1916, with a total of \$19,162,025 and the percentage to the grand total up to 4.8 per cent.

Although every effort was made to speed up the production of a metal for which the demand was greater than ever, the world output of a new gold in 1916 at \$470,442,068 fell short of that of 1915 by \$8,110,154; the total, however, was \$10,344,640, or 2.2 per cent., higher than that of 1914. The largest output came from the Transvaal where \$192,138,000 was the value of the production in 1916.

BRITISH IRON AND STEEL TRADE

IMPORTS of iron ore and scrap into Great Britain for the five months ending May 31 were valued at £10,312,752 in 1916, and £11,005,800 in 1917; an increase of £1,206,952. The quantities of iron ore are not stated.

Imports and exports of iron and steel and manufactures thereof for the five months ending May 31 are valued by the Board of Trade returns as follows:—

	Imports	
	1916.	1917.
Iron and steel ...	£4,247,437	£3,324,501
Machinery	3,524,679	3,281,961
Hardware, etc. ...	315,947	136,783
Total	£8,088,063	£6,742,245
	Exports	
	1916.	1917.
Iron and steel ..	£23,826,285	£19,574,960
Machinery	5,850,868	7,009,394
Hardware, etc. .	3,269,802	2,959,061
New ships	299,043	504,002
Total	£33,245,816	£30,047,517

In mighty wrath the sergeant came into the midst of the new batch of recruits and fixed his eagle eye on one who evidently was so self-conscious that he simply hated to wash.

"Hi, you!" roared the fierce person, "have you taken a bath?"

Mild indignation was in the soldier's voice as he answered:

"No; is there one missing!"

WAR-TIME INFLUENCE ON SHOP DEVELOPMENT

DURING some ten years past changes have been apparent in the design and lay-out of engineers' workshop buildings. The contrast is most marked in passing from a shop that has been recently built and excellently arranged into one that is a legacy from an earlier period. The object-lesson is one of strongly accentuated opposites, which on examination reveal much more than merely superficial differences.

The old shops grew in a kind of haphazard fashion as business increased and additional capital became available; and even when a works had been planned on generous lines, and when capital was ample, several matters which are now regarded as being of first-class importance were either ignored or but indifferently dealt with, such as the orderly lay-out of shops that are intimately related, and of allied departments, with the object of forwarding and facilitating to the utmost the operations and the output of the entire works. Though each separate shop is an independent and self-contained unit, and its operations are unlike those of any others, yet all are linked by sequence of production in interchanges and supplies. The foundry and the pattern shop are intimately related. The smithy and the boiler and plating shops have much in common. The machine shops and the turnery include several distinct departments of major and minor dimensions, with satellite sections, tool rooms, storage areas, heavy and light tools, sections devoted to special products, and various services for hoisting and transport. Seldom are two great engineering works duplicated. Often, in fact, at extremes they may have but few features in common. Each separate design therefore has to be considered in all its myriad details, and worked out as an individual problem. Further, the possible as well as the probable requirements of the future have to be remembered when planning those of the immediate present, and this an aspect of the matter which was pretty much neglected when the older shops were being laid out. With hardly any exceptions the earlier works were placed in the poorest parts of densely crowded cities where labor was abundant. The new ones are now generally built in suburbs, or out in the open country where ample spaces provide for future expansion.

Works differ from one another in magnitude. The big, self-contained factory is that which includes every department necessary to the carrying through of a manufacture from the receipt of the raw materials. When possible the various buildings should be laid out in parallel lines, and all be in intercommunication with railway lines of standard or industrial gauge, flanking all the shops at ends or sides, and connected directly with each. The best arrangement is a track of standard gauge disposed outside, and with turntables just without the shop doors to

serve industrial tracks of 18in. or 24in. gauge inside the shops. Loading, unloading, and transit are thus provided for, and direct connexion maintained with a railway siding. With such ample means of intercommunication secured, the precise position of the individual shops is of less importance than it would be in the absence of the extramural encircling tracks.

Handicapping of Old Shops

Few old firms who have outgrown their shells are so fortunately situated as to be able to abandon an extensive factory, the growth of perhaps a couple of generations, in the heart of a densely populated town, to build anew in the suburbs or miles away out in the country. The chance of effecting a sale of the old buildings is remote, since they are usually constructed solidly of brick or stone, and with glazed sashes they are not easily dismantled. Even if this were not the case, prudential considerations would not justify their re-erectations. Again, most of the old buildings have galleries, or upper storeys and floors, which are not held in favor for new shops. Heavy machines are erected on deep foundations, and though the machines can be transported to new quarters, little can be salvaged from foundations.

Many firms when confronted with straightened surroundings have elected to retain the old works and build a new factory out in the open, surrounding the new shops with cottages for their work-people, and thus creating an ideal garden city. It is most desirable that suitable means of intercommunication should exist in the shape of a railway siding or a canal. Failing these, if road transit must be employed, then only the lighter groups of works should be produced in the old shops, the heavier being reserved for the new.

Problems of New Shops

One of the problems which confront a firm when laying out a new works is that of uncertainty respecting the nature of the manufactures of a future period, and, again, of the methods of production. Herein occurs a sharp contrast between the ruling conditions of the present and the past. When firms were engaged in general engineering, as nearly all the old ones were, when interchangeable and gauging methods and speciality-manufacturing were not anticipated, when the old irregular congeries of isolated shops and handicraft methods predominated, little regard was had to the character and systematization of the buildings and of the operations performed in them. Many shops were mere sheds, or floors in old dwelling-houses. These were strengthened and stiffened, and connected with the old stairs, while a wall crane was installed outside to lift heavy articles to the several floors. Even when new large works were built the relative location of the departments was settled with little regard to the future, or to their means of intercommunication. Little attention was also paid

to the internal dispositions and arrangements of the separate shops, for when there was no speciality in manufacture the reputation of firms for high-class work defied keen competition, and production progressed in a more leisurely fashion than it does in the changed conditions of the present day.

Single Floor Buildings

The impossibility of retaining the old shops and the obsolete methods in face of present-day conditions has resulted, first, in the general migration from town to country, and, second, in the employment of the ground floor design of building instead of storied shops of several floors—the mill building style. The latter are still constructed when products are of a uniformly light character, but unless space is restricted, the single-floor type is given the preference. The benefits are of a dual character. The design is favorable to the operations of the present, and will facilitate probable extensions in the future. The single ground-floor shop has the advantage of being in direct communication with the outside yard, and through it with the other departments of the factory. The transport and the hoisting services are of the simplest character, comprising rail tracks, hand trucks, walking cranes, overhead travelling cranes, overhead rail tracks carrying suspended hoists or travelling trolleys, and swinging jib cranes for serving the heavier machines and certain areas. It is neither easy nor necessary to attempt to allocate the premier place to any one of the beneficial results that follow from the adoption of the single ground-floor design; they include height, the clear, unobstructed area which is secured when shops are ranged side by side, the improved light and ventilation, and the ease with which longitudinal or lateral extensions can be made.

The ample height which is available in ground floor buildings affords several advantages which are not obtainable in storied shops. It permits of the employment of heavy overhead travelling cranes and of the ready handling of massive articles. Even if these advantages should not be desired, height favors natural ventilation, with large volumes of diffused air supplied with little draught—conditions which are of the first importance in foundries and smithies, and of hardly less value in the machine and erecting shops. It is also favorable to the installation of systems of artificial ventilation and heating.

Clear, unobstructed area, obtained when shops are ranged side by side, is a strong recommendation. It may be regarded from different aspects. The entire area is enclosed by four outer walls only, leaving the divisions into parallel separate shops to be made by the iron or steel columns spaced at suitable intervals to carry the roofs. These columns sustain crane gantries when such are required. To them are attached some kinds of machine tools, as radial drills and swinging jib cranes. They obstruct scarcely any of the light

that comes through windows in the outer walls, though light from that source is deemed of little or no importance now, since skylights in the roof usually supply the total volume that is required. Managers and foremen have an unobstructed view across the series of shops, and floor-tracks provide a through communication between all the areas. The economy of wall material is great when three, four, or half a dozen bays are ranged in parallel. Partition walls not only entail useless expense, but interference with freedom of movement, with illumination, and with general supervision. They do not support the roofs any more efficiently than do columns, nor are they so convenient for the carrying of crane gentries, machine-tools, wall cranes, or shafting bearings. Even the outer walls are frequently not utilized for these purposes, but columns are employed there, identical with those that separate the bays, and the walls are merely curtains which keep out the weather.

The parallel arrangement of shops in this design is another advantage. No hole-and-corner shops are permitted in a new works. Parallelism is imperative unless the outlines of the ground area available prevent its absolute realization. But even then the rectangle is available, and the main shops may have smaller buildings or sub-departments arranged at right angles, connected with tracks and turntables or with curved rails of large radius.

It is not necessary in parallel shops to have the separate areas roofed at the same height, or even in the same style. They are often uniform, but as frequently the heights of the spans are varied in harmony with the kind of work done, with economy in materials. A tall, central, wide bay may be flanked with lower and narrower ones, these dealing with the work that was done in the galleries that were commonly ranged round the shops of the transition period.

The ease with which extensions can be effected longitudinally or laterally recommends the adoption of the ground-floor shop built in parallel bays. Existing bays can be extended, and new ones built adjacent. The sections of the constructive elements being standardized, repetition is easy of accomplishment. Each space from column to column is a unit of construction, which can be multiplied as often as required. Columns, gentries, roofs, glass, tracks, floors, etc., can be repeated, and the cost estimated very closely.

Steel-Framed Structures

The present is the era of steel-framed buildings. The columns which take the loads of roofs and cranes were, when these loads were not imposed on walls, made of cast iron, of cylindrical or of H section, provided with brackets cast on or united with bolts for the support of crane gentries and the attachment of swing cranes, machine tools, and bearings for shafts and counter-shafts. These have been replaced by rolled steel sections used singly, or multiplied in parallel, or lattice braced. They are

built up in two or more sections, those above the crane runways being of smaller sectional dimensions than those below. They are tied across the shop by the roof principals, and longitudinally by girders which are frequently utilized to carry the shafting bearings.

Since all the load of roofs, cranes, and shafting is carried by columns, their design and spacing have to be determined in relation to the needs of each individual shop. But this need not involve extensive calculations, because a large volume of reliable data is now available in the hands of those who have made a speciality of workshop construction. The work has been standardized for various spans, heights, loads, and forms of roof. When a firm has settled the lay-out of new shops, and their approximate dimensions, it is better to obtain estimates from those who specialize in factory buildings than itself to undertake the calculations and the construction. In the United States, firms have gone to wide limits in work of this character, offerings a selection of several alternative designs to suit all conceivable requirements. This circumstance explains the rapidity with which new buildings are run up.

Roofs are of two kinds—the ridge design and the saw tooth. The first named is usual, though the second is frequently adopted. The direct glare of sunshine is not very persistent in England. Continuous skylights on both slopes of a ridge roof afford ample illumination without supplementary windows in walls. Sometimes the north slope alone is glazed. The roof is generally surmounted with a louvre, in order to afford natural ventilation. If an artificial system of ventilation and heating is installed, the louvre can be omitted. A leaky roof is an intolerable nuisance in a shop. The common practice has been to lay the slates on laths, fastening them with copper nails, or to employ tiles hitched on the laths. Both make good roof coverings, provided they are laid carefully. The soundest roof appears to be constructed of asphalt felt, laid on boards which are tongued and nailed on the rafters. The felt is laid in mastic, and the edges overlap. One thickness will suffice, but two are better. It is protected by giving it a coat of varnish at intervals of a few years. Another alternative is found in the patent asbestos slates which are made in squares, and laid with lapping joints.

Corrugated iron sheet is used more extensively than its rather flimsy character would seem to justify. The explanation is that results depend on the care exercised in its use. If it is painted within and without, it will endure for many years. The extremes of heat and cold can be modified by covering the rafters with match-boarding, grooved and tongued, and interposing a thickness of felt between that and the corrugated sheet; or, better still, by leaving an air space between. An advantage of this roof is that it is not liable to accidental fracture, as are slates and tiles.

In the older roofs the glazing was distributed in small sashes, alternating with opaque roof coverings, and the larger portion of the light was obtained from the windows in the walls. The results were much glare of direct sunlight, cross lights and shadows, and leaking roofs, resulting from the use of small sashes glazed with putty. The practice now is to occupy at least one-half the roof area with glass, which is continuous as far as it extends. Puttied glass is scarcely employed. There are several patented glazings which combine the features of a water-tight joint, and of wire woven into the centre of the glass to prevent fragments from falling should the glass become fractured.

The artificial lighting of shops has been passing into the hands of experts. The basis taken is that of foot-candle intensity, or the intensity of the illumination which is afforded by a light of one standard candle-power thrown on a surface one foot distant from it, and disposed at a right angle with the rays coming from the source of light. The candle-power varies inversely as the square of the distance of the surface illuminated from the source of light, and varies also with the angle which the rays of light make with the perpendicular when they do not come at a right angle with the surface illuminated. The foot candle intensity which is desirable varies from 3.50 to 6.0, measured on a horizontal plane, five being a standard but varying with the light reflected from the surfaces in a shop, from dark to bright. The daylight conditions should be at least three times more than this in winter, and are many times greater in summer time.

Floors

The floors of workshops are subjected to such great wear and tear that several alternatives have been adopted. Earth or cinder floors were formerly not uncommon in the machine shop, and are still employed in the smiths' and boiler shops. In foundries the deep sand forms the floor. But in machine and fitting shops the choice lies between stone, concrete, and wood. Stone flags are common in the older shops, though they are not laid now because they become fractured and settle unevenly. Concrete floors are used, but the material must be employed with discretion. It is suitable on a dry foundation, but not on a wet one. Oil is injurious to it. Coarse concrete forms the basis, with finer for the top layer. Creosoted wood blocks, laid end-grain upwards and bedded in tar, form an excellent floor, being durable and free from dust. In a dry soil the blocks may be laid on a concrete basis. For the lighter floors maple boarding is much used, grooved and tongued, and nailed down to joists bedded in concrete. Boards are liable to become torn up and roughened if heavy articles are thrown about on them, and they absorb oil, but they are nevertheless the most suitable floors for light Machin. fitting, and pattern shops.—

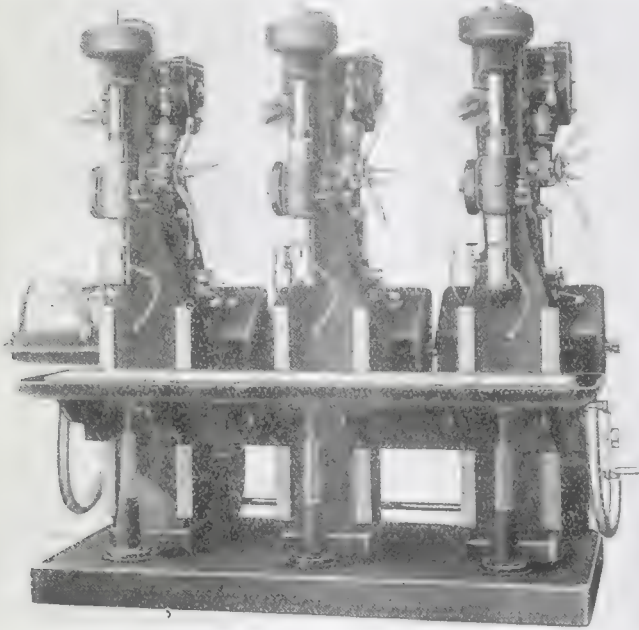
Times Engineering Supplement.

PROGRESS IN NEW EQUIPMENT

A Record of New and Improved Machinery and Accessories for the Machine, Pattern, Boiler and Blacksmith Shops, Planing Mill, Foundry and Power Plant

SELF-OILING ALL GEARED GANG DRILL

THE machine illustrated in the accompanying engraving is a 22 in. gang drill, all geared and self-oiling, which has been placed on the market by the Barnes Drill Co., Rockford, Ill., for use in rapid



22-IN. SELF-OILING ALL-GEARED GANG DRILL.

by levers directly in front of the operator and are indicated in plain figures on an index dial plate, the more important gears being case hardened, and all flooded automatically with oil. A safety overload device prevents unintentional damage.

Automatic reversing mechanism can be provided for tapping, the spindle being reversed automatically when the tap reaches the depth required; the device can also be operated so as to stop the spindle only, in addition to which a small hand trip lever is always ready for instant use if desired to reverse or stop spindle at any point in the operation. When used for drilling work only, crown gearing of 1 to 1 ratio is employed, giving eight spindle speeds from 575 to 58 rev. per min., and with 2 to 1 ratio crown gears, used for tapping, the

speeds are from 280 to 28 rev. per min.

The machine has a capacity of from 1/2 in. to 2 in. high speed drills in steel, with the following principal dimensions: distance, center of spindle to face of column, 11 in.; max. distance table to nose of spindle, 33 1/4 in.; spindle travel, 14 in.; vertical travel of table, 23 in.; floor space, 3 spindle machine, 104 in. by 55 in.; distance, centre to centre of spindles, 28 in.; net weight (3 spindle), 7832 lb.

REFERENCE TABLE RULE

THE Lufkin Rule Co., Saginaw, Mich., have recently added to their line of tools a rule, known as Lufkin, No. 97 which carries on each side a compact reference table of information in constant demand by machinists, tool-makers, and others. It is made of flexible steel, 1 7-32 in. wide by 6 1/4 in. long, one side having the sizes of tap drills for machine screw taps, and the other side, decimal equivalents. The first

column of the tap drill table gives the tap number, such as 3.48, 14.20, etc., followed by the drill size both in gauge number and thousandths of an inch. The third and last column

NO. 97

THE LUFKIN RULE CO.
SAGINAW, MICH., U.S.A.

MAKERS
MECHANICS' SCALES

DECIMAL EQUIVALENTS
COPYRIGHTED 1916

1	.015625
1 64	.03125
32 3	.046875
1 64	.0625
16 5	.078125
3 64	.09375
32 7	.109375
1 64	.125
8 9	.140625
5 64	.15625

11 64	.671875
16 64	.6875
16 45	.703125
23 64	.71875
32 47	.734375
3 64	.75
4 75	.765625
25 64	.78125
32 51	.796875
13 64	.8125
16 53	.828125
27 64	.84375
32 55	.859375
7 64	.875
8 875	.890625
29 64	.90625
32 59	.921875
15 64	.9375
16 61	.953125
31 64	.96875
32 63	.984375
64	.984375

64
16 24 32 40 48 56

TAP DRILLS FOR MACHINE SCREW TAPS

TAP	DRILL SIZE	O.S.D. SIZE
2-48	50.070	44.086
2-56	49.073	44.086
2-64	48.076	44.086
3-40	47.0785	39.0995
3-48	45.082	39.0995
3-56	44.086	39.0995
4-32	43.089	33.113
4-36	42.0935	33.113
4-40	41.096	33.113
5-30	40.098	30.1285
5-32	40.098	30.1285
5-36	38.1015	30.1285
5-40	37.104	30.1285

TAP	DRILL SIZE	O.S.D. SIZE
14-20	13.185	D.246
14-22	11.191	D.246
14-24	9.196	D.246
15-18	10.1935	F.257
15-20	8.199	F.257
15-22	6.204	F.257
15-24	5.2055	F.257
16-16	7.201	I.272
16-18	6.204	I.272
16-20	5.2055	I.272
17-16	6.204	L.290
17-18	2.221	L.290
17-20	2.221	L.290
18-16	2.221	N.302
18-18	1.228	N.302
18-20	B.238	N.302

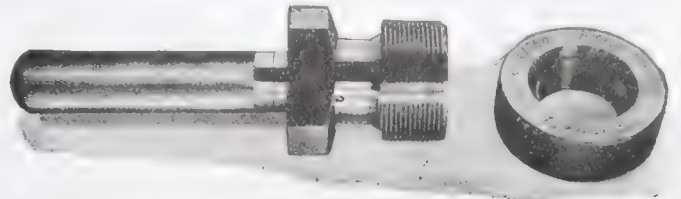
FOR STEEL WORK USE TAP DRILLS ONE OR TWO SIZES LARGER THAN LIST

OBVERSE AND REVERSE SIDES OF LUFKIN RULE SHOWING DECIMAL EQUIVALENTS AND TAP DRILL SIZE TABLE.

contains the O. S. D. or body size, also in gauge numbers and thousandths of an inch. On the reverse side, at the foot of the table across the end of the rule a length of one inch is graduated to 64ths, clear, legible figures cut in the steel, making the rule durable and efficient in use.

THREAD GRINDING ATTACHMENT

THE device shown in the accompanying engraving has been specially designed for the purpose of grinding thread gauges to correct size and shape after hardening. It is known as a thread grinder, and is used on a lathe, being



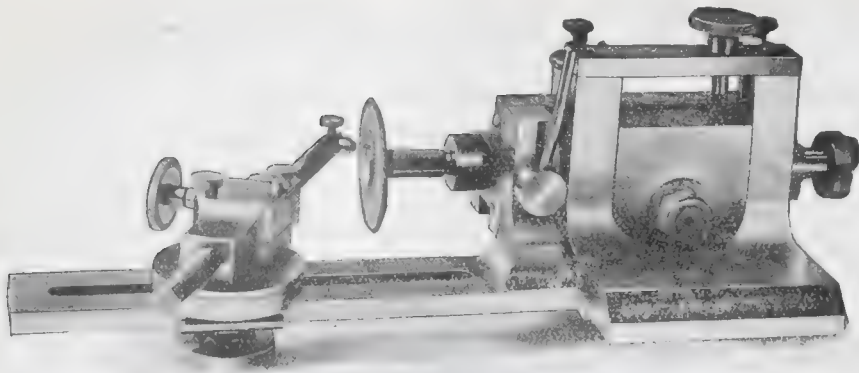
SPECIMENS OF GAUGES HAVING HARDENED THREADS GROUND BY ATTACHMENTS.

production and heavy duty work. It is essentially a manufacturing machine and is excessively strong and rigid in construction. Every bearing, (aside from the spindle sleeve and cross spindles) is self oiled, while eight changes of geared speeds and ten changes of geared feeds are all under instant control of the operator from the front of the machine. Cones and belts are entirely eliminated, the entire motion of the machine being positive in every respect. The safety requirements of all state laws are completely met by the enclosing of all gears.

The self-oiling system is manufactured under licence from Kearney & Trecker Co., and involves the use of a geared pump which delivers the oil to a reservoir from which it is distributed constantly to all gears and bearings, including the crown gears and feed box.

All transmission gears, except the friction clutch gears, but including the crown gear and pinion are cut from a special grade of chrome nickel steel, the parts being heat treated and tempered to prevent wear and provide increased strength and stiffness. Spindle may be stopped by placing shifter lever or neutral position or throwing out clutch lever.

The ten changes of feed are controlled



ATTACHMENT FOR GRINDING EXTERNAL AND INTERNAL THREADS ON GAUGES AFTER HARDENING.

driven from its own countershaft. By its use, any ordinary workman can quickly become proficient in producing satisfactory standard interchangeable gauges in any style of thread, as it obviates the necessity of slow, tedious, uncertain and necessarily expensive lapping to size—thread distortion resulting from hardening is rapidly and efficiently corrected.

The illustration shows the attachment with the diamond truing device in place. The wheel, which runs at a speed of 5,500 rev. per min., is trued to the exact angle by a diamond which is held in a square bar and racked across the face of the wheel by the small handwheel shown. Spring pressure eliminates any lost motion in the racking bar, and the entire dressing attachment is rapidly adjustable to degrees and position.

The driving shaft is independent of main bearing shaft, and thus allows the wheel perfect freedom of operation. The bronze bearing of the spindle is indented with right and left hand, as well as straight oil grooves, equalizing the flow of oil and insuring the spindle running constantly in the lubricant.

Hardened threaded tools, worms, etc., can be brought to exact shape and size, and when used in conjunction with the relieving attachment of a lathe, it is possible to grind relieved threads on taps, hobs, dies, etc. The device weighs 35 lbs., and is the product of the International Equipment Co., Philadelphia.

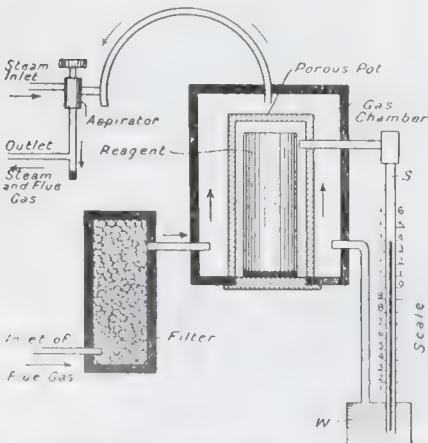
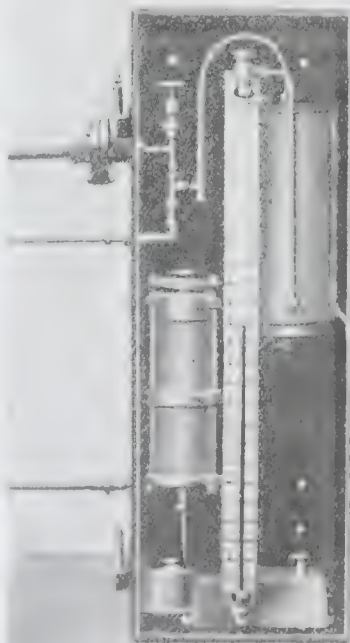


DIAGRAM ILLUSTRATING ACTION OF COMBUSTION INDICATOR.

CONTINUOUS CO. INDICATOR

A NOVEL type of combustion analysis apparatus is illustrated in the accompanying engravings, the principal features being the absence of solutions and moving parts along with simplicity of construction and facility of operation. Referring to the diagram, it will be seen that, after passing through a filter, the flue gas enters a gas chamber in which is mounted a porous pot containing a



CONTINUOUS COMBUSTION INDICATOR WITH VACUUM CONTROLLED COLUMN OF LIQUID AND GRADUATED SCALE.

cartridge of absorbing chemical. The inside space of the gas chamber is connected to the well of a fluid indicator having a graduated scale tube, the upper end of which connects with the space inside of the porous pot.

Passage of the gases through the apparatus is induced by a small steam aspirator, which operates continuously, and as the gases pass over the porous pot at a uniform rate, a constant amount passes into the interior and comes in contact with the absorbent which removes the carbonic acid gas, and thus causes a drop in the gas pressure surrounding the

cartridge. This drop in pressure causes the colored liquid in the well to rise in the graduated tube in corresponding degree, the liquid being maintained at the same height as long as the proportion of CO₂ in the flue gas remains constant.

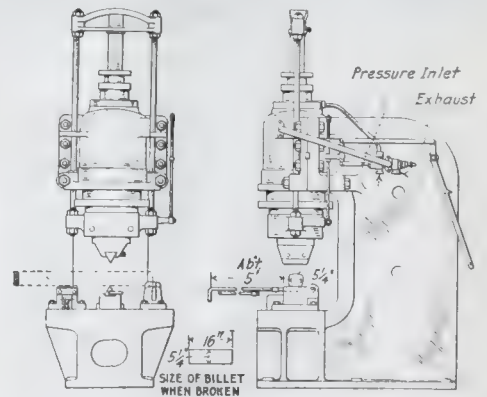
The instrument is read as easily as an ordinary thermometer, and requires no further attention than the renewal of the absorbing chemical, which is done every few days at a weekly cost of about 25 cents. The apparatus is made by Holdsworth & Sons, Ltd., Bradford, Eng., and has an accuracy within one-half of 1 per cent. of the well-known Orsat apparatus.



200-TON HYDRAULIC BILLET BREAKER.

THE machine shown in the accompanying line drawings was designed for breaking steel bars into 16 in. lengths, for use in munitions manufacture. A feature of the design is the provision of triangular section notching blades which nick the blade top and bottom simultaneously and thus avoid the necessity of turning over the billet to nick the bottom side. Their peculiar section enables them to be reset in the dies so as to get the use of three cutting edges.

The bar to be cut is fed over a spring supported roller which carries it clear of the bottom knife so that it can move over to the right hand stop. The upper knife is then forced down by the hydraulic cylinder, the spring supported roller yielding sufficiently to allow the work to be nipped between the two knives. After being thus notched, the



200-TON HYDRAULIC BILLET BREAKER.

lower knife is withdrawn by hand, and renewed pressure by the ram bends the bar down sufficiently far to break it. If the material is more than usually soft, it may be necessary to notch it all around.

The ram operates under a pressure of 1500 lb. per sq. in. and has a diameter of 20 in. with stroke of 12 in. giving a capacity of 38 billets per hour. Power is supplied direct from a three-throw pump 2 1/2 x 6 in., driven by a 25 horsepower motor through double helical gearing. A weight controlled relief valve is fitted on the pump system. The machine is a recent design developed by a Yorkshire engineering firm in England.

OIL CIRCUIT-BREAKER ACCESSORIES

BULLETIN (DS272) recently issued by the Westinghouse Electric & Manufacturing Co., under the title of "Oil Circuit-Breaker Accessories" contains information regarding every combination of tripping and signalling likely to be

ally operated breakers, it is accomplished by an interlocking bar with a suitable bracket.

And there are described and listed: signal switches, inverse-time element attachments; bell-alarm signal-contact attachments; bell-crank accelerating devices; universal mounting brackets for



Proud mother of young Corporal Jones: "You've heard about my boy, of course, Mrs. Evans?"

Mrs. Evans: "No. What is it?"

Mrs. Jones: "Why, just think—they have made a cockerel of him!"

"And how do you find school, Harold?"

Rather difficult, sir. The teachers are inconsistent. In English composition we are told to be original. In arithmetic we are all expected to get the same answer."—Louisville Courier-Journal.

A nervous man at the opera sat behind a pair of those persons who explain the plot until his endurance was exhausted. Then he leaned forward and said:

"Excuse me, will you speak a little louder? Sometimes the music prevents my hearing what you say."

Teddy had been invited out to tea. He wanted to have the afternoon off from school, but his mother would not hear of it. As his bedtime was 7 o'clock he had rather a short visit, and as he was leaving his hostess said cordially:

"I'm so sorry you've been able to stay such a little while, dear."

Teddy remembered his mother's injunctions to be polite on all occasions, and answered, sweetly: "Oh, it's quite long enough, thank you."

"Dear Clara," wrote the young man "pardon me, but I'm getting so forgetful. I proposed to you last night, but really forgot whether you said yes or no."

"Dear Will," she replied by note, "so glad to hear from you. I know I said 'no' to some one last night, but I had forgotten just who it was."

A certain learned Queen's counsel was arguing a commercial case before a learned judge. In doing so, he had occasion to speak repeatedly of an "eccentric," and the judge at length asked him what an eccentric was. The magistrate said he was familiar with the term as applied to individuals, but not to things. The Queen's counsel at once complied. "An eccentric," he said, "is a circular disk whose centre is not in the middle."

"I tell you, gentlemen," said the great explorer to the crowd in the hotel smoking room, who were listening breathlessly, "you can't imagine what things are like out in the Arctic regions!"

"Oh, I don't know!" said one. "Even if we haven't seen it, we can imagine what it feels like!"

