

CANADIAN MACHINERY

AND MANUFACTURING NEWS

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Toronto

A weekly newspaper devoted to the manufacturing interests, 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. XIV

Publication Office: Toronto, September 16, 1915

No. 12



THE SIGN OF DEPENDABLE Re-Manufactured Machinery

FOR QUICK SHIPMENT

Partial List of the Largest Stock in the World

ENGINE LATHES

- 1-4" x 5' Fitchburg Lo-Swing
- 1-10" x 5' Pratt & Whitney T.R.
- 1-12" x 5' Reed
- 3-12" x 5' Fay & Scott
- 1-12" x 5' Hendey
- 1-13" x 6' Willard
- 1-13" x 8' Willard
- 1-14" x 6' Flather
- 1-14" x 6' Hendey
- 1-14" x 6' Reed
- 2-14" x 6' Cisco
- 1-14" x 6' Prentice
- 2-14" x 6' Fay & Scott
- 2-14" x 8' Lodge & Shipley (Patent Head)
- 1-14" x 12' Cisco
- 1-15" x 6' Flather
- 1-15" x 6' LeBlond
- 1-15" x 6' W. P. Davis
- 3-15" x 6' Von Wyck
- 2-15" x 6' Walcott
- 1-15" x 6' Whitcomb Blaisdell
- 1-15" x 10' Whitcomb Blaisdell
- 1-15" x 10' Von Wyck
- 2-16" x 6' Reed
- 1-16" x 6' Blaisdell
- 1-16" x 6' American
- 2-16" x 6' Walcott
- 1-16" x 6' Cisco
- 1-16" x 7' Hendey
- 1-16" x 8' Reed
- 3-16" x 8' Flather
- 3-16" x 8' Lodge & Shipley
- 1-16" x 8' American
- 1-16" x 8' Cincinnati
- 1-16" x 8' Rockford
- 1-16" x 8' Fay & Scott
- 3-17" x 8' Greaves & Klusman
- 1-17" x 8' Prentice
- 2-17" x 10' Cincinnati
- 1-18" x 6' LeBlond
- 1-18" x 6' Whitcomb Blaisdell
- 1-18" x 8' Reed
- 1-18" x 8' Walcott
- 2-18" x 8' Bradford
- 2-18" x 8' Whitcomb Blaisdell
- 1-18" x 8' Hendey
- 1-18" x 12' Champion
- 2-19" x 8' Rahn
- 1-18" x 12' Fay & Scott

- 2-19" x 8' Cincinnati
- 1-19" x 10' LeBlond
- 1-19" x 14' Bridgford, D. B. L., double axle
- 3-22" x 10' Schumacher & Boye
- 1-21" x 16' LeBlond
- 1-21" x 14' Flather
- 1-21" x 16' Flather
- 1-24" x 10' Fay & Scott
- 1-24" x 12' Schumacher & Boye
- 1-24" x 16' Schumacher & Boye
- 1-25" x 10' Bradford
- 1-25" x 14' Bradford
- 1-25" x 20' Muller
- 1-26" x 12' Gleason
- 1-28" x 16' Fay & Scott
- 1-3" x 12' Rahn
- 1-36" x 12' Pifield
- 1-38" x 16' Pifield
- 1-45" x 12' Putnam
- 1-45" x 18' New Haven
- 1-46" x 16' Putnam
- 1-60" x 16 1/2' Fitchburg

HAND TURRET AND SCREW MACHINES

- 2-No. 1 Brown & Sharpe
- 1-No. 2 Wood
- 1-13" Gisholt
- 1-14" Pratt & Whitney
- 3-14" Pratt & Whitney
- 4-No. 2 American Fox
- 1-No. 22 1/2 Garvin
- 5-22" Potter & Johnston
- 1-24" Gisholt
- 1-36" Eddy
- 1-12" Warner & Swasey
- 1-3 1/2" Pratt & Whitney
- 1-3 1/2" Warner & Swasey
- 1-11 1/2" Parlons & Oliver
- 2-3 1/2" Pearson
- 2-3 1/2" Parlons & Oliver
- 2-3 1/2" Garvin
- 1-3 1/2" Pearson
- 1-15 1/2" Parlons & Oliver
- 1-1 1/2" Garvin
- 2-1 1/2" Parlons & Oliver
- 1-1 1/2" Pearson

- 1-1 1/2" Brown & Sharpe
- 2-2" Barlons & Olive
- 3-2" Jones & Lamson Cone
- 1-2" Pratt & Whitney
- 2-2" Jones & Lamson (Geared)
- 2-3 1/2" Warner & Swasey

AUTOMATIC TURRET AND SCREW MACHINES

- 1-No. 0 Hartford
- 1-No. 1 Acme
- 2-2" Cleveland
- 6-No. 53 National Acme

MILLING MACHINES

- 1-No. 0 Cincinnati Plain Milling Machine
- 1-No. 25 Brainard Plain
- 1-No. 15 Garvin Plain
- 1-No. 1 1/2" Garvin Universal
- 3-No. 23 Oesterlein Plain
- 1-No. 23 Oesterlein Universal
- 1-No. 13 1/2 Garvin Plain
- 2-No. 2 Cincinnati Plain
- 1-No. 2 LeBlond Universal
- 1-No. 2-A Owen Universal
- 1-No. 3 Becker Brainard Plain
- 1-No. 2-Y Brown & Sharpe Plain
- 1-No. 2-B Brown & Sharpe Plain
- 1-No. 2-H Brown & Sharpe Plain
- 1-No. 2 Kemp Smith Plain
- 2-No. 3 Cincinnati Plain
- 4-No. 34 Oesterlein Plain
- 3-No. 9 Kemp Smith Plain
- 1-No. 3 Kemp Smith Plain
- 1-No. 3-A Owen Universal
- 1-No. 30 Ohio Universal
- 1-No. 5-B Becker Brainard Plain
- 1-No. 4 Becker Brainard Plain
- 2-No. 23 Brown & Sharpe Plain
- 1-No. 18 Kemp Smith Plain
- 1-No. 5 Kemp Smith Plain
- 1-No. 5-B Heavy Brown & Sharpe Plain
- 1-No. 5-B Becker Brainard Plain
- 1-No. 1 Berlin Universal
- 1-No. 29 Ohio Universal

- 2-No. 5 Berlin Plain
- About 75 Hand Lincoln Millers

PLANERS

- 24" x 5' Flather
- 24" x 6' Whitcomb
- 24" x 6' Flather
- 2-24" x 5' American
- 24" x 6' Pond
- 4-24" x 6' Gray
- 24" x 8' Flather
- 26" x 7' Gray
- 27" x 6' Ohio
- 27" x 7' Flather
- 30" x 6' Pease
- 30" x 8' Gray
- 30" x 8' Woodward & Powell
- 36" x 8' Ohio
- 36" x 16' Pond
- 42" x 36" x 13' Flather
- 48" x 13' Pond

VERTICAL BORING MACHINES

- 5-Baker Bros. 20"
- 1-Baker Bros. 20", 2-spindle
- 2-Bickford 24"
- 3-Foote-Burt 2-spindle
- 2-Foote-Burt 2-spindle, Cylinder
- 2-Foote-Burt 4-spindle
- 1-Moline 4-spindle
- 1-Baush 30"
- 1-Bullard 32"
- 2-Rogers 34"
- 4-Bullard 34"
- 2-Brown & Sharpe 36"
- 1-Baush & Harris 37"
- 1-Colburn 48"

HORIZONTAL BORING MACHINES

- 12-Rifle Barrel Drilling Machines
- Pratt & Whitney No. 1, 2-spindle
- Also about 25 machines, such as Beaman & Smith, Rochester, Coffman, Binsse, etc.

SHAPERS

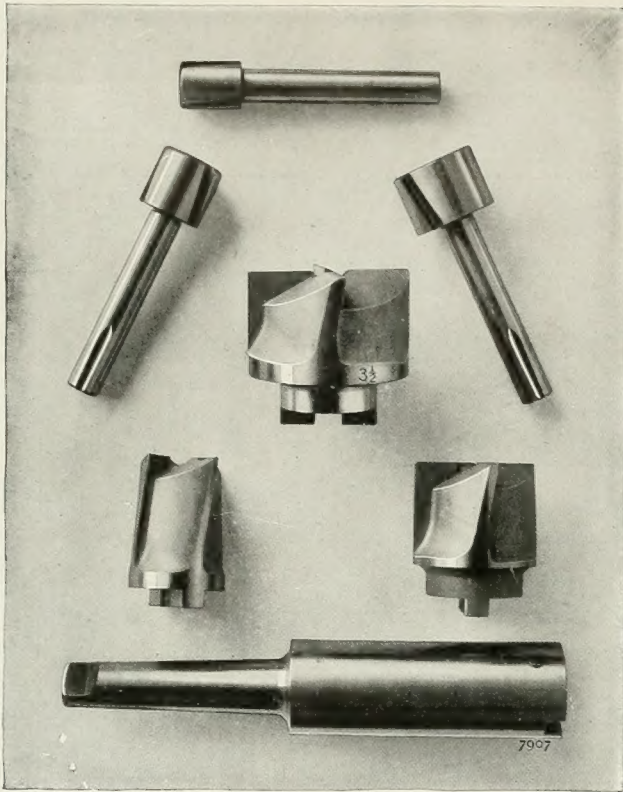
- About 36 machines from 14" to 24"



HILL, CLARKE & COMPANY OF CHICAGO

125 Canal Street

Make Your Own Combination



HOLDERS

End of holder is milled to receive the driving lug of the cutter and there is also a hole and set screw to accommodate the shank of the guides.

GUIDES

Are of hardened tool steel. They are held in place by means of a set screw in the holder engaging a V-slot in the shank of the guide.

CUTTERS

Can be furnished of either carbon or high speed steel.

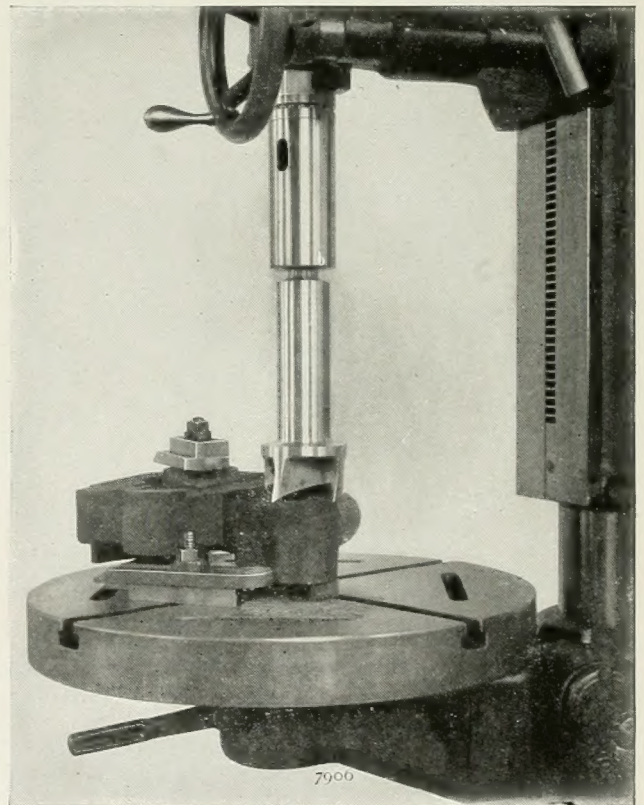
The shank of the guide passes through the hole in the cutter and the shoulder between the guide and its shank keeps the cutter in place. Cutters can be sharpened on the face and the guide is simply pushed further in the hole after grinding.

Write for catalog "Small Tools" showing our complete line.

For every counterboring job you can make immediately the right combination of holder, cutter and guide if your tool room is equipped with

P. & W. Interchangeable Cutter Counterbores

Holders, Cutters and Guides furnished in wide range of sizes.



Spot Facing
with a P. & W. Interchangeable Cutter Counterbore

Place a trial order with our nearest store.

Pratt & Whitney Company of Canada, Limited

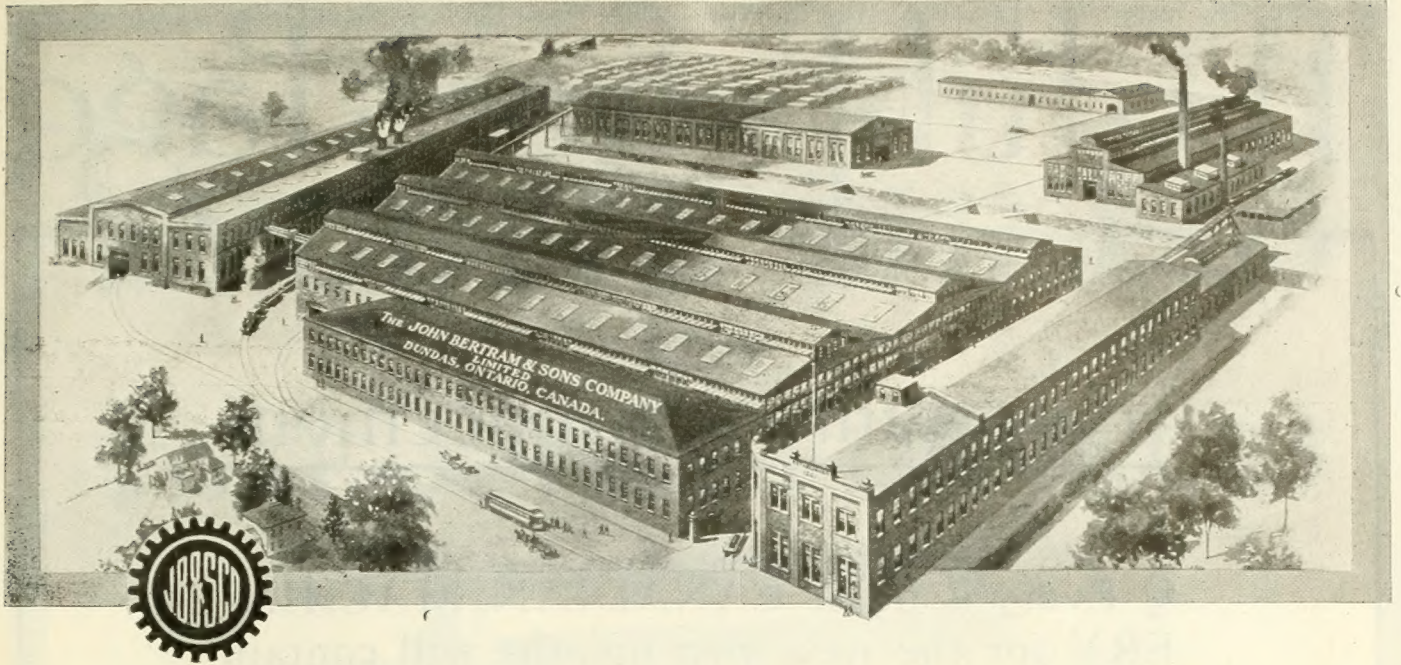
DUNDAS
Ontario

MONTREAL
723 Drummond Bldg.

WINNIPEG
Bank of Hamilton Bldg.

VANCOUVER
B.C. Equipment Co.

The advertiser would like to know where you saw his advertisement—tell him.



THE PLANT BEHIND

BERTRAM MACHINE TOOLS

60 years ago McKechnie and Bertram manufactured the first machine tools ever made in Canada on a commercial basis. Look at the immense proportions of the plant to-day!—and it is still producing Canada's leading tools.

No concern could make such a wonderful advance unless its products and its reputation were

good. Over half a century of *building in quality, service and square dealing* stand behind every BERTRAM MACHINE TOOL.

Our up-to-date engineering organization will gladly give you honest advice as to what machine tool is best for your needs.

Drop us a line to-day.

The John Bertram & Sons Co.

Limited

DUNDAS, ONTARIO, CANADA

MONTREAL
723 Drummond Bldg.

VANCOUVER
609 Bank of Ottawa Bldg.

WINNIPEG
1205 McArthur Bldg.

The advertiser would like to know where you saw his advertisement—tell him.

The Publisher's Page

By B.G.N.

Important Announcement

¶ Every issue of CANADIAN MACHINERY for the next two months will contain an article on Shell Manufacture. These articles will not, of course, monopolize the entire issues in which they appear, but they will prove extremely helpful and instructive, especially to the scores of firms and hundreds of individuals who are interested in the subject.

¶ Manufacturers who have equipment to sell will find it profitable to make CANADIAN MACHINERY even more informative and interesting by telling shell makers about their lines.

¶ Why not use CANADIAN MACHINERY for the next two months? Use it in a big way and it will quickly demonstrate the wisdom of using it six months, twelve months, and all the time.

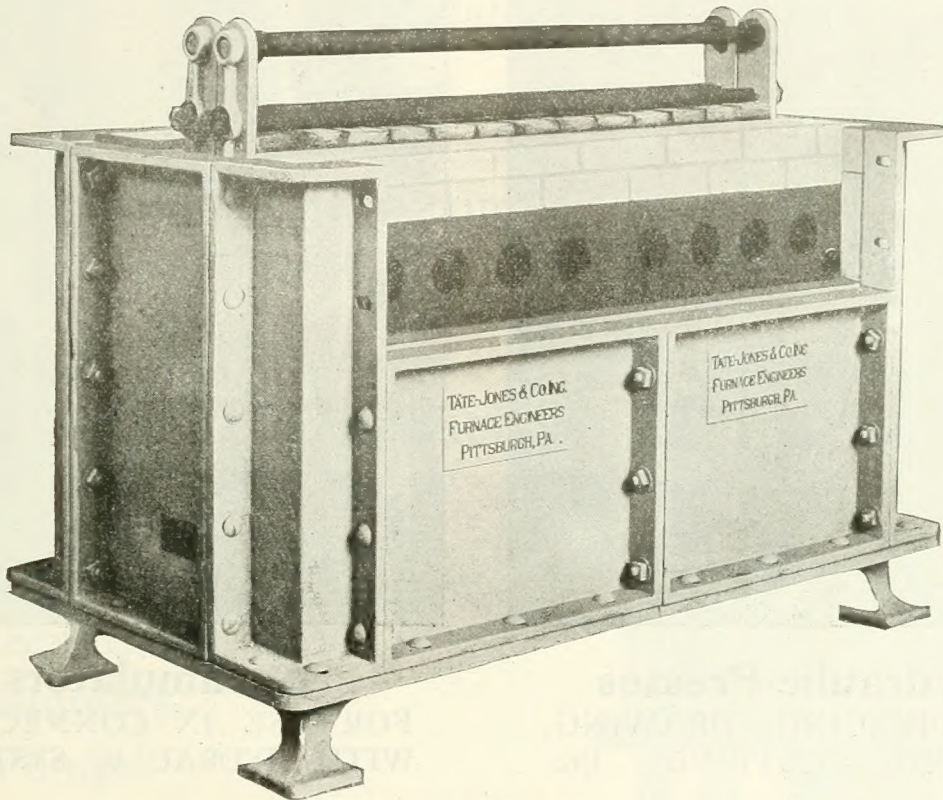
Rate card and full information on request.

Canadian Machinery and Mfg. News

143-153 UNIVERSITY AVE. TORONTO, ONTARIO

The advertiser would like to know where you saw his advertisement—tell him.

FOR NOSING
LYDDITE SHELLS
USE
TATE-JONES FURNACES



TATE-JONES FURNACE FOR 4.5 SHELLS

Are the furnaces you are using giving you maximum OUTPUT for the amount of fuel burned and the floor space occupied?

Correctly designed furnaces will maintain your output and reduce your fuel consumption.

Tate-Jones furnaces for all forging and heat-treating operations on Shells, and Tate-Jones continuous furnaces for the annealing of cartridge cases will give you maximum output and reduce your fuel consumption.

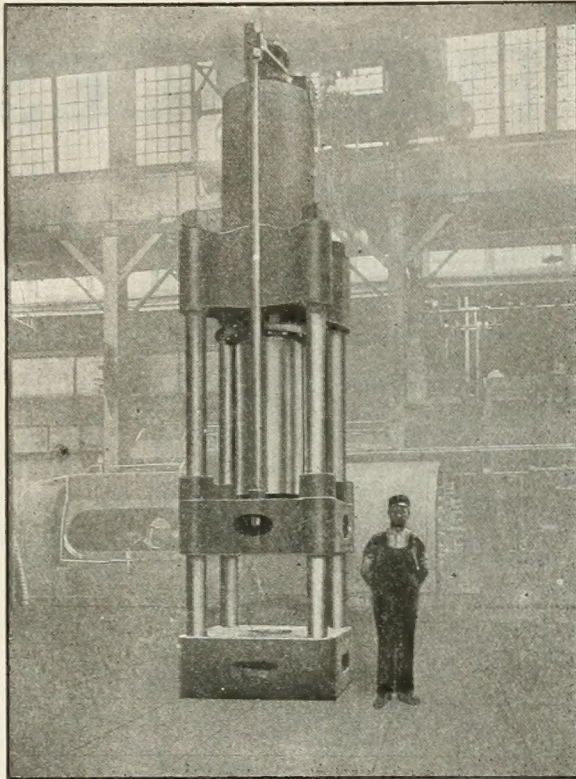
TATE-JONES & COMPANY, Inc., PITTSBURGH, PA.
FURNACE ENGINEERS

If what you want is not advertised in this issue consult the Buyers' Directory at the back.

MESTA

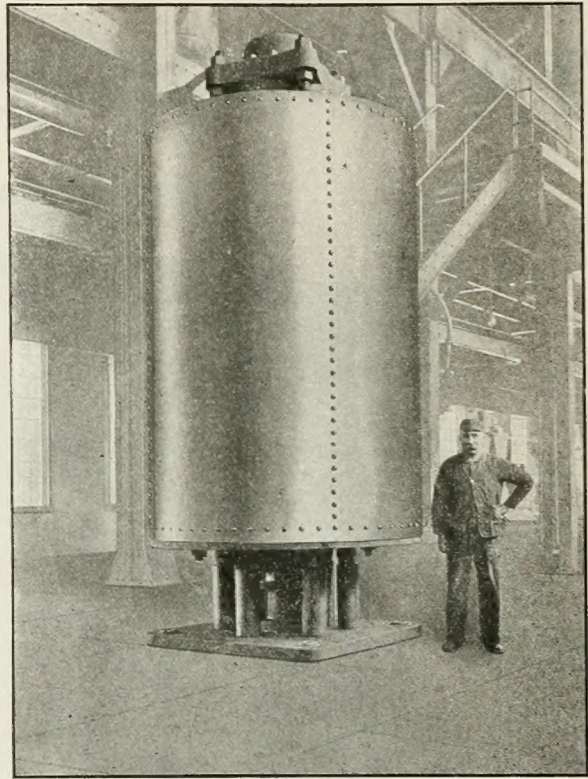
PRESSES AND ACCUMULATORS

ALL TYPES AND SIZES



Hydraulic Presses

FOR PIERCING, DRAWING,
FORGING, CUPPING, Etc.



Accumulators

FOR USE IN CONNECTION
WITH HYDRAULIC SYSTEMS.

OUR LONG EXPERIENCE in designing and building this class of machinery, and our **UNEQUALLED FACILITIES** enable us to make **QUICK DELIVERIES** of Hydraulic and Steam-Hydraulic Presses, Accumulators, Operating Valves, Etc.

MESTA MACHINE COMPANY

PITTSBURGH, PA., U.S.A.

DESIGNERS AND BUILDERS OF
GAS AND STEAM ENGINES, ROLLING MILL MACHINERY, CONDENSERS,
SHEARS, FORGING PRESSES, SAWS, GEARS, ETC.

The advertiser would like to know where you saw his advertisement—tell him.

SOUTHWARK

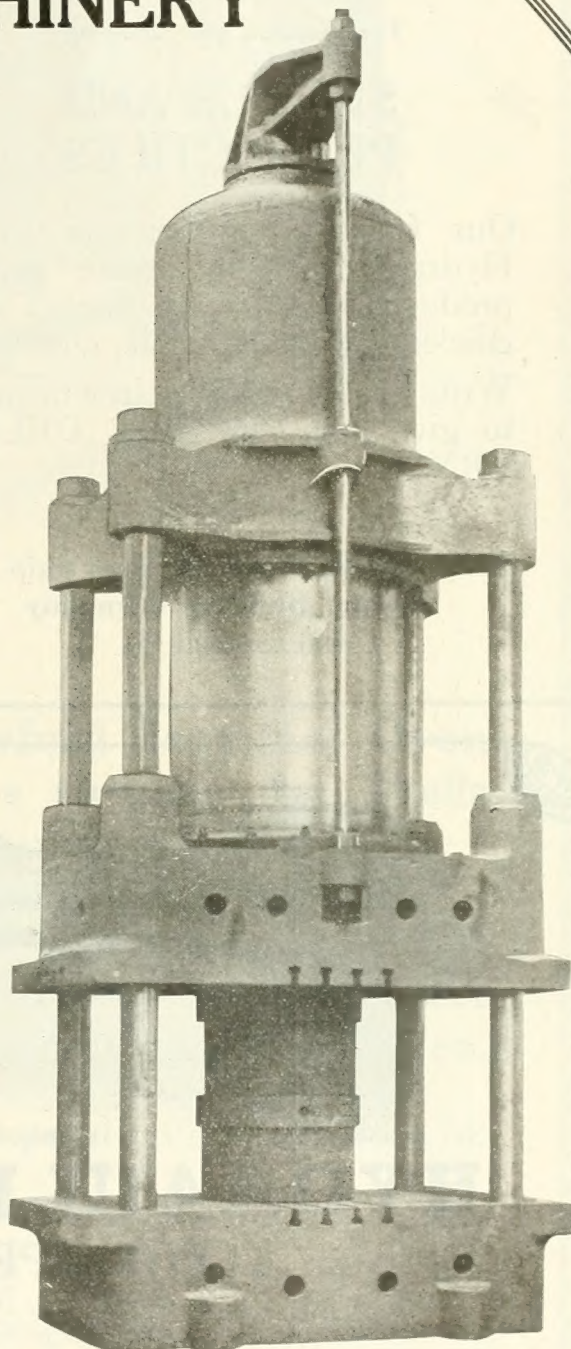
HYDRAULIC MACHINERY

For All Purposes

Presses	Pumps
Riveters	Accumulators
Cranes	Hoists
Intensifiers	Jacks
Leather Packings	Pipe Fittings
Gauges	Valves
Etc.	Etc.

Other Southwark Products

- Centrifugal Pumps.
- Turbo Generators for Direct and Alternating Current.
- Turbo Blowers.
- Turbo Pumps.
- Surface and Jet Condensers with their Auxiliaries.
- Southwark-Harris Valveless Oil Engine for Marine and Stationary use, built in sizes up to 1500 B.H.P.



500-ton 4 Column Flanging Press

Southwark Foundry & Machine Company

PHILADELPHIA

Founded 1836

Old Colony Building, Chicago

Brown-Marx Building, Birmingham

"First Builders of Large Centrifugal Pumps in America."

HYDRAULIC PRESSES

For Piercing and Drawing

SHELLS AND PROJECTILES

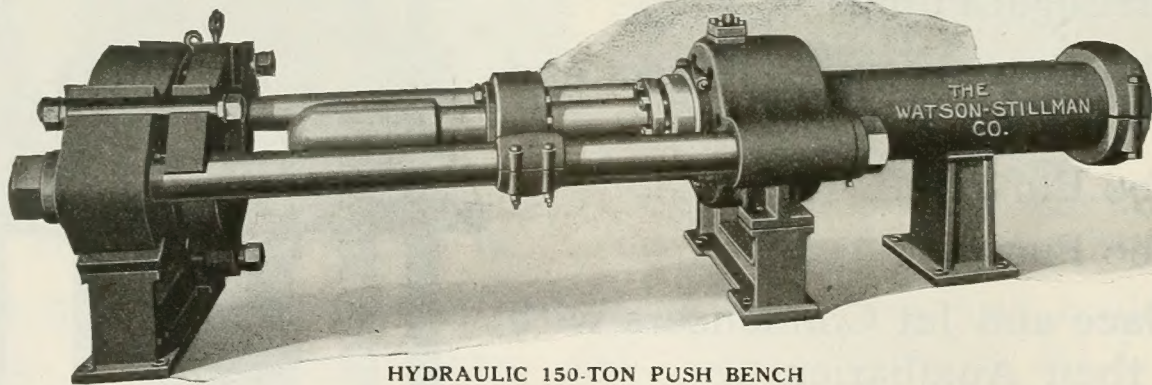
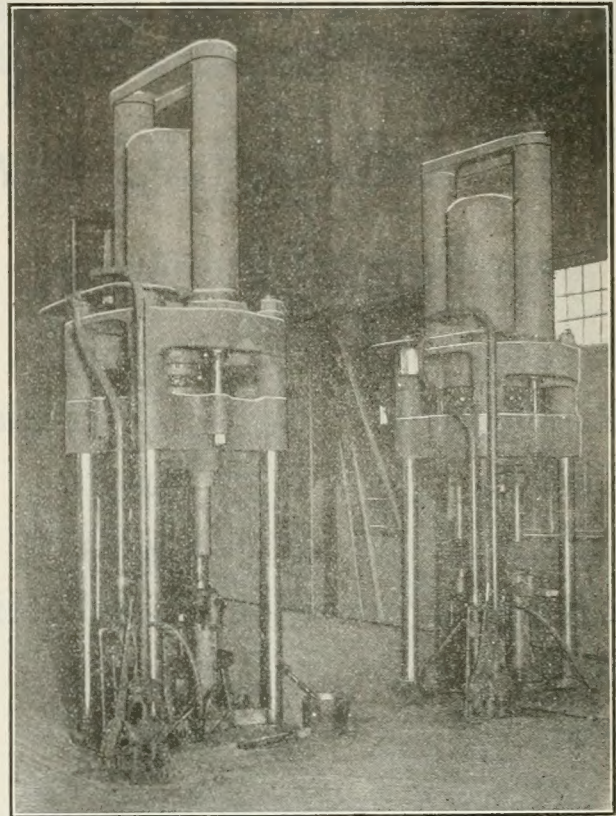
Our facilities for manufacturing Hydraulic Presses assure you a product of very high quality and efficiency at reasonable cost.

Write us now. We are in a position to give you **PROMPT DELIVERY.**

The William Cramp & Sons Ship and Engine Building Company

PHILADELPHIA, PA.

DRAWING PRESSES



HYDRAULIC 150-TON PUSH BENCH

HYDRAULIC MACHINERY FOR SPECIAL PURPOSES

We show here one of our hydraulic Push Benches for cupping, short drawing, etc. It is used in connection with other hydraulic machines for the preliminary operations of drawing seamless steel tubing, deep sheet work, etc. Our line of drawing and push benches covers a wide range and we are ever ready to adapt standard machines or design new devices to suit special requirements.

If in need of **HYDRAULIC EQUIPMENT OF ANY KIND**, write us. Our experience covers a period of over 60 years, in which time we have evolved and produced over 4,000 complete hydraulic machines. That experience is at your disposal.

WRITE FOR CATALOGS.

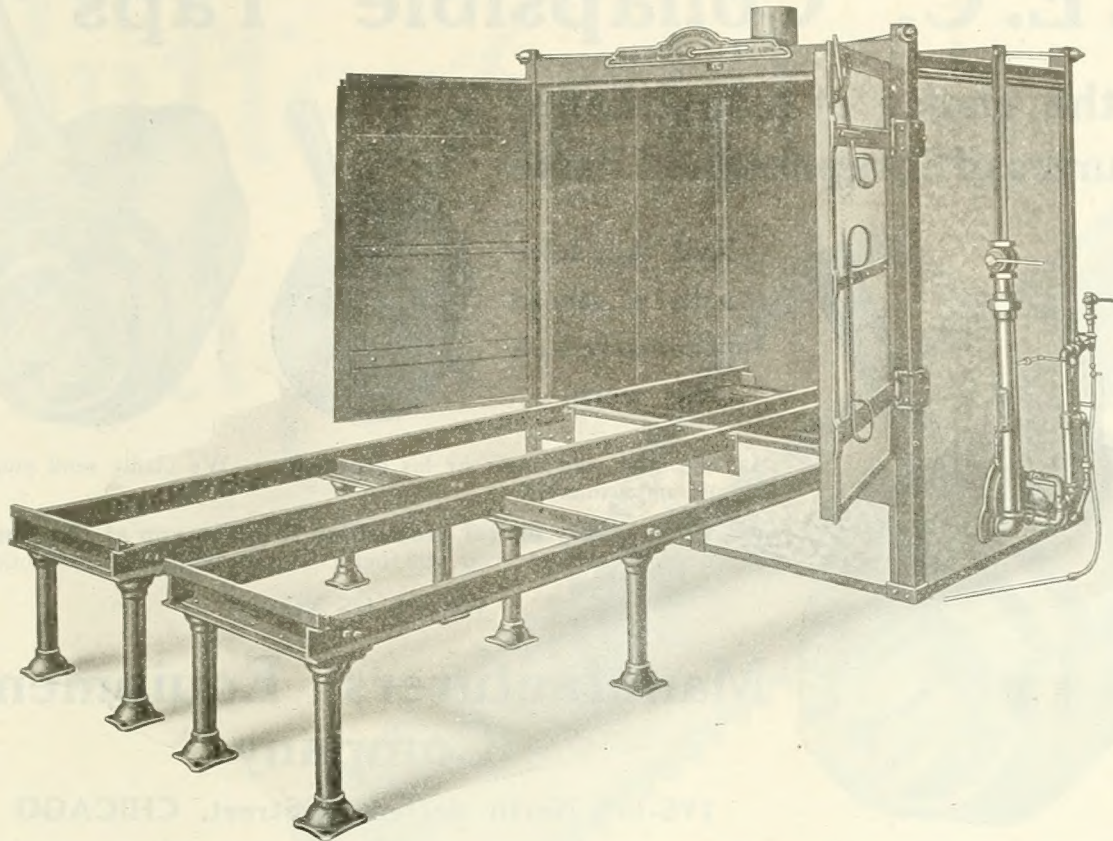
THE WATSON-STILLMAN CO.

36 DEY STREET, NEW YORK

CHICAGO, McCormick Bldg.

298

The advertiser would like to know where you saw his advertisement—tell him.



A convenient type of Crawford Sectional Oven largely used by manufacturers turning out Shells up to twenty-eight pounds each.

The method of heating explained in previous issues is the same with all types of Crawford Ovens—no direct flame coming in contact with the material in the oven.

Either city, natural, gasolene or producer gas can be used with any type of oven.

Ovens and trucks built for baking the varnish or finish on any number or size of shells required at a time.

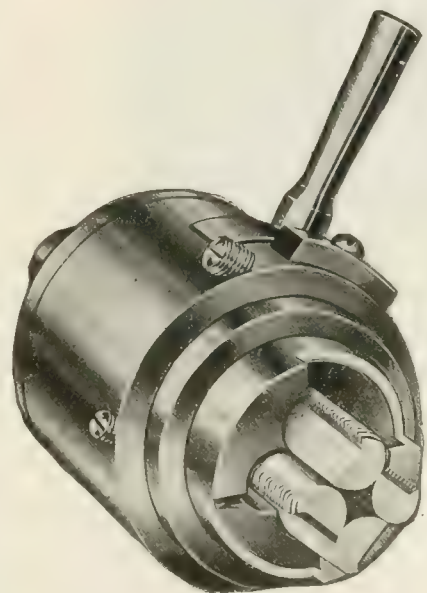
The Oven Equipment & Manufacturing Company
NEW HAVEN, CONN.

Canadian Representatives: THE A. R. WILLIAMS MACHINERY COMPANY, LIMITED, TORONTO, CANADA

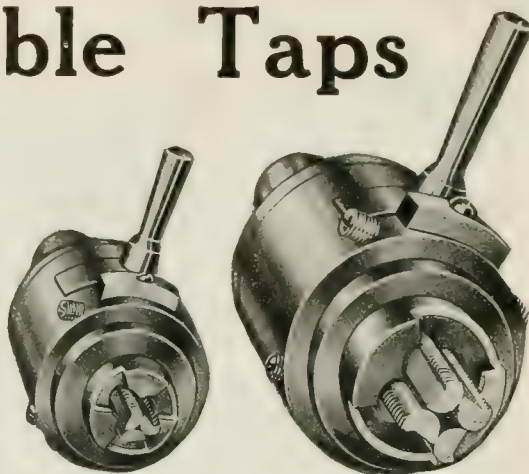
If what you want is not advertised in this issue consult the Buyers' Directory at the back.

M. E. C. Collapsible Taps

are the choice of many manufacturers of Shrapnel Shell Parts



—And they have made a record for themselves on this work.



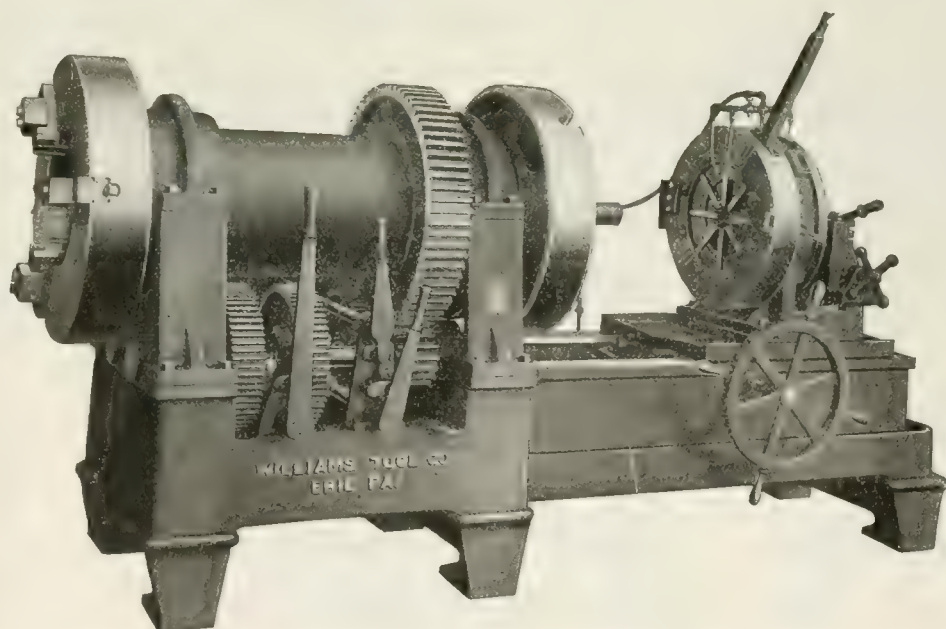
Ask the user, and profit by his experience. We gladly send you a list of our customers.

We have a very liberal proposition to offer you at this time. Let us get acquainted—you will find it a very profitable connection.

WRITE US NOW.

Manufacturers Equipment Company

175-179 North Jefferson Street, CHICAGO



The gas light was a big improvement over the tallow dip, but it had to give way to the electric light; and the Tungsten has superseded the little glimmer that once delighted us.

If you are still employing pipe-cutting methods as antiquated as the tallow dip, you need a Williams Pipe Machine, which occupies the same position in the pipe-cutting field as the Tungsten does in the lighting world, to bring you up-to-date.

Let us quote you prices and terms; any machine to cut 10 sizes of pipe between 1-4 inch and 18 inch, with any kind of power.

Anyone making, selling or buying a pipe machine, claimed to be a Canadian-made Williams Pipe Machine, does so without right or authority from us, and is liable to prosecution for damages.

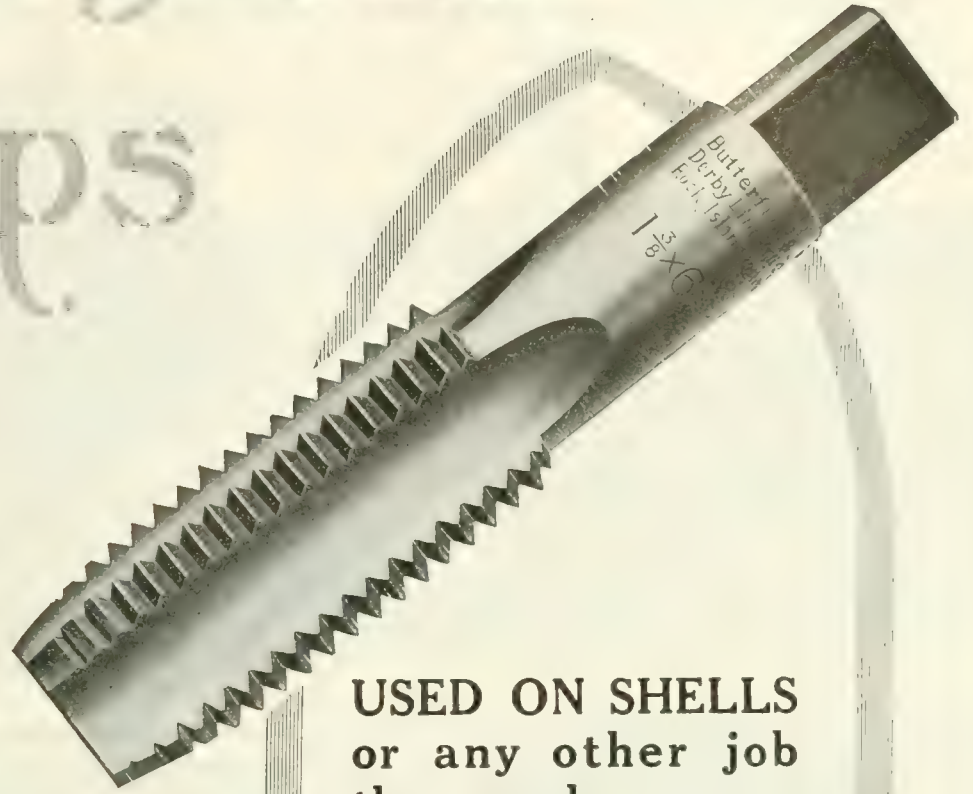
Williams Tool Co., Erie, Pa., U.S.A.

AGENTS:

A. R. WILLIAMS MACHINERY COMPANY
ST. JOHN, N.B. TORONTO WINNIPEG VANCOUVER

The advertiser would like to know where you saw his advertisement—tell him.

Butterfield Taps



**USED ON SHELLS
or any other job
they produce more
work in a given time
and last longer.**

This claim is based on results of exhaustive working tests against other makes.

Positively guaranteed. The sooner you send for a trial order, the sooner you'll get next to a better tool.

**BUTTERFIELD
& CO., INC.**

Rock Island,
Quebec

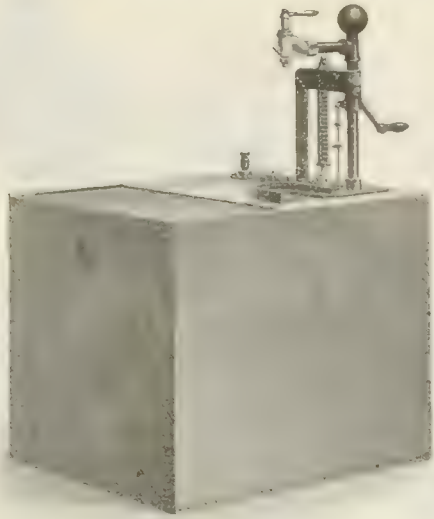
Derby Line,
Vermont

BEST BY TEST

USE THE BEST

Canadian Made

In Varnishing Shells



The only absolutely sure method is to completely fill them with varnish thereby insuring that the entire interior is covered.



Shell Varnishing Equipment

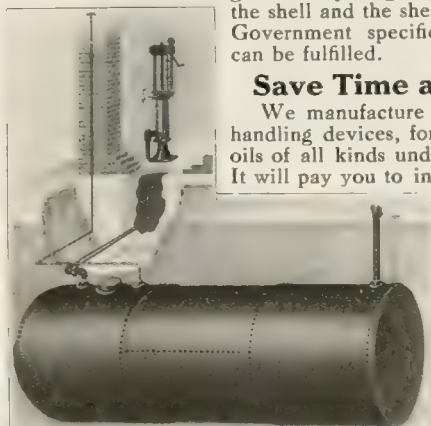
will enable you to varnish Lyddite Shells much faster than is possible with any other method.

The pump can be set to exactly fill the different sizes of shells being manufactured. They can be filled as fast as the pump can be operated, then drained and the varnish returned to storage in a clean and pure condition. There is no danger from spilling varnish on the outside of the shell and the shell is filled exactly full. Government specifications for varnishing can be fulfilled.

Save Time and Materials

We manufacture over 500 different oil handling devices, for storing and handling oils of all kinds under varying conditions. It will pay you to investigate what Bowser Equipment will mean to your works.

Awarded Highest Honors—
Grand Prize and Gold Medal—at Panama-Pacific International Exposition
San Francisco, Cal.,
U. S. A.—1915.



Made in Canadian Works by Canadian Workmen and Sold by Canadian Salesmen

S. F. Bowser & Co., Inc.

66-68 Frazer Avenue
Toronto, Ontario, Canada

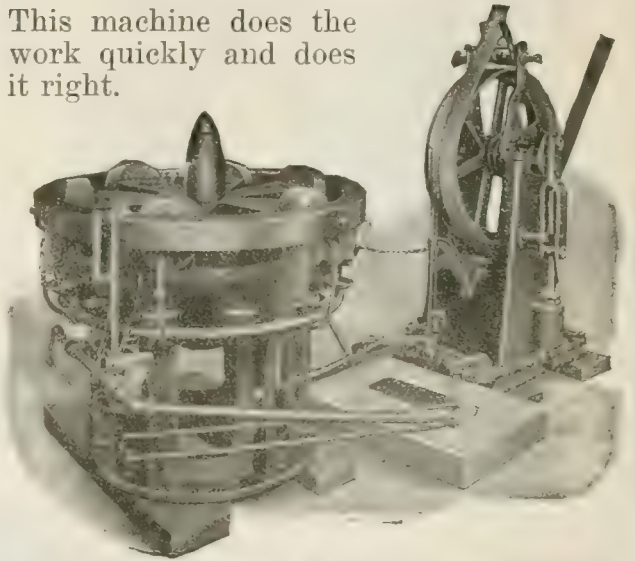
Sales Offices in all Centers and Representatives Everywhere



Hydraulic Banding Machine

For compressing bands on shrapnel shells and other projectiles

This machine does the work quickly and does it right.



In writing for information or quotation please advise width and thickness of bands and diameter of shells to be handled. Machines for our Canadian Customers are built in Hamilton, Ont.

We also manufacture machines for setting wagon and carriage tires, cold.

Please address all communications to our Rochester Office.

THE WEST TIRE SETTER COMPANY
ROCHESTER, NEW YORK



ECONOMIC WATER OIL

SHELL MANUFACTURERS use ECONOMIC WATER OIL for METAL CUTTING of every description; it will not gum nor rust, and it SAVES TIME AND LABOR.

WE CAN SAVE YOU 50% in the COST of your CUTTING MIXTURE BECAUSE

ONE GALLON of ECONOMIC WATER OIL will mix readily with 20 to 50 gallons of WATER, making a thick, creamy emulsion, and giving you a cutting mixture which will not only be satisfactory, but will produce very ECONOMIC RESULTS.

One TRIAL ORDER will prove our STATEMENT.

Made in Canada

Canadian Economic Lubricant Co.
LIMITED

1040-1042 Durocher St.

MONTREAL



Vulcan Hot Piercing Tool Steel for all Hot Work.
 Vulcan Magnet Steel for Permanent Magnet.
 Vulcan Regal Tool Steel for Brass Finishing.
 Vulcan Special "W" Tool Steel for Special Taps and Dies.

VULCAN CRUCIBLE STEEL COMPANY, ALIQUIPPA, PA.

ARMSTRONG WHITWORTH OF CANADA
 LIMITED
 MANUFACTURERS OF CELEBRATED BRANDS OF
HIGH SPEED STEEL & DRILLS
 "AW" FOR CUTTING ALL METALS AT HIGH SPEEDS
 FOR HARD METALS — "TYR" RAILWAY & TRAM TYRES
 OFFICE 22 VICTORIA SQ. MONTREAL — WORKS LONGUEUIL QUE.

Steel for Shells!

PROMPT SHIPMENT

Billets and rounds of suitable physical and chemical specification for forging and turning into shrapnel cases and lyddite shells of any size.

LACKAWANNA STEEL COMPANY

Standard structural shapes,
 Standard heavy and light rails,
 Sheared and universal mill plates,
 Sheet bars, and Lackawanna
 Sheet Steel Piling.

General Sales Offices: LACKAWANNA, ERIE CO., N.Y.