"I doubt it. It's impossible until you've seen it; until you've stood there, a small, insignificant atom, surrounded by vast stretches of white—"

"Yes, I know. I've been like that."

"Really? Where was it, may I ask?"

"First time I appeared in public in a dress shirt!"



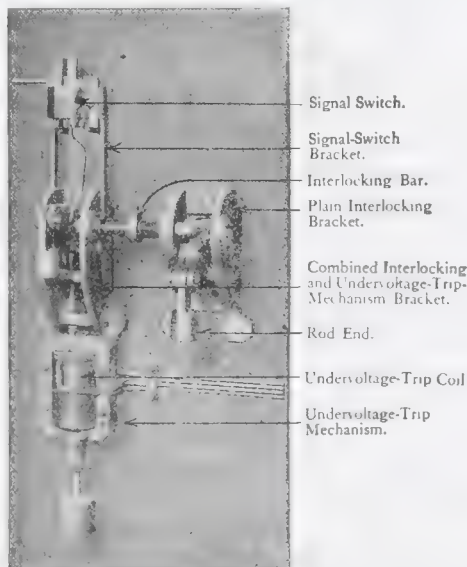
WALL MOUNTING BRACKET SUPPORTING TYPE F-1. PANEL MOUNTING BREAKER. WITH REMOTE CONTROL COMPLETE.

required. Trip-magnet frames and coils are listed for obtaining underload, undervoltage, overload, over-voltage, series and shunt trip; several and, in some cases, all of these can be applied on the same breaker to act with the standard automatic overload trip mechanism.

For controlling the operating circuit of electrically operated breakers, central switches, are listed. These can be connected with signal lamps to indicate the position of the breaker; one style has signal lamps mounted on its cover-plate. And to control the signal lamp circuits, "signal and shunt-trip cutout switches" are shown. These can be so connected as to light the proper lamps to indicate the position of the breaker at all times; they are also used to open the shunt-trip circuit when the breaker opens.

With a double-throw breaker, or with two single-throw breakers connected as a double-throw breaker, it is often desirable to have the throws so connected that with one throw closed it is impossible to close the other, and vice versa. This can be accomplished on electrically-operated breakers by interconnecting the operating circuit through a "signal and shunt-trip cutout" switch; with manu-

mounting breakers, instrument transformers, and other accessories on the rear of the panel or on a separate pipe or angle-iron frame.



REAR OF SINGLE-HAND COVERPLATES OF TWO INTERLOCKED BREAKERS.

- Signal Switch.
- Signal-Switch Bracket.
- Interlocking Bar.
- Plain Interlocking Bracket.
- Combined Interlocking and Undervoltage-Trip Mechanism Bracket.
- Rod End.
- Undervoltage-Trip Coil
- Undervoltage-Trip Mechanism.

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Vol. XVIII. SEPTEMBER 20, 1917 No. 12

QUEBEC BRIDGE COMPLETION—SUCCESS IMMINENT

AS we go to press, the task of placing the centre span of the Quebec Bridge in position has well-nigh been accomplished, and there is ample evidence that, ere our publication reaches its subscribers, complete success will have crowned the effort. Arising out of past misfortunes connected with the undertaking, popular interest the world over has been whetted to a high pitch and, for the time being, the daily war happenings, and the machinations of party politics have, so far as Canada is concerned at least, had to give place. The builders, the St. Lawrence Bridge Co., are to be commended for the dogged perseverance with which they have prosecuted the work, and, notwithstanding the tremendous strain under which those more directly concerned with the development and carrying out of the plans for "sealing the gap" have labored, and more especially during recent days, the reward will be at once commensurate and lasting. The completed structure will rank among the world's great achievements and its creation a brilliant exemplification of Canada's industrial prowess.

SHELL CONTRACTS STILL IN DEMAND

SHELLMAKING in Canada dies hard, judging by the interest taken in the possibilities of further contracts being secured by those who have for months been engaged in the work and who, in recent weeks have found the industry slipping away from them, so to speak, with nothing in sight to replace it. Rumors that orders for shells will continue to be placed in Canada are plentiful, and support is given such a contingency by advices that both Britain and France are negotiating for 6-in. shells in the United States to be delivered in six months. Of course, it has been understood all along, but more specifically since intimation was made a few weeks ago of the curtailment of orders, that 6-in. shell manufacture would continue here on a quantity basis.

It is gratifying to note that a large percentage of our former munitions plants have "shaken" the industry for

good, and are now well organized and furnished with orders along normal and peace-time lines. An instance of the declining volume of shell business and the increase in another direction is to be found in the following extract, from the Canadian Locomotive Co. statement. In June, 1916, the company's munition orders had a value of \$1,200,000, while at the end of the year just closed the value was \$199,600. Locomotive orders had, however, risen to \$3,925,400, against \$2,600,000 a year ago. In the case of this company the adjustment from war to peace activities has been almost completed.

While willing and ready to accept such shell business as continues to offer, it is undoubtedly the part of wisdom that our metal-working plants "dilute," as completely as lies in their power, munitions with peace time lines of product. Many are doing it, but the number should be promptly augmented.



TENDENCY OF FUTURE INDUSTRIAL CONDITIONS

ONE of the chief results of the international co-operation resulting from the war, and one which will have the most lasting results on the welfare of both individuals and nations is the increased interest which employers have been compelled to take in the conditions of employment under which working people spend their lives producing the goods to form the basis of any one nation's trade. In view of the increased participation by this country in the world's commerce and the prospective, nay, the certain requirements in skilled labor necessary to the attainment and maintenance of any prominence in international trade, it devolves upon all responsible bodies and individuals concerned with productive labor, to look closely into the quality of the help on which their future success depends.

In the discussion of such a subject at this time, the question of remuneration can be discounted; numerous anomalies in the matter of equitable payment for services rendered have been, and probably still are in existence, the adoption of unskilled but adaptable help on piece-work and premium systems, and the urgency of many war-time contracts which were chiefly responsible for these conditions in all countries rendering the wages question a negligible factor in international comparisons.

The ultimate and permanent industrial success of any one nation is being decided now; not so much by the production of munitions, ships and other vital needs of the moment, as by the manner in which the great supply of suitable manufacturing help brought to light is being absorbed, trained, and educated with a view to remaining a producer for the present and becoming a skilled worker in the future. Despite the adaptability shown by many adults during the last two years the indisputable fact remains that skilled engineering help must be bred from its youth up and the country, whose manufacturers recognize this fact and act accordingly, will easily and completely outdistance those who continue in the belief that the demand will create the supply.



WHEN you think you have reached the top rung of the ladder, don't forget how to yell for more ladder.

AN OFFICIAL French committee has been appointed to deal with purchases of reconstruction materials. Canada should be able to play a part in this rebuilding program.

WHY the difference? When a man wears good clothes at work his pay is a "salary"; when he wears overalls it is "wages."

INDUSTRIAL NOTABILITIES

WILLIAM S. ATWOOD, assistant to vice-president and managing director, the Canadian Car and Foundry Co., and Canadian Steel Foundries, Montreal, Welland and Fort William, with head office in Transportation Building, Montreal, was born at Conneaut, Ohio, January 19th, 1876 son of Edwin and Marion Atwood.

He received his education in the Public and Correspondence Schools, and



WILLIAM S. ATWOOD.

came to Canada in January, 1902. Previous to joining the staff of the Canadian Car & Foundry and Canadian Steel Foundries, he occupied the positions of draughtsman with the Simplex Railway Appliance Co., Hammond, Ind.; mechanical engineer with same concern at Montreal; and mechanical engineer, the Dominion Car & Foundry Co., Montreal.

Mr. Atwood married Jessie A. Elliott, daughter of A. B. Elliott, April 7, 1897, the family consisting of one daughter. His Clubs are Engineers', and Country; his Societies, the American Society of Mechanical Engineers; Canadian Society of Civil Engineers; K. of P., and I.O.F. His recreations are golf and tennis, and in religious persuasion he is Methodist. The family residence is 225 Metcalfe Avenue, Montreal.

Photo courtesy International Press.

ELECTRIC WELD COIL CHAIN B.B.

1/8 in.	\$15 50
3-16 in.	11 70
1/4 in.	8 40
5-16 in.	7 40
3/8 in.	6 35
7-16 in.	6 35
1/2 in.	6 35
5/8 in.	6 35
3/4 in.	6 35

Prices per 100 lbs.

FILES AND RASPS.

	Per Cent.
Great Western, American	50
Kearney & Foot, Arcade	50
J. Barton Smith, Eagle	50
McClelland, Globe	50
Whitman & Barnes	50
Black Diamond	40
Delta Files	37 1/2
Nicholson	40
P.H. and Imperial	50
Globe	50
Vulcan	50
Disston	50

COAL AND COKE.

Solvay Foundry Coke	\$13 05
Connellsville Foundry Coke	14 00
Steam Lump Coal	7 25
Best Slack	6 50

Net ton f.o.b. Toronto

BOILER TUBES.

Size.	Seamless	Lap-welded
1 in.	\$33 00
1 1/4 in.	36 00
1 1/2 in.	38 00	32 00
1 3/4 in.	38 00	32 00
2 in.	45 00	33 00
2 1/4 in.	48 00	35 00
2 1/2 in.	50 00	38 00
3 in.	58 00	45 00
3 1/4 in.	53 00
3 1/2 in.	70 00	55 00
4 in.	82 00	67 00

Prices per 100 feet, Montreal and Toronto.

OILS AND COMPOUNDS.

Castor oil, per lb.	40
Royalite, per gal., bulk	16
Palatine	19
Machine oil, per gal.	26 1/2

Black oil, per gal.	15
Cylinder oil, Capital	45 1/2
Cylinder oil, Acme	36 1/2
Standard cutting compound, per lb.	0 06
Lard oil, per gal.	2 50
Union thread cutting oil antiseptic	88
Acme cutting oil, antiseptic	37 1/2
Imperial quenching oil	39 1/2
Petroleum fuel oil	12 1/2

BELTING—NO. 1 OAK TANNED.

Extra heavy, single and double	30-5%
Cut leather lacing, No. 1	1 95
Leather in sides	1 75

TAPES.

Chesterman Metallic, 50 ft.	\$2 00
Lufkin Metallic, 603, 50 ft.	2 00
Admiral Steel Tape, 50 ft.	2 75
Admiral Steel Tape, 100 ft.	4 45
Major Jun. Steel Tape, 50 ft.	3 50
Rival Steel Tape, 50 ft.	2 75
Rival Steel Tape, 100 ft.	4 45
Reliable Jun. Steel Tape, 50 ft.	3 50

WASTE.

White	Cents per lb.
XXX Extra	20
Peerless	20
Grand	19
Superior	19
X L C R	18
Atlas	18
X Empire	18
Ideal	17
X press	16

COLORED.

Lion	14 1/2
Standard	13
No. 1	13
Popular	11 1/4
Keen	10 1/2

WOOL PACKING.

Arrow	25
Axle	20
Anvil	15
Anchor	11

WASHED WIPERS.

Select White	12
Mixed colored	10
Dark colored	09

This list subject to trade discount for quantity.

RUBBER BELTING.

Standard	40%
Best grades	20%

ANODES.

Nickel	.50 to .54
Cobalt	1.75 to 2.00
Copper	.44 to .46
Tin	.49 to .56
Zinc	.23 to .25

Prices Per Lb.

COPPER PRODUCTS.

Montreal Toronto	
Bars, 1/2 to 2 in.	55 00 53 00
Copper wire, list plus 10.
Plain sheets, 14 oz., 14x28 in., 14x60 in.	55 00 53 50
Copper sheet, tinned, 14x60, 14 oz.	60 00 54 25
Copper sheet, planished, 14x60 base.	64 00 60 00
Braziers', in sheets, 6x4 base	55 00 52 00

BRASS.

Brass rods, base 1/2 in to 1 in rd.	0 55
Brass sheets, 8 in. wide, 20 oz.	0 60
Brass tubing, seamless.	0 57
Copper tubing, seamless.	0 58

PLATING SUPPLIES.

Polishing wheels, felt.	3 00
Polishing wheels, bull-neck	1 75
Emery in kegs, American	06
Pumice, ground	05
Emery glue	15 to 20
Tripoli composition	04 to 06
Crocus composition	07 to 08
Emery composition	08 to 09

Rouge, silver	25 to 50
Rouge, powder	30 to 35

Prices Per Lb.

LEAD SHEETS.

Montreal Toronto	
Sheets, 3 lbs. sq. ft.	\$18 00 \$18 00
Sheets, 3 1/2 lbs. sq. ft.	18 00 18 00
Sheets, 4 to 6 lbs. sq. ft.	17 50 17 50
Cut sheets, 1/2c per lb. extra.
Cut sheets to size, 1c per lb. extra.

PLATING CHEMICALS.

Acid, boracic	\$.15
Acid, hydrochloric	.05
Acid, hydrofluoric	.14 1/2
Acid, nitric	.10
Acid, sulphuric	.05
Ammonia, aqua	.08
Ammonium carbonate	.15
Ammonium chloride	.11
Ammonium hydrosulphuret	.40
Ammonium sulphate	.07
Arsenic, white	.12
Copper, carbonate, anhy.	.35
Copper, sulphate	.17
Cobalt sulphate	.70
Iron perchloride	.20
Lead acetate	.16
Nickel ammonium sulphate	.12
Nickel carbonate	.35
Nickel sulphate	.15
Potassium carbonate	.75
Potassium sulphide (substitute)	.20
Silver chloride (per oz.)	.65
Silver nitrate (per oz.)	.65
Sodium bisulphite	.10
Sodium carbonate crystals	.05
Sodium cyanide, 127-130%	.41
Sodium hydrate	.04
Sodium hyposulphite, per 100 lbs.	5.00
Sodium phosphate	.14
Tin chloride	.60
Zinc chloride	.60
Zinc sulphate	.09

Prices Per Lb. Unless Otherwise Stated.

The General Market Condition and Tendency

THE placing of further orders for 6-inch shells in Canada has revived interest in the munitions industry. Although there has been recently a reduction in output of shells there is still a considerable amount of money being expended on the production of munitions. What might almost be termed a chaotic condition, prevails in the steel trade. What with the embargo and the delay in fixing prices at Washington, consumers do not know where they stand. The logical result is that they are keeping out of the market and business consequently is decidedly dull. It is not at all likely that business will pick up until the conditions in the trade improve and a more settled outlook prevails. The embargo will affect the building trade to a greater extent than any other business, as the larger shapes are not rolled in this country. Prices of steel are stationary with no indication of a decline in the meantime. The embargo will benefit Canadian mills and the additional business will tend to keep prices firm. The pig-iron market is dull, but prices are holding firm owing to the shortage of cars and also as a result of the embargo. The coke situation is unchanged and production is being hampered by scarcity of labor and shortage of cars. The non-ferrous metal markets are weak and demand generally is light. Declines in prices have taken place throughout the entire list. The market for old materials is dull and consumers are still refraining from buying. Prices of scrap copper, brass and lead have declined, but steel and cast iron scrap are firm. The machine tool market is quiet and the general situation unchanged.

Montreal, Sept. 15, 1917.—A factor that promises renewed interest in industrial circles is the announcement that further shell orders may be placed for the six-inch size. What the volume of this new business will be has not been definitely ascertained, but some plants are apparently assured of full capacity for the remainder of this year, and possibly well into 1918. The general condi-

tions are practically unchanged, with the bulk of the interest centred in the ship-building activity.

Pig Iron

The pig iron situation is devoid of feature developments, and the market continues to reflect the uncertainty that is evident in other directions. Pittsburgh quotations indicate an easier market in Bessemer and foundry, the former having declined to \$50.95, and the latter at the same price, being \$3 per ton lower than last week. The composite price of pig iron has declined 50c per ton on the week, the present quotation being \$50.46 per ton. This has been partly due to the easier position of coke, which has dropped \$1 during the week. Canadian conditions are virtually the same, with producers practically out of the market and no prices yet available.

Steel

No developments have taken place to improve the general tone of the steel situation, as investigations and adjustments still seem to be hanging fire, which tends to keep the market in a more or less unsettled condition. Some rumors appear to indicate that the American Government is endeavoring to arrange for their present requirements at a figure that will be satisfactory to the producers and yet withhold the price paid from the trade. This action would undoubtedly create considerable uneasiness among the consumers, as they have been

long waiting definite action from this direction to guide them in their future transactions. The American market at present is somewhat concerned over the changes that have recently been brought to light by the development of the past few months. Early in the year it appears that orders were placed for a large volume of domestic work based on the possibility of a shortage of future supplies in this connection. The advent of the U. S. into the war, however, has necessitated many changes, with the result that much of this material will not be required for enterprise that is not considered by the Government to be strictly essential for the prosecution of the war. The solution of the present problem seems to be an open attitude on the part of the Government regarding their negotiations for war requirements, so that the public and domestic consumers will have something to guide them in their future buying, as the general trade realizes that the outside price must under the circumstances be on a higher level than that paid by the Government. For the past several weeks the market has been comparatively steady, and it is generally conceded that the apex has been reached, and in certain directions the tendency is downwards. No sudden reaction is expected, but the undercurrent of uncertainty as to future conditions is an influencing factor in the present inactivity of the market. The Canadian situation is still characterized by the inability to secure delivery of steel requirements, except those to be used exclusively for the manufacture of war necessities. Few price changes are reported from the American markets, and dealers here continue to quote the prices that have been ruling for the past few weeks.

Metals

The uncertainty that still surrounds the general conditions, more particularly in the States, is the predominating factor of the present metal situation, as recent reports seem to indicate that the Government are inclined to take an attitude not conducive to the best co-operation between the producers and those consumers not included in the war program. Secrecy in this connection would only lead to uneasiness and discontent throughout the trade, and eventually lead to further unsettlement and probable disorganization. Copper is fluctuating, but comparatively firm. Tin is not very active, but has taken on strength. Spelter is stronger on better inquiry. Lead has weakened and supplies are accumulating. Antimony is inclined to steadiness and to become stronger. Aluminum has an easier tendency.

Copper.—As no announcement has yet been made by the American Government in connection with the regulations that may be placed on the price and distribution of copper requirements, the trade in this and other metals has been quiet, as both the producer and the consumer are reluctant to enter the market until a definite policy has been adopted. A suggestion by the War Industries Board to the effect that the price fixed for Government requirements should not be

divulged has not met with the approval of the trade, as this would undoubtedly tend to demoralize the situation and add to the uneasiness that is now so prevalent. Lake and electro are again coming on closer terms on the New York market, the former having lost $\frac{1}{4}$ c and the latter gained $\frac{1}{2}$ c during the week, the present quotations being 27 $\frac{1}{2}$ c and 27c respectively; castings are quoted at 26 $\frac{3}{4}$ c per lb. Local copper continues firm at last week's quotations.

Tin.—In spite of the unsettled conditions that mark the present metal situation in the States, tin has added to its strength of last week, having advanced 1 $\frac{1}{8}$ c to 62 $\frac{3}{8}$ c per lb. The market, however, is not a very active one, the current quotation being ruled more by conditions abroad than a result of heavy buying on this side. Local conditions are slightly stronger on a steady market, an advance of $\frac{1}{2}$ c placing the quotation at 62c per lb.

Spelter.—The market has increased slightly in strength, but no pronounced activity has resulted, as conditions are still influenced by the unsettled situation in the States, due to the delay in the Government's action respecting the arranging of prices and their statement of requirements. New York prices have advanced $\frac{1}{4}$ c during the week, the prevailing quotation being 8 $\frac{1}{4}$ c per lb. Dealers here continue to ask 10 $\frac{1}{2}$ c on a quiet but fairly steady market.

Lead.—Keen competition, following the recent falling off in the average consumption has developed a weaker market, which is reflected in the New York quotation of 9c, this being the price asked by both the independents and the leading producers; this represents a decline of 1c over that quoted last week. The fact that the supply of lead is increasing and that no reasonable argument could be advanced for the maintenance of such high prices, is probably the chief reason for the weaker tendency, and also in the hope that heavy buying may again be resumed. The demand for lead on the local market is steady, but following the lead of the American producers the dealers here have reduced their asking price to 12c per lb., this being 1c lower than last week.

Antimony.—An unaccountable demand for antimony in the New York market has created a somewhat nervous condition, and this has been reflected in the added strength of the market, the price quoted this week being 1 $\frac{1}{2}$ c in excess of last week. The local demand continues to be steady, but not very active. Quotations are strong at 20c per lb.

Aluminum.—The American aluminum market has become easier, but the demand had shown little decline. New York quotations are falling off, due to increase of supplies. Dealers here report a steady but quiet market, with a decline of 2c on the price quoted; this week's quotation being 63c to 65c per lb.

Machine Tools and Supplies

The week has been a comparatively quiet one in the machine tool industry, especially respecting the placing of tools by the dealers. What little is passing is of a general nature without features of

any kind. The activity in the States continues, and prices on all classes of equipment are in keeping with the high cost of raw materials. Supplies are in slightly decreased demand, due to the falling off in requirements.

Toronto, Ont., Sept. 18.—The announcement that some plants which hitherto have been engaged in making 9.2 inch and 8 inch shells will be given contracts for 6 inch shells has revived interest in the munitions industry. It is also understood that contracts will continue to be placed for other and smaller calibre shells. The industry is not by any means dead and considerable activity is likely for the remainder of this year, at least. The matter is one largely of finance and depends upon the ability of the Canadian Government to arrange credits on behalf of the British Government. The drafting of men from civil life to the army cannot help but affect the labor situation in a general way but will not be allowed to interfere with the production of shells.

Steel

There have been no developments during the week to relieve the unsettled conditions in the steel trade and the outlook continues rather obscure. The embargo on iron and steel from the United States is causing much delay and inconvenience due to the necessity of getting permits from the U.S. Government. There is also an element of uncertainty in connection with this business as permission to export material is as likely to be refused as not unless it is intended to be used in the manufacture of munitions. In spite of the adjustment in the terms of the embargo to favor certain industries, it does not appear likely that this will relieve the situation materially as indications point to a shortage of steel in the United States for any purpose other than for the war. This situation of course only affects a section of the trade but it is of sufficient importance to merit consideration in view of the large importations of iron and steel into Canada in recent years. Some relief may be looked for from the domestic mills later on in the year, when they have caught up with their orders but this will not be for several weeks. Certain materials such as larger structural shapes and plates which are not made in Canada and come under the embargo will be difficult to obtain and in consequence building operations will be curtailed while special arrangements will have to be made in regard to imports of ship-building material.

Now that Canadian steel companies will have additional domestic business to take care of, increased activity is looked for at the mills which will help to fill the gap caused by the reduction in output of shell steel. The recent announcement that contracts for 6 inch shells will be given out has caused much satisfaction in the trade. Notwithstanding the weakness in prices of steel products in the United States, the market

in Canada is holding firm and there have been as yet no price recessions. While higher prices are not anticipated, it is unlikely that there will be any marked decline in values owing to the unusual conditions now prevailing in the trade. The situation in the United States is such that Canada will have to rely to a greater extent than is usual, on its own resources which means increased business for domestic mills. The volume of this business will of course depend upon the attitude which consumers may take. High prices have had the effect of curtailing the demand for steel and if maintained will continue to restrict private enterprise. If on the other hand prices declined, consumers interest in the market would be quickened with a corresponding increase in volume of business. At present the trade is marking time owing to the uncertain outlook.

Although no decision has been arrived at regarding the U.S. Government price fixing policy, the market is practically under government control. The situation however is far from satisfactory as the mills are filling government orders and no prices are given out to the public. It is quite possible that private consumers who have been holding back purchases in the expectation of the government establishing lower values, will become tired of waiting and rush into the market. This would result in a scramble for whatever steel was available after government requirements have been satisfied. As government demands are growing heavier all the time the tonnage available for private consumers is decreasing. Such a situation might possibly lead to further advances. The market however, is so unsettled that it is impossible to say what will actually happen and the situation will not clear up until some definite policy is announced from Washington.

Pig Iron

The pig iron market continues quiet and unsettled. The embargo appears to be causing a temporary cessation of imports into Canada from the States which in view of the sold up condition of domestic furnaces is causing considerable inconvenience in the trade. The delay and trouble surrounding the issue of export licenses is making it very difficult to do business. It is expected that the whole matter will be adjusted in the near future which will relieve the situation to some extent. In addition there is a shortage of cars with no indication of when this condition will be relieved. In the States the market is tied up and promises to remain in this condition until the Government prices are fixed and made public. Business continues dull at nominally unchanged prices. The coke market is a little easier although there is still a shortage of cars and labor.

Scrap

The market for old material continues quiet. The demand for most metals is light as consumers are showing little or no interest in the market. Prices of old copper, brass and lead are down but

steel and cast iron scrap are holding firm at unchanged prices.

Machine Tools

Interest in the machine tool market has been revived following the announcement that further contracts for 6 inch shells will be placed here. It is not expected however that this will cause much demand for machine tools as existing equipment will doubtless be tooled up to suit the occasion. It will mean new jigs and fixtures in many cases and may call for a few special tools. Plants are being established for building wooden ships on the Pacific Coast also at Toronto, Three Rivers, Que., and on the Atlantic seaboard. New equipment will be required for these yards. The machine tool market in the United States is very active owing principally to the heavy demand for equipment for munitions plants and airplane factories. The shipbuilding industry is also very active and heavy tools are in good demand for

MARKET LETTER DEVELOPMENT

The attention of metal working plant executives is directed to the enlargement of the scope and usefulness of our Market Letter Department. In New York and Pittsburgh, expert correspondents have been engaged, and are already furnishing each week concise reports of production activities, price movements, etc., within the territory served by each of these important centres. During the next few weeks, further additions will be made to the number of our United States correspondents, embracing other industrial centres, and enlarging thereby the scope of the meantime service being rendered.

shipyards. It is becoming more difficult, than ever to obtain machine tools from the States which will benefit Canadian builders to some extent.

Supplies

The outlook in the supply business has not undergone any material change during the week. Business generally speaking continues fair and is of a more general character. Prices of most lines particularly those composed of iron, steel or brass are holding firm and there is no indication of lower values, just yet. A decline of 4c a pound has been put into effect on soldering coppers which now make a base price of 3 to 8 pounds, 66c per pound. For the 2½ lb. size the price is 67c per pound, 2 lb., 69c per pound; 1½ lb. 70c per pound and 1 lb. at 73c per pound. Prices of belting are unchanged but side lace leather is quoted at \$1.75 and cut lace leather \$1.95 per pound. Gasoline and coal oil continue firm and in good demand.

Metals

Weakness characterizes the local market and declines have taken place all along the line. The reason for this may be found in the unsettled condition prevailing in the trade owing to the uncertainty with regard to future prices. The falling off in munitions contracts has of course had some effect on the market but not to the extent that might have been expected as the ordinary demand has been steadily increasing for some time and is now considerable. The local market largely reflects conditions in New York where the delay in price fixing has had a depressing effect on the market there. The attitude of the U.S. Government is uncertain and consumers are awaiting developments.

Copper.—What may prove to be a temporary decline in prices of copper has brought prices down two cents per pound. The position of copper continues strong and has improved by the fact that the U.S. Government will pay 25c for copper being purchased for the Allies. This is interesting in that it indicates that the government will not make any drastic reduction when it fixes the price of copper. Local prices are now as follows. Lake and electrolytic 32c and castings 31c per pound.

Tin.—The market is dull and weaker with consumers still showing a lack of interest in current prices. The London market on the other hand has been firmer lately and higher prices have to be registered there. Tin has declined 2c locally and is now quoted at 62c per pound.

Spelter.—As in the case of other metals, spelter has also declined and the market is weak, and inactive. Spelter is now quoted locally at 10½c per pound a decline of ½c.

Lead.—The decline in prices of lead in New York reported last week has resulted in lower prices in the local market. The weakness of lead is attributed to increased production which government requirements have not absorbed. The market is also weak. Lead has declined 1c locally and is now quoted at 12c per pound.

Antimony.—The demand for antimony is light and the market weaker. Antimony has declined 1c and is now quoted at 19c per pound.

Aluminum.—The market remains quiet with light demand. Prices are lower at 62c per pound, being a decline of 2c.

Solders.—Prices have declined following the lower levels registered for tin and lead. Guaranteed is now quoted at 38½c and strictly at 36c per pound.

Pittsburgh, Sept. 15.—The general stagnation in the iron and steel markets continues. As has been pointed out in previous reports this condition is in line with all precedents, being the natural and necessary sequel to a period of great price advances and heavy buying. Two things must occur. Prices must be re-adjusted to a less unreasonable basis, so

as to establish a level at which business can be resumed, and buyers and sellers must work off a large part of the obligations they have assumed. Week by week progress is being made along these lines, but the end has not been reached as yet. It may be reached, possibly, in a few weeks, but more likely two months or more will be required still.

Price Declines

The most significant decline in the week was in billets, \$10 a ton, sales having been made of limited tonnages at \$65, with more offered at the same figure. This was by middle interests. There is an unconfirmed rumor that Italy has purchased a round tonnage of billets at \$60. This, of course, would be from a mill. Thus far the mills have not admitted making cut price quotations, their position having been that cut prices would not enable them to effect important sales and that their best interest lay in endeavoring to maintain prices while they work off the high-priced business now on books.

In foundry pig iron there has been a clear cut decline of at least \$3 a ton, some valley furnaces being willing to sell at \$50, furnace. Resale lots are occasionally offered at still less, but do not make a well-defined market. This is the first clear decline in foundry iron, Bessemer and basic iron having previously declined about \$6 a ton, since the top point for all grades of pig iron, reached late in June.

Plates, which recently declined to 8.00c, Pittsburgh, having been for some time firm at 9.00c to 10.00c, are being sold at slight cuts under 8.00c, down to 7.85c or lower.

Sheets are a trifle easier, quotations having been made in the past week at 8.35c on classes of business against which 8.50c would formerly have been quoted. Some sheet mills are now soliciting enquiries, their attitude previously having been apparently that they would prefer not to make sales.

It is learned that a leading steel mill has made one contract for merchant steel bars at 3.50c, the lowest price previously reported having been 4.00c, a decline from 4.50c as had been quoted for two or three months. There is no open quotation out at 3.50c and the market in general remains quotable at 4.00c.

Government Buying

The Government continues to place orders for steel, but very few details of transaction are allowed to become public. The total orders placed thus far is certainly far under the recent estimate in Wall Street, 3,200,000 tons. So far as Government buying is a factor in general trade conditions, the important matter is not the amount of steel the Government has bought at any one time, but the monthly rate at which the steel is to be furnished. The production of ingots is now running at fully 44,000,000 gross tons a year, which means about 33,000,000 gross tons of finished rolled steel, as the losses in scrap, scale, etc., from the ingot to the merchantable steel always runs from 25 per cent. Thus the monthly production of rolled steel is about 2,750,000 gross tons a month. The proportion that

is passing into Government work of all descriptions is between 10 and 15 per cent., according to the most accurate estimates that can be made. Within a few months a great deal more steel will be passing into shipbuilding, as increased yard facilities become available, but on the other hand there will be some decreases in other directions, as the building of shipyards is at present taking a great deal of steel, and a considerable tonnage has been going into the equipment of the army cantonments, the airplane factories and training camps, and other activities. Shell steel requirements will probably increase. In the first six months of next year the proportion of the output passing directly or indirectly into the Government may somewhat exceed 15 per cent.