Canadian Correspondents:

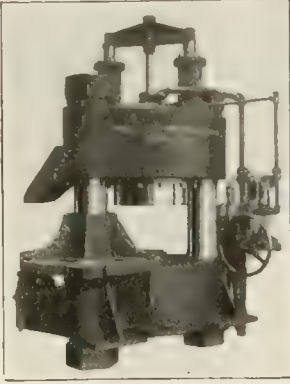
H. A. DRURY & CO., LTD., 309 Craig St. W., MONTREAL

SaBen Extra
HIGH SPEED STEEL

The most economical and efficient steel for machining shells

Manufactured by Sanderson Bros. and Newbold, Limited, Sheffield, England

H.A. Drury Company
 LIMITED
 Montreal and Toronto



ELMES HYDRAULIC PRESSES

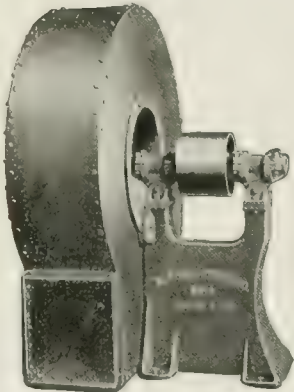
Rapid-acting hydraulic drawing presses, piercing presses, pumps, and accumulators for making Shells, etc. High pressure fittings and valves, quick shipment.

Send for our illustrated catalog to-day

Charles F. Elmes Engineering Works

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

Over 50 years' experience building hydraulic machinery.



Buffalo Slow Speed Mill Exhausters

For Conveying and Removing Shavings, Sawdust, Grain, Dust from Abrasive Wheels, Bark, Smoke, Gases, Fumes, etc.

REDUCE POWER COST 15 to 50%

and run at 35% lower speed than standard fans, decreasing wear and tear, and increasing life of fan and serviceability accordingly.

HOUSING REVERSIBLE, GIVING ANY POSITION OF DISCHARGE DESIRED. Pulley or motor drive, single or double width.

Let us send you Catalog 256-16.

Canadian Blower and Forge Company, Limited
BERLIN, ONTARIO

St. John

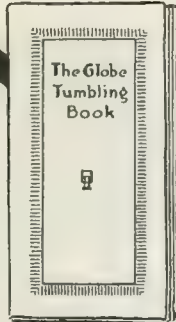
Montreal

Toronto

Winnipeg

Vancouver

GET YOURS



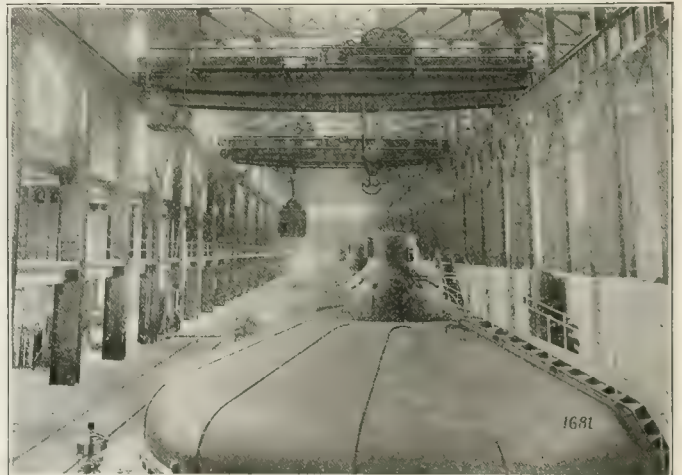
If you do—or intend to do Tumbling you should have this practical treatise.

It is the result of ten years' experience with Tumbling methods and barrels—and contains many helpful hints.

The man responsible for results in your Tumbling Room may find it instructive.

Your free copy is awaiting your call. Mention Canadian Machinery.

THE GLOBE MACHINE & STAMPING CO.
CLEVELAND, OHIO



Two 150 Ton Whiting Electric Traveling Cranes, Cedar Rapids Mfg. & Power Co., Cedar Rapids, P.Q.

Power Plant Cranes

We make a specialty of cranes for power house service—electric or handpower. Clearance diagrams and other data gladly furnished to engineers on request.

SEND FOR CATALOG NO. 110

Complete Foundry Equipments



Cranes of all Kinds

The advertiser would like to know where you saw his advertisement—tell him.

**Our Newly Designed
Shrapnel Shell
Cleaning Machine**

**Cleans all Standard Sizes
and accommodates various other sizes**

The table of this machine has six shell pockets. Three of these are in the Blasting Department, and the other three, as shown in the illustration, are in the open. Thus, while three of the shells are being cleaned, the operator can remove the other three that have been cleaned, replacing them with three more to be blasted.

Consequently the machine can be kept in constant operation.

This machine, if connected to any exhaust system, will be nearly dustless and absolutely automatic in operation.

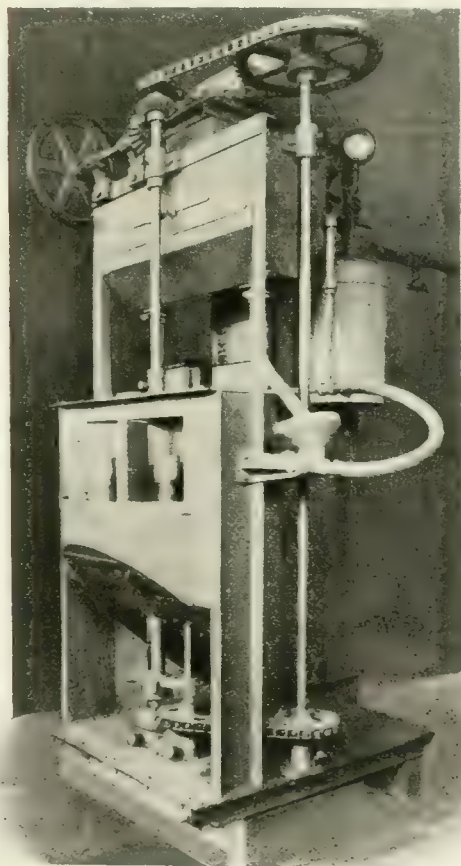
On the sand blasting table proper the division plates are lined with wood. This protects the steel plate. The wood is inexpensive and easily replaced.

The machine is so designed that the copper band groove is blasted on the exterior of the shell and another nozzle blasts the upper part of the exterior of the shell.

Its capacity for continuous running is from 150 to 200 shells per hour.

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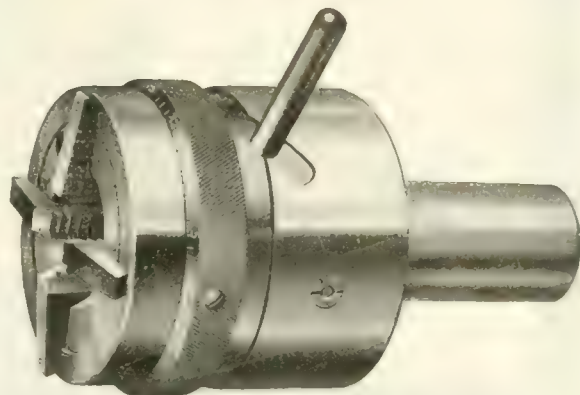
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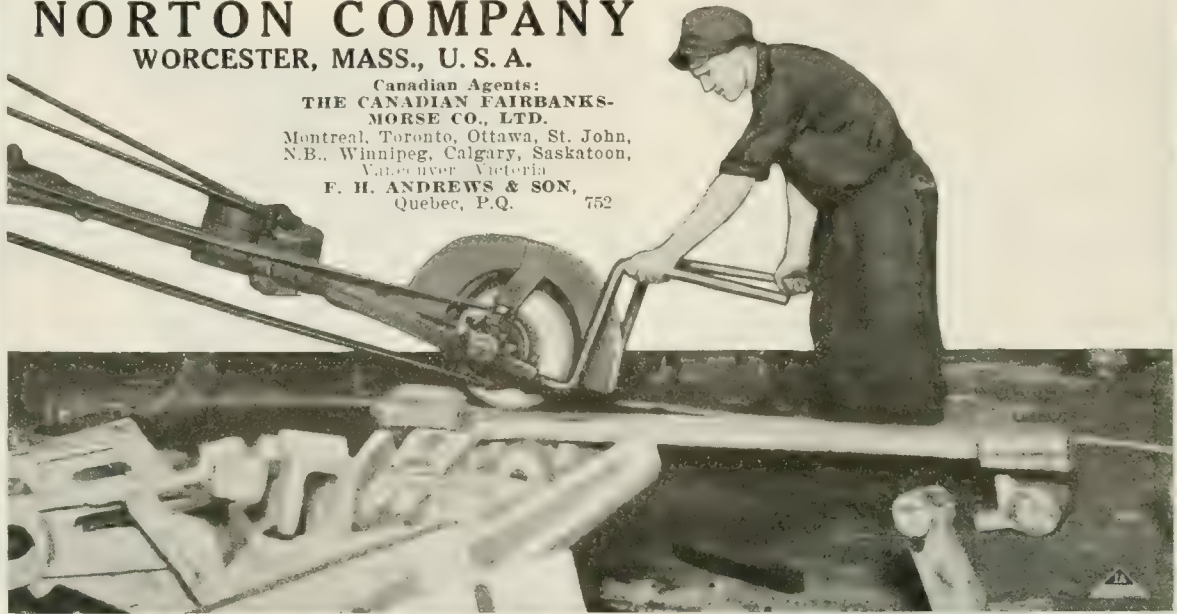
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in a swing frame grinder furnishes the most severe test of the worth of a grinding wheel. It's in work of this sort that the superiority of Norton Alundum Wheels is most clearly demonstrated.

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It is grinding out the ball races in case-hardened steel—holding its shape so well as to insure accuracy—cutting free, fast and showing long life—proving itself to be the wheel of service—

The Right Wheel in the Right Place

The Carborundum service department is ready and anxious to work with you towards real grinding economy—towards increasing and bettering your output.

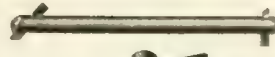
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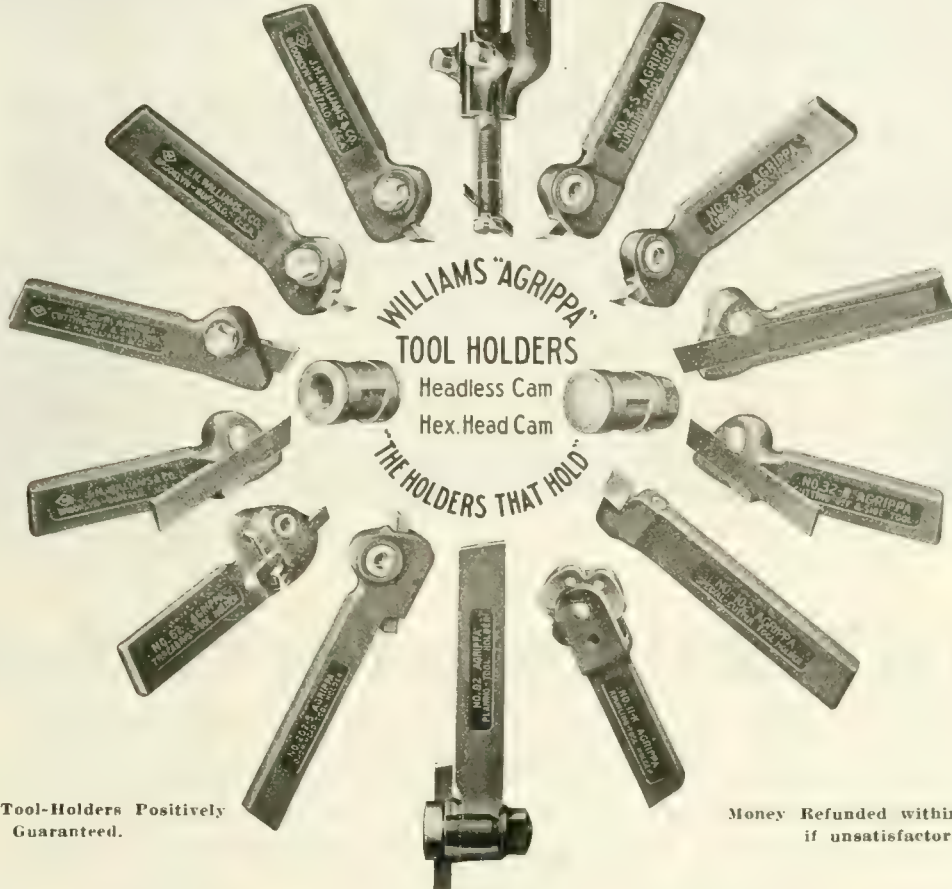
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No set-screws to
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Interchangeable
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Take multiple bars of all
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Universal cap for straight
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No loose or extra parts.

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Capacities 3"
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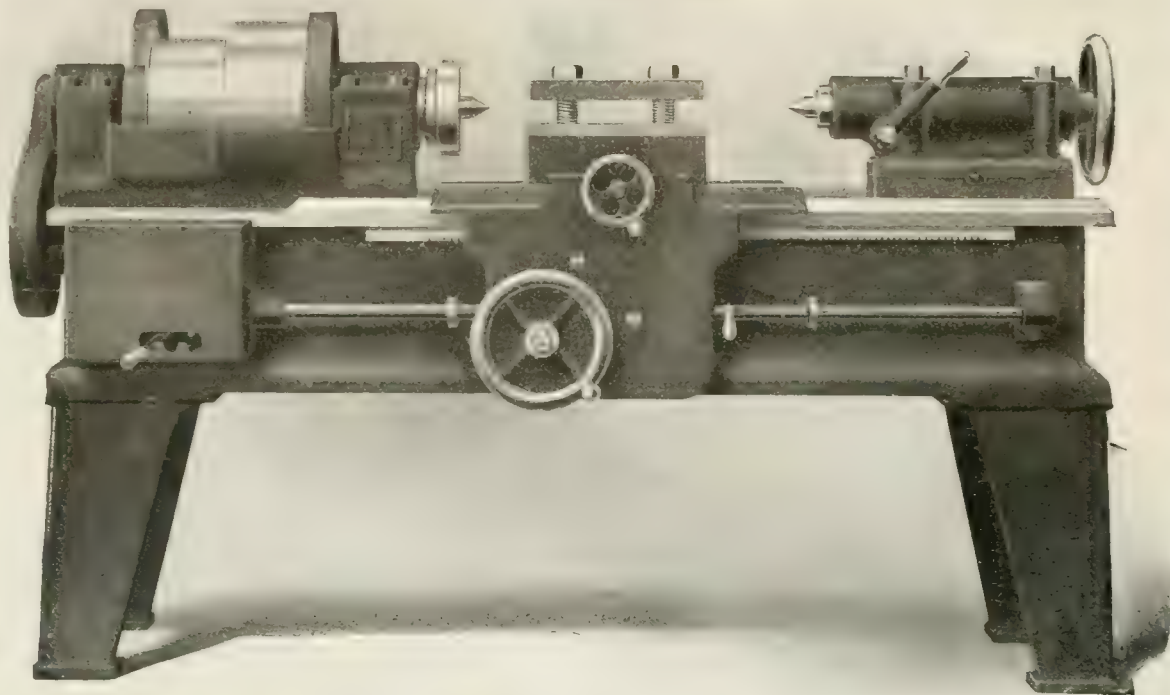
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Here is a lathe for turning and boring projectiles ranging from 3 to 6 inches in diameter. It can also be used for general manufacturing work. It is a 24" lathe cut down to swing 16", adding to the rigidity and convenience of operation. Can be operated by unskilled labor.

Specifications

Dia. of spindle	5"
Swing over bed	16"
Swing over carriage	10"
Distance between centers	21"
Ratio of back gearing	6.25 to 1
Diameter of tailstock spindle	3 $\frac{1}{2}$ "
Travel of tailstock spindle	8"

Large diameter two-step cone for 6" double belt. Steel gears.

Let us give you full details on this lathe. It will prove a money-maker for you on your work. Good deliveries still available.

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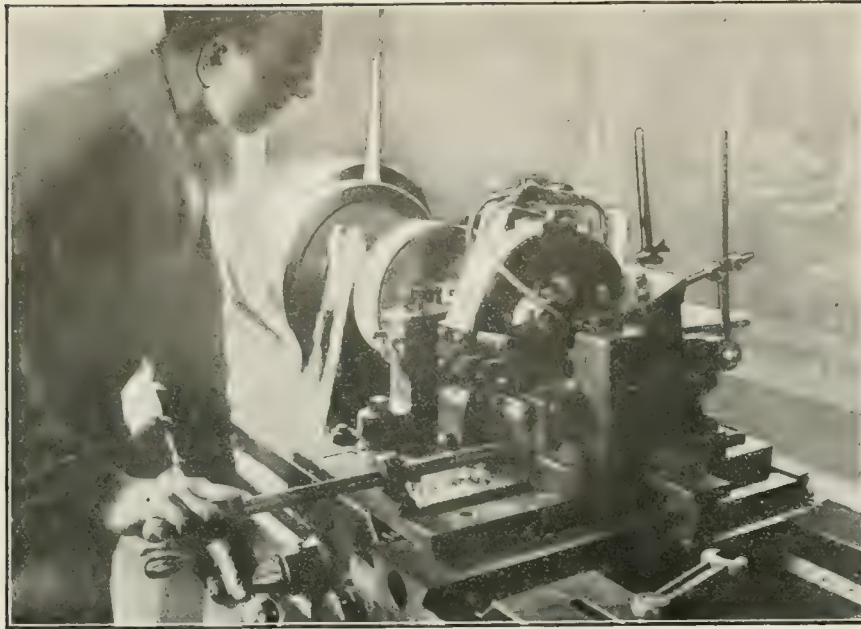


FIG. 2. GROOVING, UNDERCUTTING, KNURLING AND FACING.

roughing is done previous to this and the other operation done separately.

The main casting A of the device is bolted to the saddle of the lathe, the piece B being for the roughing operation but, owing to the possible faults already stated, was dispensed with. The steady rest C is used to hold the rollers D which are carried in the forked pieces E, these being adjustable by the set screws F. The groove for the copper band and also that for the cartridge case is put in by the tool G held in the casting H. The knurl is done by the small knurl I held in the piece J and secured by the set screw K. While the knurl is in position the undercutting is performed by the two levers L which operate the tools M through slides planed at the desired angle; this can be more clearly seen in the illustration. The end of the shell is faced off with the tool N, and the motion of the

Emmes Machine Co. lathe, also to an old "Butler" lathe. A plug is driven into the open end and the shell is placed upon the centres and rough turned as shown in Fig. 1.

Fig. 2. This operation and the device that accomplishes it indicate the ingenuity of those who have taken in hand the responsibility of production. Fig. 3 shows a rough sketch of the device which

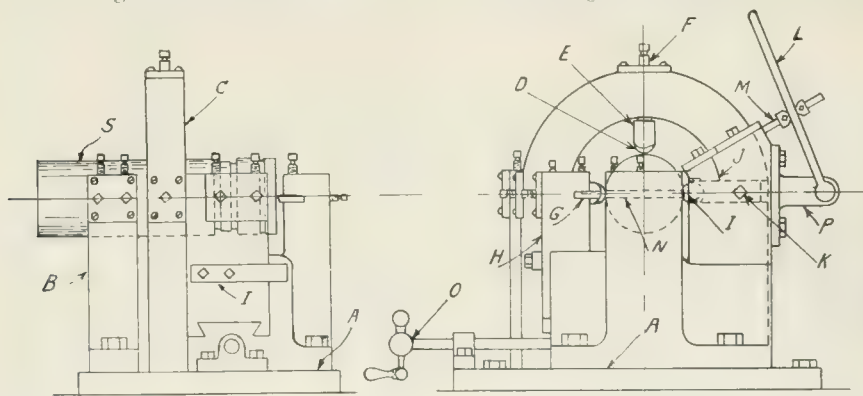


FIG. 3. GROOVING, UNDERCUTTING, KNURLING AND FACING ATTACHMENT

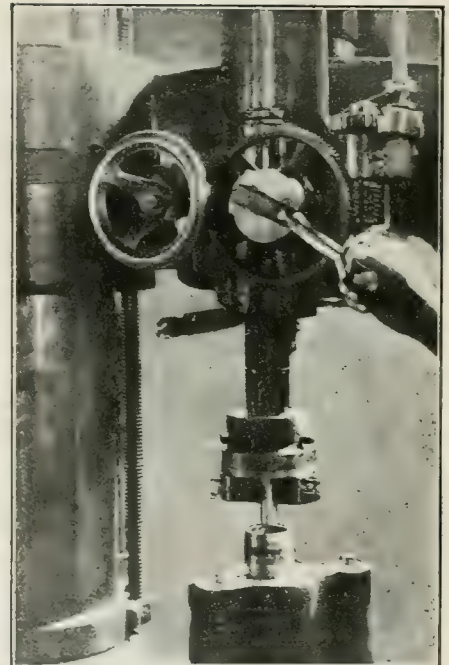


FIG. 4. NOSING OPERATION.

Grooving, Undercutting and Knurling.

The grooving, undercutting and knurling, also facing the base is performed on a "McDougall" lathe, which is shown in

originally was intended also to rough turn the body, but on account of the low limit allowance on these shells and the possibility of tearing and marking, the

tools is derived from the feed handle O. The shell during the operation is held in a split chuck.

Nosing.

The nosing is performed on an old drilling machine shown in Fig. 4. The work is held in a clamp chuck secured in a fixed position on the drill press table. The cutter head is brought down and the contour of the nose formed by the three forming cutters secured in position in the cutter head.

Boring.

The boring of the shell is accomplished on an old "Gardner" double headed lathe, shown in Fig. 5; the cutting bar being held in position on the tool post of the saddle and a shell placed in the chuck of each head. While the cutting tool is operating on one shell the operator is removing the completed shell from the opposite head and securing another in

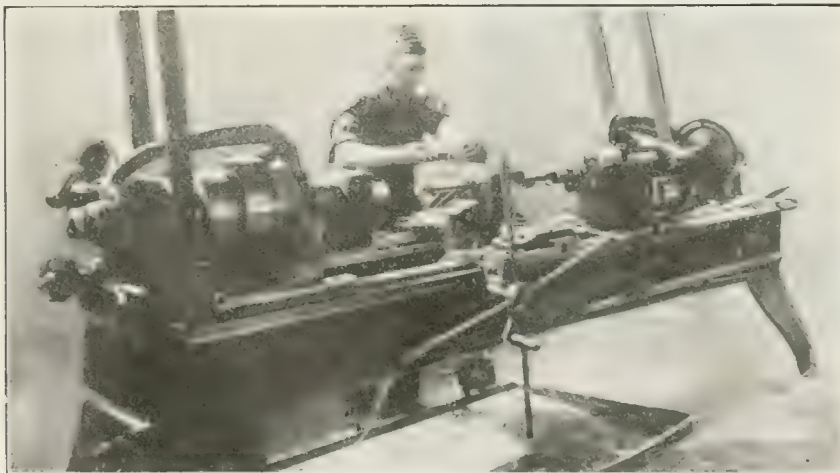


FIG. 5. BORING OPERATION ON DOUBLE HEAD "GARDNER" LATHE.

the chuck in readiness. The cutting operation is therefore almost continuous except for the time taken to change the direction of the traverse of the saddle and in running the latter from one head to the other.

As this particular shell requires a taper of 1/10 of an inch in the length of the bore, the cutting tools in the boring bar are at the top of the bar, and the rear end of each head is elevated sufficiently to give the required taper.

Base of Bore.

Another interesting operation is the forming of the radius at the base of the bore. Owing to the finish required upon these shells it was thought advisable to accomplish this result in the manner shown in Fig. 6. The two machines shown were designed by the superintendent of and built by the A. B. See Elevator Co., Montreal, with the expectations that as the cuttings were free to fall away from the cutting tool, better results would be obtained. The work produced was entirely satisfactory with the exception that the operator might with a little carelessness exert undue pressure upon the feed levers and cause the cutting tool to dig in and tear the stock. The device shown in the sketch, Fig. 7 was designed to offset any such contingency.

Two small cylinders B were bolted to the bottom of the moveable drill table A, and moveable pistons C were placed in these cylinders with an extending piece D. To operate the device, the shell being secured in the chuck shown, the machine is started and the drill raised by hand with the lever H. When about one inch from the bottom, or, when the drill began to cut, the piece E which moved freely on the base of the machine is swung beneath the piece D and the air turned on gradually. The air coming through the port I against the piston C forces the cylinder, and, therefore, the drill up to the work, allowing the chips to fall freely as the operation progresses. A jet of cutting compound is continually forced up alongside the drill, and a pressure of 80 to 100 lbs. per sq.

in. is used, giving a raising force of about 700 lbs. to 900 lbs. The pistons used were obtained from the Ford Motor Co.

Cutting Compound.

The cutting compound required in the

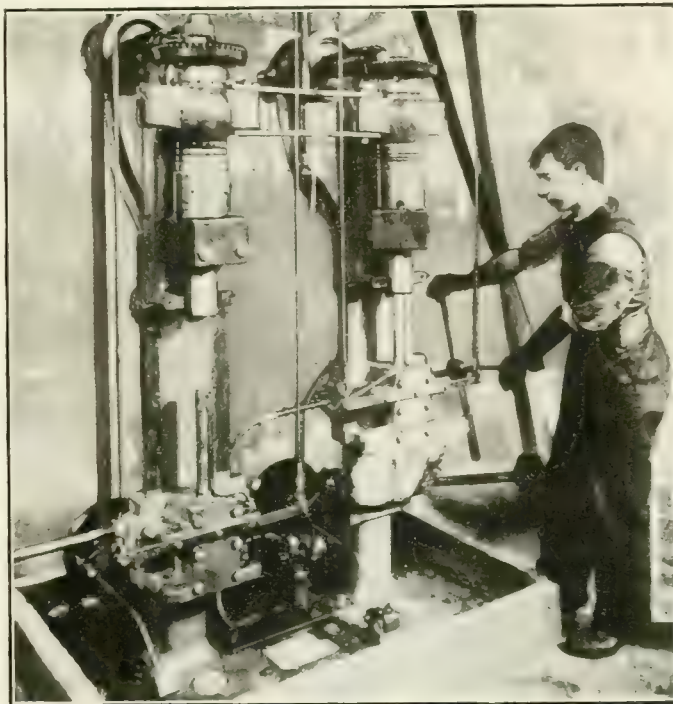


FIG. 6. FORMING BASE OF BORE RADIUS.

various operations is forced to the work by means of a small gear pump shown in Fig. 12. The frame A is secured in position on the floor at the rear of the machine so that the pulley B will be below a moveable shaft on the machine around which is placed the driving belt C. The cutting compound drips into a large pan

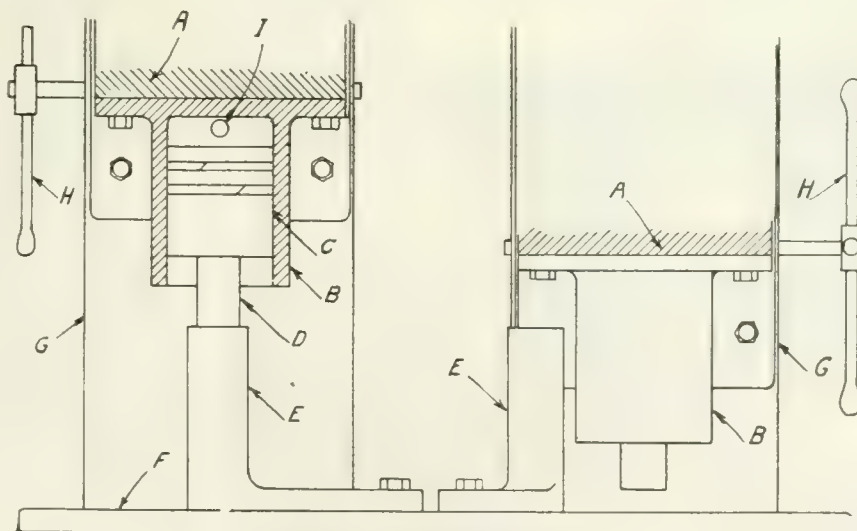


FIG. 7. AIR FEED FOR DRILL.

beneath the machine and is there drawn through the hose D by action of the pump and forced up through the hose E to the work.

Heat Treating.

The heat treating process on these shell is in accordance with prepared specifications as follows:

A—Heat slowly in furnace to 850 degrees C., or 1562 F.

B—Hold to this temperature for fifteen minutes.

C—Plunge into water of a temperature of about 62 degrees C. or 142 F.

D—Allow shell to cool in the water.

E—Leave shell in the air until thoroughly dried.

F—Afterwards immerse in a bath of lead at a temperature of about 500 degrees C. or 932 F. and allow to remain for about fifteen minutes.

G—Remove shell from lead bath and allow to cool in the air.

The first heating is done in two Mechanical Engineering Co. furnaces, and the cooling is done in a tank about 4 ft. x 5 ft. x 3 ft. deep. To retain the water at the proper temperature required, some very thoughtful consideration was given and experimenting done, the following procedure being adopted as a result.

Cold water is allowed to enter into the tank through a pipe which has its opening near the bottom of the tank, and the heated water is drawn off from near the surface. To regulate this flow of water, the following interesting and possibly original contrivance is used. An ordinary alarm clock was requisitioned and on the wheel that operates the second-hand, several pieces were arranged so that intermittent contact could be made at intervals of from a few seconds to a minute. When this contact is made, the current is transmitted to coils which, with other arrangements, operate a foot valve and allows a certain amount of heated water to flow from the tank.

As the heating of the shells and the lacquering are done in two separate, temporary buildings, the heated water from the hardening tank is forced through coils placed around the lacquering building for the purpose of keeping it warm in cold weather. The furnace for tem-

pering in the lead bath is shown to the extreme left in Fig. 8.

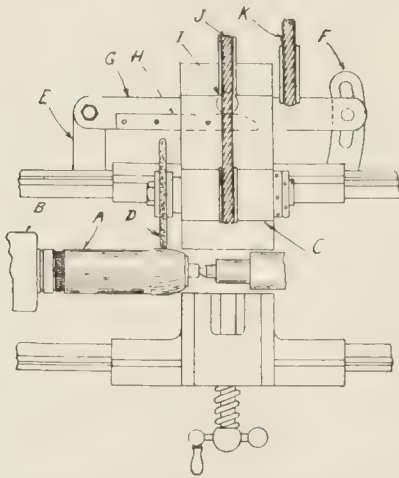


FIG. 9. EXTERNAL GRINDING.

Grinding.

After the hardening it is found necessary to grind both the bore and the outside to bring the shells down to weight also to put the finish on contour of nose. The exterior grinding is done on an old

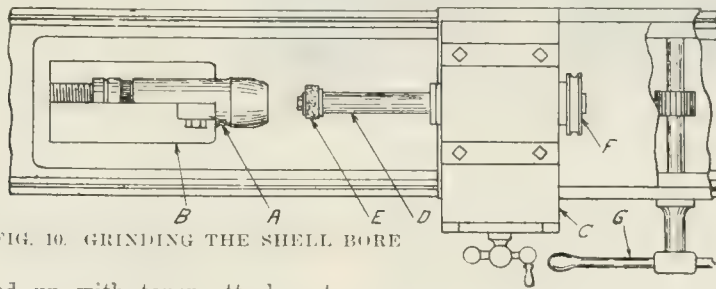


FIG. 10. GRINDING THE SHELL BORE

lathe fitted up with taper attachment, Fig. 9. The piece C is secured to the cross-slide of the lathe, and carries the arbor which holds the cutting wheel D which is driven by means of the belt J running over the grooved pulleys, the belt K being driven from a shaft over-

head. The cam H which is shaped to suit the form of the nose contour is secured to the bar G which is fitted to the brackets E and F. The roller I which is secured to the base of piece C is held in contact with the cam H by means of the spring on cross-feed spindle.

The internal grinding is accomplished on an old flat turret lathe, the shell A being held in the split chuck B. The adjustable cross slide S is secured to the traverse slide of the turret which is advanced by means of the levers G and the pinion shown which meshes with a rack below the slide. The arbor is driven by means of the groove pulley F. To accommodate the taper of the bore the head is set over the desired amount. Fig. 10 shows a sketch of this device.

Lacquering.

A very interesting and original idea for lacquering the exterior of the shells is shown in Fig. 11. The shells have to be coated with a thin even layer of lacquer, and to do this with any degree of satisfaction seemed to be quite a proposition as no ridges or unevenness must appear on the finished shell.

The sketch Fig. 11 shows the method adopted to meet the demand in view. A heavy galvanized iron tank about 2 feet square and 2 feet deep has been constructed and secured in a wooden frame. Half way down the tank B is the parti-

tion C which divides the tank into two compartments. From a 2 inch opening in the centre of this partition C, the pipe

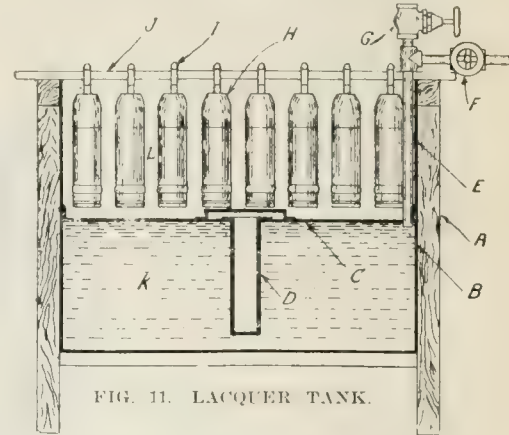


FIG. 11. LACQUER TANK.

or tube D extends downward to within about one inch of the bottom. Down one corner of the tank the air pipe E extends and just enters the bottom compartment. This joint, as well as all the others is made completely air or water tight. The operation of the arrangement is as follows:—

The compartment K is filled with the lacquering fluid and the shells are allowed to hang down supported on a bar which passes through suitable pieces screwed in the nose of each shell. When the shells are placed in position, the valve F, which controls the air from the reservoir, is opened and the air passing through the pipe E to the surface of the liquid forces the lacquer up through the tube D and gradually floods the upper compartment. When the lacquer has

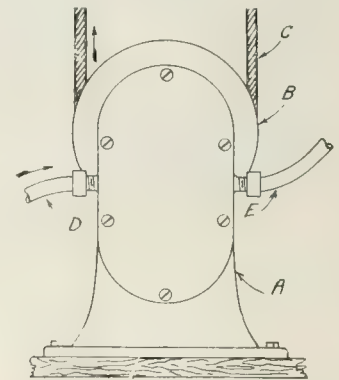


FIG. 12. FORCE PUMP.

completely flooded the shells, the valve F is closed and the fluid allowed to remain for a time, or it can be permitted to recede with any degree of rapidity by opening the exhaust valve G, thereby allowing the air to escape and the fluid to re-enter the lower compartment. An uniformly even coating of lacquer on the surface of the shells is the result. The diaphragm M is added to evenly distribute the flow of lacquer.

To prevent the lacquer from adhering to the copper band the latter is coated with a solution which is removed after the shell lacquer has set.

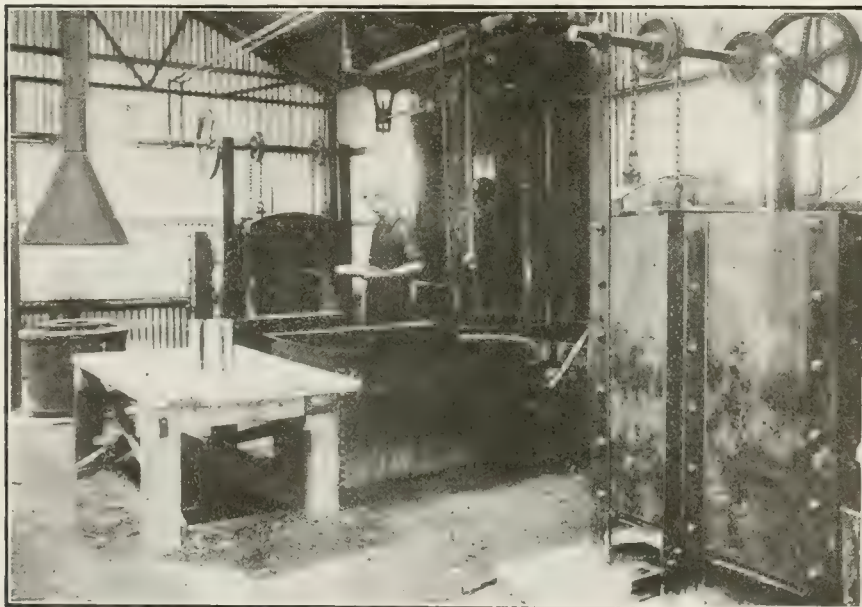


FIG. 8. HEAT TREATING ROOM

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

THREE TYPES OF SPRING TESTERS

By G. Edwards

THE springs used for automobile motor valves must be of a comparatively uniform tension in order to give satisfactory service. For this reason, nearly every motor factory has some kind of testing device for testing the power of the springs used. If too stiff or too weak, they must be discarded. Many of the testing devices make use of a standard scale to do the measuring of the spring power.

The one shown in Fig. 1 employs a common counter scale around which a wooden frame has been placed. A screw A and the handwheel B form the means of compressing the spring onto the scale platform. The spring is placed as shown at C and the screw is run down a certain distance. The scale should then "weigh" a certain amount, with an allowance for plus or minus, which has been determined previously and tabulated for the operator's use. The device shown is somewhat slow and cumbersome for any but heavy springs.

That shown in Fig. 2 is easier to use and has a wider range. The wooden fulcrum-bracket bolted to the wall has a number of holes in it for various posi-

tions of the compression lever when testing springs of different lengths. The spring to be tested is placed at A and

device, care is taken to place the springs under the same spot on the lever, so that the amount of compression and the lever-

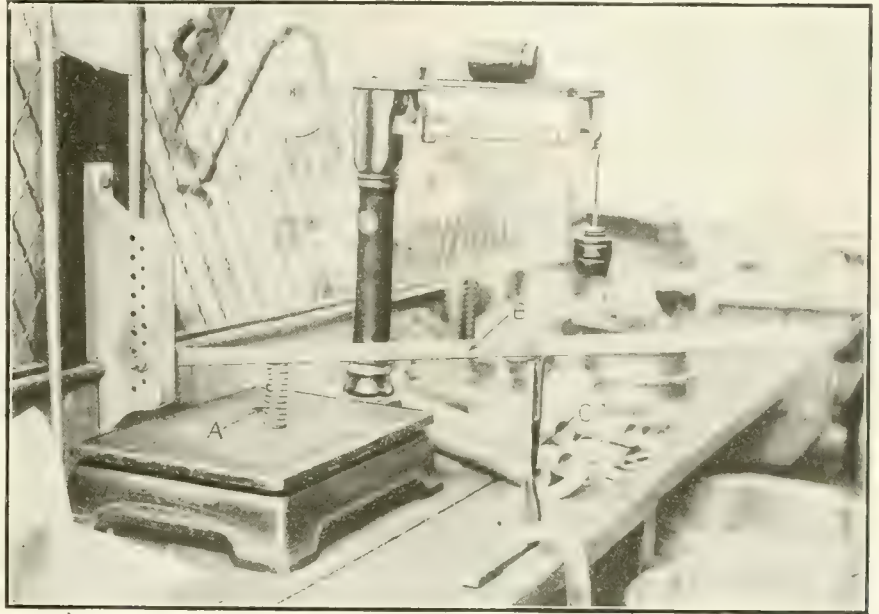


FIG. 2. DEVICE WITH WIDER RANGE

the lever B is brought down as far as the slot in the guide C will allow it to go. The reading is taken from the scale beam as in the previous case. In using this

age does not vary to any extent. This device is in use in one of the largest automobile factories in the country.

Another device that is extremely sim-

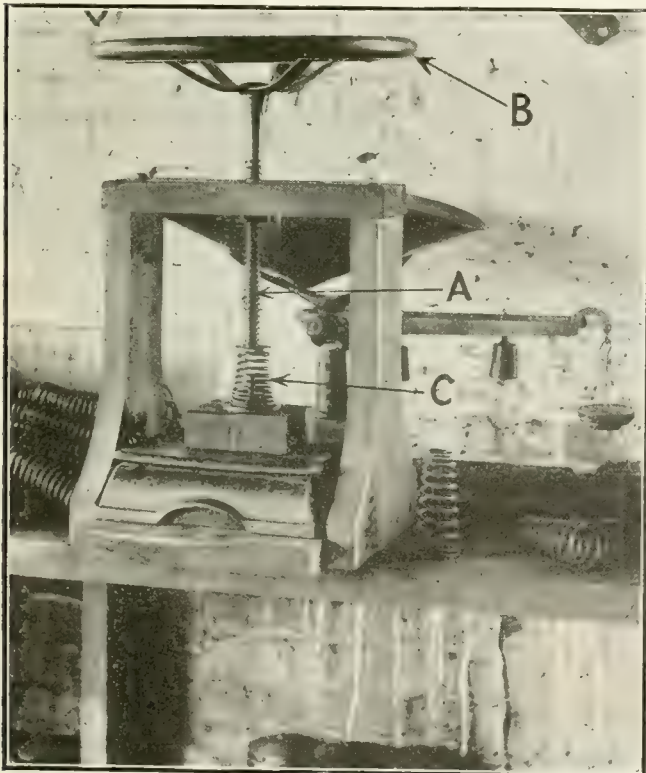


FIG. 1. SCREW-OPERATED SPRING TESTER

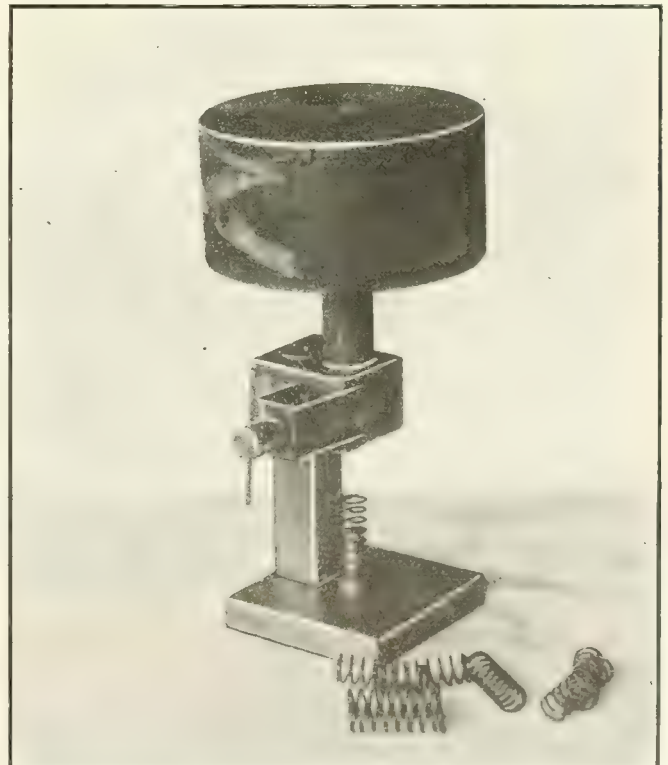


FIG. 3. SIMPLE TESTER

ple, and does not employ a scale, is shown in Fig. 3. It is used for testing the springs used on a well-known motorcycle. The spring is placed over the locating spring as shown. The weight is then released so that the plunger will come down on top of the spring, the latter having strength enough to just keep the bottom of the plunger from coming in contact with the top of the locating pin. This is adaptable to a large range of work with a few modifications, the principal requirement being suitable weights for various springs. It also has the advantage of being easily made by almost anyone at a slight cost.



SOLVING A BEVEL GEAR PROBLEM.

By L. E. Gehman.

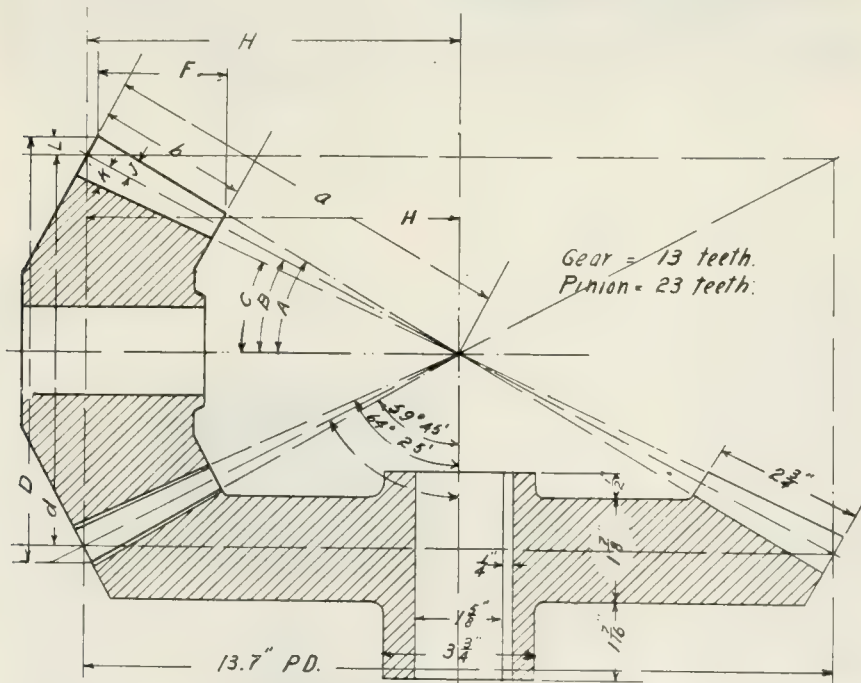
A jobbing shop received a repair order for a bevel gear and pinion, which called for cut gears and further stated that the original gears had been shipped by express.

The gear arrived in due time but the pinion could not be located. The job was a very urgent one so it was turned

ing angle 59° 45', approximately. To get the approximate centre angle one-half of the difference between the cutting and face angles were added to the cutting angle which gave 62° 5'. The outside diameter calipered 14 in., and the pitch diameter 13.7 in.

The notation and formulas that were used were as follows:

- N=Number of teeth in gear.
- n=Number of teeth in pinion.
- A=Face angle.
- B=Centre angle.
- D=Outside diameter.
- F=Face measured parallel with the axis.
- H=Distance from pitch line to the apex parallel with the axis.
- a=Distance from the apex of angle to the point of tooth.
- b=Length of face.
- d=Pitch diameter.
- p=Circular pitch.
- J=Difference in degrees between the centre angle and face angle.
- K=Difference in degrees between the centre angle and cutting angle.
- L=Distance from point of tooth to



SOLVING A BEVEL GEAR PROBLEM.

DATA: 43 TEETH, O.D. 14 INS., P.D. 13.7 INS., PITCH 1 IN., CUTTING ANGLE 59° 45', FACE ANGLE 64° 25'.

over to the draftsman who was informed that he should be able to make a drawing of both gear and pinion from the data which could be secured from the gear.

The gear had 43 teeth and the circular pitch was found to be approximately one inch. The face and cutting angles were next measured by a bevel protractor using the bore of the gear as a finished surface for the protractor. The face angle measured 64° 25' and the cut-

pitch line measured perpendicular to axis.

Calculating for the pitch diameter.

$$d = \frac{NP}{3.1416} = \frac{43 \times 1}{3.1416} = 13.687 \text{ in.}$$

which is very near the approximate dimension. In order to figure the angles it was necessary to know the number of teeth in the pinion. Thus using the centre angle 62° 5' and the formula

$$\text{Tan. } \frac{N}{n} = \text{Tan. } \frac{43}{23} = 1.88734$$

Assuming that the pinion has 23 teeth and solving for centre angle: Tan. B = 1.88734 = 22.7+.

$$\frac{43}{23} = \text{Tan. } 1.86957 = 61^\circ 51' 30''$$

Solving for 22 teeth Tan. B = 22 = Tan. 1.95454 = 62° 54' 18.8". Comparing these results with the approximate centre angle, it is found that the centre angle of the pinion with 22 teeth is 49' 18" greater, and the pinion with 23 teeth 13.5" smaller, than the centre angle, therefore it can be readily seen that the original pinion had 23 teeth.

In calculating the face and cutting angles it is necessary to know the angles J and K and the distance from the apex of the angle to the point of the tooth, parallel with the face of the tooth:—

d	13.687	13.687
a	$\frac{d}{2 \sin B}$	$\frac{13.687}{2 \times .88178} = 7.761$
Addendum	.3183	
Tan. J	$\frac{a}{7.761}$	$\frac{.3183}{7.761} = .04101$
Dedendum	.3683	
Tan. K	$\frac{a}{7.761}$	$\frac{.3683}{7.761} = .0475$

Face angle A = B + J = 61° 51' 30" + 2° 20' 54" = 64° 12' 24".