The amount of steel that will be furnished in future to our Allies is quite in doubt. Possibly on account of uncertainties as to prices, as it is far from being settled that our Allies are to be named the same prices as paid by the Government. The War Industries Board, which was to act as purchasing agent for our Allies, has done nothing in this direction, and the latest report is that the Allies have entered into some negotiations with steel-makers on their own account. As the amount of steel passing to them in the past has been very large, and as there has been little buying of this character in recent months, it will require quite heavy purchases in future merely to assure a continuance of the previous pace.

Thus there is no reason whatever for assuming that there is to be such an increase in war steel requirements, on the whole, as to make up for the decreased domestic consumption that is certain to occur in many directions, and indeed has already begun to occur, to say nothing of the continually increasing productive capacity. It is much more probable that steel will become more plentiful than that it will become scarcer.

Jobbers Somewhat Interested

Jobbers are now showing some slight signs of being interested in making purchases of steel products. Many of them did not contract for fourth quarter and although they are reducing their stocks and perhaps were in some instances overbought for third quarter, they will still need to buy some material. Manufacturing consumers, who as a rule are covered by contracts to the end of the year, are not yet showing any decided signs of interest in the market. Some of the automobile makers are sounding out the producing trade, on bars, sheets, etc., but evidently with a view to securing information as to what prices are likely to be asked rather than with an idea that they will really make any purchases at any early date.

New York, Sept. 17.—Interest in the steel industry continues to be centred almost entirely in Government purchases of material, present and prospective. It is more generally recognized that Government requirements will be of much greater magnitude than was anticipated

several months ago. At the moment, attention is being directed toward the prospective placing of contracts for heavy tonnages of shell steel. No little surprise has resulted from the announcement that Great Britain is again seeking to place large orders with American manufacturers for large sizes of shell. Inquiries on British account have been put out for 3,000,000 six-inch shells, and delivery is wanted in about six months. Additional orders for 4.5, 8, 9.2, and 12-inch shell are expected to follow quickly.

The 6-inch shell, for which bids are now being taken, will require 225,000 tons of steel, and it is estimated that the total contract will call for the expenditure of \$120,000,000. This sudden increase in the demand for steel forgings and billets will probably be reflected in a stronger tone for semi-finished steel, which has been steadily falling in price because of resale offerings for the last four to six weeks. Great Britain, however, will pay less for finished shells than was secured by manufacturers last year, and consequently lower prices will prevail for bars and billets. Orders for English shell are expected to be placed with the Bethlehem and the Crucible companies, with the American Car & Foundry Co., the Westinghouse Electric & Manufacturing Co., the American Can Co., the New York Airbrake Co., and the E. W. Bliss Co. The closing down of Canadian munition factories and the resale of machinery to American plants seems to indicate that the English authorities have changed their plans governing the manufacture of munitions.

The United States Government is still seeking to place additional contracts for heavy ordnance and other war munitions, but considerable difficulty is being encountered in finding manufacturers who are equipped to carry on this work successfully. Government representatives seeking to place orders for gun mounts among metal-working plants in the Ohio valley have found manufacturers already overcrowded with work. Several companies in the East, however, in anticipation of Government orders have been quietly inquiring for shop equipment. Manufacturers who have already accepted Government contracts for gun forgings or for machining ordnance have continued to place contracts for machine tools in the Philadelphia, New York and New England markets. Among the largest buyers in the last week were the American Brake Shoe & Foundry Co., the Tacony Ordnance Corporation, the Taylor-Wharton Iron & Steel Co., the Standard Steel Works, and the Bullard Machine Tool Co. The Inland Ordnance Co., Bedford, Ohio, has been buying tools in the Cleveland market, and another manufacturer in the Central West has placed an order for 60 turret lathes for making rifle grenades.

Shipbuilding interests also continue actively in the market for machinery of various kinds. One interesting development is the chartering of the Newfoundland Shipbuilding Co., Harbor Grace, Newfoundland, by the controlling interests in the Pennsylvania Shipbuilding

Co., the New Jersey Shipbuilding Co., and the Pusey & Jones Co. Wooden ships are to be built at first in Newfoundland, but it is planned to purchase equipment and to build steel ships in the future. This interest is now in the market for electric cranes, about 60-foot span. Another shipbuilding company has been organized at Kingston, New York, to build small craft for the United States Government and tools are to be bought for machine and fabricating shops.

The Army Department has placed contracts for 100 steel buildings for storage for the American army in France; 12,000 tons of steel are required, and bids are being taken on 32 additional buildings requiring 16,000 tons of shapes.



CANADA'S REVENUE STILL GROWING

THE financial statement of the Dominion covering the period from April 1, the beginning of the fiscal year, to September 10, shows total receipts of \$112,000,000, an increase of \$22,000,000 over the same period of last year. On the other hand payments on account of ordinary expenditure, including interest on war loans, are \$43,000,000, which is almost identical with the expenditure on this account for the same period of last year. Capital expenditure is \$7,500,000 less than last year. Of this last named reduction, public works expenditure shows a decrease of over \$1,000,000, while railways and canals expenditure is \$3,500,000 less than for the corresponding period of last year.

Taking into account both receipts and expenditures on capital and ordinary accounts, the period in question shows a surplus of receipts over these expenditures to the amount of \$62,000,000. The war expenditure in Canada during the period was \$57,000,000.

It thus appears that so far as receipts and expenditures have been entered in the books of the department, the revenues of the Dominion during the present year have more than equalled the expenditures on ordinary and capital accounts together with the war expenditure in Canada. The greater part of Canada's war expenditure, of course, is overseas. Payment on this account is arranged for with the Imperial treasury in London.



THE BRITISH COAL DISTRIBUTION SCHEME

By Mark Meredith

THERE is not the slightest doubt that the British Coal Controller is to be congratulated on the scheme that is to be put in operation on September 1, for reorganizing the transport of coal by public railway for inland consumption in the British Isles. By arranging that coal shall be sent from pits in certain specified directions instead of in any direction there will result the enormous saving of not less than 700,000,000 ton miles per annum. Apart from the ensuing economy in labor and reduction in wear and tear of rolling stock, this

means that some millions of tons of coal that would otherwise be required for locomotive use in what is now seen to be largely unnecessary haulage will be freed for national purposes: in addition wagons and locomotives will become available for use overseas is required. Special provision has been made for meeting cases in which certain particular descriptions and qualities of coal are required for special purposes, such as for automatic stokers, gas producers and coke ovens. Firms needing coal for use in these will receive certificates issued by the Controller of Coal Mines entitling them to specified supplies of the particular fuels mentioned in the certificates. These fuels will be provided by diversion, where necessary, from firms who have not received certificates. Anthracite is the only variety of coal not affected by the new regulations. Its occurrence is limited geographically speaking, and it has been found impossible to make it fit in with the scheme. It can therefore be distributed in any direction, as heretofore, in this respect resembling coal that is conveyed other-

CANADIAN GOVERNMENT PURCHASING COMMISSION

The following gentlemen constitute the Commission appointed to make all purchases under the Dominion \$100,000,000 war appropriation:—George F. Galt, Winnipeg; Hormidas Laporte, Montreal; A. E. Kemp, Toronto. Thomas Hilliard is secretary, and the Commission headquarters are at Ottawa.

wise than by public railway from the colliery or is conveyed to a port for shipment. This latter exception affects London particularly since the greater portion of the coal consumed in the metropolis is water-borne. Over 170,000,000 tons of coal per annum, are involved in this scheme and of this quantity factories need 55,000,000 tons; mines, metal industries and chemicals, etc., also 55,000,000 tons; domestic consumption 30,000,000 tons, and railways 13,000,000 tons. No allowance is made in these figures for the 80,000,000 tons of coal required for export and bunkers, which is not affected by these regulations. There is only one point that need have further attention and it would be a good suggestion that an instruction should be appended to these regulations that no unpicked coal is to be transported from the pits to the consumers, for in a year thousands and thousands of tons of dirt are transported owing to the so-called economies now practised at the pit heads.



LIQUID FIRE IN THE WAR

LIQUID fire is a weapon of value principally because of its demoralizing effect upon those attacked. There have been

some casualties resulting from liquid fire, but it is the psychological effect that is sought. According to a writer in the bulletin of American Chemical Society, the apparatus usually consists of a metal tank holding about 4 gal. of liquid to be burned, a section of pipe from the tank to a rubber hose at the other end, in which there is a smaller metal pipe about a yard long fitted with a nozzle and a friction igniter, as well as an oil burning wick. There is a valve near the tank and another near the nozzle. Benzol, from coal tar, and crude oil are used in equal proportions, and are carried in the tank under a pressure of approximately 300 lb. per sq. in., this pressure being maintained by compressed nitrogen, an inert gas having no effect upon the contents of the tank. The tank and accessories are carried by a companion when liquid is being burned. Or it may be fixed in position and operated by the same man who carries the tank.

In use a cap is drawn from the end of the nozzle, and a wick burning kerosene or similar oil is thereby lighted, since the cap is a friction igniter. The oil is then turned on, and is ignited as it leaves the nozzle under great pressure. The result is a flame of burning oil about 30 yd. long. For two-thirds of this distance the flame is straight, but it then turns up, as does any other flame. It may be directed against the ground, but care must be taken not to deflect it too sharply, as it may strike the ground and turn back on those operating the device. It is, therefore, not well suited to turning down into a trench.

It is said by an expert that liquid fire is not so effective now that it is understood by the troops and means for its defence have been worked out. It can be easily understood, however, that a number of such devices, with the roar of the escaping oil, when used together, gave a means of demoralizing the defenders of a trench, especially at night, and in the beginning was a valuable accessory, especially for raiding parties.



AN important raw product available in the State of Hyderabad which can be manufactured into products of commercial utility is the mowra flower. The mowra tree abounds in the forests and fields of Hyderabad, more especially in the districts of Nizamabad, Medak, and Asafabad. During the hot weather the flowers drop off the tree, and are gathered and dried to the consistency of raisins. Hitherto they have been utilized for liquor only. About 25,000 tons, it is calculated, are gathered annually, of which about 10,000 tons are used for liquor, and the balance is run to waste. It has been discovered that it is possible to make sugar, motor spirit, and several other valuable products out of them. The flower contains, in addition to sugar, acetic acid, and some acetone. It is stated in the "Chemical Trade Journal" that several types of motor cars have been successfully run on a spirit prepared from mowra at half the cost of petrol.

TRADE INQUIRIES

THE following inquiries have been received by the Department of Trade and Commerce, Ottawa, from which further particulars may be obtained:

1196. **Machine tools.**—An old-established British firm in Moscow, Russia, wishes to purchase in Canada machine tools required for works under construction for war purposes. Specifications will be furnished on application to the Commercial Intelligence Branch, Department of Trade and Commerce, Ottawa.

1200. **Test drills.**—The New York office of a Canadian manufacturing company have received an inquiry from abroad for 10,000 test drills of various size, and would like to get supplies in Canada. Specifications will be furnished on application to the Commercial Intelligence Branch, Department of Trade and Commerce, Ottawa.

1208. **Sulphate of copper.**—An important firm of manufacturers' representatives in Buenos Aires would like to be placed in communication with exporters with a view to selling on commission.

1213. **Engines (crude oil).**—A manufacturer's agent in Cape Town, specializing in agricultural machinery and now holding several Canadian agencies, makes inquiry re possibility of supply from Canada of a crude oil engine. (For illustration and further information see pages 445-447.)

1217. **Mining and railway supplies.**—A Johannesburg firm of engineers and importers of mining and railway supplies are in the market for agency of supplies from Canadian manufacturers of any line as above, except locomotives.

1218. **Rubber belting and hose.**—A Johannesburg firm making a specialty of mining supplies are open to take up a Canadian agency for rubber belting and hose.

1233. **Motors, machinery and tools for agricultural, electrical and building purposes.**—An Italian firm at Bari would like to represent manufacturers of motors, machinery and tools for electrical, agricultural or building purposes, b. c. & t.

1235. **Electrical materials, chemicals, steel, tools, and general machinery and engineering articles.**—Genoa engineers would represent firms manufacturing or exporting electrical materials, chemicals, steel, tools and general machinery and engineering articles, g.p.c.

1237. **Industrial machinery, especially for shipbuilding.**—Engineer, manager of a mining company, would represent British manufacturers of industrial machinery in general, especially for shipbuilding purposes, i.a.g.

1239. **Anchors and chains and machinery for ships.**—A party at Genoa would handle anchors and chains for ships, and machinery for same, g.e.c.

1242. **Electrical supplies, lamps, insulators, lamp-holders, switches, etc.**—A Rome firm would represent on commission or buy for own account, electrical supplies, lamps, insulators, lamp-holders, etc., r.g.b.

Enlarged Canadian Trade Intelligence Service

Under the arrangement made by the Minister of Trade and Commerce with Sir Edward Grey in July, 1912, the Department of Trade and Commerce, Ottawa, is able to present the following list of the more important British Consulates whose officers have been instructed by the Foreign Office to answer inquiries from and give information to Canadians who wish to consult them in reference to trade matters.

BRAZIL—Bahia, British Consul. Rio de Janeiro, British Consul General.	NETHERLANDS—Amsterdam, British Consul.
CHILE—Valparaiso, British Consul General.	PANAMA—Colon, British Consul. Panama, British Vice-Consul.
COLOMBIA—Bagota, British Consul General.	PERU—Lima, British Vice-Consul.
ECUADOR—Quito, British Consul General. Guayaquil, British Consul.	PORTUGAL—Lisbon, British Consul.
EGYPT—Alexandria, British Consul General.	RUSSIA—Moscow, British Consul General. Petrograd, British Consul. Vladivostok, British Consul. Odessa, British Consul General.
FRANCE—Havre, British Consul General. Marseilles, British Consul General.	SPAIN—Barcelona, British Consul General. Madrid, British Consul.
INDIA—Calcutta, Director General of Commercial Intelligence.	SWEDEN—Stockholm, British Consul.
ITALY—Genoa, British Consul General. Milan, British Consul.	SWITZERLAND—Geneva, British Consul.
MEXICO—Mexico, British Consul General.	URUGUAY—Monte Video, British Vice-Consul.
	VENEZUELA—Caracas, British Vice-Consul.

Canadian Commercial Intelligence Service

The Department of Trade and Commerce invites correspondence from Canadian exporters or importers upon all trade matters. Canadian Trade Commissioners and Commercial Agents should be kept supplied with catalogues, price lists, discount rates, etc., and the names and addresses of trade representatives by Canadian exporters. Catalogues should state whether prices are at factory point, f.o.b. at port of shipment, or, which is preferable, c.i.f. at foreign port.

CANADIAN TRADE COMMISSIONERS.

ARGENTINE REPUBLIC—B. S. Webb, Acting Canadian Trade Commissioner, Reconquista, No. 46, Buenos Aires. Cable address, Canadian.
AUSTRALIA—D. H. Ross, Stock Exchange Building, Melbourne. Cable address, Canadian.
BRITISH WEST INDIES—E. H. S. Flood, Bridgetown, Barbadoes, agent also for the Bermudas and British Guiana. Cable address, Canadian.
CHINA—J. W. Ross, 13 Nanking Road, Shanghai. Cable address, Cancoma.
CUBA—Acting Canadian Trade Commissioner, Lonja del Comercio, Apartado 1290, Havana. Cable address, Cantracom.
FRANCE—Phillipe Roy, Commissioner General, 17 and 19 Boulevard des Capucines, Paris. Cable address, Stadacona.
ITALY—W. Mc. Clarke, c/o H. M. Consul, Milan.
JAPAN—E. F. Crowe, Acting Canadian Trade Commissioner, P. O. Box 109, Yokohama. Cable address, Canadian.
HOLLAND—Ph. Geleerd, Acting Canadian Trade Commissioner, Zuidblaak, 26, Rotterdam. Cable address, Watermill.
RUSSIA—C. F. Just, Canadian Government Commercial Agent, Alexandrinskaya, Plosch 9, Petrograd. L. D. Wilgress, Canadian Government Commercial Agent, Bukholza Ulitsa No. 4, Omsk, Siberia.
NEWFOUNDLAND—W. W. Nicholson, Bank of Montreal Building, Water Street, St. John's. Cable address, Canadian.
NEW ZEALAND—W. A. Beddoe, Union Buildings, Customs Street, Auckland. Cable address, Canadian.
SOUTH AFRICA—W. J. Egan, Norwich Union Buildings, Cape Town. Cable address, Cantracom.
UNITED KINGDOM—Harrison Watson, Sub-division E.C., 2, 73 Basinghall Street, London, E.C., England. Cable address, Sleighing, London. N. D. Johnston, Sun Building, Clare Street, Bristol. Cable address, Canadian. J. E. Ray, Central House, Birmingham. Cable address, Canadian. J. Forsyth Smith, 31 North John Street, Liverpool. Cable address, Cantracom. F. A. C. Bickerdike, 4 St. Ann's Square, Manchester. Cable address, Cantracom. J. Forsyth Smith, Acting Canadian Trade Commissioner, 87 Union Street, Glasgow, Scotland. Cable address, Cantracom.

CANADIAN COMMERCIAL AGENTS

AUSTRALIA—B. Millin, Royal Exchange Building, Sydney, N.S.W.
BRITISH WEST INDIES—Edgar Tripp, Port of Spain, Trinidad. Cable address, Canadian. R. H. Curry, Nassau, Bahamas.
NORWAY AND DENMARK—C. E. Sontum Grubbegd No. 4, Christiania, Norway. Cable address, Sontums.
SPAIN—J. F. Roberts, Hotel Cuatro Naciones, Barcelona.

CANADIAN HIGH COMMISSIONER'S OFFICE

UNITED KINGDOM—W. L. Griffith, Secretary, 17 Victoria Street, London, S.W., England. Cable address, Dominion, London.

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IMMEDIATE SHIPMENT TORONTO STOCK

Surface Grinders.

New No. 1 DIAMOND Automatic.
 New No. 2 BROWN & SHARPE Auto.
 New No. 2 LASALLE Automatic.
 New No. 1 WILMARTH & MORMAN,
 plain.
 New No. 3 LASALLE, plain.

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14" SMITH & MILLS.
 16" SMITH & MILLS.
 16" KELLY.
 20" KELLY.
 20" GOULD & EBERHARDT.
 24" GOULD & EBERHARDT.
 28" GOULD & EBERHARDT.

Radial Drills.

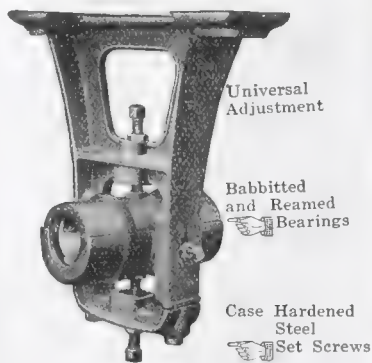
2-6' BERTRAM (almost new).
 1-5' REED PRENTICE (new).
 1-4' MUELLER (new).
 1-3' DRESES.
 1-2 1/2' FOSDICK (new).

New LeBlond Heavy Duty Lathes.

17" x 6' Double Back Gear.
 19" x 8' Double Back Gear.
 19" x 10' Double Back Gear.
 21" x 8' Double Back Gear.
 25" x 10' Double Back Gear.
 24" x 12' CMC, double back gear.
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IN War Times you should get all the speed out of your machines possible.

You can do this by using BOND Hangers. From the day you put a BOND Hanger on the job it starts saving your oil, your power, and your patience.

It is an investment that yields a steady return with every revolution of your shafting.

The sturdy, braced construction makes for smooth running without vibration. Its design permits full accessibility for adjustments or erection.

The Bond Hanger Book tells about everything we make in the line of power appliances.

Your files are not complete without it.

CANADIAN BOND HANGER & COUPLING CO.
 Limited ONTARIO
 ALEXANDRIA

Yes— it does look bad

AND if you haven't a Walton Tap Extractor, this broken tap is going to give some trouble before it comes out.

You're going to fuss around, lose your temper, perhaps injure the thread and waste half an hour or more in addition.

But with this Walton Tap Extractor a broken tap presents no difficulties.

The crucible steel fingers go down into the flutes, and the rest is easy. Just apply a wrench to the squared outer end and back the tap out. Can you imagine anything more simple?

The Walton Co.

HARTFORD
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Write for
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If any advertisement interests you, tear it out now and place with letters to be answered.

INDUSTRIAL ^A_N^D CONSTRUCTION NEWS

Establishment or Enlargement of Factories, Mills, Power Plants, Etc.; Construction of Railways, Bridges, Etc.; Municipal Undertakings; Mining News

ENGINEERING

Granby, Que.—The Southern Canada Power Co. will build a sub-station and office here.

London, Ont.—E. Leonard & Sons, York St., contemplate the erection of a blacksmith shop to cost \$20,000.

Toronto, Ont.—The City Architect has issued a permit to the Hospital of Incurables to install underground fuel oil storage system, 130 Dunn avenue, at a cost of \$3,000.

New Glasgow, N.S.—A 4,000 kilowatt steam turbine is now being erected at the Allan Mine. This addition to the existing system will give a plant of 7,000 kilowatts, constituting one of the largest power plants in the province.

Port Arthur, Ont.—Alderman Blaquier will introduce to the next meeting of the City Council a resolution to urge the Dominion Government to operate the blast furnace at the Atikokan Iron Works. The plant has been lying idle for a long time.

Ladysmith, B.C.—The smelter which was recently put in operation by the Ladysmith Smelting Corporation, will be capable of handling 1,200 tons of ore per day, although the initial capacity is 700 tons. There are two blast furnaces, one 42 in. x 120 in., and the other 42 in. x 160 in. at the tuyeres. The boiler plant consists of two 80 h.p., one 88 h.p., and one 104 h.p. boilers. Two electric generators furnish power for the motors and lighting system.

Tillsonburg, Ont.—Work has started on the new plant for the Maple Leaf Harvest Tool Co. The main building will include an office, 40 x 50 ft., at the south; paint shop, 50 x 90 ft.; finishing shop, 50 x 140 ft.; tin storage room, 50 x 60. Back of the main building will be a finished goods warehouse 100 x 130 ft. The buildings will be one storey in height of red pressed brick and steel window sashes, and will be a model factory building. In the spring a polishing shop, 50 x 80 ft. a storage room, 50 x 50 ft., and a forge shop will be erected, 50 x 270 ft.

GENERAL

Hamilton, Ont.—The American Can Co., will build an addition to their factory to cost \$125,000.

Tillsonburg, Ont.—A firm in the United States has been investigating the situation here with a view to locating a branch factory.

Tillsonburg, Ont.—The Canadian Cereal and Flour Mills are rushing work on their new oatmeal mill, and will soon begin operations.

Hamilton, Ont.—A permit has been granted to the Canadian Fastener Co.,

for a factory to be built on Sherman Ave., at a cost of \$20,000.

Oakville, Ont.—Manufacturing operations were started at the Oak Tire & Rubber Co.'s new factory on Thursday. Frank Law is managing director.

Brockville, Ont.—The large cheese factory at Seeley's Bay was destroyed by fire on Sept. 11. The owner D. Warner had only \$1500 insurance on the property.

Durham, Ont.—The cement works, which have been remodeled to manufacture cement rock instead of marl, began operations recently, and will shortly be running at full blast, under the management of R. H. McWilliams.

MUNICIPAL

Prince Rupert, B.C.—The City contemplates extending the water main system which will cost \$10,000.

St. Catharines, Ont.—The City Council are considering the purchase of a motor driven sewage pump. W. P. Near is the city engineer.

Bradford, Ont.—A by-law will be submitted to the ratepayers on Oct. 6, to authorize an expenditure of \$15,600 on installing a hydro-electric transmission system.

Lethbridge, Alta.—Commissioner Freeman stated recently at a meeting of the City Council that a new steam turbine and generator will have to be ordered without delay in order to provide power for the increasing load. It is estimated that a new unit will cost \$50,000.

ELECTRICAL

Aylmer, Ont.—The Town Council will purchase electrical transmission equipment and also motor driven pumps.

Hamilton, Ont.—The Barton Township Council has decided to submit Hydro-Electric and enabling by-laws to the ratepayers.

Welland, Ont.—The voltage of the Hydro-electric system here will be increased from 12,000 to 46,000 volts and the equipment in the sub-station is being changed to suit the new service.

Scarborough, Ont.—The Hydro-Electric Power Commission has notified the Township Council that work has been started on a line to go through Birchcliffe, Scarborough Junction and Agincourt. It is hoped to complete the work this fall.

New Toronto, Ont.—Building operations have been already commenced on the new hydro-electric sub-station at the corner of 9th street and Birmingham avenue, New Toronto, by Witchall and Son, the contractors. The concrete foundation is already laid and the con-

tractors are aiming to have the building completed before the winter. It will be a three-storey structure of pressed brick, steel and concrete, at a cost of \$80,000 with the equipment. The station will be about 40 feet high and 75 feet wide.

TENDERS

Charleswood, Man.—Tenders will be received by the undersigned up to September 22, for the drilling of one 5-inch well, and equipping same with pump and platform, on the Arbore Street, West Winnipeg. A. B. Blakely, secretary-treasurer.

Toronto, Ont.—Tenders will be received, addressed to the Chairman, Board of Control, City Hall, Toronto, up to October 2, for the construction and delivery of stop valves, valve operating pump and special castings, for main pumping station. Specifications and forms of tender may be obtained at the Works Department, Room 12, City Hall.

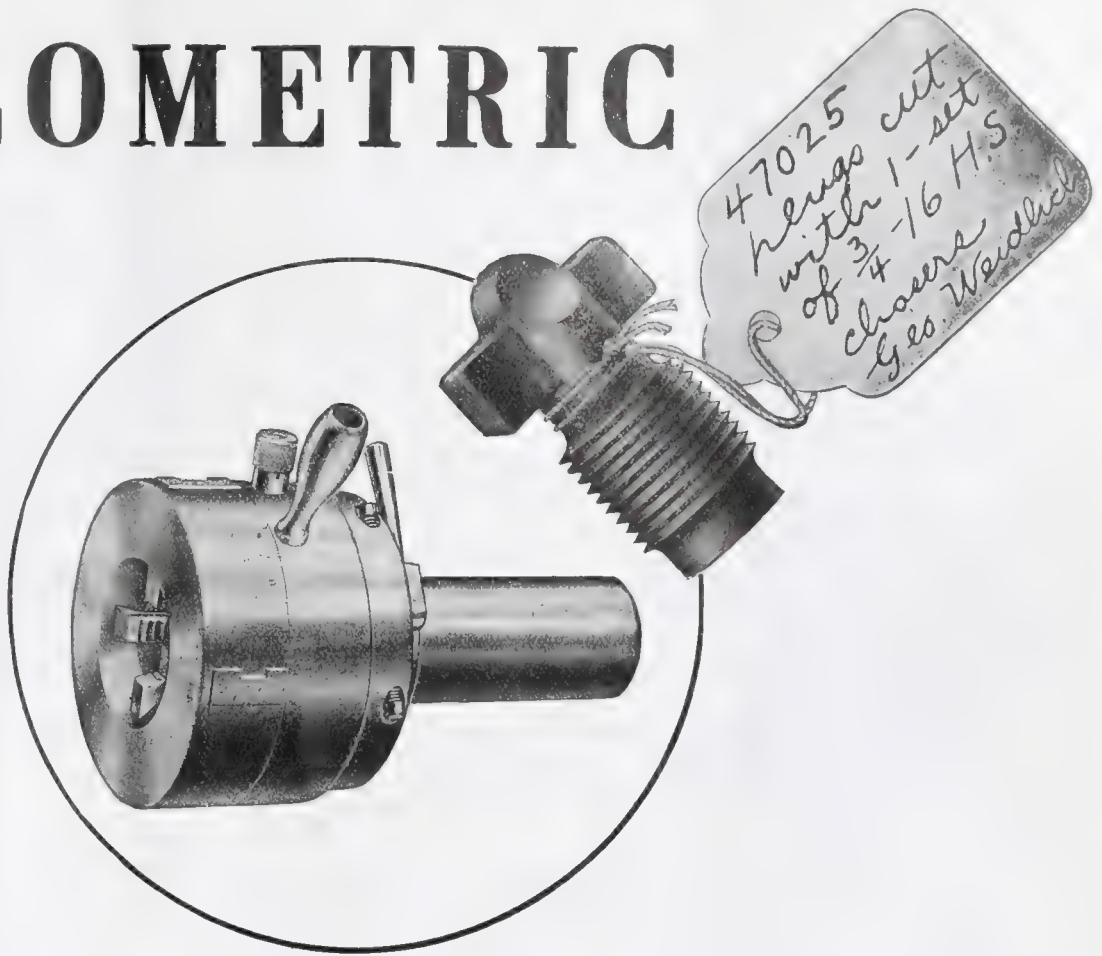
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Ottawa, Ont.—Tenders will be received at this office until Tuesday, September 25, 1917, for dredging required at West St. John, N.B. Combined specification and form of tender can be obtained on application to the Secretary, Department of Public Works, Ottawa. Tenders must include the towing of the plant to and from the work.

Moncton, N.B.—Tenders will be received up to September 22, for the construction of the substructure of a three-track subway at Trenton, N.S., under the tracks of the Intercolonial Railway. Plans and specifications may be seen at the following locations:—Office of the chief engineer, Department of Railways and Canals, Ottawa, Ont.; office of the chief engineer, Canadian Government Railways, Moncton, N.B.; office of the resident engineer, Canadian Government Railways, New Glasgow, N.S.

Ottawa, Ont.—Tenders for Metallic Fittings, No. 1811, will be received until Wednesday, Sept. 26, 1917, for the supply of filing sections for Dominion Public Buildings, Ottawa. Plans, specification and forms of contract can be seen and forms of tender obtained on application to the office of the Caretaker, Post Office, London, Ont., the Overseer of Dominion Buildings, Post Office, Montreal, the Clerk of Works, Postal Station "F," Toronto, and at this Department.

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RAILWAYS—BRIDGES

Toronto, Ont.—The Ontario Railway Board has extended indefinitely the period in which the Toronto Railway Co. may construct a car line on Pape Avenue as it is impossible to secure rails.

Montreal, Que.—It is proposed to build a new bridge over the Back River at Cartierville. Alternative estimates ranging from \$7,500 to \$200,000 have been submitted to the Board of Control by W. Chase Thompson consulting engineer.

Orillia, Ont.—The Grand Trunk is to proceed at once with the building of a new station at this place. The new building, which will replace the one destroyed by fire, is to be a handsome structure of dark, brown brick, with stone and concrete base.

Montreal, Que.—The C. W. R. tunnel and other developments here have cost \$9,632,718 up to April 30, 1917. It is estimated that \$768,628 will be required to complete the terminal facilities in this city. The principal items are: Tunnel, \$65,354; terminal, \$441,373; electrification, \$32,890.

Chatham, Ont.—The construction of a new and up-to-date station to replace the one which was burned to the ground at Charing Cross, has been commenced by the Michigan Central Railway at the site of the old depot. The plans and specifications call for a much larger and more modern building which will be, when completed, 70 feet long by 20 feet deep.