Cutting angle C = B - K = 61° 51' 30" - 2° 43' = 59° 8' 30".

The calculated angles and approximate angles are very nearly the same.

The distance H from the pitch line to the apex, parallel with the axis $d \times \frac{\cosine B}{2} = 13.687 \times .53489 = 7.31605$.

The face measured parallel with the axis $F = b \times \cosine A = 2.75 \times \cosine 64^\circ 12' 24'' = 2.75 \times .43511 = 1.197$.

The distance L = addendum $\times \cosine B = .3183 \times .47166 = .150$.

Outside dia. D = d + 2L = 13.687 + .30 = 13.987.

From the foregoing dimensions a drawing was made, the number of teeth for the pinion being 23, and the pitch diameter twice the distance from the pitch line of the gear to the apex of the angle measured parallel with the axis. The other dimensions being calculated with similar formulae that were used for the gear and the length of the hub was taken from the machine.

The Coming Foundrymen's Convention and Exhibition

The privilege of spending a week in Atlantic City with its health-bracing and pleasure-giving opportunities may at any time be considered acceptable. There is, therefore, little doubt that, with the added features of a thoroughly installed and attractively displayed exhibition of foundry equipment and supplies, and an unusually high-grade programme of interesting and instructive work-a-day topics arranged for discourse and discussion, foundrymen from all over the United States and Canada will make their presence felt on this occasion in numbers greatly exceeding those of even the most successful of past similar functions.

THE selection of Atlantic City, N.J., as the meeting place for the 1915 Annual Convention of the American Foundrymen's Association and of the American Institute of Metals may justly be stated as a happy choice. The fact also that the Foundry & Machine Co. Exhibition is again found in co-operation leaves nothing to be desired by even the most fastidious or critical. It has been stated—and with more real truth than the mere words express—that the whole eastern section of the country have united as hosts to return the hospitality tendered at similar functions held in recent years in Toronto, Detroit, Cincinnati, Pittsburgh, Buffalo, and Chicago. This is clearly indicated by the fact that the local committee is formed of prominent foundrymen, chosen from the States of Pennsylvania, New Jersey, New York, Connecticut, Rhode Island and Massachusetts.

Its central location and excellent transportation facilities make Atlantic City easily accessible, while its proximity to Philadelphia and New York, in which districts are to be found many large and varied foundry establishments, gives unlimited scope and opportunity to such as may desire to visit and inspect

Association and the American Institute of Metals 63 papers and reports will be presented and discussed. In quality and variety the papers are fully equal to those presented at previous meetings and the programmes have been arranged to stimulate the fullest possible discussion.

Both societies will hear the reports of committees that have been at work throughout the year, and it is expected that an unusual volume of valuable foundry information and data will become available through this source. The exhibition will have the advantage of an ideal location which precludes the possibility of overcrowding and inconvenience and affords unusual facilities for the display of working equipment. The entertainment features of the week will be unique and of a character such as can only be found at Atlantic City.

The tenth annual foundry and machine exhibition, under the auspices of the Foundry & Machine Exhibition Co., will open Saturday morning, September 25, and close Friday evening, October 1. The convention proceedings will open at 10 a.m. Tuesday, September 28, with a joint meeting of the American Foundrymen's Association and the American Institute of Metals.

American Foundrymen's Association and the American Institute of Metals will be at the Hotel Traymore, the latest addition to Atlantic City's galaxy of hostels. The headquarters for the Machine & Exhibition Co. will be at the Hotel Dennis.

Thursday, September 30, has been set aside as "Philadelphia Day" and an effort will be made to close all Philadelphia foundries on that day to enable the employees to attend the convention and exhibition. The annual joint banquet of the American Foundrymen's Association and the American Institute of Metals will be held Thursday evening, September 30, in order to give as many of the Philadelphia visitors as possible an opportunity to attend.

The American Foundrymen's Association will introduce an innovation by holding its annual business meeting on Wednesday evening, September 29, instead of on Friday morning as heretofore.

Exceptional facilities are, we understand, being provided for operating exhibits. Electric current, both direct and alternating, will be available at various voltages, while exhibitors of pneumatic machinery will have as usual an un-



YOUNG'S MILLION DOLLAR PIER WITH FOUNDRY AND MACHINE CO. AND FOUNDRYMEN'S CONVENTION HEADQUARTERS IN FOREGROUND

lay-out and operation systems with which they may be unfamiliar, but by which they may profit. At the various sessions of the American Foundrymen's

The registration bureaus for both associations, which will be located on the pier, will open Monday morning, September 27. The headquarters of the Am-

limited supply of compressed air. Steam as a motive power will also be on tap. The various convention programmes are as follows:—

American Foundrymen's Association

TUESDAY, SEPT. 28, 10 a.m. CONVENTION HALL

Joint session, American Foundrymen's Association and American Institute of Metals.

Addresses of welcome and response.
Report of A. F. A. committee on safety, by A. W. Grogg, chairman, Bueyrus Co., South Milwaukee, Wis.

"Tests of Lenses for Foundry Glasses," by F. W. King, Julius King Optical Co., New York. This address will be accompanied by a demonstration of a lens testing machine and a colored spectroscopic test showing scientifically, colors of lenses used in dangerous conditions of light and glare.

Report of A. F. A. committee on industrial education, by Frank M. Leavitt, chairman, University of Chicago, Chicago.

"Functions of Sand Binders," by Henry M. Lane, consulting foundry engineer, Trussed Concrete Bldg., Detroit.

"Notes on Applications and Characteristics of Cores in Modern Molding," by R. A. Bull, Commonwealth Steel Co., Granite City, Ill.
"Molding Sands," by C. P. Karr, associate physicist, Bureau of Standards, Washington, D.C.

Appointments of nominating and resolutions committees.

TUESDAY, SEPT. 28, 2.30 p.m. CONVENTION HALL

Report of A. F. A. committee on specifications for foundry scrap, by S. D. Sleeth, chairman, Westinghouse Air Brake Co., Wilmerding, Pa.

"Patternmaking for Molding Machine Work,"

of The Fire Engineer, and Harry Y. Carson, Central Foundry Co., New York.

WEDNESDAY, SEPT. 29, 2.30 p.m. CONVENTION HALL

Gray Iron Session

"Pouring Systems for Gray Iron Foundries," by H. Cole Estep, associate editor, The Foundry, Cleveland.

"Fuel Oil Cupolas," by Bradley Stoughton, consulting metallurgical engineer, New York City.

"Inspection of Automobile Castings," by C. B. Wilson, Wilson Foundry & Machine Co., Pontiac, Mich.

"Common Defects in Gray Iron Castings—Their Causes and Remedies Therefor," by Herbert M. Ramp, Elmwood Castings Co., Cincinnati.

Report of A. F. A. committee on specifications for gray iron castings, by W. D. Putnam, chairman, Detroit Testing Laboratory, Detroit.

Report of A. F. A. committee on standard methods for analyzing coke, by H. E. Diller, chairman, General Electric Co., Erie, Pa.

WEDNESDAY, SEPT. 29, 8 p.m. HOTEL TRAYMORE

Annual Business Session

Annual address of the president, R. A. Bull, Commonwealth Steel Co., Granite City, Ill.

Report of the secretary-treasurer, A. O. Backert, Cleveland.

Report of the auditor.
Report of the nominating committee.
Election of officers.

Malleable Iron Practice," by L. E. Gilmore, Baltimore Malleable & Steel Co., Baltimore.

Paper on malleable practice, by J. P. Pero and J. C. Nulsen, Missouri Malleable Iron Co., East St. Louis, Ill.

"Coal—Its Origin and Use in the Air Furnace," by F. Van O'Linda, Consolidation Coal Co., Chicago.

THURSDAY, SEPT. 30, 7 p.m., HOTEL TRAYMORE

Annual banquet.

FRIDAY, OCT. 1, 10 a.m. CONVENTION HALL

Introduction of new officers.
Report of committee on resolutions.
Appointment of standing committees.
Unfinished business.

American Institute of Metals

TUESDAY, SEPT. 28, 10 a.m. CONVENTION HALL

Joint meeting with the American Foundrymen's Association. (For details see A. F. A. program.)

TUESDAY, SEPT. 28, 2 p.m. HOTEL TRAYMORE

General Papers

Report of official chemist, by Arthur D. Little, Inc., Boston.

"An Investigation of Fusible Tin Boiler Plugs," by Dr. G. K. Burgess, Bureau of Standards, Washington, D.C.

"The Influence of the Impurities of Spelter on the Cracking of Slush Castings," by Gilbert Rigg, New Jersey Zinc Co., Newark, N.J.

"Cobalt in Non-Ferrous Metals," by H. T. Kalmus, Kalmus, Comstock & Westcott, Cambridge, Mass.

"Furnace Methods for Pure Castings," by F. L. Antisell, Raritan Copper Works, Perth Amboy, N.J.

"Standard Test Specimen of Zinc-Bronze: Cu. 88, Sn. 10, Zn. 2. Relation of the Mechanical Properties to the Microstructure," by Dr. H. S. Rawdon, Bureau of Standards, Washington, D.C.

"Notes on the Copper-Rich Kalkoids," by S. L. Hoyt, University of Minnesota, Minneapolis.

TUESDAY, SEPT. 28, 8 p.m.

Theatre party.

WEDNESDAY, SEPT. 29, 10 a.m. HOTEL TRAYMORE

"The Effect of the Present European War on the Metal Industries," by Thos. F. Wettstein, United Lead Co., New York.

"Sherardizing," by Dr. S. Trood, U. S. Sherardizing Co., New Castle, Pa.

"Electric Furnace for Brass Melting," by F. A. S. Fitzgerald, Fitzgerald Laboratories, Niagara Falls, N.Y.

"Substitutes and Alloys to Take the Place of Platinum," by W. E. Mowrey, St. Paul, Minn.

"Alloys of Nickel, Chromium and Copper," by David E. McFarland and O. E. Harder, University of Illinois, Urbana, Ill.

WEDNESDAY, SEPT. 29, 2 p.m. HOTEL TRAYMORE

Aluminum and Aluminum Alloys

"Aluminum Die Castings," by Chas. Pack, Doehler Die Casting Co., Brooklyn, N.Y.

"The Manufacture and Use of Aluminovanadium," by Wm. W. Clark Seymour Mfg. Co., Seymour, Conn.

"Recent Advances in the Manufacture and Uses of Aluminum," by E. V. Pannell, British Aluminum Co., Toronto, Ont.

"The Welding of Aluminum," by E. V. Pannell, British Aluminum Co., Toronto, Ont.

"Aluminum Bronze Alloys," by W. M. Corse, Titanium Alloy Mfg. Co., Niagara Falls, N.Y.

THURSDAY, SEPT. 30, 10 a.m. HOTEL TRAYMORE

Acid Metals and Bearing Bronzes

"Development of an Acid-Resisting Alloy," by S. W. Parr, University of Illinois, Urbana, Ill.

"Methods of Analysis for Complex Alloys," by S. W. Parr, University of Illinois, Urbana, Ill.

"Effect of Zinc on Copper, Tin, Lead Alloys," by G. H. Clamer, Ajax Metal Co., Philadelphia.

"The Advantages of a Standard Railway Journal," by Russell R. Clark, Pennsylvania Railroad, Pittsburgh.



BEACH SCENE, ATLANTIC CITY.

by E. I. Chase, Cadillac Motor Car Co., Detroit.

"Foundations for Jar-Ramming Molding Machines," by E. S. Carman, Osborn Mfg. Co., Cleveland.

"The History and Development of the Molding Machine with Sidelights on Latter-Day Practice," by J. J. Wilson, Cadillac Motor Car Co., Detroit, and A. O. Backert, The Foundry, Cleveland.

"Scientific Management and Its Relation to the Foundry Industry," by H. K. Hathaway, Tabor Mfg. Co., Philadelphia.

"Reclaiming Molding Sand," by W. M. Saunders and H. B. Hanley, Saunders & Franklin, analytical and consulting chemists, Providence, R. I.

"The Relation of the Foundry Foreman to His Employer," by S. V. Blair, Rushville, Ind.

TUESDAY, SEPT. 28, 8 p.m.

Theatre party for members and ladies of the American Foundrymen's Association and the American Institute of Metals.

WEDNESDAY, SEPT. 29, 10 a.m. CONVENTION HALL

"The Modern Foundry Advance," by Dr. Richard Moldenke, consulting metallurgical engineer, Watchung, N.J.

"Manufacture, Constituents and Essentials in the Purchase of Pig Iron for Foundry Use," by Oliver J. Abel, The Iron Age, Chicago.

Report of the A. F. A. committee on tests, by B. D. Fuller, chairman, Westinghouse Electric & Mfg. Co., Cleveland.

Organization in the Foundry of the University of Illinois Shop Laboratories," by R. E. Kennedy and J. H. Hegue, instructors, University of Illinois, Urbana, Ill.

"The Structural or Mechanical Theory of the Effect of Cast Iron and Wrought Iron or Steel," by R. C. McWane, publisher

THURSDAY, SEPT. 30, 10 a.m. AND 2.30 p.m. CONVENTION HALL AND ANNEX

Steel Sessions

"Dynamic Properties of Steel Employed in the Manufacture of Castings of Various Types," by J. Lloyd Uhler, Union Steel Casting Co., Pittsburgh.

"The Particular Application of the Converter in the Manufacture of Steel Castings," by C. S. Koch, Fort Pitt Steel Casting Co., McKeesport, Pa.

"Notes on Electric Furnace Construction and Operation in the Steel Foundry," by James H. Gray, U. S. Steel Corporation, New York City.

"Open-Hearth Furnace Checker Design," by W. A. Janssen, Bettendorf Co., Davenport, Iowa.

"Causes of Shrinkage Cracks in Steel Castings," by William R. Bossinger, Marion Steam Shovel Co., Marion, O.

Report of A. F. A. committee on specifications for steel castings, by W. C. Hamilton, American Steel Foundries, Granite City, Ill.

Report of A. F. A. committee on steel foundry standards, by Dudley Shoemaker, American Steel Foundries, Indiana Harbor, Ind., and R. A. Bull, Commonwealth Steel Co., Granite City, Ill.

"Notes on Arc Welding," by Robert Kinkead, Lincoln Electric Co., Cleveland.

Malleable Sessions

"Some Remarks Regarding the Permissible Phosphorus Limit in Malleable Iron Castings," by Prof. Enrique Tonedá, Rensselaer Polytechnic Institute, Albany, N.Y.

"Standardization of Air Furnace Practice," by A. L. Pollard, Johnston Harvester Co., Batavia, N.Y.

"An Outline to Illustrate the Interdependent Relationship of the Variable Factors in

THURSDAY, SEPT. 30, 2 p.m. HOTEL TRAYMORE**Forging and Rolling Alloys**

"Forging Manganese Bronze," by Jesse L. Jones, Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa.

"The Failure of Structural Brasses," by Dr. P. D. Merica, Bureau of Standards, Washington, D.C.

"Experiences with Brass in Civil Engineering Work," by A. D. Flinn, board of water supply, New York.

"Stellite," by Elwood Haynes, Haynes Stellite Works, Kokomo, Ind.

THURSDAY, SEPT. 30, 7 p.m. HOTEL TRAYMORE

Annual banquet.

Plant Visitation

A large number of important foundries have agreed to throw open their doors to the visitors. Among those may be mentioned the following:—

Southwark Foundry & Machine Co., Philadelphia.

American Engineering Co., Philadelphia.

Girard Iron Works, Philadelphia.

Sheeler-Hemsher Co., Philadelphia.

Eynon-Evans Mfg. Co., Philadelphia.

Baldwin Locomotive Works, Philadelphia.

J. W. Paxson Co., Philadelphia.

Tabor Mfg. Co., Philadelphia.

Isaac A. Shepherd & Co., Philadelphia.

R. D. Wood & Co., Philadelphia.

Wm. Sellers & Co., Inc., Philadelphia.

Ajax Metal Co., Philadelphia.

Thomas Devlin Mfg. Co., Philadelphia.

Niles-Bement-Pond Co., Philadelphia.

American Steel Foundries, Chester, Pa.

Seaboard Steel Casting Co., Chester, Pa.

Worth Bros. Co., Coatesville, Pa.

Baldt Steel Co., New Castle, Del.

The committee in charge of plant visitation is as follows:—

H. W. Brown, chairman, Tabor Mfg. Co., Philadelphia; Harry E. Asbury, Enterprise Mfg. Co., Philadelphia; W. J. Coane, Ajax Metal Co., Philadelphia; Geo. C. Davies, Pilling & Crane Co., Philadelphia; Harry Drinkhouse, Thos. Devlin Mfg. Co., Philadelphia; Thomas Evans, Eynon-Evans Mfg. Co., Philadelphia; Chas. H. Harrar, Midvale Steel Co., Philadelphia; J. S. Hibbs, J. W. Paxson Co., Philadelphia; Wilfred Lewis, Tabor Mfg. Co., Philadelphia; Geo. F. Pettinos, Pettinos Bros., Bethlehem, Pa.; Wm. H. Ridgway, Craig Ridgway & Son Co., Coatesville, Pa.; F. L. Shepherd, I. A. Shepherd Co., Philadelphia; A. G. Warren, J. W. Paxson Co., Philadelphia; and Robert Wetherill, Jr., Robert Wetherill & Co., Chester, Pa.

For the Devotees of Golf

To afford the visiting foundrymen an opportunity to indulge in the favorite pastime of golf, special arrangements have been made with the Country Club of Atlantic City for the use of its course at Northfield, N.J. This feature is in

charge of a special committee, whose members will afford the golf devotees every assistance to indulge in this favorite sport. The committee is constituted as follows:—H. M. Bougher, chairman, J. W. Paxson Co., Philadelphia; Peter S. Brauscher, Philadelphia & Reading Railroad, Reading, Pa.; W. J. Coane, Ajax Metal Co., Philadelphia; Wm. J. Devlin, Thomas Devlin Mfg. Co., Philadelphia; Howard Evans, J. W. Paxson Co., Philadelphia; Howard C. Matlack, Marshall, Matlack Co., Philadelphia; H. P. Rebman, American Engineering Co., Philadelphia; Otto Schaum, Schaum & Uhlinger Co., Philadelphia; J. H. Sheeler, Sheeler, Hemsher Co., Philadelphia; W. P. Smith, Wm. Cramp Ship & Engine Building Co., Philadelphia; and E. P. Williams, Baldwin Locomotive Works, Philadelphia.

Local Convention Committee

The local convention committee includes the following:—

Thomas Devlin, chairman, president Thomas Devlin Mfg. Co., Philadelphia; W. H. Bassett, vice-president American Institute of Metals, American Brass Co., Waterbury, Conn.; Henry A. Carpenter, vice-president American Foundrymen's Association, General Fire Extinguisher Co., Providence, R.I.; A. F. Corbin, president New England Foundrymen's Association, Union Mfg. Co., New Britain, Conn.; Alex. T. Drysdale, vice-president American Foundrymen's Association, United States Cast Iron Pipe & Foundry Co., Burlington, N.J.; Stanley G. Flagg, Jr., past president American Foundrymen's Association, Stanley G. Flagg & Co., Philadelphia; H. W. Gillett, vice-president American Institute of Metals, Ithaca, N.Y.; Dr. Richard Moldenke, past secretary, American Foundrymen's Association, Watchung, N.J.; Geo. C. Stone, vice-president American Institute of Metals, New Jersey Zinc Co., New York; A. W. Walker, past president, American Foundrymen's Association, Walker & Pratt Mfg. Co., Boston, and Walter Wood, vice-president American Foundrymen's Association, R. D. Wood & Co., Philadelphia.

List of Exhibitors.

Ajax Metal Co., Philadelphia, Pa.
Arcade Mfg. Co., Freeport, Ill.
E. C. Atkins & Co., Indianapolis, Ind.
Ayer & Lord Tie Co., Chicago
Berkshire Mfg. Co., Cleveland, O.
Chas. H. Besly & Co., Chicago
S. Birkenstein & Sons, Chicago
Blystone Mfg. Co., Cambridge Springs, Pa.
Brass World and Plater's Guide, New York City.
Brown Specialty Machinery Co., Chicago.
Buch Foundry Equipment Co., Bridgeport, Pa.
Buckeye Products Co., Cincinnati, O.
Carborundum Co., Niagara Falls, N.Y.
Cataract Refining & Mfg. Co., Buffalo, N.Y.
Charles J. Clark, Chicago.
Clark Foundry Co., Rumford, Me.
Clearfield Machine Shops, Clearfield, Pa.
Cleveland Automatic Machine Co., Cleveland, O.
Cleveland Pneumatic Tool Co., Cleveland, O.
Clipper Belt Lacer Co., Grand Rapids, Mich.
Geo. P. Clark Co., Windsor Locks, Conn.
Joseph Dixon Crucible Co., Jersey City, N.J.

Electric Controller & Mfg. Co., New York.
Elliott & Larrabee Mfg. Co., Chicago.
Factory & W. Shaw Pipe, Stange Co., Chicago.
Gardner Machine Co., Beloit, Wis.
General Electric Co., Schenectady, N.Y.
Grubb-Parsons Thermal Corp., New York.
Graceton Coke Co., Graceton, Pa.
Great Western Mfg. Co., Leavenworth, Kansas.
H. A. Hurry & Co., New York.
H. Howard Inc., New York.
Hobson Pneumatic Machine Co., Zanesville, Pa.
The Herald Brass Co., Cleveland, O.
Hill & Gerhart Co., Cincinnati, O.
Hunter Saw & Machine Co., Pittsburgh, Pa.
Ingersoll-Rand Co., New York.
International Molding Machine Co., Chicago.
International Steam Pump Co., New York.
The Iron Age, New York.
Iron Tradesman, Atlanta, Ga.
Jennison Wright Co., Toledo, O.
Julius King Optical Co., Chicago.
Landis Tool Co., Waynesboro, Pa.
Lehigh Coke Co., South Bethlehem, Pa.
Lincoln Electric Co., Cleveland, O.
David Lupton's Sons Co., Philadelphia, Pa.
J. S. McCormick Co., Pittsburgh, Pa.
McCrosky-Reamer Co., Meadville, Pa.
MacLean Publishing Co., Toronto, Ont.
The Macleod Co., Cincinnati, O.
Mahr Mfg. Co., Minneapolis, Minn.
Malleable Iron Fittings Co., Branford, Conn.
Midland Machine Co., Detroit, Mich.
Monarch Engineering & Mfg. Co., Baltimore, Md.
Mott Sand Blast Mfg. Co., Chicago.
E. H. Mumford Co., Elizabeth, N.J.
Mumford Molding Machine Co., Chicago.
Metal Record and Electro-Plater, Bridgeport, Conn.
National Engineering Co., Chicago.
New Haven Sand Blast Co., New Haven, Conn.
The Norma Company of America, New York.
Norton Co., Worcester, Mass.
S. Obermayer Co., Chicago.
Osborn Mfg. Co., Cleveland, O.
Oxweld Acetylene Co., Chicago.
Pangborn Corporation, Hagerstown, Md.
J. W. Paxson Co., Philadelphia, Pa.
Penton Publishing Co., Cleveland, Ohio.
Pickands, Brown & Co., Chicago.
Henry E. Pridmore, Chicago.
Philadelphia Bourse, Exhibition Dept., Philadelphia, Pa.
Railway Age Gazette, Chicago.
Ready Tool Co., Bridgeport, Conn.
Richey, Brown & Donald, Inc., New York.
Robeson Process Co., New York.
Rogers, Brown & Co., Cincinnati, O.
Sand Mixing Machine Co., New York.
Shepard Electric Crane & Hoist Co., Montour Falls, N.Y.
W. W. Sly Mfg. Co., Cleveland, Ohio.
R. P. Smith & Sons, Chicago.
Snyder Electric Furnace Co., Chicago.
Standard Sand & Machine Co., Cleveland, O.
Sterling Wheelbarrow Co., West Allis, Wis.
W. F. Steadler, Syracuse, N.Y.
Strong, Kennard & Nutt Co., Cleveland, O.
Sullivan Machinery Co., Chicago.
Tabor Mfg. Co., Philadelphia, Pa.
Thomas Iron Co., Easton, Pa.
Titanium Alloy Mfg. Co., Niagara Falls, N.Y.
Union Steam Pump Co., Battle Creek, Mich.
U. S. Graphite Co., Saginaw, Mich.
Waterbury Welding Co., Waterbury, Conn.
Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa.
White & Bro., Inc., Philadelphia, Pa.
Whiting Foundry Equipment Co., Harvey, Ill.
T. A. Willson Co., Reading, Pa.
E. J. Woodison Co., Detroit, Mich.
T. B. Wood's Sons Co., Chambersburg, Pa.
Wyoming Shovel Works, Wyoming, Pa.



Steel Ingots for Guns.—Prof. J. O. Arnold, of Sheffield University, at the Royal Institution, said that the managing director of Krupps told him that they were making steel ingots weighing 110 tons for guns by the crucible process evolved 175 years ago by an Englishman—Benjamin Huntsman. Neither the Germans nor the Americans could produce the Sheffield white crucible, however. That was a secret handed down from father to son in Sheffield. In the North of England they were making ingots weighing 150 tons, and there were 12,000-ton presses squeezing out armor plate like cheese.

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

HIGH SPEED HACK SAW MACHINE

THERE has recently been put upon the market the high speed hack saw machine here described and illustrated. It has been developed by the Massachusetts Saw Works, Springfield, Mass., and embodies among other features a shock absorber, extension frame, swivel-jaw vise, and an automatic patent lift.

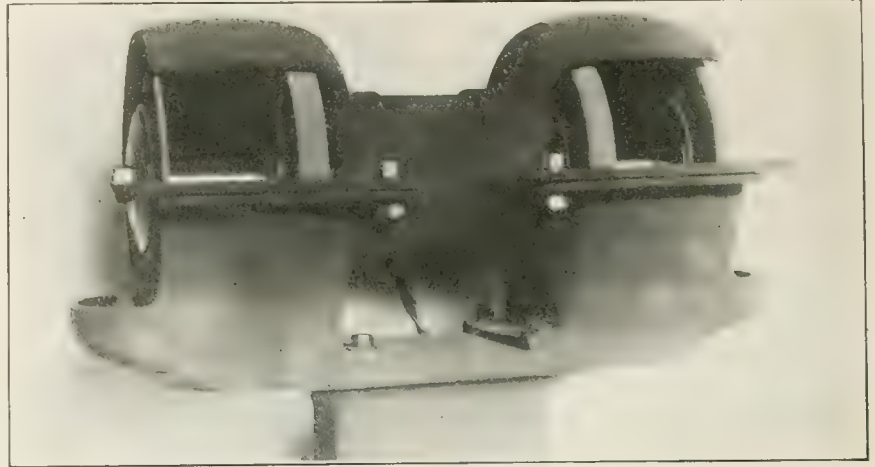
The machine is particularly designed for the rapid cutting of metals in sizes up to 9 by 9 inches, and is heavily constructed with all intricate mechanism eliminated as far as possible. The unit is set low on a solid foundation with wide-spread legs to give the maximum rigidity and steadiness, while a large pan for suds surrounds the bed and contains a 9-gal. tank divided and screened for chips. The tank, pan, bed and legs together form a single casting. The power section or head of the machine swings on a shaft centre, an arrangement which is relied upon to give a steady, silent motion with little wear and to secure a full length stroke of the blade at any angle. The bearings have, as far as possible, been made heavy and wide throughout the machine, and readily

the starting lever on the back of the machine to engage one or the other of the pulleys mounted on the driving shaft.

The descent of the blade is lever con-

trolled and cushioned, while the vertical movement may be stopped at any point, a shock absorbing device permitting it to engage the material gently. On completion of the cut the machine stops, an-

vary the length of the frame, it is simply necessary to push a button which releases the locking mechanism, and pull the frame out as far as desired, after



SPECIAL PATTERN SHOP GRINDING MACHINE.

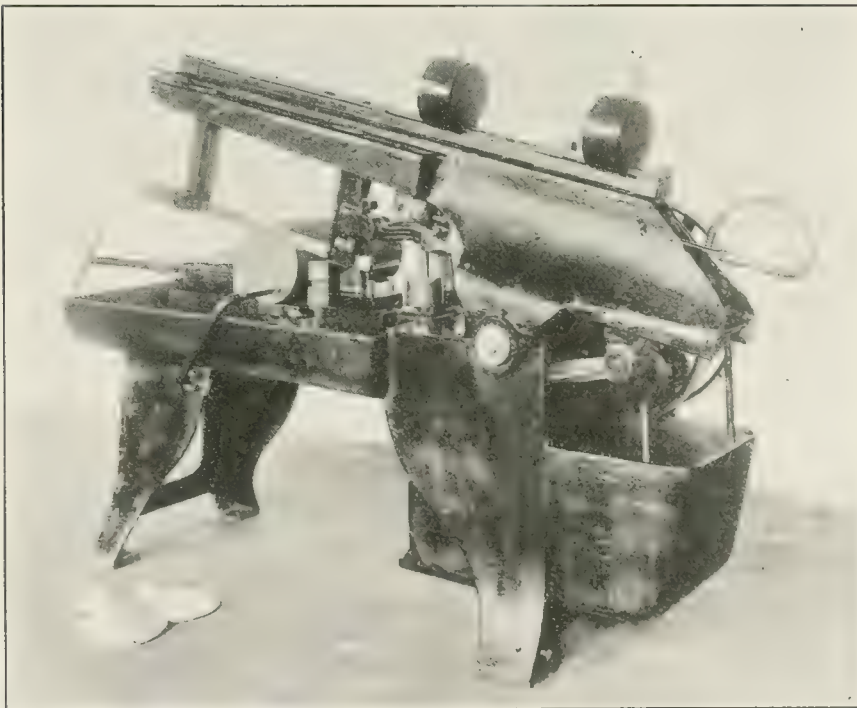
trolled and cushioned, while the vertical movement may be stopped at any point, a shock absorbing device permitting it to engage the material gently. On completion of the cut the machine stops, an-

which the blade is inserted without other manipulation. Means are provided for lifting the saw clear of the work on the idle or non-cutting stroke.

The patent swivel-jaw vise has a capacity of 9 in. and the rear jaw may be set at any angle up to 45 deg. in either direction. The front or sliding jaw will adjust itself to the angle of the fixed jaw or to an irregular surface. If desired, the vise may be advanced along the table of the machine to double the capacity of the blades on small work or it can be removed entirely and bolts and clamps substituted when necessary.

A rotary pump with a double check valve delivers cutting compound to the blade as soon as the machine starts. The lubricating system has received particular attention and includes oil cups, waste boxes and holes for every bearing or working point.

The principal dimensions of the machine are as follows: Capacity for cutting stock up to 9 inches square; size of blades, from 12 to 17 inches in length; size of pulleys, 16 inches in diameter by 3 inches face width; floor space occupied, 5 feet 3 inches by 2 feet 8 inches; and weight of machine 845 pounds.



HIGH SPEED HACK SAW MACHINE.

accessory arrangements for taking up the wear are provided.

Two speeds for the saw blade are provided, the change being made by shifting

oil dashpot under the bed acting as a cushion.

The extension frame will hold blades ranging from 12 to 17 in. in length. To

THIS new tool grinder, which is a product of the Forbes & Myers Co., Worcester, Mass., has been designed to meet the needs of pattern-making and other

PATTERN SHOP GRINDING MACHINE.

wood-working shops. It is made in both the bench and floor types, the photograph showing the grinder and top of stand of the floor type machine.

The regular equipment of wheels consists of one 10 in. x 1 in. with flat face for grinding chisels and other straight edge tools, also three round face wheels 10 in. in diameter by 1 in., $\frac{1}{2}$ in., and $\frac{1}{4}$ in. respectively in thickness, for grinding gouges and special cutters. Other shapes of wheels can also be furnished.

The spindles are $\frac{3}{4}$ in. in diameter and ample space is allowed between the wheels. The guards are of heavy malleable iron, and the tool rests are adjustable in two directions. High grade ball bearings are used, these being thoroughly protected from dirt and grit by double grooved covers, and packed in grease.



SHRAPNEL SHELL SPRAYING APPARATUS

The motor is of the squirrel cage induction type and can be supplied for two or three-phase alternating current circuits only. The capacity of the motor which is fully inclosed as a protection against dirt and mechanical injury, is $\frac{1}{2}$ h.p. Frequencies of 25, 50 or 60 cycles can be used, the speed being 1,500 r.p.m. on the 25 and 50-cycle circuits, and 1,800 r.p.m. with the 60-cycle current.



MACHINE FOR SPRAYING SHRAPNEL SHELLS

TO coat the inside of shells, or for that matter any relatively inaccessible surface, with an asphaltum paint or anti-corrosion material, and to do the work rapidly, uniformly, and without waste of the coating compound, the Spray Engineering Co., Boston, Mass., has developed an interesting machine.

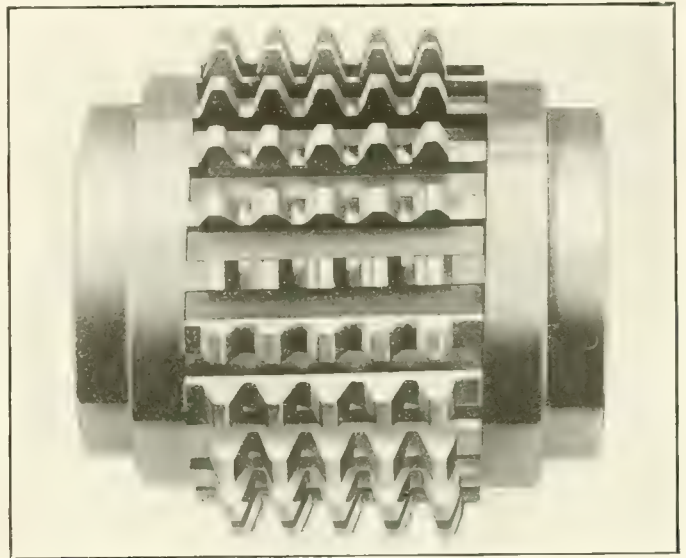
It looks not unlike a strongly built table with a circular recess in the top. The operator inverts a shell over the

recess, pushes it down an inch or so into the latter, lifts it from the table, and the operation is completed, the shell having received its coating. He is then ready to repeat the operation with another shell. As the period covered in thus spraying a shell is 2 sec., or at the rate of 30 per minute, the capacity of the machine for coating is placed at 1,500 per hour.

The act of pushing the shell downward admits a supply of compressed air to a definite quantity of the protective liquid, which is driven through a spraying nozzle. The apparatus is supported under the table top. It includes what is substantially a three-way valve which holds the protective liquid and which opens the channel between the compressed air supply and the nozzle when the

chamber. For a given size of shell and a given paint and thickness of film, it is found that one setting of the measuring device suffices to insure that not only is sufficient paint sprayed upon the shell surface but there is no excess which has to be disposed of. The machine thus aims at a maximum economy of the protecting compound beside allowing for high working speed.

It is expected that the fundamental elements of the machine, the use of the spray head, and of the scheme for automatically measuring out the quantity of material to be sprayed, may have applications apart from war munitions. However, at this writing the company is engaged on working out details for utilizing the machine for spraying the small annular passage in the timing device or



LEES BRADNER HYPERBOLOID HOB

shell is down, so to speak, and which receives the measured amount of liquid for the next shell when the pressure of the operator's hand is removed; that is, when the coated shell is removed. The fact that only the desired amount of liquid is admitted each time is a particular feature and application has been made for a patent covering the device. The working parts are counterbalanced as far as possible so that a minimum pressure will suffice to push the shell to the spraying position. It is obvious the machine is likely to find fields of usefulness outside of that for which it has been brought into being.

The height of the spray head is adjusted to coat the entire inner surface of the shell and the extent of this surface with the prescribed thickness of the paint film, sometimes 0.00025 in., gives some measure of the requirements. The amount of paint is regulated by what corresponds to a plunger which may be screwed in or out, decreasing or increasing the contents of the measuring

nose portion of the shell. This passage, which receives the time fuse, is small and somewhat inaccessible, and to swab the passage with a hand brush consumes too much time in view of the demands for high quantity production. It appears that in spite of the fact that the timing parts of the shell are of brass, the powder has a corroding influence, which fact makes it desirable to protect the brass work.



HOB OR GENERATING TOOL

THE accompanying illustration shows the type of generating tool, commonly called a hob, as produced by the Lees Bradner Co., Cleveland, Ohio.

Technical papers for years past have been full of arguments pro and con on the hobbing process, or as it should be correctly termed, the generating process. Much of the criticism, justly made, as far as practice was concerned, was due both to practice and theory—the errors being occasioned almost universally by

error in the hob, or due to the design of the machine employed.

The cardinal principles of gear cutting cannot be overlooked simply because the gears are hobbled. In other words, gears must be concentric, and the sides of the teeth must be uniform. These two features have been most criticized from the fact that the teeth have not been uniform due to the hob, or the gears have not been concentric, due to the design of the tool on which the hob was used.

The Lees-Bradner Co., who are pioneers in the art of hobbing gears, have made a careful study of this subject for a number of years, as a result of which the "hyperboloid" hob shown in the illustration has been developed. The theoretical considerations calling for the use of a hob of this form are that the cutting edges of each series of teeth must enter and depart simultaneously on a theoretical line, which has been designated the "generating plane."

It will be apparent in a hob of the solid cylindrical type, which is fluted at right angles to the lead, that the row of teeth which is generating presents an elliptical outline to the gear being cut. In addition, the helical flute presents a warped surface with one end of the flute stubbed and the other end raked, as far as the generating plane is concerned. This can be readily seen if the fact is grasped that a section taken through a cylinder at right angles to the axis is a circle, that a section taken through a cylinder parallel to the axis is a rectangle, while a section taken through a cylinder at an angle to the axis is an ellipse.

As a result, it will be evident that with the hob set at its working angle, an elliptical outline will be presented to the work. Therefore, to obtain a hob that will produce a rectangle under these conditions, it is necessary for the tool to be of hyperboloid outline. The hyperboloid hob shown is made up of a series of high-speed steel racks which are ground for lead, side relief, top relief, and to provide sharp cutting edges. The racks can be renewed as they become worn out, and as the housing is hardened and the bore ground to a plug gauge fit, it is likely to last indefinitely.



TO DEVELOP MUNITIONS OUTPUT IN CANADA

STEPS were taken by the Canadian Government on Sept. 13 to organize an effective and energetic coalition of the representatives of industry and finance with the Militia Department towards the production in Canadian factories of war munitions in the largest possible quantities and with the greatest possible expedition.

Representatives of finance and industry to the number of a hundred or more

were summoned to Ottawa by Sir Robert Borden and Sir Sam Hughes for a conference as to how best to finance and produce the ammunition, ordnance and supplies of all kinds of war munitions which Canada can furnish to meet the pressing needs of Great Britain and her allies.

Devising Ways and Means

To-day's conference was with a view to taking counsel together as to the possibilities of manufacture, the methods of financing, etc. The conference was, of course, of a confidential character, but the discussion emphasized the fact that through adequate co-operation and organization Canada can and will do much more towards meeting the most urgent needs of the allies at the present time—namely, the furnishing of the engines of war, including the manufacture of field guns.

Permanent Advisory Board

A sub-committee of those attending the conference was appointed, under the chairmanship of Sir John Gibson, and this committee met for three hours and carefully considered the whole situation. As a result a report will be presented a little later to the Minister of Militia, embodying some suggestions as to organization and methods of distributing and filling orders, and in regard to proposals for the manufacture of ordnance of various kinds. The sub-committee adjourned, to meet at the call of the chairman, and it will constitute a permanent advisory body to the Government.

The conference, which was held in the room of the Militia Council, was presided over by Sir Sam Hughes, who gave to those present a full and frank statement of the needs and opportunities of the situation.

Sir Robert Borden also spoke at some length, giving the conclusions reached from his conferences with the War Office and Munitions Department in London.

Personnel of Conference

The personnel of the conference included the following: Hon. Major-General Sir Sam Hughes, President; Sir Robert Borden, Brig.-Gen. Bertram, Sir John Gibson, J. F. Taylor and Arch. Stewart, Algoma Steel Company, Sault Ste. Marie; Col. Noel Marshall; John Carew, M.P.P., Lindsay; Col. Woods, Ottawa; Col. Wanklyn, C.P.R., Montreal; James Young of the John Bertram & Sons' Co.; P. L. Findlay, Montreal; H. Bertram, Dundas; H. M. Asling, Polson Iron Works, Toronto; M. C. Ellis, Toronto; R. Gilmour, Ottawa; W. R. Angus, Canada Star Foundry, Montreal; H. D. Pickett, Moose Jaw; G. H. Duggan, Dominion Bridge Co., Montreal; G. H. Chaplin, St. Catharines; Brig.-Gen. F. S. Meighen, Montreal; Col. C. W.

Watts, Canadian General Electric Co.; Major R. W. Leonard, F. P. Jones, Sir W. Mackenzie, Edward Gurney, Toronto; S. Major, Hamilton; H. H. Vaughan, Montreal Ammunition Co., Montreal; E. Hay, General Manager Imperial Bank of Canada, Toronto; B. B. Stevenson, Quebec Bank, Montreal; Sir William Ince, Union Bank, Quebec; G. H. Balfour, General Manager Union Bank of Canada, Winnipeg; C. P. Schofield, General Manager Standard Bank of Canada, Toronto; F. L. Pease, General Manager, Royal Bank of Canada, Montreal; Sir Herbert Holt, President Royal Bank of Canada, Montreal; Sir Edmund Walker, President Canadian Bank of Commerce, Toronto; John Aird, General Manager Canadian Bank of Commerce, Toronto; H. A. Richardson, General Manager Bank of Nova Scotia, Toronto; K. W. Blackwell, Vice-President Merchants Bank of Canada, Montreal; Hector McInnes, K.C., Halifax, N.S.; Sir Lyman M. Jones, Toronto; Senator Edwards, Ottawa; H. W. Wheatley, Can. Loco. Works, Kingston; W. D. Robb, G. T. R., Montreal; T. J. Dillon, Wexford; A. R. Goldie, Galt; J. P. McNaughton, Sydney; W. Inglis, Toronto; Rev. F. W. Squire, Ottawa; D. Lemon, Montreal; J. A. Vaillancourt, Montreal; John P. Dunn, Prescott Emery Wheel Co., Prescott; Sir Henry M. Pellatt, Toronto; P. C. Brooks, Can. Fairbanks-Morse Co., Toronto; C. G. Drinkwater, Can. Fairbanks-Morse Co., Montreal; E. W. Gilman, Ingersoll Rand Co., Sherbrooke; E. S. Winstow; Col. Fred Nicholls, Toronto; M. L. Davis, Standard Chemical Co., Toronto; Douglas C. Ridout, President Toronto Furniture Co., Toronto; Robert Hobson, Steel Company of Canada, Hamilton; George Burn, President Canadian Bankers' Association; A. D. Braithwaite, Bank of Montreal; E. F. Hebden, Merchants Bank, Montreal; H. B. Mackenzie, Bank of British North America, Montreal; H. J. Myler, Hamilton; Warren Y. Soper, Ottawa Car Works.

Sub-Committee on Ordnance

The sub-committee appointed to report on an increase in munitions, and particularly to inquire into the feasibility of Canada, in addition to making shells, going into the manufacture of heavy guns and ordnance, is as follows:

Sir John Gibson, the members of the Shell Committee, Col. Nicholls, Toronto; W. D. Robb of the Grand Trunk; Hector McInnes, Halifax; F. L. Wanklyn, C. P. R.; Sir Lyman Jones, Sir William Mackenzie, Toronto; Senator Edwards, Ottawa; K. W. Blackwell, Montreal; James Young, Dundas; G. H. Duggan, Montreal; George Burn, Ottawa; J. Chaplin, St. Catharines, and P. L. Miller of the Canadian Vickers Co.

The MacLean Publishing Company

LIMITED

(ESTABLISHED 1888)

JOHN BAYNE MACLEAN - - - - - President
 E. T. HUNTER - - - - - General Manager
 H. V. TYRRELL - - - - - Asst. General Manager

PUBLISHERS OF

CANADIAN MACHINERY

AND MANUFACTURING NEWS

A weekly newspaper devoted to the machinery and manufacturing interests.

PETER BAIN, M.E., Editor.

Associate Editors,

A. G. WEBSTER. J. M. WILSON. J. H. RODGERS.

B. G. NEWTON - - - - - Advertising Manager

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CANADA—

Montreal—Rooms 701 702 Eastern Townships Bank Building.
 Telephone Main 1255.
 Toronto—143-153 University Ave. Telephone Main 7324.

UNITED STATES—

New York—R. B. Huestis, 115 Broadway. Phone 8971 Rector.
 Chicago—A. H. Byrne, Room 607, 140 South Dearborn St.
 Telephone Randolph 3234.
 Boston—C. L. Morton, Room 733, Old South Bldg.
 Telephone Main 1024.

GREAT BRITAIN—

London—The MacLean Company of Great Britain, Limited,
 88 Fleet Street, E.C. E. J. Dodd, Director. Telephone Central
 12960. Address: Atabek, London, England.

SUBSCRIPTION RATES:

Canada, \$2.00; United States, \$2.50; Great Britain, Australia and other Colonies, 8s. 6d. per year; other countries, \$3.00. Advertising rates on request.

Subscribers who are not receiving their paper regularly will confer a favor by letting us know. We should be notified at once of any change in address, giving both old and new.

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THE FUTURE OF DEMOCRATIC LABOR

WHEN Bellamy wrote that noteworthy book, "Looking Backward," he did not enter into specific details regarding previous conditions, the climax of which was characterized as a world cataclysm. Social developments in Britain previous to this war were proceeding at a rapid pace to a point where opposition of a decided nature was beginning to show itself. A complete permeation of society with democratic ideas, such as are evidenced by state insurance and employment

bureaus might probably have resulted in that social upheaval or disruption in the mysteries of which Bellamy shrouded his imaginary transformation of human society. The scheme by which each member of society was allowed to pursue the active duties which were most congenial to the individual and of corresponding value to the community, in return for which he was entitled to a sufficiency of life's necessities and luxuries, has had, and always will have a great attraction for those whose effort is to secure for labor an adequate reward.

Attempts have been made on different occasions to put into practice some of the basic principles of socialism. Some have succeeded and some have failed; the failures being partly due to the fact that man is occasionally possessed of ambition, and the "bacillus ambitionis" has decided objection to being levelled down or otherwise restrained from exerting its expansive properties.

Students of current events may perhaps perceive in the present turn of affairs, a change in man's attitude to man, the ultimate result of which will be a considerable advance toward that Utopian existence so ardently advocated in some quarters. Germany, as a nation, seems to have had some idea of developing the world on Bellamistic lines, but made the unfortunate mistake of trying to force matters. Her loss will, however, prove to be the world's gain first, and her own gain ultimately.

The great change in society's attitude toward labor is at the present time more strongly evidenced in Europe than in Canada. This is so because of the more acute conditions prevailing there.

Its most important feature is, perhaps, the acknowledgement by society of its absolute dependence on labor, and by society is meant the nation, government, titled and untitled persons, the rich and the poor. When lords and similarly classed individuals get into overalls and do their bit voluntarily because they realize the necessity, it ill befits labor to counteract these additional efforts by wilful abstinence from production.

Canadian labor has shown and will continue to show a patriotic enthusiasm in production, which one would fain believe to be universal in the Motherland. Canadian manufacturers have shown an appreciation of labor's efforts, such as never would have occurred in times of peace, and the chief interest of labor should now be how to maintain that appreciation when peace returns.

It is quite obvious that if the majority of men receive adequate remuneration, they will give adequate service, willingly and continuously, always provided, of course, that not more than adequate profit is acquired through their labor. The experience of the British Government in organizing controlled shops may ultimately be incorporated in legislative efforts which may be epoch-marking, and the indiscriminate mixing of all grades of society which has taken place with the growth of Britain's armies will have an undoubted influence on the future reception of democratic legislation.

While Canada as a younger and distant nation has had to form her national character alone and unaided, the centuries old experience of the Motherland has always been available, and in the readjustment of affairs in the days yet to come, the development of advanced democratic views in all branches of Canadian life, will be not the least interesting result of that spirit of co-operation now so happily existing between employees and employers.

SELECTED MARKET QUOTATIONS

Being a record of prices current on raw and finished material entering into the manufacture of mechanical and general engineering products.

PIG IRON.