Toronto, Ont.—Two large concrete bridges of new design are being built on the C. P. R. line from North Toronto to Leaside. Each one will be about 390 feet long and 90 feet high. One will be double-tracked; the other will have three tracks. The bridges are of the reinforced concrete trestle type, founded on continuous piers resting on clay subsoil. The spans are 34 feet; the middle ones 36 feet. The design is by P. B. Motlev, engineer of the C. P. R. department of bridges. Montreal. The local supervisor is Mr. Barber, divisional engineer of the C. P. R. in Toronto. Wells & Gray, Ltd., Toronto, are the contractors for the three-tracked bridge at Reservoir Ravine, and the Dominion Construction Co. will build the bridge over the Belt Line.

BUILDING

Toronto, Ont.—The City Architect has issued a building permit to W. T. Keens, 177 Spadina avenue, for the erection of a factory of brick construction to cost \$75,000.

CONTRACTS

MacLeod, Alta.—The City Council has awarded a contract for a motor-driven centrifugal pump to Gorman, Clancy & Grindley, Ltd., of Calgary.

Woodstock, N.B.—The Town Council have let contract for filtration plant to the New York Continental Jewel Filtration Co., New York, at \$64,948.

Moose Jaw, Sask.—A contract has been let to Gorman, Clancy & Grindley, Ltd., Calgary, for three motor-driven centrifugal pumps, for Rosedale pumping station.

Ottawa, Ont.—The Canadian Tungsten Lamp Co., Hamilton, have the general contract for tungsten lamps for the Department of Public Works, Dominion Government.

New Liskeard, Ont.—A contract has been let to the Turbine Equipment Co., Toronto, by the Casey-Cobalt Silver Mining Co., for a unit for operating against 450 foot head.

Jordan Harbor, Ont.—The Toms Contracting Co., Toronto, have been awarded the general contract for the construction of power house for the Provincial Government Department of Public Works.

MARINE.

New Glasgow, N.S.—Walter and Charles McNeil are preparing to build a couple of wooden vessels along the East River in New Glasgow.

Three Rivers, Que.—The Three Rivers Shipyard Co., has acquired a site here for a ship building plant. T. M. Kirkwood of Toronto who is interested in the proposition has a contract for two freighters.

Vancouver, B.C.—British Columbia's shipbuilding programme provides for the construction of some 117,000 gross tons of commercial shipping, to have a total carrying capacity of nearly 185,000 tons. The value of these ships, some fifty in all, is in the neighborhood of \$25,000,000.

Sarnia, Ont.—The tug Michigan of the Great Lakes Towing Co., Mich., has left Port Huron for Georgian Bay, to assist the tug Favorite of the same company in raising the steamer Western Star, which was wrecked in the Georgian Bay district during the severe storms of the fall of 1915. This is the second effort made to raise this steamer by the Great Lakes Towing Co.

Ship for Cunard Company.—The first of a fleet of 150 vessels to be constructed in this country under British registry to replace the losses due to the submarine warfare was launched on Sept. 16, at the yards of the Chicago Shipbuilding Co., Chicago, Ill. The ship was built for the Cunard Line, the first to be constructed in America for that company. Its approximate cost was \$800,000.

Three Rivers, Que.—A new concern known as the Three Rivers Shipyards, Ltd., has recently been incorporated at Ottawa to establish a shipbuilding plant at Three Rivers, Que. The company has obtained a contract from the Imperial Munitions Board to construct two wooden freighters to the following dimensions. Length 268 feet; beam 43 ft. 6 ins., and depth 27 ft. They will be 2900 tons deadweight. Work will be started shortly on the construction of the plant. W. T. Donnelly a well known naval

architect is interested in the proposition

Alexander MacGregor, R.N.R., representative in Halifax of the London Salvage Association, died suddenly on September 13. Considered a high authority on steamship construction in Canada, Mr. MacGregor has since the commencement of the war been the means of saving much tonnage. Within the past month he brought safely into Halifax two steamships which had gone ashore on the Magdalens, and in addition to these had to his credit the saving of the Matatua, which sank at her dock in St. John, and the Clematis and Lord Antrim, which were ashore in dangerous positions on the Cape Breton coast. Mr. MacGregor was sent as guarantee engineer for the steamships built on the Clyde for the Boston and Yarmouth steamship service, and was engaged by that company as their marine superintendent. Later he was with the C.P.R., and at the outbreak of the war was in Scotland, superintending the building of monitors for the British Admiralty. His relatives are all on the other side of the Atlantic.

WOODWORKING

Parry Sound, Ont.—The Parry Sound Lumber Co.'s planing mills, tramway and part of the dam, together with a quantity of lumber were destroyed by fire on Sept. 11.

PERSONAL

Arthur Chenoweth, has succeeded M. A. Hunter as apprentice instructor at the G. T. R. shops, Stratford, Ont.

A. M. Robertson, formerly on the staff of the Dominion Glass Co., has been appointed mechanical engineer of the Acadia Coal Co., New Glasgow, N.S.

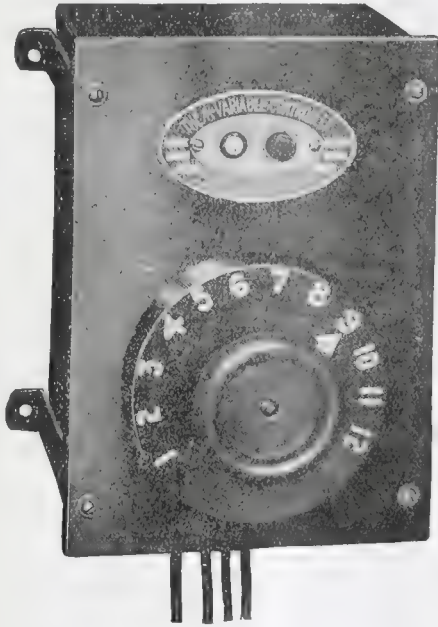
W. G. Ross, chairman of the Montreal Harbor Commission was re-elected president of the American Port Authorities at the convention held in Cleveland last week.

E. Jordan, has been appointed general manager and chief engineer of L'Air Liquide Society in succession to E. Roger who has resigned. The head office of the company is in Montreal.

W. H. Biggar, K.C., has been appointed as vice-president and general counsel of the Grand Trunk Railway. Mr. Biggar is also vice-president and director of the Grand Trunk Pacific Railway and other associated companies. He was appointed general counsel of the road in 1910, after holding the position of general solicitor for some years.

M. A. Humber, who has been local instructor of apprentices in the Grand Trunk shops at Stratford, Ont., has been appointed apprentice examiner over the whole system, which will necessitate him making monthly visits to the shops at Ottawa, Montreal, Battle Creek, as well as Stratford, to conduct examinations. His headquarters will be at Stratford.

Aikenhead's



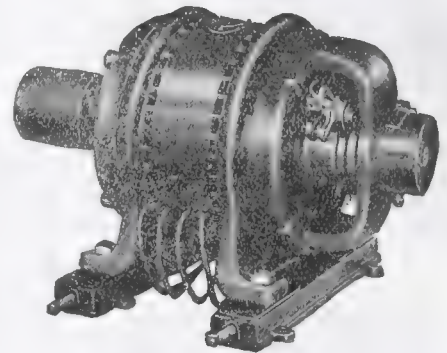
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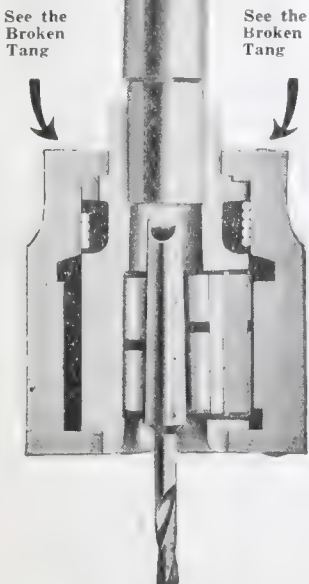
Perhaps you are about to discard some taper shank drills because the tangs are broken off—DON'T DO IT—they are worth their weight in gold. You can use them just as they are with a

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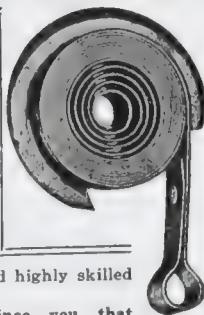
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TRADE GOSSIP

Ottawa, Ont.—C. A. Magrath, Canadian Food Controller, has issued a warning to coal dealers that they are not to increase prices, now that winter is approaching, without first making representations to him.

The Pangborn Corporation of Hagerstown, Md., manufacturer of sand-blast equipment, has purchased and taken over the sand blast department of the Curtis Pneumatic Machinery Co., St. Louis, which will enable it to greatly increase its line of sand-blast equipment.

Tungsten Prices Firm.—The demand for tungsten has been more active and prices while firm are unchanged. Wolframite is quoted at \$23 to \$25 according to grade and Scheelite at \$26 per unit on the basis of 60 per cent. metal and 30c per unit additional up to 65 per cent.

Acadia Coal Co. Staff Change.—There have been several changes in the staff of the Acadia Coal Co. Neil McLean formerly manager at the Allan Mine, has been transferred to the Albion, and Rod Campbell, whom he succeeds, takes a position at the Allan. Edward O'Riley, formerly U. G. manager at the Allan, now assumes the position of mine manager. Jas. Mason has been promoted to the position of manager, and is in charge of the new workings at Thorburn.

More Shell Contracts Placed.—The Imperial Munitions Board has promised contracts for 6-inch shells to the owners of plants which hitherto made eight-inch and 9.2 inch shells, but which have been idle since the last contracts for these sizes expired and were not renewed owing to Britain's ability to turn out enough in its own plants. Should the owners of the works thus left idle care to convert the plants, the Board promises plenty of work.

Montreal, Que.—At a meeting held here recently of the Toronto Terminals Co., the following officers were elected: Howard G. Kelly, president; Sir George Bury, vice-president; Harry Phillips, secretary; H. E. Suckling, treasurer; W. H. Ardley, auditor, and J. W. Leonard, general manager. Good progress was reported on the construction of the new Union Station at Toronto, which has proceeded as rapidly as supplies of construction material will permit.

War Contract for Canadian Cottons.—A. O. Dawson, vice-president of the Canadian Cottons, Ltd., Montreal, states that the company has closed an order for 2,000,000 yards of khaki shelter tent duck. The order is said to have a value in the vicinity of \$700,000. The company, having received orders from the Canadian Government for this type of material running into considerable volume, which it is claimed has given every satisfaction, was asked by the American Government to submit a sample. This was done and met with approval, with the result that the order was placed.

Dawson, Y.T.—A large production of gold will result from the heavy summer rainfall, according to reports from

Nome, Alaska. Traces of platinum deposits in the Dime Creek country, tributary to the Kuyukuk River, on the lower Yukon, are being traced by experts, who said the metal comes from lava fields in the vicinity. A placer strike twenty miles west of Selkirk by a veteran Yukon prospector has resulted in quite a movement to that region. It is estimated that probably 150 claims have been staked on Kitchener and Seymour Creeks and their tributaries.

U. S. Government Let Shipyard Contracts.—Contracts for construction of a Government-owned shipbuilding yard at Hog Island, Penn., and for the construction therein of fifty fabricated steel merchant vessels, were let by the Emergency Fleet Corporation last Thursday to the American International Corporation. These contracts are the first actually signed for the three new plants in which the U. S. Government will have built a large number of fabricated ships. The Hog Island plant will cost slightly less than \$20,000,000. The other contracts will go to the Submarine Boat Corporation for a plant at Newark, and to the Merchants' Shipbuilding Co. for one at Chester, Pa.

Large Credit for Imperial Government. It is understood that negotiations to provide a credit of \$75,000,000 for Imperial Government purchases of meats, bacon, etc., in Canada are now in progress. The statement of the Minister of Finance, a few days ago, that larger credits to Great Britain would have to be arranged if Canada was to maintain its export trade, was followed at the beginning of the week by a conference between the Minister and representatives of the banks. The \$75,000,000 credit, if it is arranged, would probably be spread over a fairly long period, as the resources of the banks are already pretty well taken up with financing the ordinary business of the country, in addition to the special business placed through the Imperial Munitions Board.

Guarantee Interest on Drydock Bonds. The Drydock Subsidies Act, introduced by Hon. Dr. Reid in the Commons at Ottawa, on September 13, differs in one or two respects from the measure as outlined when the preliminary resolution was considered earlier in the session. The most important change provides that the Government may guarantee the interest on bonds issued for drydocks when the expenditure by the builders has reached one million dollars. It was first proposed to require an investment of \$500,000 before the Government assisted. The interest to be guaranteed will be up to 4½ per cent. instead of 4 per cent. In accordance with suggestions of the Admiralty the docks are to be 125 feet with a depth over the sills of 38 feet, a slight increase on former specifications.

Toronto Harbor Improvements.—The work of the Toronto Harbor Board for 1917 and 1918 is being confined solely to revenue-producing land in the Ashbridge's Bay harbor industrial area and the inner waterfront. Two hundred and fifty-seven acres have been filled in the former district and 160 acres are now under lease. This is valued at from

\$2,000 to \$3,000 an acre. Next year the commission intend to fill in about 150 additional acres, so that an asset worth at least about \$3,000,000 will be produced by a portion of the \$2,000,000 proposed to be expended next year. In addition to the 257 acres already reclaimed, there are 343 acres partially reclaimed. Work has been proceeding on the ship canal, and when the walls of this are complete, filling operations adjacent to it may be carried on. Work is now proceeding on the ship canal in the Ash-bridge's Bay area. This runs from the Toronto Bay, north of the eastern gap, 7,500 feet east, and is 400 feet wide. Of the 16,400 feet of wall required 10,000 feet has been constructed.

Forest Fires Destroy B.C. Timber.—An estimate, made by an expert forester who has travelled through the British Columbia regions affected by the recent forest fires, is that \$5,000,000 worth of timber was destroyed in Southern British Columbia alone. The loss by reason of the forest fires which have burned in the Alberta forest reserves is not nearly so great, in fact, would be covered, perhaps, by an estimate of \$200,000, and this loss was principally in the one great fire which swept the slopes of Crow's Nest Mountain in the Crow's Nest Pass country. The timbers lost are mostly fir, with some tamarack and pine and a few cedar trees.

U.S. to Limit Her Exports.—The United States Government has published a conservation list of materials which cannot be exported except under license. The ruling is intended for Northern European Neutrals but also affects Canada. The list follows: "Acetone; alcohol; aluminum; ammonia salts; ammonia nitrate; anhydrous ammonia; arsenate of lead; arsenate of soda; boiler tubes (iron and steel); butter; carbolic acid (phenol); castor oil and castor beans; chrome nickel, steel; cotton lintens; cyanide of sodium; ferromanganese; phosphoric acid; phosphorus; pig iron; potash and chlorate of potash; ferro-silicon; ferro-vanadium; flax, glycerine; iron and steel plates, including ship, boiler, tank and other iron and steel plates half inch thick and heavier and wider than six inches, whether plain or fabricated; mercury salts; nitrate of soda; nitric acid; nitric salts; potassium salts; saltpetre; scrap iron; scrap steel; searchlights and generators (suited for army or navy use); sodium sulphite; spiegeleisen; stearine and stearic acid; steel billets; steel blooms; steel ingots; steel sheet bars; steel slabs; sugar; sulphate of ammonia; sulphur and sulphuric acid; super phosphate; tinplate; toluol; tungsten; wireless apparatus; wheat; wheat flour and wool rags.

Must Use Cylindrical Head Planers.—For the protection of workmen employed in woodworking plants from the loss of a hand in square-head planers, the Minister of Public Works for Ontario has issued an order, immediately enforceable,

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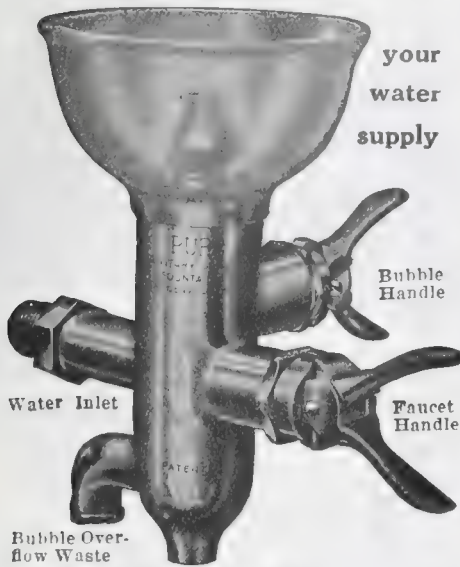
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These are the qualities that forced the leading safety and sanitary engineers to pick Puro in preference to all others. No device can be as efficient that does not contain all these qualifications; and Puro was not tied for first place; Puro was first. Don't be satisfied with half-way goodness, or makeshift drinking arrangements for your employees.

If the men in your factory must drink, give them a clean drink. Puro is clean—it does not rust or corrode. Puro is economical. It allows just the proper amount of cool, clean fresh water to come through the bubbler. No spurting, no overflowing, no loss. Puro regulates itself. You can attach it in five minutes. Tell us how many men in your factory and your water pressure in pounds—We'll tell you just what it will cost to "PURO-FY" YOUR WATER SUPPLY.

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TRADE MARK

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that in all pattern shops throughout the Province cylindrical head planers must be substituted for the square-head type so generally in use. If a workman's hand is caught in the cylindrical machinery only the tips of the fingers are severed, while in the square-head planer the whole hand is usually drawn into the machine and destroyed. The new order will eventually be extended to all wood-working factories in which the square-head planer is in use.

British Government Take Over Norwegian Freighters.—The steel vessels now being built in Vancouver for J. E. Knudson, representing large Norwegian shipbuilding interests close to the Norwegian Government, have been taken over by the British Government, according to notice received by the local construction firm. The Vancouver firm has a contract for eight boats. The keel of the first is laid and the boat is now in the frame, and is partially plated. It is expected the first boat will be completed in the fall.

Shipping Board Will Requisition Ships.—It is stated in Washington, D.C., that the Shipping Board and the Emergency Fleet Corporation will take control of all American shipping built, building and contracts, except small vessels unsuitable for the Government needs. When the request for \$500,000,000 additional appropriation is presented to Congress, it will be shown that a small part will be applied to shipbuilding. The money the Board already has available is nearly sufficient for the building program. The \$500,000,000 will be utilized for the most part in requisitioning practically every American ship over 2,500 tons now sailing the seas.

N. Y. Shipping Board Will Fix Rates.—An independent scheme of fixing trans-oceanic freight rates was worked out by the Shipping Board. Bainbridge Colby, of New York, the new member, received complete charge of rate-making. It was said the Board will fix the rates to be charged by all American vessels without regard to the rates charged on ships under the flags of the allied countries or on neutral ships. Efforts to pool all allied shipping undertaken in conference with the British War Mission have failed so far. The Board has flatly declined to surrender in any degree its control of American shipping.

B. C. Construction Programme.—British Columbia has a programme of construction, mostly of an industrial nature, which will necessitate the expenditure of nearly \$60,000,000. Work to the value of \$40,000,000 is now in progress or contracted for in the province. Of this sum, \$27,000,000 is for the newly-established shipbuilding industry. About \$30,000,000 is being expended on railway terminals, piers and wharves, dredging operations, sewer construction, cold storage plants, factories, mills, schools, churches, residences and stores. Of this sum, \$13,500,000 is being expended in Vancouver, \$8,500,000 in Victoria, and over \$7,000,000 in other parts of the province.

CATALOGUES

Nautical Instruments.—John Lilley & Sons, Ltd., London and North Shields, England, have issued a descriptive list of specialties in nautical instruments, such as chronometers, compasses, sextants, sounding apparatus, semaphores, etc. Each specialty is illustrated and briefly described. The instruments shown in the catalogue are stated to be only a selection from stock and are principally the company's special patterns.

Centrifugal Pumps.—Bulletin No. 7251 dealing with multi-stage centrifugal pumps made by the A. S. Cameron Steam Pump Works, New York. The bulletin contains specifications covering the principal features of the Cameron pump while the improvements which have been made at various times are discussed in detail. The illustrations include pump details and cross-sections. The concluding page contains some useful hydraulic data.

Heavy Duty Lathes made by the Bridgeford Machine Tool Works, Rochester, N.Y., are described and illustrated in a series of loose leaf bulletins recently issued. The machines described include 26 inch to 50 inch geared head lathes, a 26 inch cone driven lathe, double head and centre drive axle lathes and a heavy duty plain turning machine etc. A brief specification given of each lathe and the principal dimensions and weights are also included.

Hoisting Machinery.—The Shepard Electric Crane and Hoist Co., Montour Falls, N.Y., have recently issued a Handbook of Hoisting Machinery for Industrial Works 1917. The handbook which contains 130 pages 8 x 4 1/4 in., consists of a series of bulletins bound together in loose leaf form, illustrating and describing an extensive line of hoisting machinery and giving the capacities, speed and prices, etc., for the various sizes of equipment. The handbook is intended to present in clear and exact form such data as will enable engineers and managers conveniently to consider the application of hoisting and conveying units to the various uses for which they are adapted.

BOOK REVIEW

Homestead Map.—A publication which should prove of considerable interest to the prospective settler to Western Canada, has just been issued by the Natural Resources Intelligence Branch of the Department of the Interior, Ottawa, Ont. It is known as the "Homestead" Map and shows graphically the exact location of each quarter-section which is still available for entry under the free Government offer of 160 acres. The map has been published in four separate sheets, one each for Manitoba, Saskatchewan, Northern and Southern Alberta, respectively, and is available for free distribution in individual sheets or in complete sets.

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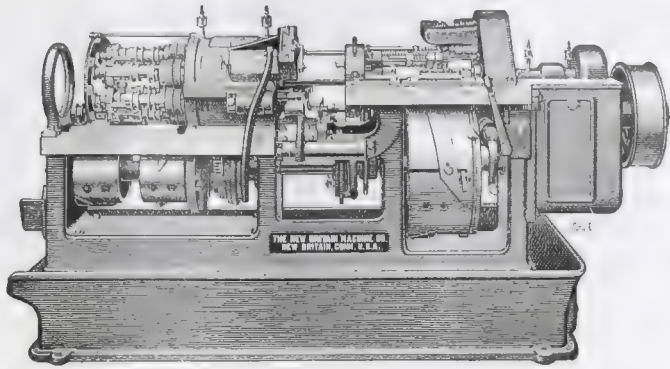
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THE system for distributing oil to the tools on the “New Britain” Six-Spindle Automatic Screw Machine is designed to eliminate much of the exterior piping heretofore common to all screw machines.

Oil is conveyed from the pump by means of a flexible metallic tube through an opening in the under side of the tool slide into a machined chamber at the centre surrounding the driveshaft bushing. From radially drilled holes connecting with this chamber the oil is tapped off at the circumference through short tubes to the individual tools.

This construction adds materially to the convenience of the operator as well as to the simplicity of appearance of the machine.

The pump is driven by spur gear from indexing shaft, which runs at constant speed regardless of speed of cam shaft or spindles. This insures a uniform supply of oil to the work under all conditions.

Sight feed oilers on top of spindle cylinder housing supply oil to the spindles when in the upper position, each bearing being lubricated in turn as the cylinder indexes. The danger of core dust and sand working into the bearings, which is common to many types of screw machines, is eliminated from the “New Britain” by machining the spindle carrier all over.

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MARINE

Captain J. D. Warren, pioneer sealer of Victoria, B.C., and owner of the S.S. Beaver, the first steamer to ply the Pacific, died in the above city on September 9, aged 80 years.

Sarnia, Ont.—The tug Fischer, recently sold by the Reids, of Sarnia, to the French Government, has left for Montreal, where she will be fitted for ocean service. The Fischer was built in Toledo in 1896, and was one of the most powerful tugs on the lakes. She has been employed on many big wrecks since 1911. The selling price of the tug paid by the French was \$265,000.

For Ocean Service.—Six vessels owned by the Canada Steamship Lines have been taken over, jointly, by the Canadian and British Governments for service. This is as a result of a decrease in shipping caused by ravages of the German U-boat campaign. The ships sold are the H. N. Pellatt, J. H. Plummer, Beaverton, A. E. Ames, Mapleton and Saskatoon.

To Protect Shipyards.—Precautionary measures, designed to protect ships under construction in Canadian shipyards, have been taken by an Order-in-Council. This provides that it shall not be lawful for any owner of a ship, ship's agent, ship broker, who is not a natural-born British subject, to enter or to be upon any shipbuilding premises without the permission in writing of the Minister of Marine and Fisheries. The penalty is a fine not exceeding \$500.

Aemilius Jarvis, of Toronto, has been awarded the Special Service Decoration for his patriotic work since the outbreak of war. Mr. Jarvis placed his offices at 103 Bay Street at the disposal of the Admiralty to facilitate the return of British naval reservists, and followed this up with active participation in the recruiting campaign for men for all branches of the British navy. Lieut. “Bill” Jarvis, a son, lost his life at St. Julien; a second son is a member of the C.E.F. The only other decoration of this order conferred upon a Canadian was awarded to Sir John Eaton, whose patriotic efforts are well known.

\$20,000,000 Corporation.—A twenty million dollar corporation to operate ships between San Francisco and the Orient, has been formed by seven Japanese, who have amassed fortunes in the shipping boom in the Far East, according to Teiji Ishida, president of the concern, who was in San Francisco to-day to establish an American office.

One of the directors of the concern, said Ishida, is Chozo Ito, who five years ago was a mechanic in a Tokio shipbuilding yard, and is now considered the richest man in Japan.

It is planned to make Manila a port of call to relieve the shipping conditions there, where it was said millions of dollars worth of hemp, copra, rice and other commodities are piled on the docks waiting shipment.

The next page

is the first page of the Classified Advertising Section. Turn over and look through these pages. Whether you want to buy or sell, employ or be employed, you'll doubtless find there a proposition to interest you. If you don't, tell your wants in a little ad.

CANADIAN MACHINERY

Classified Advertising Section

143-153 University Avenue - Toronto

CLASSIFIED ADVERTISING

Rates (payable in advance): Two cents per word first insertion; one cent per word subsequent insertions. Count five words when box number is required. Each figure counts as one word. Minimum order \$1.00. Display rates on application.

SECTION

FOR SALE

A PAYING PROPOSITION FOR RAILROADS or manufacturers. Wish to sell our Canadian rights with fixtures. Address Frank Bayless, 311 Fair Street, Springfield, Ohio. c9m

FOR SALE — 1 LEES-BRADNER THREAD miller, equipped for threading nose and base of 6" shells. Apply The Hayes Wheel Co., Chatham, Ontario. c9m

SECOND-HAND 26" NEWTON TYPE COLD saw cutting-off machine, arranged for motor belt drive and complete, with or without motor. Price \$600.00, cars Sherbrooke. MacKinnon, Holmes & Co., Limited, Sherbrooke, Quebec. c10m

ONE ARMINGTON & SIMS 10" x 12" HIGH speed engine, belted to one Westinghouse Electric Mfg. Co. direct current generator, 40 K.W., 550 volts, 75 amps.; speed 910 r.p.m.; also 40" 0"-10" double leather belting; all in good condition. Armstrong, Whitworth of Canada, Limited, Montreal, Que. c6m

FOR SALE—1 NEW 25 H.P. HOR. TUBULAR boiler, 1 second-hand 12 H.P. hor. tubular boiler, tested to 150 lbs.; 1 second-hand 50 H.P. loc. boiler; 1 second-hand Leonard 12 x 12 high speed engine; 1 second-hand 500-lb. belt-driven Beaudry power hammer, only in use two months; in perfect condition. Canadian Engineering & Mfg. Co., 128 Bleury St., Montreal, Que. c9m

HYDRAULIC EQUIPMENT FOR SALE.—The equipment listed below is in first-class shape having only been used about three months. Blue prints and specifications and foundations drawings will be furnished. 2—14 x 12 x 5" Fairbanks-Morse duplex steam driven high pressure pumps at 80 gals. per minute capacity each against 600 lbs. pressure, steam pressure 150 lbs. 1—Weighted Accumulator good for 1000 lbs. per sq. inch, 16" diameter, plunger 11 ft. stroke with squeezing water cushion and wooden outside bumper blocks. The tank for the weighting material surrounding the cylinder is 10' 7" in diameter and 11' 0" high. 1—Return Suction Tank for above pumps and accumulator. Height, 9' 0", diameter 8' 0". Capacity, 2700 Imperial gallons. This equipment can be shipped immediately and is open for inspection at the company's plant. Prices on application. The Canadian Copper Company, Copper Cliff, Ont. c8m

PATTERNS

THE BRANTFORD PATTERN WORKS ARE fully equipped to manufacture patterns, large or small, from blue prints, sketches or sample castings. Expert management. Prompt service. Prices reasonable. Brantford Pattern Works, 49 George St., Brantford, Ont. c13m

SPECIAL MACHINERY

H. C. THOMAS, GENERAL MACHINE SHOP, tools, jigs and machine repairs. 301 King St. W., Toronto. Telephone Adelaide 3836. tf

MANUFACTURERS—WE CAN UNDERTAKE work to any specification—munition production equipment or otherwise. Write W. H. Sunbling Machinery Co., 7 St. Mary St., Toronto

SITUATIONS WANTED

TOOL MAKER ACCURATE, GOOD draughtsman desires responsible position. Box 330, Canadian Machinery. c14m

A PRACTICAL MACHINE SHOP SUPERIN- tendent of broad experience in Canada and States will be open for position as superintendent or general foreman, July 15th. All references. Address Producer, Box 321, Canadian Machinery. c8m

MACHINE SHOP FOREMAN DESIRES change as shop foreman or master mechanic. Acquainted with scientific management; 26 years' experience. Box 328 Canadian Machinery. c11m

A PRACTICAL MACHINE SHOP SUPERIN- tendent of broad experience in Canada and States wants position as superintendent or general foreman. Large or small shop on ammunition or machinery; All references. Address Box 327, Canadian Machinery. c9m

WORKS MANAGER OR GENERAL SUPER- intendent open for engagement—28 years' experience as machinist, toolmaker, inspector, superintendent of tool-making and tool-designing, experimental and development work, heat-treating and testing of steel in raw and finished state; shop superintendent, works manager. Experience has been on rifle work, electrical work, typesetting machines, lock-making and bridge-work. Correspondence solicited, and can furnish good references. Address Box 332, Canadian Machinery. c14m

FOR SALE

4—No. 2 Foster Plain Head Screw Machines and 2—No. 3 Foster Friction Head Screw Machines all completely equipped with air cylinders and air chucks suitable for use on No. 80 Time Fuse Bodies. These machines have never been used. Also one Graduating Machine made by the American Ammunition Co.

For full particulars apply the

**Holden Morgan Thread
Miller Limited**

Toronto, Ontario

c14m

WANTED

WANTED—SMALL SECOND-HAND POWER press, in good condition. Hosmer Stamping & Die Works, Ltd., 831 Dundas St., Toronto, Ont. c13m

WANTED—SECOND-HAND POWER SQUAR- ing shear to cut No. 10 gauge steel up to 24" wide. Must be in good working condition. Packard Electric Company, St. Catharines, Ont. c4m

SITUATIONS VACANT

MAN WANTED TO ACT AS SUPERINTEND- ent of a fast growing die and stamping plant in City of Toronto. Box 329, Canadian Machinery. c12m

NIGHT SUPERINTENDENT FOR SHELL MA- chinery plant in Western Canada; knowledge of four point five shell and good all-round experience essential. Write, stating qualifications, salary and references, otherwise application will not be considered. Box 325, Canadian Machinery. c6m

FOREMAN WANTED—FOR SHOP IN CEN- tre of Toronto, with up-to-date equipment, employing about thirty men, doing jobbing business and making fine special machinery and tools. When applying state experience and give references, also wages expected. Only first-class men need apply. Box 326, Canadian Machinery. c8m

FOR SALE

- 4—14 x 6 Flather Engine Lathes, C.R., Q.C.G., new.
- 4—14 x 5 Reed Engine Lathes, R. & F.
- 3—18 x 8 Davis Engine Lathes, D.B.G.
- 1—18 x 10 Rahn-Larmon Engine Lathe, new.
- 1—18 x 12 Rahn-Larmon Engine Lathe, new.
- 1—22" x 10' Nicholson & Waterman Engine Lathe.
- 1—No. 13 B. & S. Automatic Gear Cutter.
- 1—30" Newark Automatic Gear Cutter.
- 1—5 x 48 Pratt & Whitney Plain Grinder.
- 1—No. 2 Bath Universal Grinder.
- 1—12 x 60 Modern Plain Grinder, new.
- 2—Lees-Bradner Thread Millers.
- 1—30 x 30 x 8' Powell Planer, new.

Brownell Machinery Co.
Providence, R. I.

Complete 18-pr. Shrapnel Plant for Sale

PRINCIPAL ITEMS AS FOLLOWS:

- 1-Cutting off Machine, with 15" three jawed chuck.
- 1-Lathe, 28" swing, 8' bed.
- 1 Air Chuck, Double End Rough Turning Lathe.
- 1-Single End Rough Turning Lathe.
- 1-Single End Lathe, for bass roughing.
- 1-Single End Base Facing Machine.
- 1 Double End Tool Grinder.
- 1 Jenckes Grinder.
- 2-Rotary Machines, C.M.C. with turrets.
- 2-C.M.C. Lathes, equipped for nosing and tapping.
- 1-22" Davis Turret Lathe.
- 1 Jenckes Copper Band Lathe.
- 1-Gisholt Lathe, with 15" three jawed chuck.
- 1-Lo-Swing Lathe for turning profiles.
- 1 Tool Grinder, 34" wheel.
- 1-Lathe, 14" swing, 6' bed.
- 2-Ford Smith Shell Grinders, complete.
- 1-17" LeBlond Lathe, equipped for wavy groove.
- 1-Drill Press, fitted for screwing in sockets.
- 1-16" Swing Acme Turret Lathe, for turning sockets, fitted with air chuck.
- 1-Double End Painting Machine, with 1/4 h.p. motor.
- 1-Jenckes Air-operated Copper Band Press.
- 1 35 H.P. Canadian General Electric Motor, complete with starting box.
- 1 30 H.P. Westinghouse Motor, 550 volts, complete with starting box.
- 1-49 H.P. Canadian General Electric Motor, 2,200 volts, complete with starting box.
- 1-Westinghouse 40 H.P. Induction Motor, 550 volts, complete with starting box.
- 1-Nosing Press, for nosing shells.
- 1-5 H.P. Canadian General Electric Motor for same.
- 1-Hoskins Pyrometer.
- 1-Nose Furnace.
- 1-Tempering Furnace.

Jenckes Machine Co., Ltd.
Sherbrooke, Que.

Single End Punch

- 1-30" Throat Iron on Single End Punch and Shear, cap. 3/4 through 3/4. Rectangular gear drive.

RIVERSIDE MACHINERY DEPOT

17-29 St. Aubin Ave., Detroit, Mich.

ROCK CRUSHER

Allis-Chalmers Gates Works Rock and Ore Crusher, size "1K", receiving opening 10" x 30"; discharge, 18" x 24". Capacity 20-40 tons per hour, weight, 22,000 lbs.

NEW YORK MACHINERY EXCHANGE
50 Church Street : : New York City

IS IT HERE?

If what you want isn't advertised here, insert a small ad. outlining your wants. Mail your copy to-day for next week's issue.

CANADIAN MACHINERY
Classified Advertising Section
143 University Ave., Toronto

H. W. PETRIE of MONTREAL Limited Montreal, Que.

LIST OF NEW AND USED MACHINERY IN STOCK FOR IMMEDIATE SHIPMENT

ENGINE LATHES

- New 13" x 5' Lancaster Sgl. B.G., Geared Feed.
- New 15" x 6' South Bend, Sgl. B.G., Stand. Change Gears.
- New 16" x 6' South Bend, Sgl. B.G., Stand. Change Gears.
- New 15" x 7' Oliver Dbl. B.G., Q.C. Gear. Oil Pump and Pan.
- New 16" x 24" x 10' South Bend Gap Sgl. B.G., Stand. Change Gears.
- S.H. 17" x 8' Greaves Klusman Sgl. B.G., Geared Feed.
- New, 18" x 8' Greaves Klusman Dbl. B.G., Geared Feed.
- New 18" x 8' Giddings & Lewis Dbl. B.G., Geared Feed.
- New 18" x 8' Stevens Sgl. B.G., Standard Change Gears.
- New 18" x 8' South Bend Sgl. B.G., Stand. Change Gears.
- S.H. 18" x 10' Muller Sgl. B.G., Standard Change Gears.
- New 18" x 12' South Bend Sgl. B.G., Stand. Change Gears.
- S.H. 20" x 10' Flather Sgl. B.G., Standard Change Gears.
- S.H. 36" x 10' Fay & Scott Sgl. B.G., Stand. Change Gears.

HEAVY DUTY MANUFACTURING LATHES

- New 20" x 8' Petrie Heavy Duty Manufacturing Lathes.

TURRET, SPEED AND BRASS LATHES SCREW MACHINES

- New 13" x 7' Putman Speed Lathe.
- S.H. 15" x 5' 6" Fox Brass Lathe with Chasing Attachment.
- S.H. 30" x 10' Vilter Lathe, Friction B.G., Geared Feed with 18" Hex. Power Feed Turret.

DRILLS

- New 20" Excelsior, Back Geared Wheel Lever, Power Feed.
- New 20" Silver, Back Geared Wheel Lever, Power Feed.
- New 14" Leland Gifford Single Spindle Sensitive.
- S.H. 14" Avey Spindle Spindle Sensitive.
- S.H. 14" Foote-Burt Four.
- New No. 1 Emco Bench Single.

HACK SAW MACHINES

- New Peerless High Speed.
- New No. 1 Rapid.

GRINDING AND BUFFING MACHINES

- New 20" Ford Smith Water Tool Grinder.
- New 18" Ford Smith S.O. General Purpose Pedestal Grinder.
- New 16" Ford Smith S.O. General Purpose Pedestal Grinder.
- New 12" Ford Smith S.O. General Purpose Pedestal Grinder.
- New 12" Ford Smith S.O. Combination Grinder and Buffer.
- New 12" Ford Smith S.O. Buffing Machine.

MISCELLANEOUS

- S.H. No. 22 Garvin Vertical Milling Machine.
- S.H. No. 9 Burke Hand Milling Machine.
- New 14" National Bolt Cutter with Lead Screw Attachment.
- New No. 1 Grabo Metal Saw Table.
- New D4 Rock River Slitting Shear.
- New No. 4 Chicago Ouel Bending Brake.

Telegraph, Phone or Write for Prices and Further Particulars

H. W. PETRIE of MONTREAL LIMITED MONTREAL, QUEBEC

PETRIE'S LIST

Of New and Used Machine Tools Stock for IMMEDIATE DELIVERY

TURRET LATHES AND SCREW MACHINES.

- 15" x 5 1/2' American, fox.
- 16" x 5 1/2' MacGregor, D.B.G. (3)
- 16" x 6' Pratt & Whitney, turret.
- 20" x 7' Fay & Scott.
- 22" x 8' Pratt & Whitney.
- 24" x 10' Conradson, D.B.G.
- 24" x 8' Lodge & Shipley.
- 26" x 8' Fay & Scott, B.G.
- 2" x 24" Stevens Screw Machines (2).
- No. 2 Warner & Swasey, plain head.
- No. 6 Warner & Swasey, friction head.

ENGINE LATHES.

- 13" x 6' Filsmith, D.B.G.
- 14" x 6' Lodge & Shipley.
- 15" x 8' Sebastian, back geared (2).
- 16" x 8' McDougall, back geared.
- 18" x 6' New Haven.
- 18" x 8' C.M.C., double back geared.
- 18" x 10' Putnam, back geared.
- 20" x 8' Fifield, back geared.
- 21" x 8' Bawden, heavy duty (3).
- 24" x 11' Pond, back geared.
- 30" x 10' Ames, back geared.
- 31" x 16' Fifield, back geared.
- 18" x 32" x 12' C.M.C. gap.
- 24" x 40" x 20' Dundas, gap.
- 28" x 50" x 24' Bertram, gap.

DRILLS.

- 13" Perfect, 2-spindle.
- 16" Barr, sliding head.
- 18" Buffalo, post drill.
- 20" Perfect, lever feed.
- 20" Silver, back geared.
- 22" Barnes, back geared.
- 24" Kerkhoff, sliding head.
- 40" Bickford, back geared.
- 46" Allfree, upright.
- 64" Canedy-Otto, wall radial.
- No. 10a Baush, 16-spindle.
- D-1 Colburn, heavy duty.

GRINDERS.

- No. 1 Cincinnati, universal tool.
- No. 2 Landis.
- No. 2 Sellers, universal.
- No. 3 Modern, universal.
- No. 3 La Salle, plain and surface.
- 24" Barnes, wet tool.
- 20" Gardner, disk.

IRON PLANERS.

- 20" x 20" x 5' Bertram.
- 24" x 24" x 6 1/2' Bertram.
- 25" x 25" x 12' Lodge & Davis.
- 36" x 36" x 10' Sellers, 4 heads.
- 40" x 40" x 12' New Haven, power feed.

MILLING MACHINES.

- Bertram, plain.
- Brown & Sharpe, power feed, plain.
- Van Norman, bench.
- No. 2 Ford-Smith.
- No. 4 Fox, universal.
- No. 6 Whitney, hand feed.

SHAPERS.

- 16" Canada Mach. Corp.
- 16" Queen City, back geared.
- 24" Bertram, back geared.
- 24" Gould & Eberhardt.
- 30" Morton, draw cut.

MISCELLANEOUS.

- 6" and 12" Racine Hack Saws.
- 4" and 6" Robertson Hack Saws.
- 6" Kennedy Cutting-off Machine.
- 12" Hall Pipe Machine.
- No. 2 Colburn Keyseater.
- No. 5 Grant Rotary Riveting Hammer.
- Nos. 1 and 3 1/2 Greenerd Arbor Presses.
- No. 2 Bliss Foot-power Press.
- No. 3 West Tire Setter Banding Press.
- No. 3 Goldie & McCulloch Banding Press.
- Brown-Boggs Punching Press.
- Bertram Single-end Punch and Shear.
- No. 3 Dundas Double-end Punch and Shear.
- 7" Geared Bending Rolls.
- 1500-lb. Toledo Drop Hammer.
- 450-lb. Williams Drop Hammer.

H. W. PETRIE, LTD.
FRONT STREET WEST, TORONTO

FOR SALE

The following used machinery, guaranteed to be in first-class condition, at lowest prices:—

- 1 16" x 8' Hendey Engine Lathe.
 - 1 18" x 10' Cisco Engine Lathe.
 - 2 LeBlond Heavy Duty 19" x 8' Engine Lathes.
 - 1—Pay Scott Engine Lathe, 24" x 8', with extra turret.
 - 1—LeBlond Engine Lathe, 17" x 6'.
 - 2 Oliver 16" x 7' Double Back-geared Engine Lathes.
 - 1 11" x 7' Niles Engine Lathe.
 - 1—16" x 8' Butler Engine Lathe.
 - 1—Boring Lathe for 9.2 or 12" shells.
 - 1—Turning Lathe for 9.2 or 12" shells.
 - 1—Jones & Lamson 3 x 36 Flat Harkness Turret Lathes.
 - 2 No. 50 Foster Turret Lathes, 16" swing.
 - 4 John Hall & Sons No. 4 Cutting-off Machines.
 - 5—10" x 36" Norton Grinding Machines.
 - 1 6" x 32" Norton Grinding Machine.
 - 1 Wilmarth & Morman Wet Tool and Twist Drill Grinder.
 - 1 Banfield Plug Milling Machine.
 - 2—Otis-Fensom Bench Thread Millers.
 - 1—Cincinnati Universal Milling Machine, No. 3.
 - 1—Brown & Sharpe Milling Machine, No. 1B.
 - 1—Surface Grinder.
 - 1 Gardner Grinder, No. 4, complete with discs.
 - 1—No. 1 Racine Rapid Hack Saw.
 - 1 Gould Triplex Hydraulic Pump, Fig. 997, single acting, 1 1/4" x 6".
 - 1—Jno. Steptoe Shaper, 20" x 24" traveling head.
 - 1—Cincinnati Bickford Drill.
 - 1—Holden-Morgan Marking Machine.
 - 2—Northern Electric Co.'s Electric Soldering Irons.
 - 1—1/15 H.P. General Electric Motor.
 - 1—Brown-Boggs Nosing Press, No. 320.
 - 1—Hisey Wolf Grinder, Portable Electric.
 - 1—Dumore Grinder, Portable Electric.
 - 8—Mech. Engr. Co. Fuel Oil Burners.
 - 4—Mech. Engr. Co. Fuel Oil Burning Furnaces, 24" x 16".
 - 1—Gilbert & Barker Fuel Oil Burning Furnace, 24" x 16", C-15.
 - 6—Gilbert & Barker Fuel Oil Burners, 2".
 - 2 Gilbert & Barker Positive Pressure Blowers, 3".
 - 2 Canadian Buffalo Forge Co. Blowers, No. 6, 30".
 - 1—Portable Blacksmith's Forge.
 - 1 Circular Banding Press, suitable for 18-pdr. shells.
 - 4—Shore Instrument Co.'s Scleroscopes.
 - 3 Resin Pots, Simplex Electric Co.'s make.
 - 3 Chapman Double Ball-bearing Trucks.
 - 2 Oil Quenching Tanks, 8" long x 3" 4" wide x 2' 6" deep.
 - 1 Bury Air Compressor, 6 x 8.
 - 2 Brown Instrument Co.'s Pyrometers.
 - 1 Thwing Pyrometer.
 - 3 Fairbanks 25-lb. Scales.
 - 1—Clipper Belt Lacer.
 - 1 International Time Clock for 200 men, with racks for tickets.
- Also small tools, rotary pumps, vises, pulleys, belting and shafting, etc., etc

All can be inspected at Midland, Ontario

Prices on application to
Zenith Coal & Steel Products, Limited

MONTREAL—402 McGill Building
TORONTO—1410 Royal Bank Bldg.

Eastern Machinery & Equipment Co., Inc.

319 COMMERCIAL TRUST BUILDING PHILADELPHIA, PA.

NEW TOOLS FOR IMMEDIATE DELIVERY.

- 4—12" x 36" Bridgeport Grinders.
- 1—2 1/2" x 5" Wm. Sillers Tool Grinder.
- 3—15" x 9" Turning and Boring Lathes.
- 3—25" x 11" Am. Patt. Eng. Lathes.
- 3 Double head Sullivan Grinders.
- 1—32" x 12" Pittsburgh Engine Lathe.
- 1—3" Ohio Shaper.

USED MACHINERY ENGINE LATHES.

- 4 New 30" x 5" Wickes Engine Lathes, quick-change gear, double back gear.
- 8—30" x 10" American Gear head A-1.
- 5—20" x 8" Lodge & Shipley, geared head, q.c.g.
- 1—27" x 10" Bullard.
- 1—27" x 6" Bullard.
- 3—24" x 11" American.

TURRET LATHES.

- 9 18" x 6" Warner & Swasey Hexagon Turret, geared friction head.
- 30 Ford & Johnson No. 4 Automatic Turret Machines.
- 3—3 x 36 Jones & Lamson Flat Turret.
- 2—24" x 24" Jones & Lamson Flat Turret, bar equipment. Full set Turret Tools.
- 9—25" Gisholt 12" Collet chuck 6 1/2" hole in spindle threading lathe.
- 3 25" Putnam heavy duty lathe.
- 14" x 6" Lodge & Shipley Turret. Backgear-1.
- 5 24" Gisholt Steptoe cone, 6 1/2 H.S.

BORING MILLS.

- 1—Binse Horizontal Boring Mill, 5" bar.
- 6—66" swing Bement-Miles Die Turning Mills, two swivel heads, 1 1/2" under rail.
- 1—37" Bausch Boring Mill, 2 heads, good as new.
- 1—Cylinder boring mill, capacity of 24" diam. to 96" diam. 10' long.

Tool equipment included, good as new.

1—42" Bullard Boring Mill (2) heads.

MILLING MACHINES.

- 1—No. 3 LeBlond Plain Miller, table 13 1/2 x 58 1/4.
- 1—No. 2 Kemp-Smith, table 10' x 45".
- 1—24" x 3' Beaman & Smith Open Side Slab Miller, with two vertical spindles.
- 1—No. 1 1/2 Universal Milling Machine.

GEAR CUTTERS.

1—24" Fellows Gear Shaper.

2—36" Fellows Gear Shapers.

SCREW CUTTING MACHINES.

- 1—Cleveland automatic.
- 1—No. 55 National Acme 4 spindle, good as new.
- 1—No. 54 National Acme 4 spindle, good as new.

SLOTTERS AND SHAPERS.

- 1—9" Bement Slotter.
- 1—15" Bement Slotter.
- 1—20" Wharton Slotter.
- 1—20" Gould & Eberhardt Shaper. B.G. Vise. C.S.
- 1—16" Steptoe Shaper.

GRINDERS.

- 8 12" x 30" Bridgeport.
 - 1—1 1/2" Full Universal Lathis Machine.
 - 1—No. 13 Brown & Sharpe Universal and Tool Grinder. Full equipment.
 - No. 1 1/2 Universal Cutter and Reamer Grinder.
 - 1—28" Bridgeport Face Grinder, with magnetic chuck.
 - 5—Fisher Profile Grinders for Cutters.
 - 1—No. 28 Brown & Sharpe Plain Grinder, 17" x 36".
 - 5—No. 6 Std. Universal Tool & Cutter Grinders.
- DRILL PRESSES.**
- 1—24" Bickford Upright back gear sliding head lever and wheel feed drill.
 - 1—4' Bickford Radial, with Tapping attachment, motor drive, with motor.

GOOD USED EQUIPMENT

OVERHEAD TRAVELING CRANES

- 20-Ton, 56' 3" span, three motor, 110 volts, D.C.
- 25-Ton trolley, three motor, 220 volts, D.C.
- 10-Ton, 40' span, 30' lift, three motor.
- 5-Ton, 47' 0" span, three motor, 220 V., D.C.
- Crane Motors, 10 and 4 1/2 H.P., 220 V., D.C.
- 10-Ton hand crane, 35' 0" span.
- 20-Ton hand crane, 29' 6" span.
- 2-Ton hand cranes, 22' span.

PUNCHES AND SHEARS

- Laver Shear (double), cap. 2" sq.
- 28" throat (single), cap. 3/8 x 7/8" (belt).
- 48" throat (single), cap. 3/16" (steam).
- 18" throat (single), cap. 1 1/2 x 1 1/2" (belt).
- 36" throat (single), cap. 7/8 x 7/8" (belt).
- 15" throat (single), cap. 3/4 x 1" (hand).
- 10" throat (double), cap. 1 1/2 x 1" (belt).
- Squaring Shear, 53" cap., 14 gauge.
- Angle Shear (double), cap. 6 x 6 x 3/4" (belt).
- Plate Shear (Univ.), 18" blade, cap. 3/4".
- Rotary splitting, 36" throat, cap. 1/2".
- Retax head, 5" throat, cap. 1/2".
- Coulter & McKenzie, cap. 3 1/2", spring steel.
- Gulstone, Perkins, No. 6, cap. 2 1/2" sq.
- Butterfly shear for light scrap.

MISCELLANEOUS.

- Ajax Belt Header and Upsetter, 2 1/2" cap.
- Acme Belt Header and Upsetter, 1 1/2" cap.
- Bulldozer, No. 12 Ajax, 30" stroke.
- Bending Roll, 6", drop end, 6 1/2 and 8" rolls.
- Lathe 24" 10" American, lat-1.
- Grinder, No. 10 B. & S. Plain.
- Grinder, No. 13, B. & S. Universal and Tool.
- Rotary Planer, 36", Cleveland No. 2.
- Saw, cold, 20" blade, 18" travel.
- Press (trimming) No. 11 Perkins, 16,500 lbs.
- Rolling Mill, 1 stand, 2 high, 30" bet. housings.
- First-class condition—quick shipments.

McCoy-Brandt Machinery Co.

Office and Warehouse:

216-218 Penn Ave., Pittsburgh, Pa.

Machinery, Bar Stock, Twist Drills, Dies & Taps For Sale

MACHINE TOOLS.

- 5—Rickert-Shafer Vertical Tapping Machines (used).
- 1—Power Hack Saw (used).
- 1—No. 1 Sheldons Exhauster.
- 1—Stewart Gas Furnace (used).
- 1 No. 200 Oil Extractor (new).
- 6—No. 4 Smurr & Kamen Screw Machines, Auto. Chuck, W.F., B.G. (used).

BAR STOCK.

33,000 lbs. 1 3/8" Round C.D. Screw Stock.

1,500 lbs. 1/4" Round C.D. Screw Stock.

TWIST DRILLS (Straight Shank)

- 48—13/16" Left-hand, high speed steel.
- 18—21/32" Right hand, high speed steel.
- 36—41/64" Left hand, high speed steel.
- 12—17/32" Right hand, high speed steel.
- 108—33/64" Right hand, high speed steel.
- 84—33/64" Right hand, carbon steel.
- 191—13/32" Right hand, carbon steel.
- 59—1/4" Left hand, carbon steel.
- 36 B Right hand, carbon steel.
- 71—No. 1 Left hand, carbon steel.
- 48 No. 4 Right hand, carbon steel.
- 161—No. 6 Right hand, high speed steel.
- 61—No. 25 Left hand, carbon steel.
- 50—No. 26 Right hand, high speed steel.
- 200—No. 27 Right hand, carbon steel.
- 240—No. 45 Right hand, high speed steel.

DIES AND TAPS.

- 13—No. 5B Modern Opening Dies (used).
- 16—Set 1.998"-14 Whitworth Chasers for above heads (new).
- 4—No. 4B Modern Opening Dies (used).
- 12—Set 1 3/8"-14 Whitworth Chasers for above.
- 10—No. 4 Manufacturers Equipment Co. Collapsible Taps (used).
- 15—Set 1.378"-14 Whitworth Chasers for above taps.

The Packard Fuse Co., Ltd.
St. Catharines, Ont. c 13m

The Cost is Trifling

It will cost you very little to adequately tell your wants in this section. Send in your copy to-day for next week's issue.

CANADIAN MACHINERY

Classified Advertising Section
143 University Avenue, Toronto

For Quick Sale

PLANERS.

- 50" x 50" x 18' NEW HAVEN, two heads on cross rail, one extension head.
- 36 x 36 x 14' POND, two heads.
- 36 x 36 x 12' GRAY Planer.
- 30 x 30 x 8' CINCINNATI, two heads.
- 20 x 30 x 8' OHIO, one head.
- 24 x 24 x 6' LODGE & DAVIS.
- 36 x 36 x 12' DETRICK & HARVEY Open Side Planer, one head on cross rail, one side head.

LATHES.

- New 24" STEINLE, turret chucking equipment.
- New 36" x 24' BRADFORD, triple geared.
- 38" x 14' FAY & SCOTT, triple geared, quick-change gear.
- 40" x 18' PITTSBURGH, triple geared, quick change.

36" x 22' NEW HAVEN, triple geared.

MISCELLANEOUS.

- 84" BICKFORD Vertical Boring Mill, two swivel heads.
- 42" NILES Boring Mill, single pulley drive, two swivel heads.
- No. 3 ROCHESTER Horizontal Boring, Drilling and Milling Machine, 3 1/2" bar.
- New NATCO Multiple Spindle Drill, eight 1 1/4" spindles.
- 2 48" x 10" GOULD & EBERHARDT Automatic Gear Cutters, practically new.
- No. 2 LAPOINTE Broaching Machine.
- New No. 3H LEBLOND Universal Miller, heavy duty, cone type.
- New No. 2H LEBLOND Universal Miller, heavy duty, cone type.
- New GOULD & EBERHARDT Continuous Vertical Milling Machine.

A. R. WILLIAMS MACHINERY CO., LIMITED
 64 Front Street West Toronto, Ontario

"One insertion of this ad will do"

We receive from three to four ads a month from the firm who told us this when sending in their last ad. So you see they **know** what the Classified Advertising Section can do for them.

There is no reason why it won't do the same for you if you're proposition is of interest to our readers.

Canadian Machinery
 Classified Advertising Section
 143 University Avenue, Toronto, Ont.

RIVERSIDE Machinery List

We Own Every Tool Offered

ENGINE LATHES

- 1-8 x 10 Hamilton Standard Engine Lathe with turret.
- 1-8 x 10 Pittman Standard Engine Lathe
- 1-8 x 10 Reed Standard Engine Lathe
- 1-8 x 8 New Springfield Engine Lathe
- 1-8 x 6 J. E. & L. Standard Engine Lathe
- 1-6 x 8 New Springfield Engine Lathe
- 1-6 x 7 1900 Standard Engine Lathe
- 1-6 x 8 Reed Standard Engine Lathe
- 1-4 x 8 Sebastian Standard Engine Lathe
- 1-4 x 6 Springfield Engine Lathe
- 1-4 x 6 Phoenix Engine Lathe
- 1-4 x 6 Sebastian Engine Lathe
- 1-4 x 6 Van Work Engine Lathe

TURRET AND SREW MACHINES.

- 1-8 x 4 Peck & Jones Automatic Turret
- 1-8 x 4 Jones & Lamson Turret Lathe
- 1-2 x 4 Jones & Lamson Turret Lathe, cone head.
- 1-8 x 4 G. E. Turret Hand Screw Machine
- 1-8 x 4 Smith & Keeler Hand Screw Machine
- 1-8 x 4 Peck & Jones Hand Screw Machine
- 4-New 1 1/2" Pierce Turret Lathes.
- 1-New 4 x 4 Turret Lathe with screw Machine.
- 1-2 x 4 Peck & Jones Turret Machine, 6227 Tool.

MILLING MACHINES AND GRINDERS

- 1-8 x 2 Hill Precision Milling Machine
- 1-New No. 12 American Precision Milling Machine
- 1-8 x 12 Garvin Precision Milling Machine
- 1-New 8" B. W. & M. Surface Milling Machine
- 1-8 x 12 Garvin Precision Milling Machine
- 1-New 12" Pratt & Whitney Universal Tool Milling Machine
- 1-New 12" Keeler Machine and Drilling Machines
- 1-Fox Hand Milling Machines.
- 1-Garvin Hand Milling Machine
- 1-New No. 10 Brown Bond Mills
- 1-No. 12 Bath Universal Grinder
- 1-New 12" W. & M. Surface Grinder
- 1-New 12" W. & M. Surface Grinder
- 1-Miami Valley Universal Grinder

DRILL PRESSES.

- 1-7" Muller Plan Radial Drill Press
- 1-20" Baker H. D. Drill
- 1-20" Buffalo Plan Radial Presses
- 1-8 spindle 8" overhead, B. W. & M. High Speed Drill
- 1-8 spindle Fox High Speed Drills
- 1-8 spindle Fox High Speed Drills
- 1-8 spindle Nateso Drill
- 1-12" Leland & Groves High Speed Radial Drills

SHAPERS AND PLANERS.

- 1-24" Lodge & Davis Geared Shaper
- 1-48" Hendey Geared Shaper
- 1-48" New Springfield B.G. Crank Shaper
- 1-27 x 27 x 8' Cincinnati Planer, S.H.
- 1-14 x 16 x 5' Hendey Planer, S.H.

PRESSES AND HAMMERS

- 1-Waterbury Patent O.B.I. Press
- 1-No. 10 Perkins Drawing Press
- 1-No. 2-W Bliss Wring Presses
- 1-80lb. B. & S. Roll Band Hammer
- 1-80lb. P. & W. Roll Band Hammer
- 1-50lb. Fairbanks Roll Hammer
- 1-25lb. Bradley Helve Hammer

AIR COMPRESSORS.

- 1-16 x 18 x 12 Union State Pump Co. Driven Air Compressor
- 1-8 x 8 Westinghouse Steam Air Compressor
- 1-16 x 16 Clayton Bellows Air Compressor
- 1-8 x 8 Fairbanks Morse Piston Type Air Compressor
- 1-8 x 8 G. E. Bellows Steam Air Compressor
- 1-8 x 8 Fairbanks Morse Piston Type Air Compressor
- 1-8 x 8 Fairbanks Morse Piston Type Air Compressor
- 1-8 x 8 Fairbanks Morse Piston Type Air Compressor
- 1-8 x 8 Fairbanks Morse Piston Type Air Compressor
- 1-8 x 8 Fairbanks Morse Piston Type Air Compressor

We own in the works, for sale, a large stock of tools, both large and small.

RIVERSIDE MACHINERY DEPOT
 17-29 St. Aubin Avenue
 DETROIT, MICH.

IMMEDIATE DELIVERY

DRILLING MACHINES

Leland H.S., B.B., bench type.
 No. 1½ Knight Driller and Miller.
 32" Hamilton, s.h., b.g., p.f.
 32" W. F. & J. Barnes, s.h., b.g., p.f.
 20" W. F. & J. Barnes, 4 spindle.
 No. 11 P. & W. Multiple, 10 spindles.
 3' W. E. Gang Plain Radial.
 3½' W. E. Gang Plain Radial.
 4' Mueller Plain Radial.
 Pawling & Harnischfeger Horizontal Driller.

GEAR CUTTERS

Reynolds Hobber.
 No. 11 B. & S. automatic.
 30" x 9" G. & E. auto. for spur and bevel.
 24" x 7" G. & E. for spur.
 No. 3-26" B. & S. for spur.
 36" Walcott for spur.

GRINDERS

Yankee Drill.
 No. 1-½ Cincinnati Cutter and Tool.
 No. 2 Woods Universal Cutter and Tool.
 No. 23 B. & S. Gear Cutter.
 No. 1 Brown & Sharpe Universal.
 14" x 20" B. & S. Plain.
 Garvin hole grinder.
 Gisholt tool grinder.
 No. 5 Diamond water tool.
 No. 16 Gardner disc grinder.
 No. 24 Gardner disc grinder.