Grey forge, Pittsburgh	\$14 70	
Lake Superior, charcoal, Chicago	15 75	
Ferro Nickel pig iron (Soo)	25 00	
	Montreal.	Toronto.
Middlesboro, No. 3	22 00	.....
Carron, special	23 00	.....
Carron, soft	23 00	.....
Cleveland, No. 3	22 00	.....
Clarence, No. 3	22 50	.....
Glengarnock	26 00	.....
Summerlee, No. 1	28 00	.....
Summerlee, No. 3	27 00	.....
Michigan charcoal iron	26 00	.....
Victoria, No. 1	23 00	19 00
Victoria, No. 2X	22 00	19 00
Victoria, No. 2 plain..	22 00	19 00
Hamilton, No. 1	22 00	19 60
Hamilton, No. 2	22 00	19 00

FINISHED IRON AND STEEL.

Per Pound to Large Buyers.	Cents.
Common bar iron, f.o.b., Toronto	2.20
Steel bars, f.o.b., Toronto	2.20
Common bar iron, f.o.b., Montreal	2.20
Steel bars, f.o.b., Montreal	2.20
Twisted reinforcing bars	2.20
Bessemer rails, heavy, at mill.	1.25
Steel bars, Pittsburgh	1.30
Tank plates, Pittsburgh	1.30
Beams and angles, Pittsburgh	1.30
Steel hoops, Pittsburgh	1.40
F.O.B., Toronto Warehouse.	Cents.
Steel bars	2.10
Small shapes	2.35
Warehouse, Freight and Duty to Pay.	Cents.
Steel bars	1.90
Structural shapes	1.95
Plates	1.95

Freight, Pittsburgh to Toronto.

18.9 cents carload; 22.1 cents less carload.

BOILER PLATES.

	Montreal.	Toronto.
Plates, 1/4 to 1/2 in., 100 lb.	\$2 35	\$2 25
Heads, per 100 lb.	2 55	2 45
Tank plates, 3-16 in.	2 60	2 45

OLD MATERIAL.

Dealers' Buying Prices.	Montreal.	Toronto.
Copper, light	\$12 25	\$12 00
Copper, crucible	13 25	13 00
Copper, unch-bleed, heavy	13 25	13 00
Copper, wire, unch-bleed.	14 00	14 00
No. 1 machine compos'n	11 50	11 50
No. 1 compos'n turnings.	9 00	9 00
No. 1 wrought iron	6 50	6 50
Heavy melting steel	7 00	7 00
No. 1 machin'y cast iron	10 50	10 50
New brass clippings	11 00	11 00
No. 1 brass turnings	9 00	9 00
Heavy	5 00	5 00

Tea lead	\$ 3 25	\$ 3 50
Scrap zinc	8 50	9 00

W. I. PIPE DISCOUNTS.

Following are Toronto jobbers' discounts on pipe in effect Aug. 27, 1915:

	Buttwd	Gal.	Lapweld	Gal.
	Black	Standard	Black	Gal.
1/4, 3/8 in.	63	38 1/2	.....	.....
1/2 in.	68	47 1/2	.....	.....
3/4 to 1 1/2 in.	73	52 1/2	.....	.....
2 in.	73	52 1/2	69	48 1/2
2 1/2 to 4 in.	73	52 1/2	72	51 1/2
4 1/2, 5, 6 in. ....	.....	.....	70	49 1/2
7, 8, 10 in. ....	.....	.....	67	44 1/2
	X Strong	P. E.		
1/4, 3/8 in.	56	38 1/2	.....	.....
1/2 in.	63	45 1/2	.....	.....
3/4 to 1 1/2 in.	67	49 1/2	.....	.....
2, 2 1/2, 3 in.	68	50 1/2	.....	.....
2 in. ....	.....	.....	63	45 1/2
2 1/2 to 4 in. ....	.....	.....	63	48 1/2
4 1/2, 5, 6 in. ....	.....	.....	66	48 1/2
7, 8 in. ....	.....	.....	59	39 1/2
	XX Strong	P. E.		
1/2 to 2 in.	44	26 1/2	.....	.....
2 1/2 to 6 in. ....	.....	.....	43	25 1/2
7 to 8 in. ....	.....	.....	40	20 1/2
	Genuine	Wrot Iron.		
3/8 in.	57	32 1/2	.....	.....
1/2 in.	62	41 1/2	.....	.....
3/4 to 1 1/2 in.	67	46 1/2	.....	.....
2 in.	67	46 1/2	63	42 1/2
2 1/2, 3 in.	67	46 1/2	66	45 1/2
3 1/2, 4 in. ....	.....	.....	66	45 1/2
4 1/2, 5, 6 in. ....	.....	.....	63	42 1/2
7, 8 in. ....	.....	.....	60	37 1/2
	Wrought Nipples.			
4 in. and under	.....	.....	77 1/2%	
4 1/2 in. and larger	.....	.....	72 1/2%	
4 in. and under, running thread.	.....	.....	57 1/2%	
	Standard Couplings.			
4 in. and under	.....	.....	60%	
4 1/2 in. and larger	.....	.....	40%	

MILLED PRODUCTS.

Sq. & Hex. Head Cap Screws....	65%
Sq. Head Set Screws	65 & 10%
Rd. & Fil. Head Cap Screws.....	45%
Flat & But. Head Cap Screws....	40%
Finished Nuts up to 1 in.	70%
Finished Nuts over 1 in. N.	70%
Semi-Fin. Nuts up to 1 in.	70%
Semi-Fin. Nuts over 1 in.	72%
Studs	65%

METALS.

	Montreal.	Toronto.
Lake copper, carload	\$20 00	\$19 00
Electrolytic copper	19 75	18 75
Castings, copper	19 00	18 50
Tin	39 00	39 00
Spelter	19 00	18 00
Lead	6 25	6 25
Antimony	40 00	38 00
Aluminum	40 00	38 00

Prices per 100 lbs.

BILLETS.

	Per Gross	Ton
Bessemer, billets, Pittsburgh...	\$24	00
Openhearth billets, Pittsburgh..	24	50
Forging billets, Pittsburgh	32	00
Wire rods, Pittsburgh	29	00

NAILS AND SPIKES.

Standard steel wire nails, base	\$2 40	\$2 35
Cut nails	2 50	2 70
Miscellaneous wire nails..	75	per cent.
Pressed spikes, 5/8 diam., 100 lbs.	2	85

BOLTS, NUTS AND SCREWS.

	Per Cent.
Coach and lag screws	75
Stove bolts	80
Plate washers	40
Machine bolts, 3/8 and less.....	70
Machine bolts, 7-16 and over....	60
Blank bolts	60
Bolt ends	60
Machine screws, iron, brass.....	35 p.c.
Nuts, square, all sizes..	4 1/4c per lb. off
Nuts, Hexagon, all sizes.	4 3/4c per lb. off
Iron rivets	72 1/2 per cent.
Boiler rivets, base, 3/4-in. and larger	\$3.25
Structural rivets, as above.....	3.25
Wood screws, flathead, bright .....	.85, 10, 7 1/2, 10 p.c. off
Wood screws, flathead, Brass .....	.75 p.c. off
Wood screws, flathead, Bronze .....	.70 p.c. off

LIST PRICES OF W. I. PIPE.

	Standard.	Extra Strong.	D. Ex. Strong.
Nom. Diam.	Price.	Price.	Price.
per ft.	Ins.	per ft.	Ins.
	per ft.		per ft.
1/8 in	\$.05 1/2	1/8 in	\$.12
1/4 in	.06	1/4 in	.07 1/2
3/8 in	.06	3/8 in	.07 1/2
1/2 in	.08 1/2	1/2 in	.11
3/4 in	.11 1/2	3/4 in	.15
1 in	.17 1/2	1 in	.22
1 1/4 in	.23 1/2	1 1/2 in	.30
1 1/2 in	.27 1/2	1 3/4 in	.36 1/2
2 in	.37	2 in	.50 1/2
2 1/2 in	.58 1/2	2 1/2 in	.77
3 in	.76 1/2	3 in	1.03
3 1/2 in	.92	3 1/2 in	1.25
4 in	1.09	4 in	1.50
4 1/2 in	1.27	4 1/2 in	1.80
5 in	1.48	5 in	2.08
6 in	1.92	6 in	2.86
7 in	2.38	7 in	3.81
8 in	2.50	8 in	4.34
8 in	2.88	9 in	4.90
9 in	3.45	10 in	5.48
10 in	3.20		
10 in	3.50		
10 in	4.12		

COKE AND COAL.

Solvay Foundry Coke	\$5.75
Connellsville Foundry Coke...	4.85-5.15
Yough, Steam Lump Coal	3.83
Penn. Steam Lump Coal	3.63
Best Slack	2.99

Net ton f.o.b. Toronto.

COLD DRAWN STEEL SHAFTING.

At mill	45%
At warehouse	40%

Discounts off new list. Warehouse price at Montreal and Toronto.

MISCELLANEOUS.

Solder, half-and-half	0.24
Putty, 100-lb. drums ..	2.70
Red dry lead, 100-lb. kegs, per cwt.	9.67
Glue, French medal, per lb.	0.18
Tarred slaters' paper, per roll ..	0.95
Motor gasoline, single bbls., gal...	0.18
Benzine, single bbls., per gal.	0.18
Pure turpentine, single bbls.	0.62
Linseed oil, raw, single bbl's.	0.63
Linseed oil, boiled, single bbls. ..	0.66
Plaster of Paris, per bbl.	2.50
Plumbers' Oakum, per 100 lbs.	4.00
Lead wool, per lb.	0.10
Pure Manila rope	0.16
Transmission rope, Manila	0.20
Drilling cables, Manila	0.17
Lard oil, per gal.	0.73
Union thread cutting oil	0.60
Imperial quenching oil	0.35

POLISHED DRILL ROD.

Discount off list, Montreal and Toronto ..	40%
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PROOF COIL CHAIN.

1 1/4 inch	\$8.00
5-16 inch	5.35
3/4 inch	4.60
7-16 inch	4.30
1 1/2 inch	4.05
9-16 inch	4.05
5/8 inch	3.90
3/4 inch	3.85
7/8 inch	3.65
1 inch	3.45

Above quotations are per 100 lbs.

TWIST DRILLS

Carbon up to 1 1/2 in.	60
Carbon over 1 1/2 in.	25
High Speed	40
Blacksmith	60
Bit Stock	60 and 5
Centre Drill	20
Ratchet	20
Combined drill and c.t.s.k.	15

Discounts off standard list.

REAMERS.

Hand	25
Shell	25
Bit Stock	25
Bridge	65
Taper Pin	25
Centre	25
Pipe Reamers	80

Discounts off standard list.

IRON PIPE FITTINGS.

Canadian malleable, A. 25 per cent.; B and C, 35 per cent.; cast iron, 60; standard bushings, 60 per cent.; headers, 60; flanged unions, 60; malleable bushings, 60; nipples, 75; malleable, lipped unions, 65.

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

SHEETS.

	Montreal	Toronto
Sheets, black, No. 28.	\$3 00	\$2 90
Canada plates, dull,		
52 sheets	3 25	3 50
Canada Plates, all bright..	4 40	4 60
Apollo brand, 103 1/4 oz.		
galvanized	6 40	5 95
Queen's Head, 28 B.W.G.	6 00	6 25
Fleur-de-Lis, 28 B. W. G...	5 75	5 75
Gorbal's Best, No. 28....	6 50	6 50
Viking metal, No. 28....	6 00	6 00
Colborne Crown, No. 28..	5 38	5 30

BOILER TUBES.

Size	Seamless	Lapwelded
1 in.	\$11 00	.....
1 1/4 in.	11 00	.....
1 1/2 in.	11 00	.....
1 3/4 in.	11 00	.....
2 in.	11 50	9 20
2 1/4 in.	13 00	.....
2 1/2 in.	14 00	12 10
3 in.	16 00	12 70
3 1/4 in. ....	.....	13 90
3 1/2 in.	20 00	15 90
4 in.	25 50	18 90

Prices per 100 feet, Montreal and Toronto.

WASTE.

	Cents per lb.
WHITE.	
XXX Extra	0 11
X Grand	0 10 1/2
XLCR	0 09 3/4
X Empire	0 09
X Press	0 08 1/4
COLORED	
Lion	0 07 1/2
Standard	0 06 3/4
Popular	0 06
Keen	0 05 1/2

WOOL PACKING.

Arrow	0 16
Axle	0 11
Anvil	0 08
Anchor	0 07

WASHED WIPERS.

Select White	0 08 1/2
Mixed Colored	0 06 1/4
Dark Colored	0 05 1/4

This list subject to trade discount for quantity.

BELTING RUBBER.

Standard	50%
Best grades	30%

BELTING—NO. 1 OAK TANNED.

Extra heavy, sgle. and dble.	50%
Standard	50 & 10%
Cut leather lacing, No. 1	\$1.20
Leather in sides	1.10

ELECTRIC WELD COIL CHAIN B.B.

3-16 in.	\$9.00
1/4 in.	6.25
5-16 in.	4.65
3/8 in.	4.00
7-16 in.	4.00
1/2 in.	4.00

Prices per 100 lbs.

PLATING CHEMICALS.

Acid, boracic	\$.15
Acid, hydrochloric .....	.05
Acid, hydrofluoric .....	.06
Acid, Nitric .....	.10
Acid, sulphuric .....	.05
Ammonia, aqua .....	.08
Ammonium carbonate .....	.15
Ammonium chloride .....	.11
Ammonium hydrosulphuret .....	.35
Ammonium sulphate .....	.07
Arsenic, white .....	.10
Copper sulphate .....	.10
Cobalt Sulphate .....	.50
Iron perchloride .....	.20
Lead acetate .....	.16
Nickel ammonium sulphate .....	.10
Nickel carbonate .....	.50
Nickel sulphate .....	.17
Potassium carbonate .....	.40
Potassium sulphide .....	.30
Silver chloride	(per oz.) .65
Silver nitrate	(per oz.) .45
Sodium bisulphite .....	.10
Sodium carbonate crystals .....	.04
Sodium cyanide, 127-130% .....	.35
Sodium hydrate .....	.04
Sodium hyposulphite (per 100 lbs.)	3.00
Sodium phosphate .....	.14
Tin chloride .....	.45
Zinc chloride .....	.20
Zinc sulphate .....	.08

Prices Per Lb. Unless Otherwise Stated.

ANODES.

Nickel .....	.47 to .52
Cobalt	1.75 to 2.00
Copper .....	.22 to .25
Tin .....	.45 to .50
Silver .....	.55 to .60
Zinc .....	.22 to .25

Prices Per Lb.

PLATING SUPPLIES.

Polishing wheels, felt.....	1.50 to 1.75
Polishing wheels, bullneck..	.80
Emery in kegs .....	.4 1/2 to .06
Pumice, ground .....	.05
Emery glue .....	.15 to .20
Tripoli composition .....	.04 to .06
Crocus composition .....	.04 to .06
Emery composition .....	.05 to .07
Rouge, silver .....	.25 to .50
Rouge, nickel and brass...	.15 to .25

Prices Per Lb.

The General Market Conditions and Tendencies

This section sets forth the views and observations of men qualified to judge the outlook and with whom we are in close touch through provincial correspondents

Montreal, Que., Sept. 13, 1915.—The firm trend and noticeable improvement in the industrial situation is undoubtedly due to the steady demand from Britain and her allies for munitions and supplies, incidental and necessary to the maintenance of men and equipment for the successful prosecution of the war. That still greater activity is about to develop is shown by the meeting held in Ottawa to-day, at which a number of our leading financiers and executive heads of manufacturing establishments discussed ways and means whereby both sections may co-operate with the Government to increase production of war necessities.

It is expected that orders for shells in still larger quantities will soon be placed. One large firm in Montreal, in discussing this feature, said that they had received word from Ottawa, the tone of which was highly optimistic. Some manufacturers are now installing extra heavy tools for the production of 4.5 shells, the expectation being that the near future may warrant them doing so when still larger size shells will be called for.

Many inquiries have been received, and in some cases orders have been placed for lathes of 24 in., 26 in., and even larger sizes, for the production of 6-in. and 9-in. shells for the French and Russian War Offices.

Steel.

The abnormal demand for billets and bars used in the production of various types of shells and component parts keeps the steel mills constantly going at about 100 per cent. capacity, and with orders on their books which cannot be filled for many months to come. If a supply of larger shells is demanded, and this seems more than likely, it will call for increased activity on the part of our steel producers to keep up the required supply of raw material.

Pig Iron

The pig iron market shows little activity, but quotations on the various grades remain firm.

Machine Tools and Supplies

Inquiries for machine tools continue to come in, but in a great number of cases it is almost impossible to have delivery within a period of six or eight months, especially on machines employed in the production of 3.3 and 4.5 shells. The feeling is growing that machine tool builders will soon have to meet the demand for a larger and heavier pro-

duct to meet the requirements of a correspondingly larger and heavier type of shell.

The demand for supplies, both for the smaller and larger tools, is daily growing greater, and there is little doubt that the near future will see further development in that direction.

Metals.

Very little change is shown in the metal quotations for the week, and as many of the leading manufacturers of brass and copper products are withholding their price lists, it leaves the tone of the market a little uncertain.

Scrap.

The tendency is upward in scrap metals, a slight increase being noticeable in the majority of quotations.

Toronto, Ont., Sept. 14.—Industrial conditions are much the same as last

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.

week, but a better feeling prevails in business circles due to the splendid crops in the West, a large yield being now assured. This will stimulate domestic trade, which has been comparatively quiet for several months, but has lately been showing distinct signs of improving. The expansion in the export trade of the country has had much to do with this, as has also the return of a more confident spirit in business circles. There is every reason to expect further heavy orders for war supplies being placed with Canadian manufacturers. It is understood that Premier Borden has been given the fullest assurance by the British Government that for all supplies that have to be procured outside the United Kingdom Canada's resources would be utilized to the fullest extent.

Steel Market.

Reports of the financial condition of the principal steel companies in Canada are exceedingly satisfactory. Conditions in the trade continue to improve, due

principally to increasing export business and demand for rounds and forgings for shells. In this regard it is announced that as a result of Mr. Thomas' visit further orders approximating fifty million dollars will be placed in Canada for making munitions. It is further stated that it is the desire of the authorities to place such orders where they can be most speedily and economically filled. Prices on bars, plates, and shapes are very firm, but unchanged. Billets have again advanced, "Bessemer" being now quoted at \$24, open hearth \$24.50, and forging billets \$32, all f.o.b. Pittsburgh. Wire rods have also advanced, and are now quoted at \$29 Pittsburgh. With regard to semi-finished steel, it is reported from Philadelphia that competition has appeared in that market from Canadian mills for various sizes of billets and blooms. No sales, however, have been heard of.

There is no abatement in the demand in the United States for open-hearth steel products, much of it being for war munitions. Pittsburgh mills report that they are operating to capacity, and unable to catch up with deliveries. The new demand for plates, shapes, and bars, particularly the latter, is very urgent, and the mills are filled up for weeks ahead. The scarcity of steel-making metal, particularly ferro-manganese, is gradually becoming more acute, and prices for ferro-alloys are advancing. Ferro-manganese is now being quoted at \$100 to \$110 per ton f.o.b. seaboard. Prices of steel bars have advanced to \$1.35 Pittsburgh.

The galvanized sheet market is firming up slightly because of the uncertainty in the price of spelter. The advancing tendency in price of spelter has reduced production of sheets somewhat, as makers do not want to accumulate stocks until the spelter situation clears up. The high-speed tool steel situation does not improve, and prices have an advancing tendency.

Pig Iron

The situation is much the same as last week, and there is a good demand for steel-making pig iron. Prices for American brands are firmer, and grey forge has advanced to \$14.70 Pittsburgh. Domestic pig irons are unchanged.

Machine Tools

There is practically no change in the situation as regards machine tools, and no developments have as yet to be noted. The report that further large orders for shells will be distributed may result in further buying of machine tools, although it is highly probable that plants already well equipped will be favored with the greater part of this business. There is every possibility, however, that even these concerns will have to install

more equipment. Inquiries for new machines have fallen off, but there is still a good demand for second-hand equipment. Deliveries in new tools are still very backward and prices have a higher tendency.

Supplies.

Business in machine shop supplies continues brisk, and prices all round are very firm. All American lathe chucks have advanced. "Independent" chucks, which were 20 per cent. off, are now net list, and 12 per cent., has been added to geared scroll chucks. Prices of leather belting are very firm, as there is a great scarcity of hides and a big demand for leather. Half-and-half solder is a little lower, and is now quoted at 24c per pound. The linseed oil market is steadier, but business is very dull. Prices have declined 2c, and oil is now quoted at 63c for raw and 66c for boiled oil per gallon.

Scrap Metals

The scrap metal is firmer, particularly

for copper and brass scrap, which have advanced. Heavy lead is also little higher, being quoted at 5c per pound, but tea lead is unchanged. Revised prices are given in the selected market quotations.

Metals.

The metal markets all round are dull and weaker, with lower levels for all, with the exception of tin. The tin market is firm, but dull on account of buyers staying out of the market. There is also little interest being shown in copper, and the market is entirely a nominal one. Spelter has reacted after the advance recorded last week, and lead has also declined slightly. Antimony and aluminum have both declined, and quotations are nominal.

Tin.—The market is stagnant and void of all interest. Buyers have continued to stay out, and the extreme dullness is reflected in the tone being easier. Tin is unchanged at 39c per pound.

Spelter.—The market is dull and lower, with business very dull. Outside of a fair demand for prompt shipments there is nothing doing, futures being entirely neglected. Spelter has declined 1c, and is quoted at 18c per pound.

Copper.—The market is dull, and little interest is being shown by consumers. Quotations have declined 1/2c, and are nominal at 19c per pound.

Lead.—The market is unsettled and stagnant. The "Trust" has reduced the price to 4.70c, New York. Lead locally had declined 1/4c, and is being quoted at 61 1/2 per pound.

Antimony.—The market is dull and weaker on light demand. Antimony has declined 2c, and is being quoted at 38c per pound.

Aluminum.—The market is entirely nominal. Supplies are so scarce that it is almost impossible to get any aluminum for spot delivery. Quotations are nominal at 38c per pound.

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.

H. R. Poussette, 278 Balcarce, Buenos Aires. Cable Address, Canadian.

Australasia.

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, 6 Kiukiang Road, Shanghai. Cable Address Cancoma.

Cuba.

Acting 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

Japan.

G. B. Johnson, P.O. Box 109, Yokohama. Cable Address, Canadian.

Holland.

J. T. Lithgow, Zuidblaak, 26, Rotterdam. Cable address, Watermill.

Newfoundland.

W. B. 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.

E. de B. Arnaud, Sun Building, Clare Street, Bristol. Cable address, Canadian.

J. E. Ray, Central House, Birmingham. Cable address, Canadian.

Acting Trade Commissioner, North British Building East Parade, Leeds. Cable address, Canadian.

F. A. C. Bickerdike, Canada Chambers, 36 Spring Gardens, Manchester. Cable address, Cantracom.

Fred. Dane, 87 Union Street, Glasgow, Scotland. Cable address, Cantracom.

Harrison Watson, 73 Basinghall Street, London, E.C., England. Cable address, Sleighing, London.

CANADIAN COMMERCIAL AGENTS.

British West Indies.

Edgar Tripp, Port of Spain, Trinidad. Cable address, Canadian.

R. H. Curry, Nassau, Bahamas.

Colombia.

A. E. Beckwith, c-o Tracey Hmos, Medelln, Colombia. Cables to Marmato, Colombia. Cable address, Canadian.

Norway and Denmark.

C. E. Sontum, Grubbegeg No. 4, Christiana, Norway. Cable address, Sontums.

South Africa.

D. M. McKibbin, Parker, Wood & Co., Buildings, P.O. Box 550, Johannesburg.

E. J. Wilkinson, Durban, 41 St. Andrew's Buildings, Durban, Natal

CANADIAN HIGH COMMISSIONER'S OFFICE.

United Kingdom.

W. L. Griffith, Secretary, 17 Victoria Street, London, S.W., England.

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

Coaticook, Que.—E. O. Baldwin, Cutting street, will shortly be in the market for hoisting and carrying cranes.

Ford, Ont.—The Ford Motor Co. contemplate building a plant for making farm tractors. No definite plans have been made yet.

Brighton, Ont.—Thos. Garnet & Son contractors, of Port Hope, have commenced the construction of the building for the D. J. Barker Foundry Co. The main structure will be of brick, 220 by 100 feet. Jas. Hickey is manager.

Welland, Ont.—Preparations are being made to re-open the local plant of the Canadian Steel Foundries, Ltd. Operations will first begin in the foundry on shell billets and the rolling mill may open later. Mr. Gilmore is the manager.