LATHES

13" x 5' P. & W., c.r., taper.
 14" x 6' Fairbanks, c.r. taper.
 16" x 6' Prentice, c.r.
 18" x 8' L. & S. pat. head, c.r. taper.
 18" x 10' Fitchburg, c.r.
 18" x 12' Barker, c.r.
 20" x 14' Blaisdall, c.r.
 21" x 12' New Haven, c.r.
 24" x 13' New Haven, c.r.
 36" x 20' American, t.b.g.
 36" x 22' New Haven, t.b.g.

PLANERS

24" x 24" x 4' Gray, one head.
 24" x 24" x 8' Cincinnati, one head.
 26" x 26" x 8' Pease, one head.
 30" x 30" x 8' Woodward & Powell, one head.
 30" x 30" x 8' Cincinnati, two heads.
 36" x 36" x 14' Sellers, one head.
 40" x 38" x 14' Putnam, one head.
 50" x 50" x 18' New Haven, two heads, two extension heads.

SCREW MACHINES

No. 1 Foster, Plain, A.C. and W.F.
 1" B. & S. Plain.
 16" P. & W. Plain.
 No. 2 Costello, plain head.
 No. 2 P. & W. friction head.
 No. 4 Pearson, geared head.
 No. 3 Bardons & Oliver, plain head.
 7½" Cleveland, automatic.
 TURRET LATHES
 No. 22 Garvin.

16" Lodge & Shipley.

25" Niles.
 2 x 24" Jones & Lamson.
 3 x 36" Jones & Lamson, chucking equipment.
 3 x 36" Jones & Lamson, bar equipment.
 21" Gisholt, with taper.
 2-24" Gisholt turret lathes, taper attachment.

PUNCHES AND SHEARS

No. 3 American Can.
 No. 3 Bauroth, O.B.I.
 No. 5 Bauroth Geared, O.B.I.
 No. 6 N. American Can.
 No. 2 L. & A. Angle Iron Shears, 5"x5"x½" (new).
 No. 5 L. & A. Double Punch & Shear, 5"x5"x½", 3"x3"x½", 1½ rd. (new).
 No. 1 L. & A. Multiple Punch (new).
 No. 1 L. & A. Horizontal Punch, ½" in 1" (new).

MISCELLANEOUS

No. 0 Mitts & Merrill Keyseater.
 50-lb. Bradley Strap Hammer.
 ¾" Acme Forging Machine.
 52" Niles car wheel boring mill.
 3" Stover Pipe Machine.
 6" x 14" P. & W. Thread Miller.
 No. 1 American Air Tempering Furnace.
 Belt Lacing Machine.
 3-ton Yale Duplex Hoist.

Stocker-Rumely-Wachs Company, 117-121 N. Jefferson St., CHICAGO, ILL.

SURPLUS MACHINERY FOR SALE

2-3" Hall cut-off machines
 1-Lodge & Shipley Turret Lathe, 22" x 10"
 1-Lodge & Shipley Turret Lathe, 24" x 10"
 2-Libby Turret Lathes, 18"
 1-Gisholt Turret Lathe, 18"
 2-Gisholt Turret Lathes, 21"
 1-Gardner Shell Base Grinder, 4A
 1-Ford-Smith Grinder, 20"
 2-Landis Traverse Grinders, No. 4 and 12 x 66
 1-Symington Band Turn Lathe, 3"
 1-3" Stamping Machine
 2-Tate-Jones Shell Furnaces
 1-16' Rushworth Plate Planer
 1-16' Bertram Plate Planer
 1-Coping Machine

Polson Iron Works, Ltd.
 TORONTO, ONTARIO

Let them know it's there

In complimenting us upon the results secured from their advertisement in this section, one advertiser said:

"Of course we would not have sold it without letting people know it was here, that is obvious, and thanks are due you for letting the people know it was for sale."

If you have any old or used equipment for sale, let people know it's there. Your message in Canadian Machinery will be placed before the probable buyers of such equipment.

Canadian Machinery

Classified Advertising Section

143 University Ave., TORONTO

LOOK—HERE THEY ARE

BORING AND TURNING MACHINES—Vertical

- 1-30" Bullard, one turret head
- 1-30" Flatbed, one turret head
- 1-36" Baush, 2 swivel heads
- 2-36" B & S, one turret head, Dec. Delivery
- 2-42" Colburn, 1 swivel head
- 1-NEW 42" Gisholt, 2 heads
- 1-64" Colburn, 2 swivel heads
- 1-72" Bickford, 2 swivel heads
- 1-72" Niles, 2 swivel heads
- 1-84" Niles, 2 swivel heads
- 1-90" Vertical Cylinder
- 1-NEW 84" Rockford
- 1-Niles 10'-16" Extension, 2 heads.

BORING MACHINES—Horizontal

- 1 No. 2 27" Barrett, 2 facing heads
- 1 Lucas 24" bar
- 1-Niles 2 1/2" spindle.
- 1-24" Cleveland, 24" bar takes 1' 6" compound table
- 1 No. 1 Barrett (Miller Error, 34" bar type).

BULLDOZERS

- 1-NEW No. 4 Garrison (same as No. 4 Williams White)
- 1-No. 7 High Speed Atlas 16" stroke
- 1-No. 9 Williams & White 16 1/2" Drive
- 2-No. 3 Williams & White 16 1/2" Drive
- 1-No. 3 Williams & White 16 1/2" Drive

COMPRESSORS—Air

- 1 Ingersoll Sargent Duplex, 8 x 14 1/2 x 8"
- 1 10" x 17" x 12" Single Cylinder Smith-Vail, Steam Driven.
- 1-10" x 12" Chicago Pneumatic, belt driven
- 1-Cincinnati Cross Compound, two stages, 750 cu. ft.
- 1-22" x 16" Ingersoll-Rand motor driven

CRANES

- 2-10-ton Electric, 47' span
- 1-50-ton Niles, 61' span
- 1-Locomotive 36' boom, standard gaged steam driven.

CUTTING-OFF MACHINES

- 30-Davis 4 1/2"
- 3-4" Curtis & Curtis
- 4-3 1/2" Hall
- 10-4 1/2" Williams.

DRILLING MACHINES—Radial

- 2-NEW 2' American cone drive
- 1-3' Bickford, semi-Universal table
- 1-3' Bickford, gear drive
- 3-3' New American, sensitive tapping attachment
- 1-NEW 3' Mueller, plain speed box drive
- 1-NEW 3 1/2' Western Drill, 86" circle.
- 2-4' Mueller Plain, speed box drive
- 1-NEW 4' Rverson belt drive
- 1-6' Baush Radial; arranged for motor drive
- 1-6 1/2' American Full Universal
- 1-NEW 6' Triumph Motor Drive, Sept. delivery.

DRILLING MACHINES—Heavy Duty

- 4-No. 310 Baker Single Pulley Drive, late type
- 2-NEW No. 2 Colburn
- 2-D-3 Colburn, plain Table.

DRILLING MACHINES—Multiple Spindle

- 4-NEW Ireland-Gifford Sensitive Four Spindle
- 1 14 Spindle Baush, capacity 1" holes, 36" circle.
- 1-No. 30-C Baush 12 spindle, capacity 1 1/2" holes, 30" circle.

GEAR CUTTING MACHINES

- 1-No. 3 Bickett Gear Rack Planer, delivery 60 days
- 1-No. 3 Brown & Sharpe Auto Gear Cutter spur
- 1-No. 3 Barber-Colman Hobber
- 1-NEW 6" Standard Gear Cutter, spur.
- 1-10" Gleason Bevel Gear Planer
- 1-15" Gleason Bevel Gear Planer
- 1-16" Bilgram Gear Bevel Generator
- 1-20" Grand-Lux Gear Hobber
- 1-No. 1 200 Schuchardt & Schutte Gear Hobber
- 1 20" x 8" G. & F. spur and bevel cutter
- 1-20" Fellows Gear Shaper
- 1 30" Becker Bramard
- 1 30" x 8" G. & F. for spur and bevel
- 1-NEW Flatbed, Split Pattern 20" Automatic Gear Cutter.

GRINDERS—Universal for Cutters, Drills, Reamers, etc.

- 1-NEW Norton No. 1
- 1-No. 1 Cincinnati
- 1-NEW Walker, No. 1 Outfit B
- 1-NEW No. 1 Cincinnati Universal.
- 1-NEW Walker, No. 2 Outfit K (capacity 9" x 30")
- 1-NEW Wilmarth & Morman, Style B-K
- 8-NEW No. 199 Wells.
- 1-Gisholt No. 5-12"
- 1-NEW LeBlond

GRINDERS—Cylindrical—Plan

- 1-NEW No. 12 B. & S. 8" x 20", Sept. delivery.
- 2-42" x 30" Modern Self-contained
- 2-40" x 30" Brown & Sharpe
- 1-42" x 30" Lanis, rebuilt
- 6-12" x 30" Modern self-contained, motor belt driven
- 2-12" x 42" Lanis Self-contained
- 6-12" x 48" Modern self-contained, motor driven.
- 1-NEW 10" x 50" Norton Sept. delivery
- 1-10" x 50" Norton
- 1-14" x 50" Norton
- 1-4 1/2" x 60" Lanis with crank grinding
- 1-NEW 10" x 72" Norton, Plain.

GRINDING MACHINES—Cylindrical—Universal

- 1-NEW No. 2 Bath, 9" x 20"
- 1-No. 2 Bath
- 1-Brown & Sharpe No. 13-8" x 24"
- 1-NEW No. 2 Walker, 9" x 20"
- 1-No. 1 1/2 12" x 30" Lanis
- 1-NEW No. 1 1/2 10" x 30" Bath
- 1-NEW No. 3 Modern 13" x 30", Sept. delivery
- 1-No. 3 12" x 40" Brown & Sharpe
- 1 1 1/2" x 4 1/2" Lanis
- 1-No. 4 Cincinnati, capacity 12 x 72"

GRINDERS—Internal

- 1-No. 1 1/2 Lanis
- 1-No. 70 Head
- 1-No. 75 Head

GRINDERS—Cylinder

- 1-No. 60 Head, single pulley drive

GRINDERS—Profile

- 1-NEW Cleveland

GRINDERS—Ring

- 1-No. 270 Head
- 1-No. 210 Head

GRINDERS—Surface

- 1-No. 1 Diamond, capacity 12" x 12" x 24" automatic
- 1-NEW No. 1 Wilmarth & Morman
- 2-NEW No. 1 1/2 Walker's complete
- 4-NEW No. 2 Reid (same as B. & S.)
- 1-No. 2 Brown & Sharpe.

HAMMERS—Power Forging

- 1-40-lb. Badley Helve
- 1-150-lb. Bradley Helve, upright.

HAMMERS—Board-Lift, Drop.

- 1-E. W. Bliss 800 lbs.
- 1-No. 4 Standard Machinery Co. 400 lbs.

HAMMERS—Steam Forging

- 1-360-lb. Bell Single Frame Hammer
- 1-600 lb. Niles Single Frame
- 1-18" Morgan & Williams, 600 to 800 lbs., 21" gap
- 1-NEW 2,000 lbs. Morgan Single Frame
- 1-3,000 lbs. Morgan Double Frame
- 1-3,000 lbs., No. 787, Morgan Engineering Co.

KEYSEATERS

- 2-No. 0 Mitts & Merrill
- 1-No. 1 Baker Bros.
- 1-No. 2 Mitts & Merrill.

LATHES—Manufacturing—Not Screw-Cutting

- 2-NEW No. 3 Harding Bros. Bench Lathes
- 49-14" x 6' Reed Stud and Bolt
- 12-No. 3 X, Reed-Prentice, semi automatic
- 14-16 x 8 Simplex Single Pulley Drive
- 3-16" x 6' Fairbanks-Morse, heavy duty
- 70-NEW Simplex, 16" x 8'
- 14-REED Prentice Shell Lathes for 4" or 18 lbs American shells
- 22-16" x 8' Battle Creek, heavy duty.
- 4 3" x 8' Merschon
- 53-20" x 10' Hinbuan, high duty.

LATHES—Engine

- 8" Wade Precision, Sept. delivery
- 1-14" x 8' Bradford, taper attachment
- 1-NEW Harding Bros. 15" Precision Lathe, Q.C.G., Page 35, Third Catalogue
- 3-NEW 10" x 6" Cleveland Tool Room Lathes, complete equipment
- 1-NEW 17" x 8' National quick-change gears
- 12-17" x 8' LeBlond, pan bed, quick-change gears
- 4-(NEW) 18 x 8 Hamilton
- 4-18" x 10' Lodge & Shipley
- 3-18" x 9' Chard
- 1-18 x 10 Henley quick-change gear, 14" chuck
- 1-NEW 19" x 9' LeBlond heavy duty
- 5-20" x 8' Lodge & Shipley, quick-change gear
- 1-NEW 20" x 8' American Heavy Duty
- 1-NEW 20" x 10" Cleveland Geared Head
- 19-NEW 22" x 10' Porter, S.B.G.
- 5-NEW 22" x 10' Monarch, D.B.G., Q.C.G.
- 9-22" x 10' Putnam oil pan turrets
- 1-24" x 14' Lodge & Shipley, patent head

LATHES—Turret

- 1-20" x 14" American quick change
- 1-17" x 11 Hamilton
- 2-24" x 12" S. & B.
- 1-30" x 20" Peckin single back-geared, rotary change gear, 10" die chuck
- 1-40" x 22" American double spindle.
- 1-26" x 24" New Haven
- 1-25" x 14" Patent Head, Lodge & Shipley compound
- 1-28" x 18" New Haven, single back-geared
- 1-18" x 18" S. & B.
- 1-NEW 20" x 14" American Double Back-Geared, Quick Change
- 1-NEW 22" x 12" Putnam Pattern
- 8-NEW 36" x 24" Putnam, triple geared
- 1-30" x 17" American Gear Head quick change
- 1-71" x 20" Fifield, triple-geared.

LATHES—Turret

- 9-24" x 26" Greenlee Flat Turret Lathes
- 1-24" x 24" Jones & Lamson
- 1-37" x 36" Jones & Lamson, geared sliding head
- 1-NEW 21" Gisholt
- 1-NEW 24" Gisholt
- 2-24" Libbey
- 18-6A Potter & Johnson.

MILLING MACHINES—Knee Type—Universal

- 1-New Kempsmith
- 1-No. 2 Kempsmith, 13" dividing head
- 1-No. 2 Kempsmith Vertical Attachment
- 1-No. 2 Kempsmith Back-geared
- 1-NEW No. 3 Kempsmith
- 1-NEW No. 4 LeBlond
- 1-NEW No. 4 LeBlond, heavy duty, immediate.
- 1-No. 4 Cincinnati
- 1-NEW No. 4 LeBlond

MILLING MACHINES—Knee Type—Plan

- 1-No. 0 Pratt & Whitney
- 1-No. 1 Kearney-Trecker
- 2-NEW No. 1 Kempsmith
- 2-NEW No. 1 1/2 American back gear
- 2-NEW No. 2 Rockford
- 1-No. 3 LeBlond
- 2-NEW No. 3 Kempsmith
- 1-No. 4 Brown & Sharpe

MILLING MACHINES—Vertical

- 1-NEW Bickett, No. 0
- 4-NEW No. 4-B Becker
- 2-No. 5 Becker.

MILLING MACHINES—Planer Type

- 2-Ingersoll Slab Millers, working surface of table 60" x 30"
- 1-Bement-Niles Heavy Duty Planer Type 24" x 24" x 12"
- 1-Ingersoll Slab, 17" x 48" cap.
- 1-No. 33 Becker-Bramard Slab Milling, working surface 7' x 20"
- 1-No. 2 Beaman & Smith Vertical Spindle, open side.

PLANERS

- 1-24" x 24" x 6' Gray, one head on cross-rail
- 24" x 24" x 8' Cincinnati, one head, used three months
- 1 30 x 30 x 10' Ohio Machine Tool Co., 2 heads
- 1-36 x 30 x 12' New Haven, one head
- 1-36 x 30 x 12' Woodward & Powell, two heads on cross-rail, one side head, Oct. delivery
- 1-36 x 30 x 12' Gray, two heads
- 1-38 x 38" x 14' Ditrick & Harvey Openside
- 1-40" x 40" x 11' Niles, four heads
- 1-40" x 40" x 10' L. W. Pond, 2 swivel heads
- 1-50" x 50" x 16' Pond, 2 heads on rail
- 1-52" x 52" x 16' Betts, 2 heads on cross-rail
- 1-52" x 52" x 16' Betts, two heads, right angle drive
- 1-64" x 42" x 16' Gray, 3 heads
- 1-54" x 42" x 16' Gray, 2 heads on cross rail one side head.

SCREW MACHINES—Automatic

- 3-No. 51 National Acme
- 2-No. 52 National Acme
- 2-No. 63 National Acme
- 9-No. 56 National Acme, 4 spindle
- 1-No. 516 National Acme, 1 spindle
- 4-13 1/2" x 2 1/2" Graham 4 spindle
- 1-13 1/2" x 4 1/2" Graham single spindle

SHAPERS AND SLOTTERS.

- 1-NEW 8 1/2" Betts Heavy Model Vertical Geared Crank Slatier
- 1-NEW 10" Betts Belt Drive
- 1-NEW 16" Springfield
- 1-16" Motor Drive Rockford
- 2-NEW 20" Milwaukee
- 1-NEW Barker 24"
- 1-NEW Smith & M.S. Triple-Geared
- 1-8" Walcott Gear Drive

W. F. DAVIS MACHINE TOOL COMPANY

CHICAGO, ILL. 549 Washington Blvd. CINCINNATI, OHIO 1018 Union Central Life Bldg. CLEVELAND, OHIO 508 Leader News Bldg. NEW YORK CITY Singer Bldg.

WRITE OR WIRE OUR NEAREST OFFICE FOR QUOTATIONS
THIS IS ONLY A PARTIAL LIST OF AVAILABLE MACHINES

If any advertisement interests you, tear it out now and place with letters to be answered.

New York's Greatest Stock

(Partial List)

BORING MILLS

- 52" Bement-Miles Vertical, two heads; motor driven, A.C., 250 volts.
- 36" Bridgeport Vertical, two heads.
- 34" Rogers Vertical, single turret head.
- Five 30" Bullard Vertical, single turret head.
- 20" Bullard Vertical Turret Lathe, with side and turret heads.
- 18" Bullard Vertical Turret Lathe, with side head and turret head.
- Betts Horizontal, 2¼" bar.
- 48" Niles Car Wheel.

MILLING MACHINES

- No. 4B Brown & Sharpe Plain, single pulley drive.
- No. 4 Cincinnati heavy duty Plain, single pulley drive.
- No. 4 Brown & Sharpe Plain.
- No. 2 Hendey-Norton Universal, dividing head, vise, arbor, vertical attachment.
- No. 2 Cincinnati Universal, dividing head.
- No. 2 Cincinnati Plain.
- No. 14A Garvin Plain.
- No. 1 Kempsmith Plain, gear box feeds.
- Two No. 5 Brown & Sharpe Vertical.
- Beaman & Smith 2 spindle Vertical Slab, table 24" x 48".

LATHES

- 60" Fifield, 9' centers, face plate drive.
- Two 60" x 20' New Haven, face plate drive.
- 48" x 16' Niles Tire or Car Wheel, double head type, face plate drive, triple geared.
- 36" x 20' New Haven, compound rest, power cross feed, 14' 6" between centers.
- 36" x 16' Bradford, compound rest, power cross feed.
- 36" x 14' Putnam, heavy duty, triple geared, face plate drive.
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- 30" x 16' Fifield, raising blocks to swing 38", compound rest, power cross feed.
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Exchange, Inc.**

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MACHINE TOOLS IN STOCK

- No. 4 Cincinnati Universal Miller with vertical attachment and power feed Rotary Table.
- No. 3 LeBlond Universal Miller.
- No. 1½ NEW American plain Millers.
- 5—No. 0 NEW Steptoe Hand Millers.
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- 24" x 10' NEW Carroll-Jamieson heavy duty lathe.
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- 20" x 10' Hamilton lathe.
- 6—19" x 8' NEW, Sidney D.B.G. quick change lathes, swing 21" over V's.
- 3—17" x 8' NEW, Sidney D.B.G. quick change lathe, swing 19" over V's.
- 15" x 6' NEW, Sidney D.B.G. quick change lathe, swings 17" over V's.
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- 15" x 6' NEW, Carroll-Jamieson, quick change.
- 48" Harrington plain Radial Drill.
- 36" Dresses plain Radial Drill.
- D-4 Colburn high duty Drills.
- 3—20" Rockford high duty Drills.
- 16" Queen City B.G. Shaper.
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- 125 lb. Dupont Belt Hammer.
- 30 Ton Watson & Stillman Hydraulic Press.

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We Have for Immediate Delivery the Following Second-hand Machinery in Good Oper- ative Condition

- 1 Landis No. 3 Universal Grinder 12" x 42", complete equipment, less internal grinding attachment. . \$1,500
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These machines are particularly good value, and may be seen at our works.

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HESPELER, ONT.

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2—Heavy Blount Double Floor Grinder. 45" spindle, two 8" wheels	100	22—S-Wheel Robinson Detroit Grinder.	825
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4—Stouffville Floor Grinder. No rest or c/s. Shaft 32", two 8" wheels	30	24—Anvil, 154-lb.	15
5—Large Polishing Stand (new). 4' shaft. Bearings 1 1/4" x 6	35	27—5 H.P. Vertical Boiler, Submerged tubes, and one Steam Pump 3 x 2 x 3.	125
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18—Brown & Boggs 6' 6" Power Shears	450	35—Fairbanks Scale, 5-Ton	75
19—No. 21 Crosby Punch Press, Inclinable.	350	36—Hand Former, Toggle Type	15
20—Heavy Grinder, Bearings 2 1/4 x 12"—cross adjustment slide, one 12" wheel.	50	31—15 H.P. Westinghouse, 550 volt, 60 cycle, 3 phase, 1,120 R.P.M.	325
		33—40 H.P. Westinghouse, 550 volt, 60 cycle, 3 phase, 850 R.P.M.	600
		34—3 Westinghouse Transformers, 30 kw., 3,200—550 volt	684

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CANADIAN MACHINERY

Classified Advertising Section

143 University Avenue,

TORONTO

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We offer the following Used Machinery and Equipment, subject to prior sale:

- 2—Hall Cutting-off Machines.
- 1—24" x 8' Bertram Engine Lathes, B.G., with plain saddle and tool post and arbor for rough turning.
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- 1—Newton 2-spindle Boring Machine, fitted with tool holders and chucks for boring fuse hole.
- 1—Brown, Boggs Marking Machine, converted for finished tapping fuse hole, with tap holder and sliding chuck.
- 1—Special 3-spindle Finished Turning Machine, complete with tool holders and profile cam.
- 1—18" x 6' Draper Engine Lathe, with split chuck and steady rest. Equipped with boring bar for inside profile.
- 1—Holden-Morgan Thread Milling Machine for Base Recess Thread, with attachment for threading base plates.
- 3—18" Single Drive Head Stocks, with hinged chucks, suitable for repair work on shells.
- 1—18" Single Drive Head Stock, with 3-jaw scroll chuck, steady rest and saddle. Suitable for correcting weight, etc.
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Try our W-G Rawhide Silent
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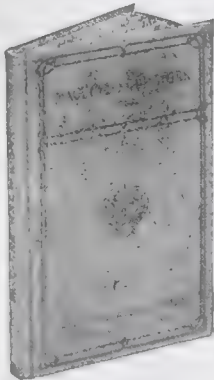
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If you are desirous of improving yourself in your trade and so putting yourself in the position of making more money, these Mechanical Engineering Books will be found helpful.

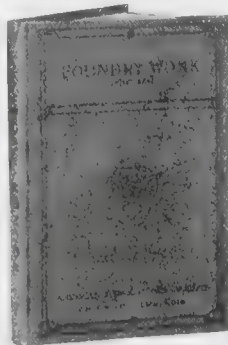


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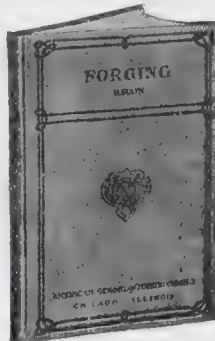


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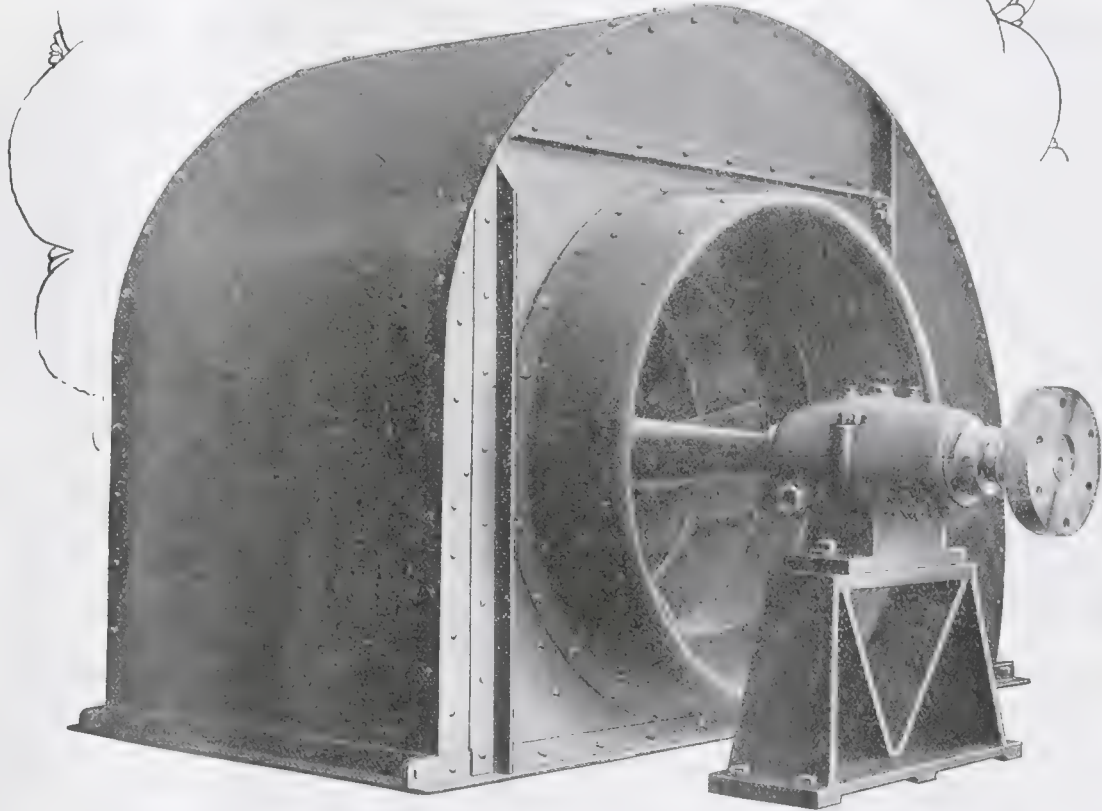
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It has an exceeding high efficiency, not only at full load but over the entire useful range. The efficiency curve is practically flat between $\frac{3}{4}$ load and $1\frac{1}{4}$ load, which gives high operating efficiency over a wide range of conditions—either at peak load, full load, or when operating below normal.

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GERMANY is plotting in Canada and the United States right now. If you are curious to know just what she is doing, learn from Miss Agnes C. Laut's article in the October MACLEAN'S, "The Plot Behind the Pacifists."

THE biggest single feature ever secured by MACLEAN'S MAGAZINE is a serial story by E. Phillips Oppenheim, British author and a great writer of romantic stories.

The serial beginning in MACLEAN'S for October is "The Pawn's Count," a story of the present war, dealing with the work of the secret service agents of the various belligerent countries. You can depend on its being a strong, thrilling story, told by a master of his craft.

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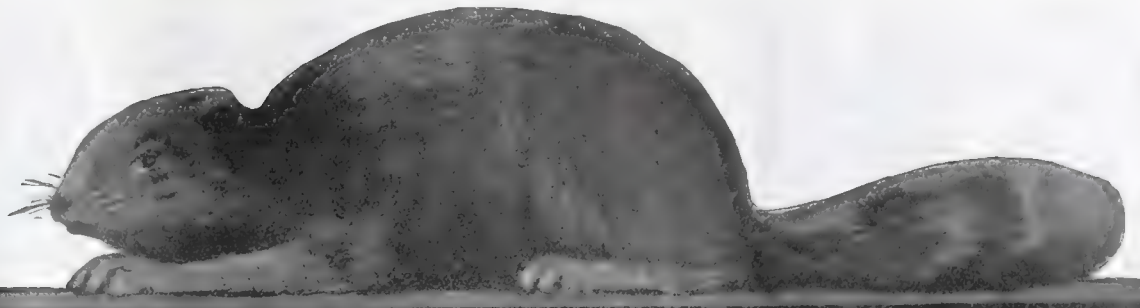
Stringer, Fraser, Leacock and Hendryx

THE work of these masters of the short and long story appears in the October MACLEAN'S. Stringer's story is "The Redeemer of Waste Lands"; W. A. Fraser writes a love story, "For Catherine's Sake"; Leacock has a humorous sketch; and Hendryx continues his captivating story of the Canadian Northwest, "The Gun Brand."

MacLean's Magazine

For OCTOBER

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Used in over 2,000 Canadian Factories. They have other good points too. Ask us to send full details.

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But the line shafting that's equipped with Chapman Double Ball Bearing will save 75 per cent of the friction loads making an average total saving of power from 15 to 30 per cent.

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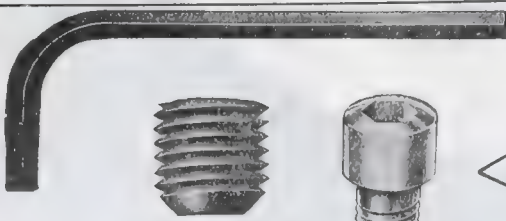
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Oxy-Acetylene cutting of any kind of steel construction.

Portable Welding Apparatus of all kinds with trained operators always available to repair your breakdown at once.

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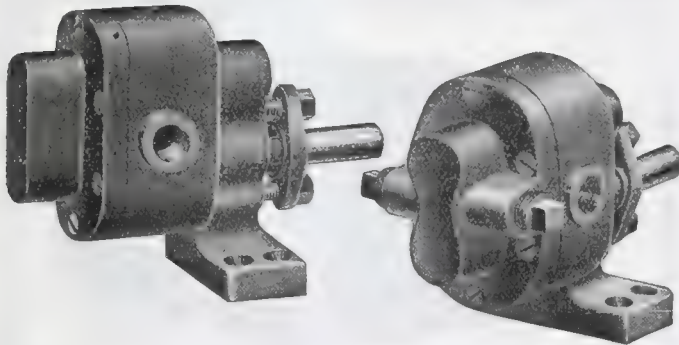
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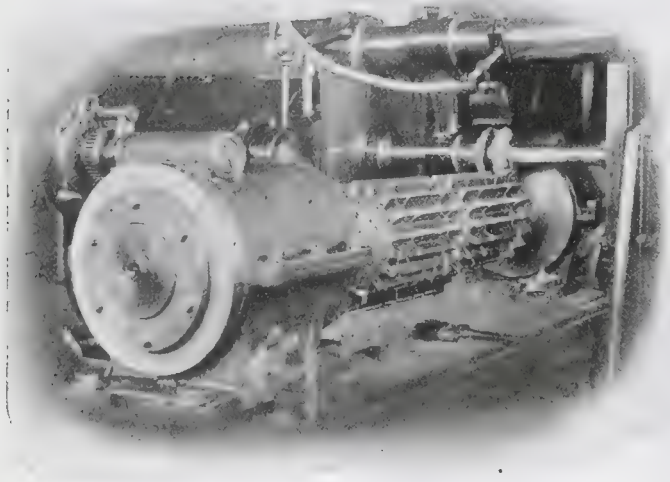
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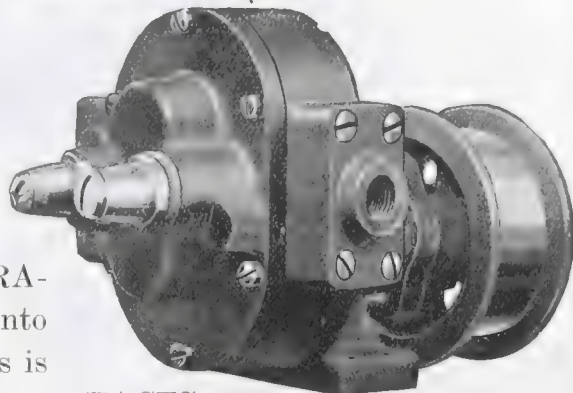


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Reversible
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relief valve.

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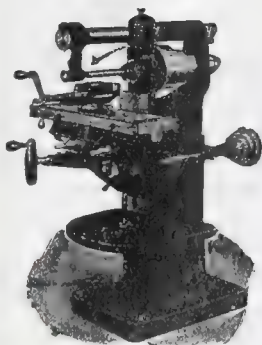
Did you ever notice somebody starting a conversation in a low voice with the two words "They say"? The moment you hear it you know it is gossip, scandal, and most likely a lie. But when you hear everyone saying that HARRIS HEAVY PRESSURE is the best BABBITT METAL they can use for all general machinery bearings, isn't it about time to believe them?

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Nobody would think of putting 16-inch lathe work on a 30-inch lathe, then why leave small parts on a large Milling Machine?

A Steptoe Hand Miller or small power feed can be handled quickly and will cut your production cost. You will have less money invested in your Milling Machines and have more machines to do the work.

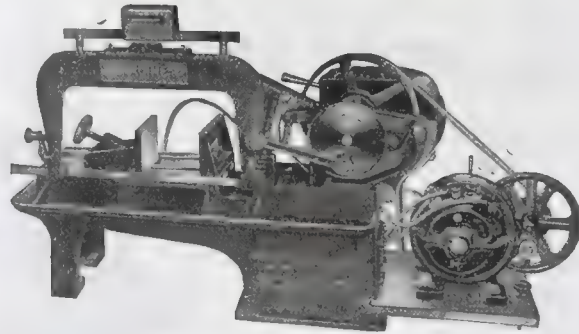
That same principle applied to your small planer work will cut the cost of planer work.

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All bearings long, heavy and adjustable, so that you can take up any wear that may occur from time to time.

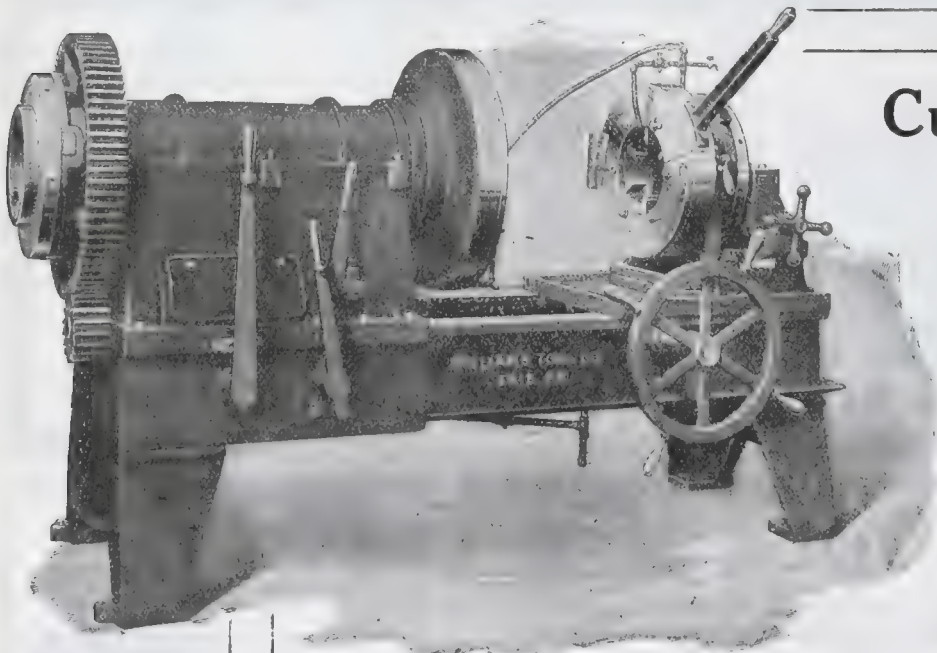
Saw frame guide of heavy semi-steel that will not spring. It holds the saw frame rigid, insuring accurate cuts.

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We have made this claim all along and this judgment only verifies it.

Made in 11 sizes and each size has a range of 8 to 10 consecutive sizes between $\frac{1}{4}$ " and 18" diameter.

Write us about them. They will save you money, time, and increase the quality of your product.

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PRICES ON APPLICATION

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in cutting on PEERLESS HIGH SPEEDMETAL SAWS; they save both Time and Material.

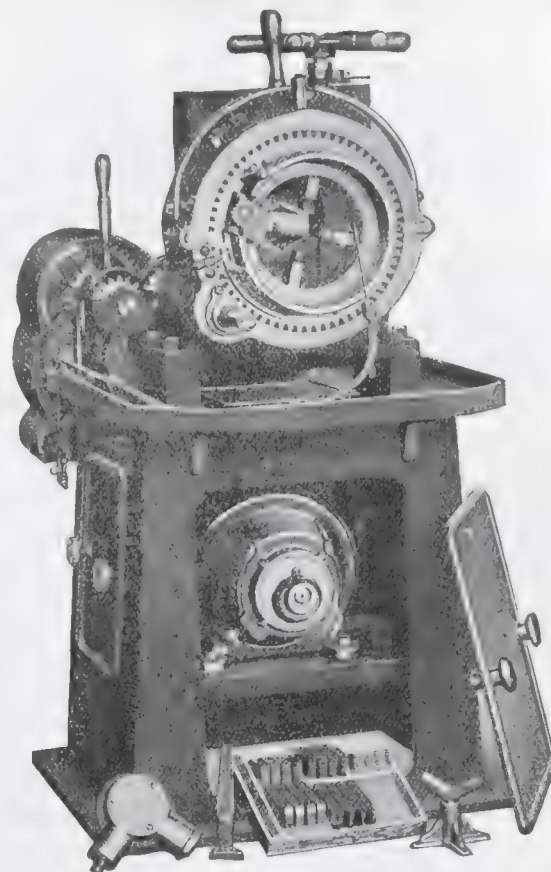
Supposing you save only 1.16 on each cut, 200 lbs. of material are saved on 100 cuts of 12 in. round. Your savings may be several times 1/16.

Have you ever stopped to consider the waste of material in wide cuts, especially at the present high cost, will pay for a PEERLESS in a remarkably short time.

This is only one of the reasons for so many repeated orders and large concerns having standardized the PEERLESS. The many other reasons can only be fully appreciated after comparative test.

Write for a list of users; some of these machines may be working in your vicinity. A careful investigation always arouses enthusiasm.

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With Forbes-Cut
Threads** *Clear, Sharp and
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Poor and indifferent threading in the first place is usually the seat of the trouble with Leaky Pipe Joints. To be sure of tight joints that won't leak, thread your pipes with the

Forbes Pipe Cutting and Threading Machine

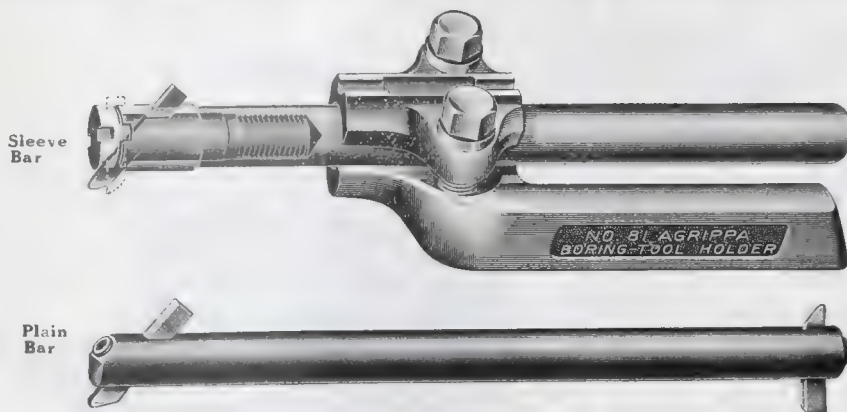
Only one man is required to operate this speed-worker. Motor-driven by self-contained motor, or in case of no power facilities being available, it is operated by hand with ease, doing first-class work. No belts, no countershafts necessary.

EASILY PORTABLE—MOVE IT FREELY TO THE JOB—NO NEED TO CARRY HEAVY PIPE TO AND FROM YOUR SHOP. MADE IN SEVERAL CONVENIENT STYLES AND SIZES. DOES THE WORK OF FOUR MEN OPERATING BY THE OLD STOCK-AND-DIE METHOD.

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GARDEN STREET BRIDGEPORT, CONN.

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ALL
"AGRIPPA"
TOOL HOLDERS
CAN BE
SHIPPED
PROMPTLY

ITS sleeve bar cap admits a straight or angular cutter; and you can quickly insert either at the business end of the bar without removing the cap or disturbing the setting of either the bar or the holder. You need neither make nor buy any bushings hereafter, for the "twin screw" fastenings of "AGRIPPAS" within their range accommodate any bar section you may have handy. Now's the time to begin saving—caps, bushings and time! Procure your tool holder text book here or from your dealer and learn the many other economies afforded by

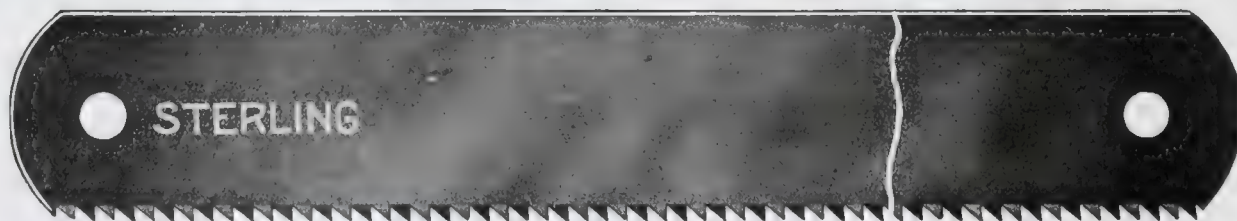
Williams' Grand Prize "AGRIPPA" Tool Holders
"THE HOLDERS THAT HOLD"

Western Office and Warehouse
40 S. Clinton Street
Chicago, Ill.



Quality alone is our
measure of "AGRIPPA"
Tool Holder Value

HACK "STERLING" SAWS

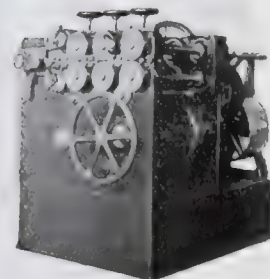


MANUFACTURED BY
DIAMOND SAW & STAMPING WORKS **BUFFALO, N.Y., U.S.A.**



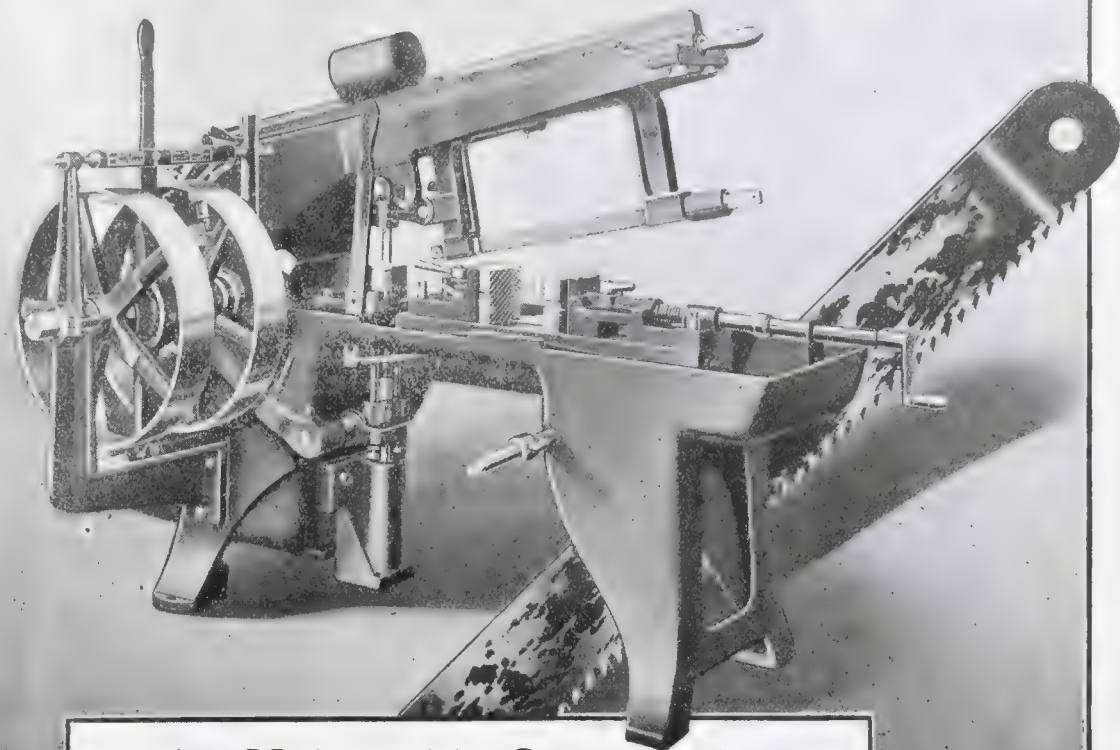
*The Machines that put
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More Than Forty Standard Spring Making Machines.
High-Speed Automatics for Making Fuse
and Small Arms Springs.
Flexible Metallic Tube and Casing Coilers.



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An Unbeatable Combination



An Unbeatable Combination

Are you a manufacturer of metal products, where accuracy, speed, production and economy count, and which require constant cutting-off of stock.

Here's The Combination You Are Looking For

The V. S. W. No. 5 High Speed Hack Saw Machine equipped with a VICTOR blade is unbeatable when it comes to increased production, and a minimum amount of power blade breakage and consumption.

Why?

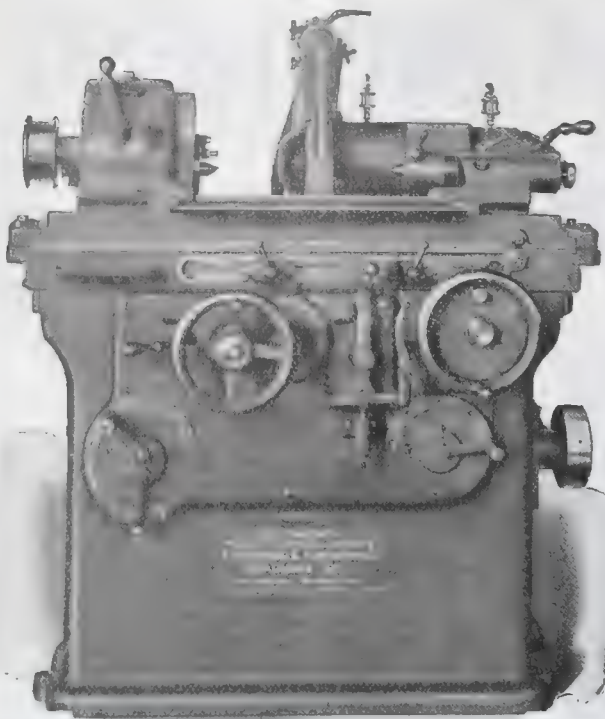
An actual machine and blade operated by one of your own men in your own shop will be the most convincing demonstration we can make.

Let us send you one V. S. W. machine on a thirty days' trial, with enough VICTOR blades to show you why.

VICTOR SAW WORKS LTD - HAMILTON, CANADA



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MODEL "A"

Occupies 52" x 66" floor space; requires 7 H.P. to operate; speeds up to 640 r.p.m. on tight or loose pulleys; 1,300, 1,500 and 1,800 are the wheel speeds. Dead or live centres. Lubricating features reduce wear to a minimum.

Taking into consideration the small floor space required and the range of straight or taper cylindrical grinding, we claim this the most compact, concentrated grinding unit on the market.

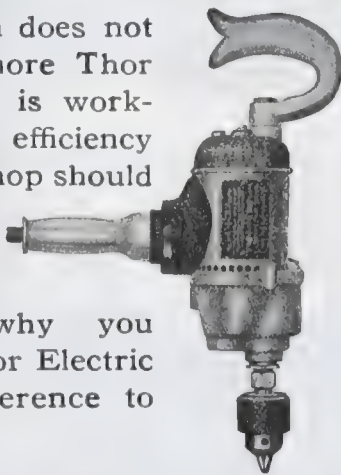
Our Model "B" for facing, etc., and this model are for the most part interchangeable. Inquire of us. We will gladly furnish complete information.

Fitchburg Grinding Machine Co.
Fitchburg, Mass., U.S.A.

Thor UNIVERSAL Electric Drills

Licensed Under Burke Universal Motor Patent

No shop which does not use one or more Thor Electric Drills is working to full efficiency which every shop should do during these critical times. Let us demonstrate why you should use Thor Electric Tools in preference to other makes.



Independent Pneumatic Tool Company

Office: 334 St. James Street, MONTREAL, QUE.

Toronto: 32 Front St. W.; Winnipeg: 123 Bannatyne Ave., E.;
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Keep Your Grinding Wheels in Trim---

The Diamo-Carbo Emery Wheel Dressers

The Diamo-Carbo Dresser is being very generally adopted as a substitute for the expensive diamonds. Diamonds are becoming more scarce and quality is deteriorating. The quality of the Diamo-Carbo is uniform and in most places will do the same work as a diamond. They can be tried at our expense.

The Desmond Huntington No. 2 is the best dresser ever devised for use on large and coarse wheels.

We can make prompt deliveries of any type of Dresser desired.

THE CANADIAN DESMOND-STEPHAN MFG. CO.
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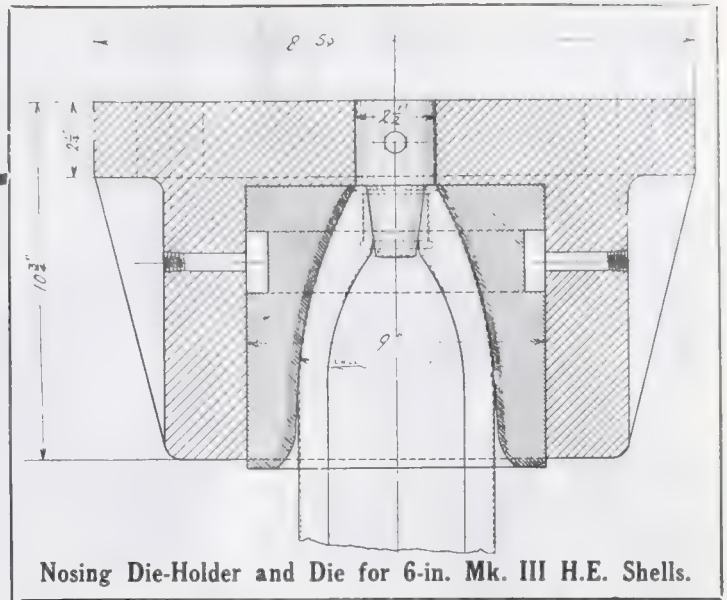
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Most Shell Factories

are now using our
NOSING DIES

of
Chilled Cast Iron
for

4.5-in. 5-in. and 6-in. Shells

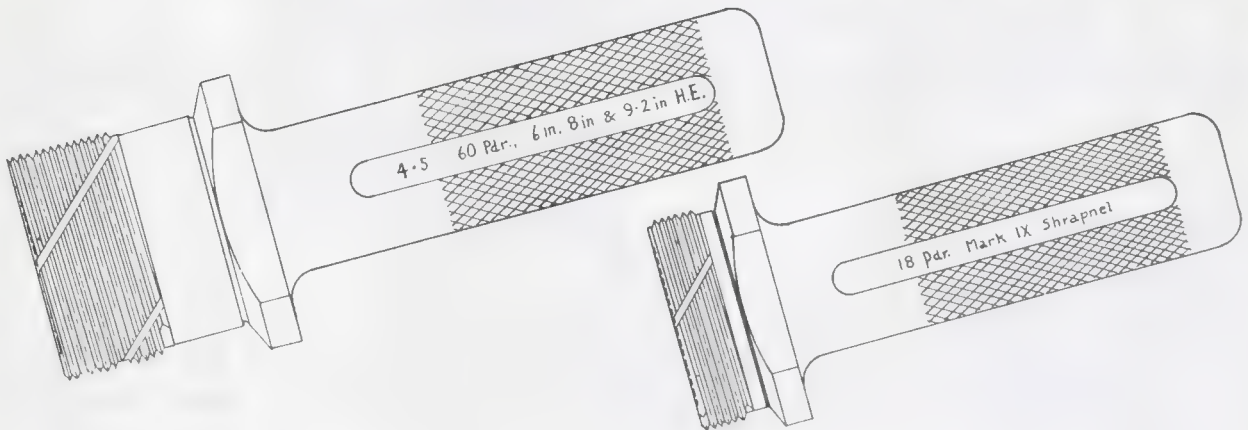


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MARSH & HENTHORN, LIMITED

BELLEVILLE, ONTARIO, CANADA

FUSE HOLE GAUGES



Manufacturing and inspection fuse hole gauges for all size shells. A surplus stock enables us to ship immediately.

Windsor Machine & Tool Works

Windsor, Ontario

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—and Every Chuck a Hannifin!

PHOTO shows a long line of lathes on six-inch shells —all equipped with Hannifin Air Chucks. This plant has been turning out more shells per machine than any other in its vicinity, and the fact that Hannifin chucks have been used exclusively gives us a certain degree of justifiable pride.

That our claims for increased production with a Hannifin have been substantiated by the records of many Canadian munition plants is good reason why you should investigate them.

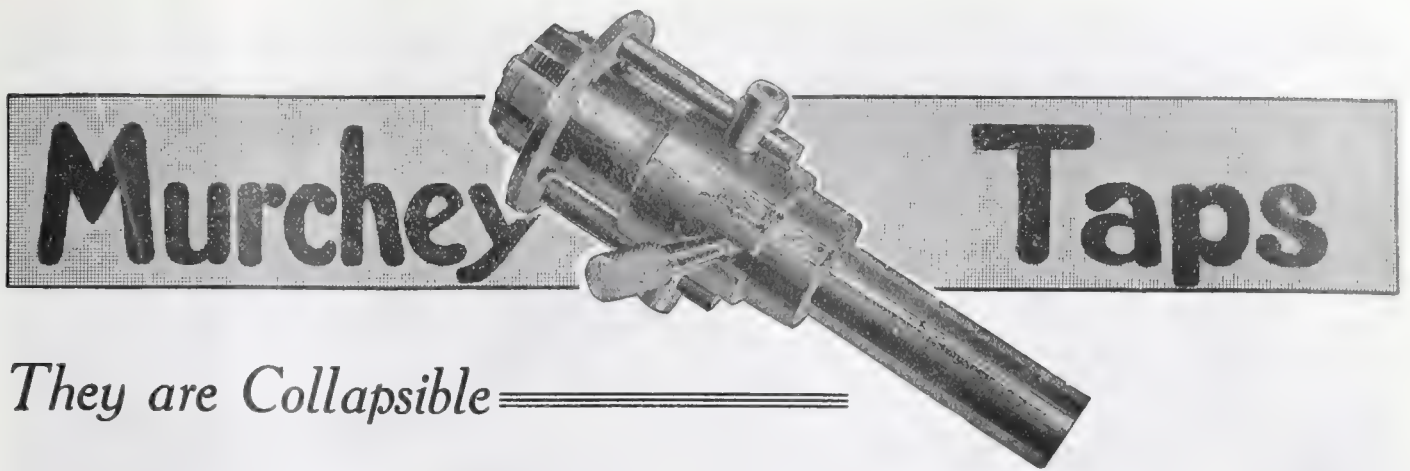
The Hannifin Chuck is almost instantaneous in action, holds securely, cannot slip, saves time and labor. The work is chucked and rigidly gripped by simply turning a lever. Another turn effects the release. With the introduction of female labor and skilled male help almost unobtainable, Hannifin chucks will save delays and make-overs by means of these time and labor-saving features.

**Our catalog will tell you
more about this chuck.
Send for it to-day.**

Hannifin Manufacturing Co. CHICAGO, ILL., U.S.A.

REPRESENTATIVES: R. E. Ellis Engineering Co., Chicago; Coats Machine Tool Co., New York City; A. R. Williams Machinery Co., Toronto; Williams & Wilson, Montreal; Canadian Fairbanks-Morse Co., Montreal. EUROPEAN REPRESENTATIVES: Machine Tool Co., Ltd., London; Fenwick Freres & Co., Paris; Iznoskoff & Petrograd.





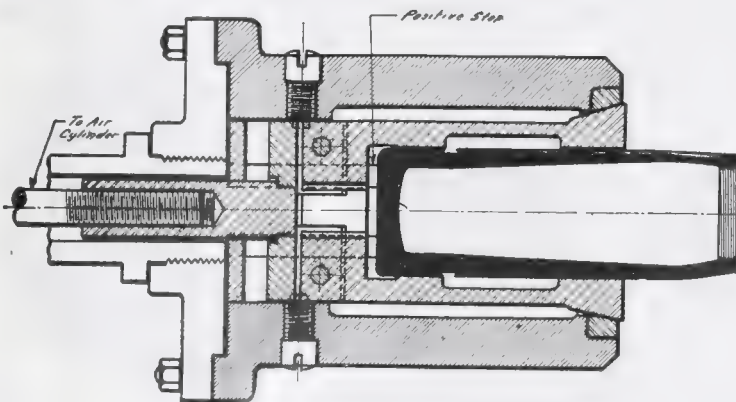
They are Collapsible

The only time they don't collapse or bend is under strain of heavy work and when in action. But for speedy adjustment, convenient, quick-acting operation, the collapsible and adjusting features stand prominently in the foreground. The chasers are adjustable to compensate for any wear, and this feature enables the tap to maintain its minute accuracy, and adds to its general dependability.

The records performed by Murchey Taps on munitions work is equally prominent in general lines. They are built for service, and they give it. We maintain a special chaser service for our clients that enable them to renew chasers at the minimum cost. Inquire immediately. Quick action means quick solution to your troubles.

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Fenwick Freres & Co., 16 Rue Fenelon, Paris, France.

Murchey Machine & Tool Co., 75 Porter Street, Detroit, Mich.



Consider Just This One Feature of M.E.C. Air-operated Hinged Collets

They save from 50 per cent. to 90 per cent. of the time usually required to do the same work by an ordinary chuck. While they possess many other points of superiority, the above feature alone is one that should appeal to users of chucks.

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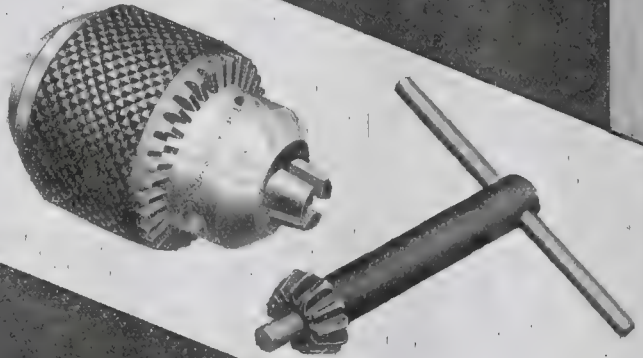
Drill Chuck

**A
Winner
By Sheer Merit**

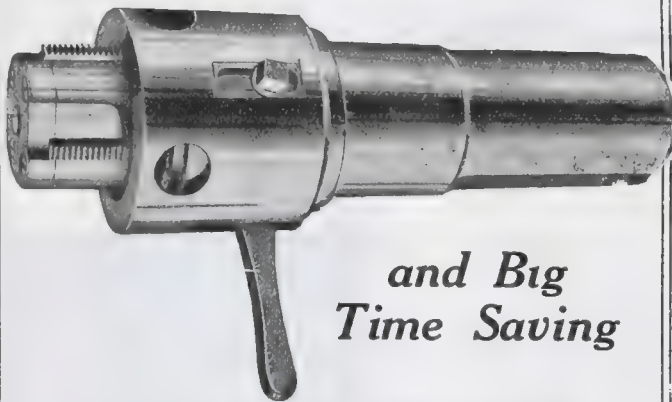
Jacobs Improved Drill Chucks are recognized as the STANDARD the world over. Once tried—always used.

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Manufacturing Co.**
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For Positive Accuracy—

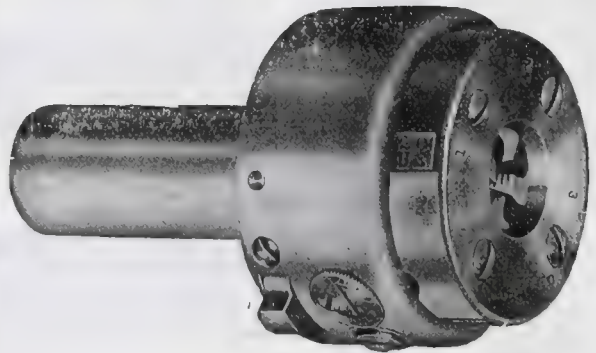


*and Big
Time Saving*

"Victor" Collapsible Taps are simple in construction; the few parts can be made large and strong; the body is machine steel, and the chasers are high-speed; screw adjustment from front end makes it easy to maintain close accuracy; trip is automatic; reset by means of lever. The above features—and others—make the "Victor" a time and money saver for severe service. It is being used by many shell manufacturers.

VICTOR Collapsible TAPS

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Will they stand improvement? If they will and you want the best results—H. & G. Automatic Self-Opening Die Heads will do the trick.

The Chasers are set and held in place by a steel cam, which, once adjusted, locks; there is no stoppage or changing in size. The quick release not only insures the cutting of the thread to a given point every time, but permits cutting right up to a shoulder when necessary.

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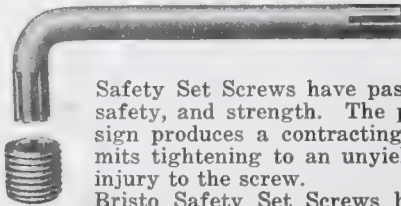
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Every head is perfectly formed, any shape, round, flat, oval, rectangular, etc.

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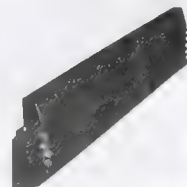


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Metal Testing Instruments

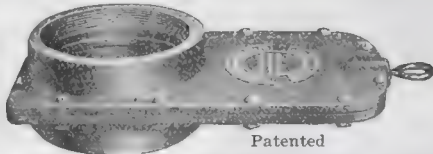
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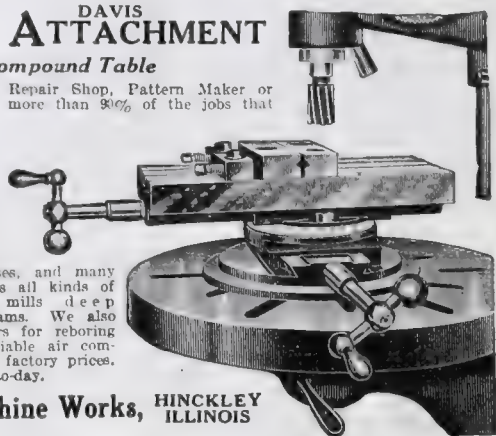
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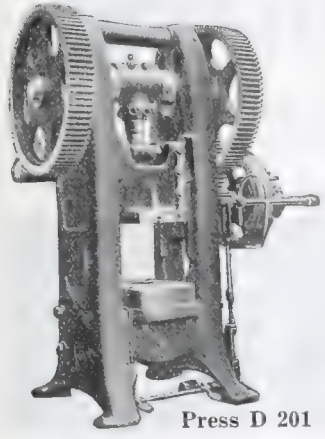


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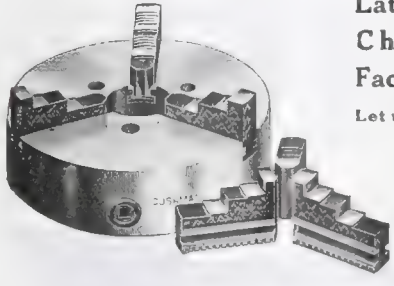
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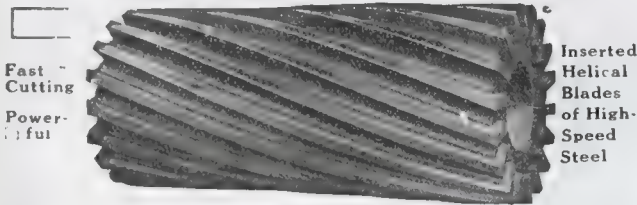
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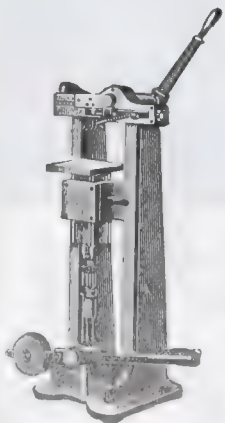
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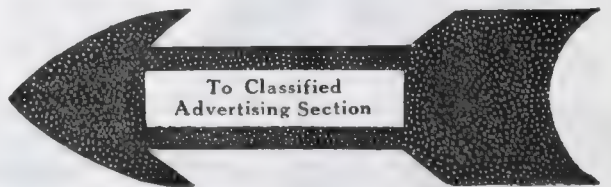
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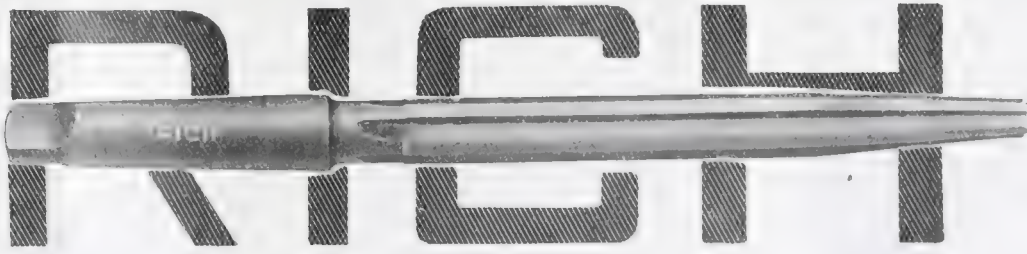
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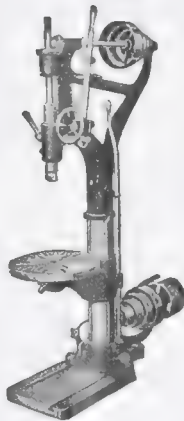
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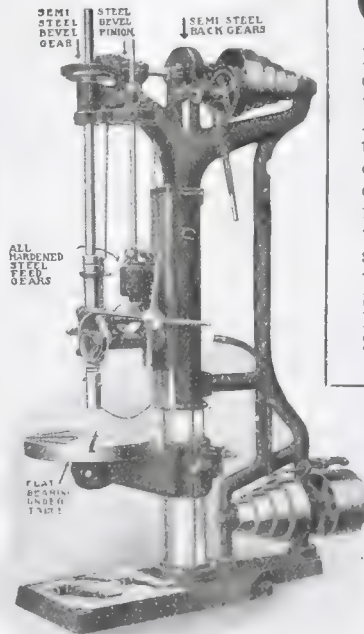
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 Niles-Bement-Pond Co., New York.
 Petrie of Montreal, Ltd., H. W., Montreal, Que.
 H. W. Petrie, Toronto.
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 Canada Machinery Corp., Galt, Ont.
 Garlock-Walker Machinery Co., Toronto, Ont.
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 Hill, Clarke & Co., Chicago, Ill.
 Niles-Bement-Pond Co., New York.
 H. W. Petrie, Toronto.

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 Canada Machinery Corp., Galt, Ont.
 De Mooy Machine Co., Cleveland, Ohio.
 Foss & Hill Machy. Co., Montreal.
 Garlock-Walker Machinery Co., Toronto, Ont.
 Henry & Wright Mfg. Co., Hartford, Conn.
 D. McKenzie Machinery Co., Guelph, Ont.
 Niles-Bement-Pond Co., New York.
 Pratt & Whitney Co., Dundas, Ont.
 R. E. T. Pringle, Ltd., Toronto, Ont.
 Stow Mfg. Co., Binghamton, N.Y.
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 Cincinnati Pulley Machy. Co., Cincinnati, Ohio.
 Garlock-Walker Machinery Co., Toronto, Ont.
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 R. McLaughlin Co., Galt.
 Niles-Bement-Pond Co., New York.
 Petrie of Montreal, Ltd., H. W., Montreal, Que.

H. W. Petrie, Toronto.
 Rockford Drilling Mach. Co., Rockford, Ill.
 Silver Mfg. Co., Salem, Ohio.
 A. R. Williams Machinery Co., Toronto.

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 Keystone Mfg. Co., Buffalo, N.Y.
 Silver Mfg. Co., Salem, Ohio.

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 W. F. & John Barnes Co., Rockford, Ill.
 Can. Blower & Forge Co., Kitchener, Ont.
 Canadian Fairbanks-Morse Co., Montreal.
 Cincinnati Pulley Machy. Co., Cincinnati, Ohio.
 Foss & Hill Machy. Co., Montreal.
 Garlock-Walker Machinery Co., Toronto, Ont.
 Millers Falls Co., Millers Falls, Mass.
 H. W. Petrie, Ltd., Montreal.
 Pratt & Whitney Co., Dundas, Ont.
 R. E. T. Pringle, Ltd., Toronto, Ont.
 United States Electrical Tool Co., Cincinnati.

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 Can. Blower & Forge Co., Kitchener, Ont.
 Cleveland Twist Drill Co., Cleveland.

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 Cincinnati Electrical Tool Co., Cincinnati, Ohio.
 Foss & Hill Machy. Co., Montreal.
 Independent Pneumatic Tool Co., Chicago.
 Niles-Bement-Pond Co., New York.
 H. W. Petrie, Ltd., Montreal.
 H. W. Petrie, Toronto.
 Prest-O-Lite Co., Inc., Toronto, Ont.
 R. E. T. Pringle, Ltd., Toronto, Ont.
 Stow Mfg. Co., Binghamton, N.Y.
 United States Electrical Tool Co., Cincinnati.
 A. R. Williams Machinery Co., Toronto.

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 Canadian Fairbanks-Morse Co., Montreal.
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 H. A. Drury Co., Montreal.
 Eagle & Globe Steel Co., Montreal, Que.
 Foss & Hill Machy. Co., Montreal.
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 Pratt & Whitney Co., Dundas, Ont.
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 Niles-Bement-Pond Co., New York.
 H. W. Petrie, Ltd., Montreal.
 Garlock-Walker Machinery Co., Toronto, Ont.
 Pratt & Whitney Co., Dundas, Ont.

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 Armstrong Bros. Tool Co., Chicago, Ill.
 Can. Blower & Forge Co., Kitchener, Ont.
 Canadian Fairbanks-Morse Co., Montreal.
 Cincinnati Electrical Tool Co., Cincinnati, Ohio.
 Cleveland Twist Drill Co., Cleveland.
 Garlock-Walker Machinery Co., Toronto, Ont.
 A. B. Jardine & Co., Hespeler, Ont.
 Millers Falls Co., Millers Falls, Mass.
 Morse Twist Drill & Mach. Co., New Bedford, Mass.
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 H. W. Petrie, Toronto.
 Pratt & Whitney Co., Dundas, Ont.

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 Foss & Hill Machy. Co., Montreal.
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 A. R. Williams Machy. Co., Toronto.

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 Clark Equipment Co., Buchanan, Mich.

Cleveland Twist Drill Co., Cleveland.
 Morse Twist Drill & Mach. Co., New Bedford, Mass.
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 H. W. Petrie, Toronto.
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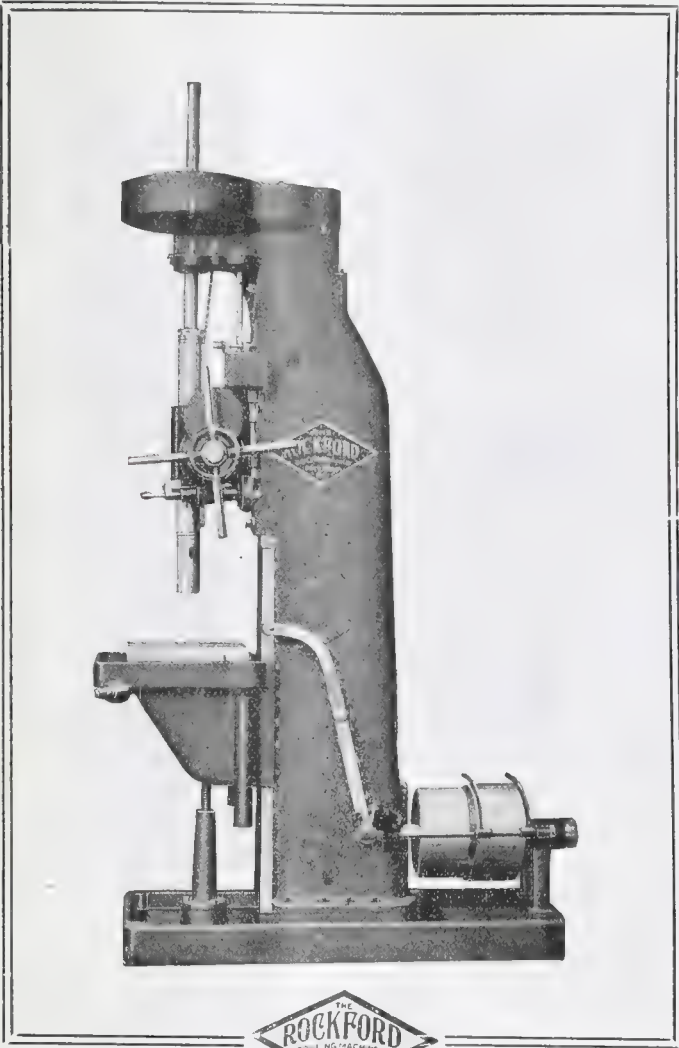
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H. W. Petrie, Ltd., Montreal.
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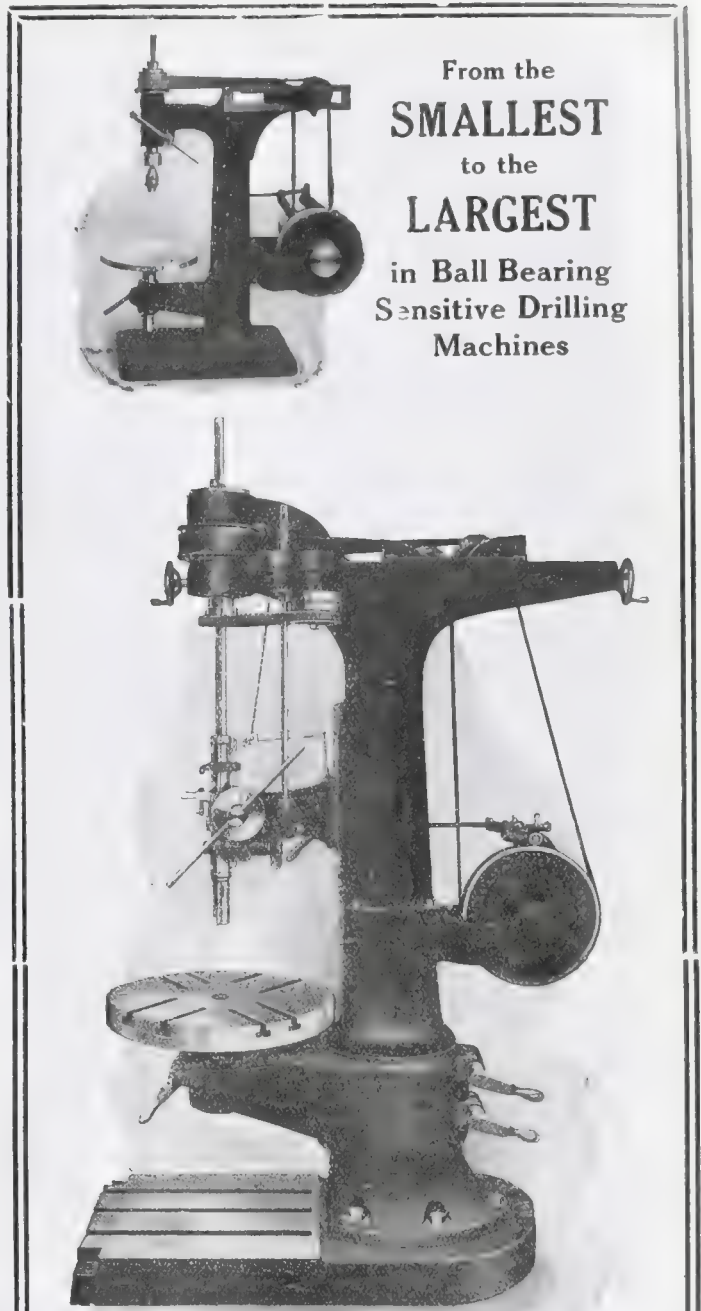
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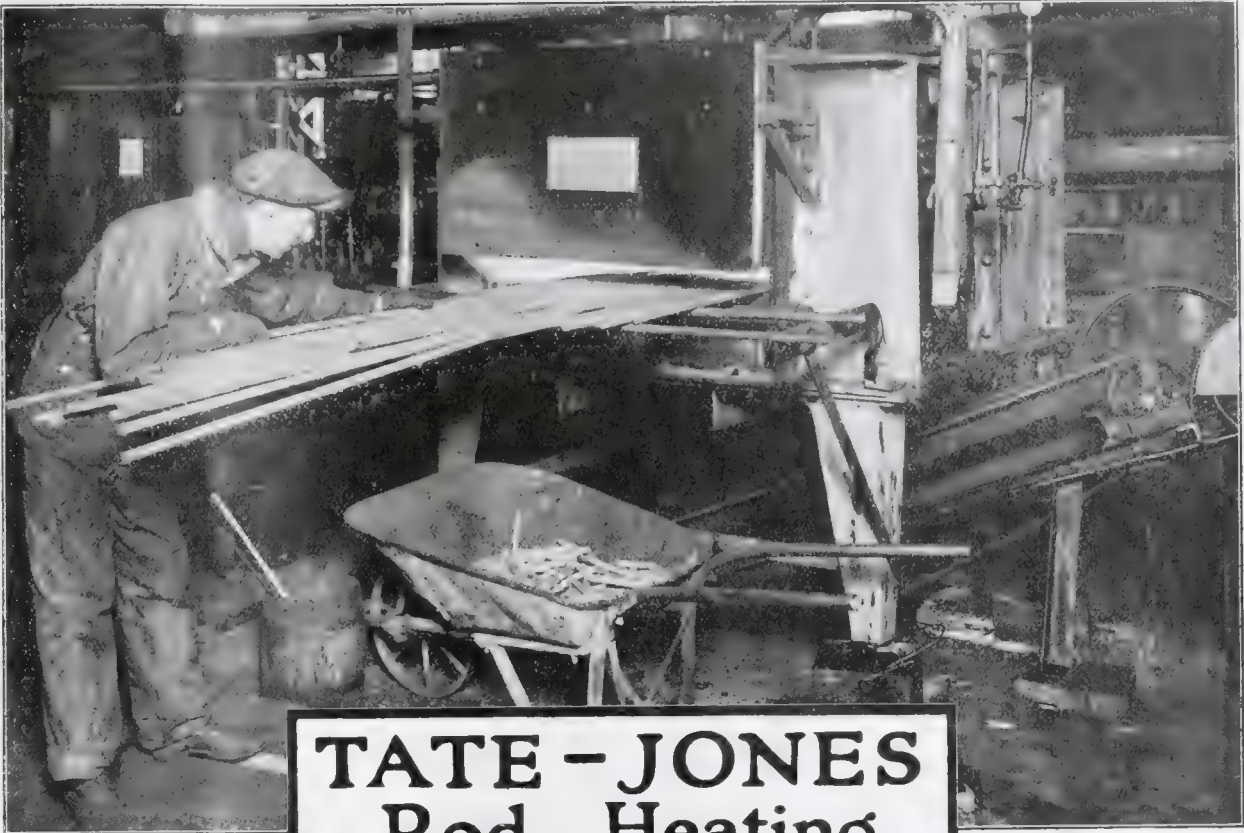
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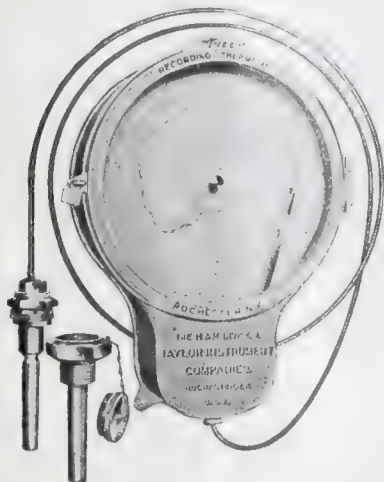
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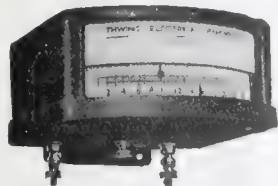
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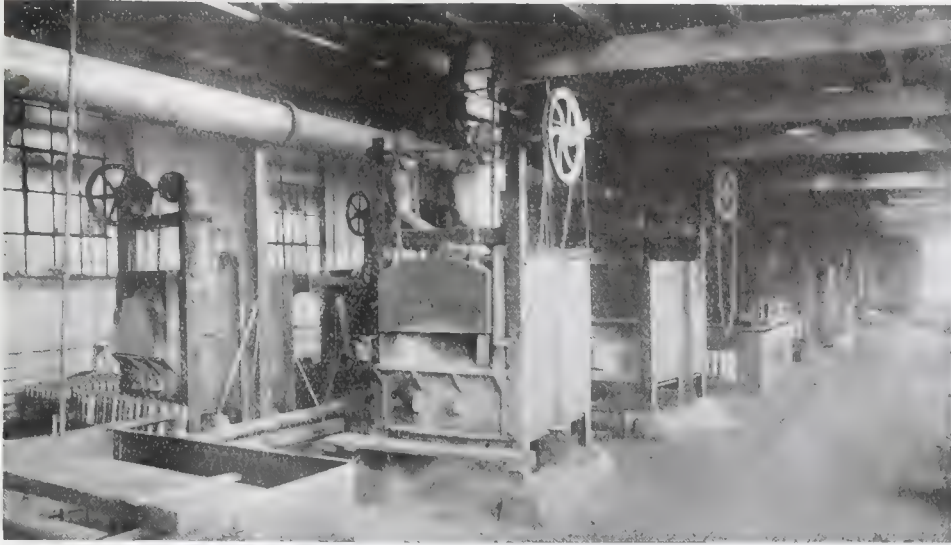
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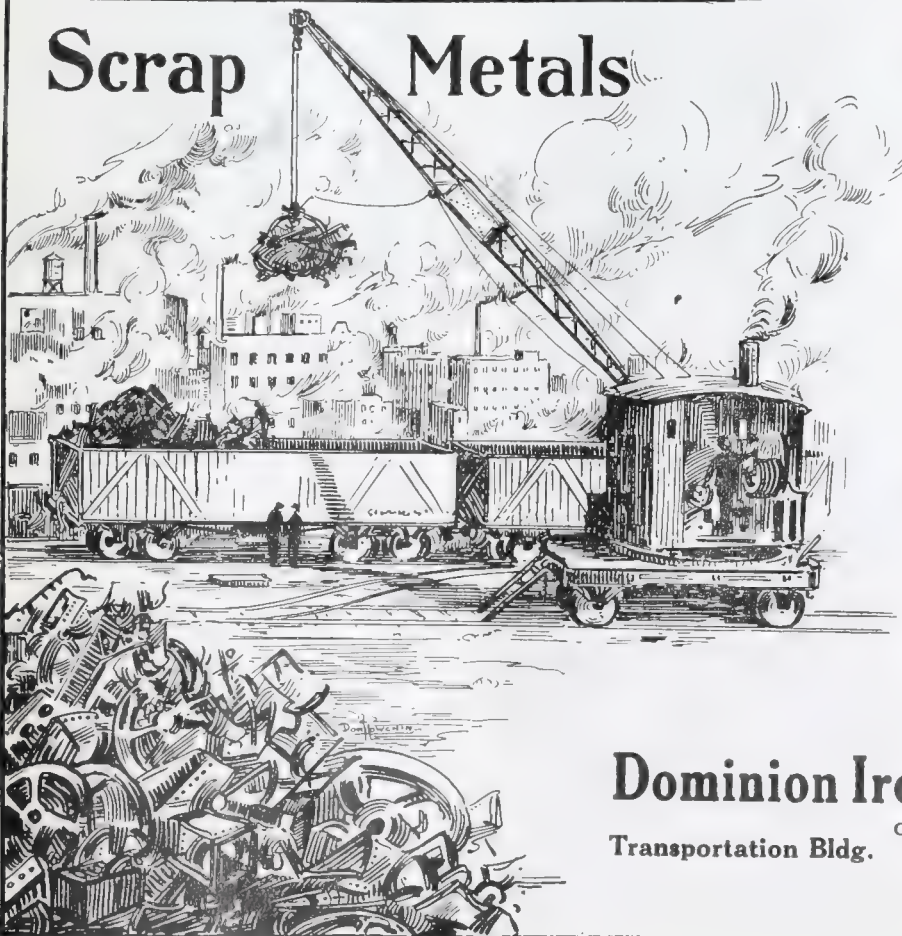
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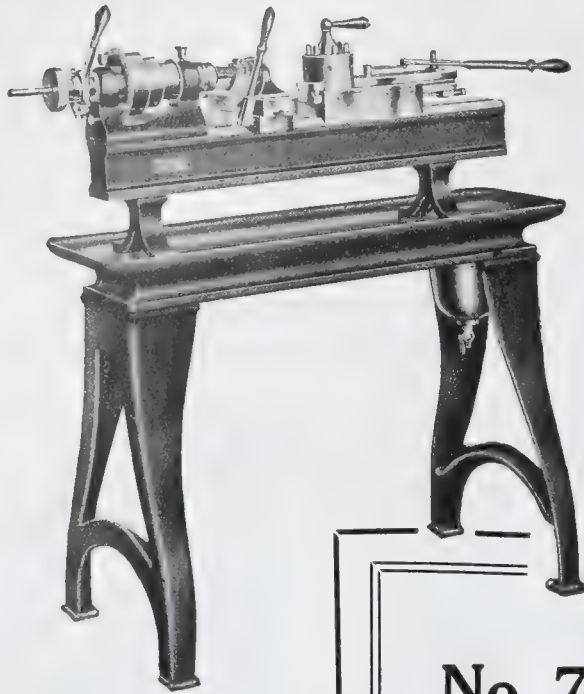
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A weekly newspaper devoted to the machinery and manufacturing interests.

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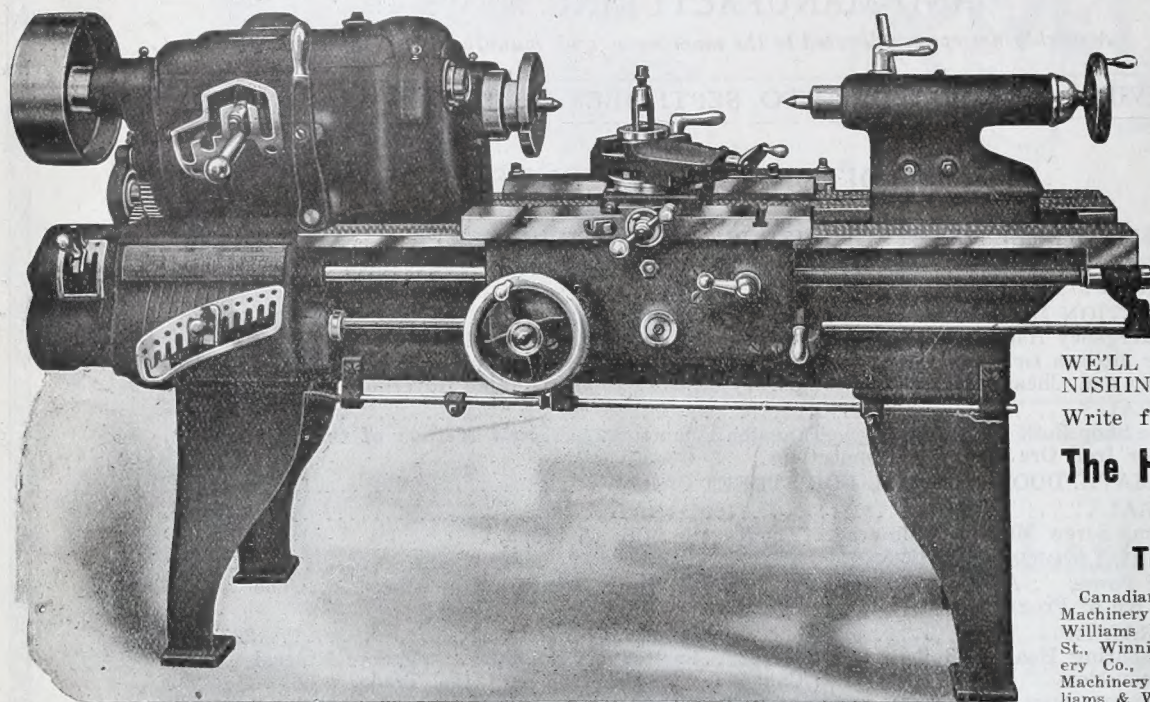
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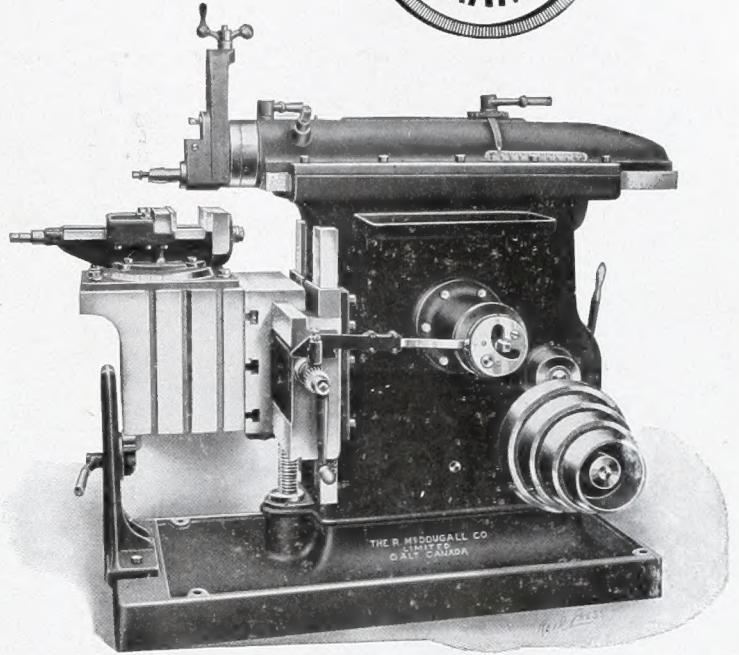
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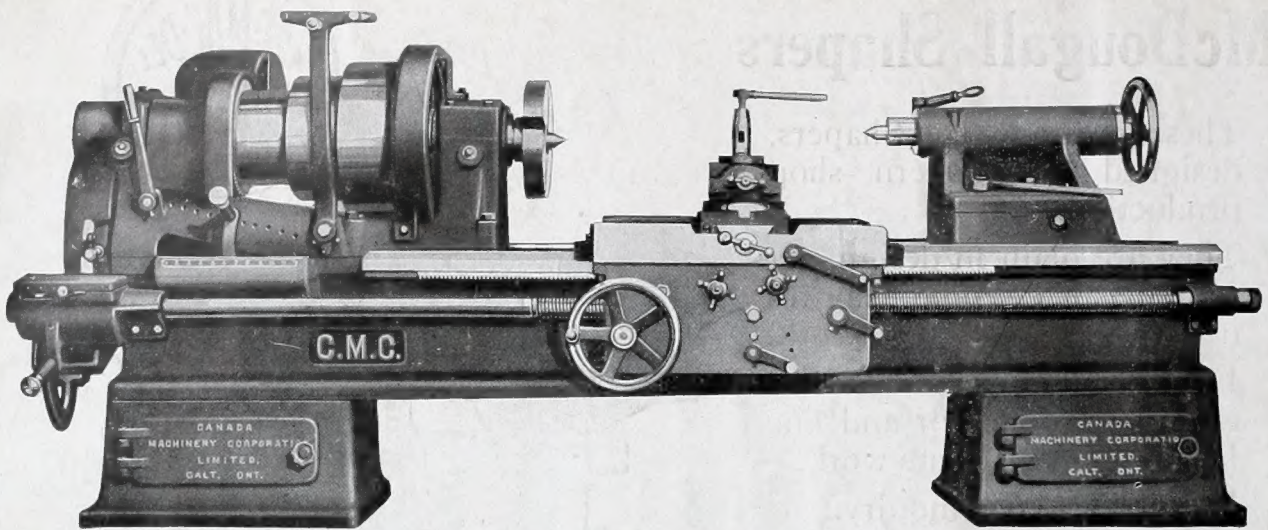
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