Ottawa, Ont.—It is reported that the Government may turn the shops of the Sorel shipyard into a factory for shells, as well as using a private owned factory there for that purpose. This course has been urged by a delegation of members of Parliament for the district.

Electrical

Crediton, Ont.—The council are considering the installation of a power distribution and lighting system.

Granton, Ont.—The town council propose to install a hydro-electric system at a cost of approximately \$5,000.

Toronto, Ont.—The Provincial Hydro-electric Commission favor the building of a line from Chatham to Petrolea and Oil City, a distance of about 24 miles. Authority has been given to construct a transmission line for Granton, Kirkton and Exeter, about 24 miles, and also a line from Lucan to Ailsa Craig, nine or ten miles. It is expected that power will be turned on at Eugenia Falls about the first of next month.

Municipal

The Pas, Man.—Work will be proceeded with on the waterworks and sewage disposal plant.

Edmonton, Alta.—Work has started on the sewage disposal plant. The cost is estimated at \$30,000.

Liverpool, N.S.—The Town Council contemplate making improvements to the municipal electric light plant.

Brantford, Ont.—The Fire and Light Committee have decided to purchase a motor truck for the fire department.

Esquimalt, B.C.—The City Council contemplates submitting by-laws to the ratepayers to authorize the raising of \$30,000 by debentures to provide for the building of a fire hall and the purchase of fire apparatus.

Armagh, Que.—The Armagh Electric Co. propose to supply light and power to several villages in the County of Bellechasse. Joseph Leclere, Mayor

has obtained a track site here and will erect tanks this fall.

Winnipeg, Man.—The Peabody Over-all Co., of Walkerville, Ont., may build a factory here for supplying the West.

Montreal, Que.—The Mount Royal Color & Varnish Co. will build an extension to their factory at a cost of \$20,000.

Brantford, Ont.—The Brantford Cordage Co. will build an addition to their factory. C. L. Messecar is the general manager.

Salem, Ont.—The Salem tannery was burned down on September 4, and is a total loss, this being estimated at \$3,000, with \$1,000 insurance.

Chatham, Ont.—The Ideal Electrical Mfg. Co. of Wallaceburg is going to move to the city shortly. This is among the oldest establishment in Canada making electrical heating goods.

Contracts Awarded

Berlin, Ont.—George Moogk, of Weston, has been awarded the contract for the construction of an extension to the sewer disposal plant this fall. His tender amounted to \$43,512.75.

Lachine, Que.—The City Council have awarded a contract for the construction of an incinerator of the "Decarie" type to the Atlas Construction Co. of Montreal. The plant will have a capacity of 20 tons per 24 hours.

Hull, Que.—The City Council has awarded the general contract for the construction of a hydro-electric plant to the Canadian General Electric Co. at \$34,840. Works include power house, draft tube, open flume and gates.

Tenders

Victoria, B.C.—The City Council have for sale a quantity of contractors' equipment. Full information may be obtained from the city purchasing agent at the City Hall.

Chatham, Ont.—The city engineer, F. P. Adams, is open to receive tenders for the machinery and equipment of the Chatham electric light plant, which consists principally of gas engines and producers, and electric generators.

ALLIES PURCHASING AGENTS

The Trade and Commerce Department, Ottawa, has published the following list of purchasing agents for military purposes for the allied Governments:

International Purchasing Commission, India House, Kingsway, London, Eng.

French.—Hudson Bay Co., 56 McGill Street, Montreal; Captain Lafoulloux, Hotel Brevort, New York; Direction de l'Intendance Ministère de la Guerre, Bordeaux, France; M. De la Chaume, 28 Broadway, Westminster, London.

Russian.—Messrs. S. Ruperti and Alessieff, care Military Attache, Russian Embassy, Washington, D.C.

of St. Charles, Que., is president of the company. Contracts will probably be let shortly.

Windsor, Ont.—Definite steps for the acquisition of the street railway lines in Windsor, Walkerville, and Sandwich by the municipal interest will shortly be taken if a recommendation of the Ontario Hydro Commission meets with the approval of the councils of the three townships.

General Industrial

Montreal, Que.—Robin Bros. are building an extension to their factory.

Redvers, Sask.—The Imperial Oil Co.

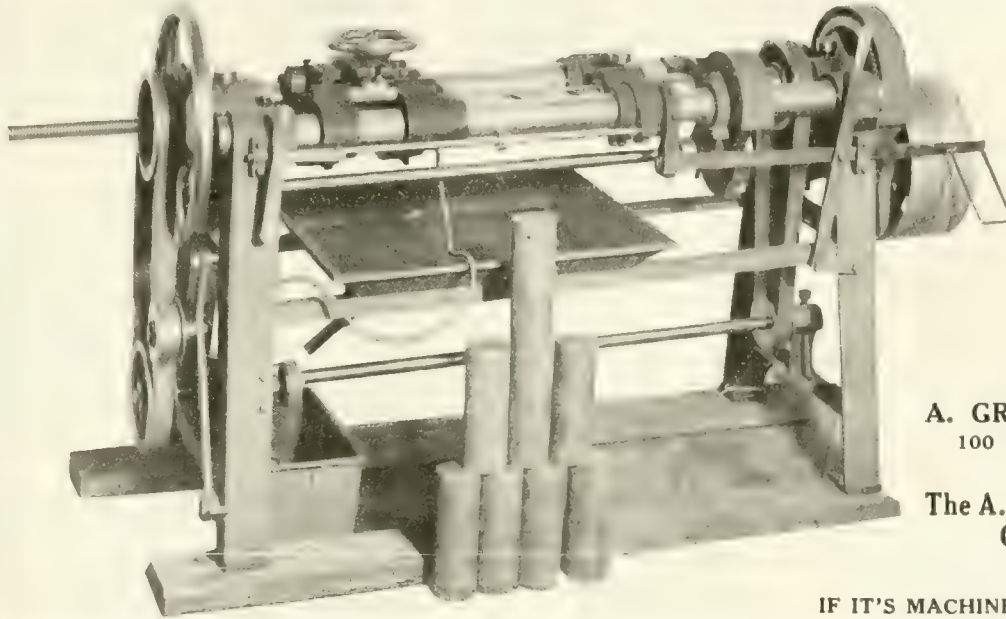


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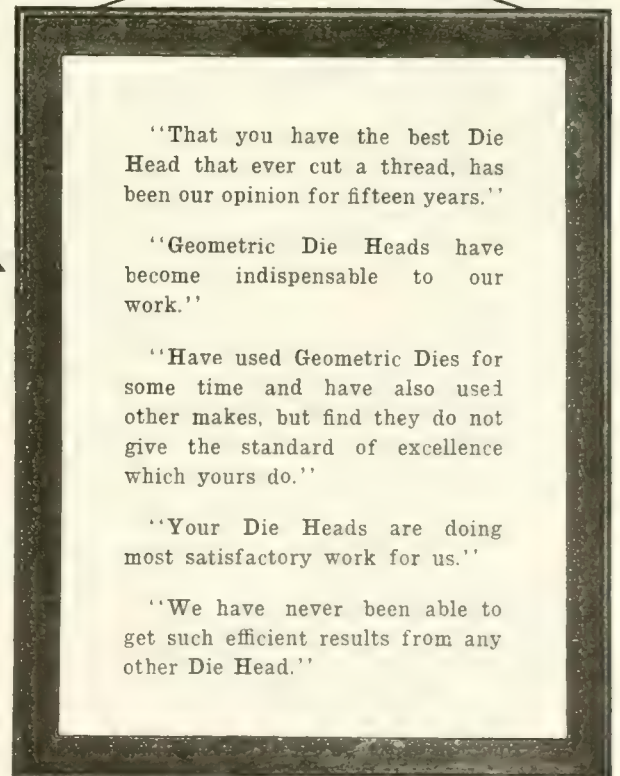
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Cleveland 2 1/2" Automatic (2).
Acme 3/4" Automatic.
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22 1/2" Barnes.
26" Sibley & Ware.
28" Barnes.
28" Sibley & Ware.
31" Barnes.
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Bickford 3 1/2" Plain Radial.
Prentice 5" Plain Radial.

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No. 3 Fox Hand and Power.
No. 0 LeBlond, plain.
No. 2 Owen, plain.
No. 3 Pratt & Whitney, plain.
No. 3-A Owen Universal.
No. 4 Becker Vertical.
Becker No. 7 Lincoln.
Phoenix No. 1 Lincoln.

PRESSES

Bliss No. 18 o.b.l.
Bliss No. 19 o.b.l.
Bliss No. 42 o.b.l.
Rockford No. 2 o.b.l.
American Can No. 3 o.b.l.
Walsh No. 4 o.b.l.
American Can. No. 4 1/2 o.b.l.
Bauroth No. 5 o.b.l.
Bliss No. 69-N Double Acting.
Adriance No. 12-A Double Acting.
Toledo No. 14 Horning.
Toledo No. 94-A Double Crank.

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Acme 1 1/4" Bolt Cutter.
Acme 2 1/2" Bolt Cutter.
No. 2 and No. 3 M. & M. Keyseaters.
No. 3 Baker Keyseater with rotary table.

Tenders for Scrap.—Sealed tenders for the purchase of a quantity of scrap metal at the Dominion Arsenal, Quebec, will be received up to noon of Thursday, the 23rd day of September, 1915. The quantities are approximately as follows:

	Lbs.
Brass, etc.	16,000
Charger steel	81,120
Steel, tool, lumps	13,950
Steel, mild, lumps	129,232
Turnings	72,074
Cast iron	183,848

The prices should be for delivery, ex stores, Dominion Arsenal, Quebec, material to be removed within 30 days after acceptance of tender. All the scrap is loose, and information required may be obtained from the Superintendent, Dominion Arsenal, Quebec; or Department of Militia and Defence, Ottawa.

Trade Gossip

The Canadian Iron Foundries, Ltd., Montreal, have been awarded a contract for the supply of cast iron pipe to the city of Hull, Que.

St. John's, Nfld.—W. F. Mackay has made application to the City Commissioners for permission to erect a small smelting plant near the west end water front.

The General Supply Co. of Canada, Ottawa, Ont., have opened an office at 408 McGill Building, Montreal, in charge of G. W. Robb. They handle railway supplies, concrete machinery, pumps, etc.

Smith's Falls, Ont.—M. G. Henniger and J. S. Gould, of this town, have purchased an interest in the Rideau Power Co., of Merriekville, Ont. It is understood that the policy under the new arrangement will be to develop power to its fullest extent.

Pit Props to England.—If the war continues Newfoundland expects to ship one million cords of pit props next season for English collieries. During the season just passed, fifty steamers took cargoes running from 5,000 to 20,000 cords each. This was all that was cut last winter.

Canada Iron Corporation—It is announced authoritatively that the affairs of the Canada Iron Corporation, which went into liquidation about two years ago, and the assets of which were taken over by the Canada Iron Foundries, Ltd., will be wound up about the end of the present month.

Steel Billets Higher.—It is reported from Pittsburgh, Pa., that the constantly increasing demand for shrapnel bar is causing the price of steel billets to jump, until a maximum limit has been reached, and buyers in the open market are declaring quotations to be prohibitive.

Nickel Commission at Work.—The Ontario Nickel Commission got down to business on September 10, when it paid a visit to the smelters at Deloro, Ontario. The commission will form its own itinerary, having been given carte blanche by the Hon. G. Howard Ferguson, Minister of Lands, Forests, and Mines.

Canadian Gen. Electric Co.—While the ordinary trade of the Canadian General Electric Company has been a little slack during the year so far, war orders have enabled it to maintain its strong financial position and keep up the dividend on the basis that has persisted for some 25 years. The war orders were officially stated recently to be of considerable proportions.

Niagara Falls, Ont.—Engineers of the Ontario Hydro-Electric Commission have just completed a survey for an Ontario Government power-house on the Smeaton farm between Queenstown Heights and Niagara Falls, Ont. It is planned to use the surplus waters of the Welland Canal to develop 300,000 horse-power, carrying the water to the generating station through a canal running from the Chippewa creek.

The Transmission Ball Bearing Co., Buffalo, N.Y., has been incorporated with a capital stock of \$100,000 to manufacture ball bearings for factory transmission and for engines, motors and trucks. The directors of the new company (which is the United States branch of the Chapman Double Ball Bearing Company of Toronto) are W. J. Murray and J. P. Beatty, of Toronto, and W. Morse Wilson, of Buffalo. The office of the company is at 1407 West Avenue, Buffalo, N.Y.

U. S. Munitions Export.—American exports of war supplies are increasing enormously now that converted munitions plants are getting into full swing. Figures made public by the Bureau of Foreign and Domestic Commerce show that shipments of horses, mules, automobiles, aeroplanes and explosives, all classed as war supplies, aggregated nearly \$50,000,000 in July. The principal increase compared with June exports was in the classification of "all other explosives," including shells and other ammunitions of special manufacture, which jumped from \$5,911,929 to \$9,329,303. Automobiles, the only item to show a material decrease, dropped from \$14,500,000 to \$11,000,000.

Steel Co. of Canada.—Figures of earnings of the Steel Co. of Canada, for July, are not yet available, but it is learned that they were well in excess of the June figures, which indicated profits at the annual rate of 21 per cent. on the common stock. In the first half of 1915,

CLASSIFIED ADVERTISEMENTS

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the company did a gross business of about \$6,400,000. Its best year's gross was 1912, when orders totalling nearly \$16,000,000 were filled. Gross in the second half of 1915 should be at least \$10,000,000, which would make the year a record one. Net earnings for 1915 are conservatively estimated at about \$3,200,000, this estimate being based on suppositious earnings of \$400,000 monthly for the second half.

Canadian Car & Foundry Co.—Advices from New York state that negotiations for the purchase by the Russian Government from the Canadian Car & Foundry Co. of 3,000,000 sharpnel and high explosive shells at a cost of \$52,000,000 have been virtually completed. The information was given out at the New York office of the company. Canadian Car & Foundry have already received contracts from the Russian Government valued at nearly \$100,000,000. The contract calls for the delivery of the ammunition by April of next year and part of the work will be sublet. Russian funds, it is understood, in Wall Street, have been sent to New York and Canada to cover payment. The contract, it was announced, covers orders for additional shells just as soon as the present ones are turned out.

Personal

Frank Morgan, for 29 years with the Cowan Co., Galt., has been appointed manager of the Dominion Bronze Co., Preston, Ont.

Charles Hothan, of the Brantford Motor Truck Co., has completed a new bayonet and automatic wire entanglement cutter.

E. J. Chamberlain, president of the Grand Trunk Railway, and party of officials, are on their way to Prince Rupert, B.C., on their annual tour of inspection.

Edward Cahill, general manager of the Winnipeg branch of the Gray-Campbell, Ltd., makers of mill equipment and machinery, Chatham, Ont., died suddenly at Hanley, Sask., on September 1. He was 55 years of age.

Hon. T. W. Crothers, Minister of Labor, has left Ottawa on a trip to Western Canada. He will go through to the coast and up as far as Prince Rupert. The Minister of Labor will stop off at all the principal cities and inquire into industrial conditions. At Vancouver he will attend the Dominion Trades and Labor Congress.

The **G. H. Tod Co.**, engineers, late of Manning Chambers, Toronto, have transferred their business to 10-20 Croft Street, city, where a machine shop has been equipped for carrying on a general

NOTICE

Having purchased the entire shop equipment of the **W. S. Nott Fire Engine Company**, 1620 Central Ave., Minneapolis, Minn., we offer, subject to prior sale, f.o.b. Minneapolis, the following machines:

- 1—36" x 16' American geared head, single pulley, heavy duty Lathe, Q. C. G., very little used.
- 1—24" x 12' Schumacher & Boye Lathe, D. B. G.
- 1—24" x 10' LeBlond Lathe.
- 1—20" x 12' Barker & Chard Lathe.
- 1—18" x 10' Hamilton Lathe.
- 1—18" x 8' Greaves & Klusman Lathe.
- 3—16" x 8' Hamilton Lathes.
- 1—16" x 6' Hamilton Lathe.
- 1—14" x 6' Hamilton Lathe.
- 1—No. 5 LeBlond Heavy Duty Plain D. B. G. Miller.
- 1—No. 3 Cincinnati Universal Miller.
- 1—51" Niles Vertical Boring Mill—nearly new.
- 1—No. 3½ Universal Horizontal Boring, Drilling and Milling Machine with aux. table and 14 bars, in fine condition.
- 1—No. 4 Landis Universal Grinder, complete with extra centers and 10½" Walker Circular Magnetic Chuck fitted, A1 condition.
- 1—No. 1 Cincinnati Universal Cutter and Tool Grinder.
- 1—American Twist Drill Grinder.
- 1—Dresses 6' Universal Radial Drill.
- 2—28" Drills.
- 2—24" Drills.
- 1—22" Drill.
- 3—20" Drills.
- 1—30" x 30" x 8' Cincinnati Planer.
- 1—24" Hamilton heavy duty B. G. Shaper.
- 1—16" Barker B. G. Shaper.
- 1—2" x 24" Jones & Lamson cone head Flat Turret Lathe—bar outfit.
- 1—No. 3 Dresses Universal Fox Monitor Lathe, with large assortment of attachments.
- 1—1½" Plurality Bolt Cutter with bolt and pipe dies.
- 1—No. 4 Besley Disc Grinder with floor press and four 18" steel discs.
- 1—No. 3 Burr Cold Saw Cutting-off Machine.
- 1—No. 14½ W. & W. Single End Punch and Shear, 18" throat.
- 1—700-lb. Ball Steam Hammer.
- 1—100-lb. Pittsburgh Steam Tool Dressing Hammer.
- 1—Type C, size 5 Pangborn Sand Blast Machine—serial No. 1257—good as new.

Also many other smaller Machines, Belting, Small Tools, Pneumatic Tools, Electric Drills and Grinders.

Our representative will be at plant until Sept. 22nd and we invite inspection.

The H. A. Stocker Machinery Co.

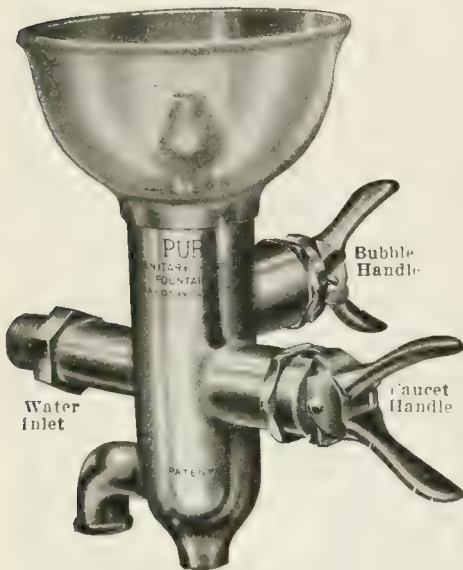
572 W. Randolph Street
CHICAGO, ILL.

Make Your Own Engravings

It doesn't take an expert to operate the GORTON ENGRAVING MACHINE. The ordinary workman can turn out lettering or designs either sunk or in relief, on dies, moulds, tools, patterns, core boxes, label plates, instruments, etc., etc., better than the most skilled hand engraver in the fraction of time the hand workman would take.

WRITE FOR DETAILS.

Geo. Gorton Machine Co
RACINE WIS.



Saving or Wasting?

The manner in which you handle the drinking water problem in your plant may seem to be a small matter to you—but investigate. The results will be surprising.

The old-time faucet is costly. Running hour after hour, day after day, its ceaseless flow is costing you money, yet without any better service.

Puro Saves 35%

A Puro Sanitary Drinking Fountain will cut that water bill 35%. We can prove that it has done that for others.

It will give every employee a safer, saner draught of bubbling water free from the contamination of the common drinking cup.

In a word, it is the only sanitary Drinking Fountain that is really safe, sanitary, simple, automatic in control, and easy to attach.

“PURO - FY”

(MADE IN CANADA)

YOUR WATER SUPPLY

Puro Sanitary Drinking Fountain Company

147 University Ave., Toronto, Canada

engineering business. The company will continue to handle “Bennis” stokers and “Ashworth-Parker” engines, etc., and will in addition be in a position to build machinery and tools for the trade.

D. A. Thomas, the special representative of the British Minister of Munitions, left Ottawa on September 9 for New York. He has completed his work in Canada for the time at least, but will, it is understood, remain in New York. Mr. Thomas' inspection of the munition manufactories in Canada and his conferences with Canadian manufacturers have resulted satisfactorily. He has had several conferences with Sir Robert Borden since the latter's return from England.

Capt. P. M. Campbell, a director of the Collingwood Shipbuilding Co., died at Collingwood, Ont., on September 10, at the age of 69. Capt. Campbell was for many years commodore of the Great Northern Transit Co. fleet, which was later merged into the Northern Navigation Co. He was also one of the founders of the Georgian Bay Navigation Co. Capt. Campbell was one of the original directors of the Collingwood Drydock Co., which ultimately became the Collingwood Shipbuilding Co., of which he was a director up to the time of his death.

D. M. Medcalf, chief inspector of steam boilers for the Province of Ontario, has left for a tour of the Western provinces to confer with the heads of the boiler inspection departments of the Provinces of Manitoba, Saskatchewan, Alberta and British Columbia, with regard to the standardization of rules covering boiler construction and inspection, and to arrange for boilers built under Ontario regulations being accepted by the other provinces. Mr. Medcalf will also visit the Panama-Pacific Exhibition at San Francisco, Cal.

Sir William Cornelius Van Horne, K.C.M.G., at one time president of the C.P.R., died in Montreal on September 11, following a comparatively brief illness. Sir Wm. Van Horne was born at Joliet, Ill., on February 3, 1843, the son of a lawyer. He entered the railway service as a telegraph operator on the Illinois Central Railway in 1857, served in various capacities on the Michigan Central Railway 1858-64, for three years as train despatcher. He was superintendent of telegraphs for a year and divisional superintendent for three years while with the Chicago and Alton Railway, 1864-72; was general superintendent of the St. Louis, Kansas City and Northern Railway, 1872-4; general manager of the Southern Minnesota Railway, 1874-8, and president 1878-9; general manager of the Canadian Pacific

For Steel Castings

Low Phosphorus Pig Iron

Ferro-Manganese

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50% Ferro-Silicon

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LIMITED
MONTREAL

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If you want a buyer for your business, or have a situation to fill or want a situation, send us a Condensed Advertisement. There is someone who is looking for a proposition such as yours. For two cents a word you can speak across the continent with a condensed advertisement in this paper.

Try it out.

For Rapid Production and Accurate Work

USE THE
"BRIGGS"

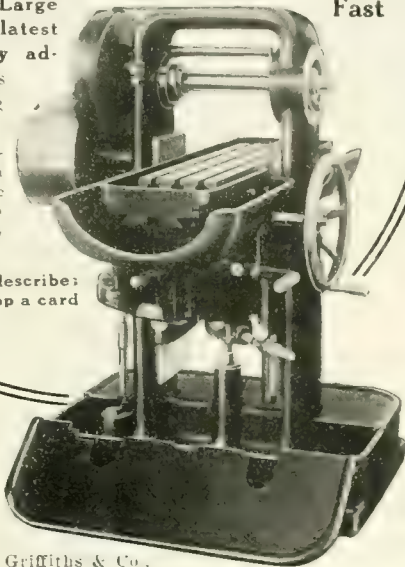
The Briggs Miller handles work no other machine of its size can touch. It is a manufacturing machine. On account of its rigid construction it will produce accurate work when running at a high rate of speed and feed.

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.

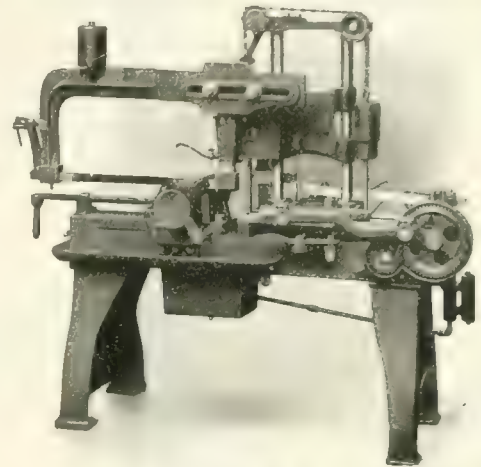
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Gooley & Edlund
Inc.
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HACK SAWS



MANUFACTURED BY
DIAMOND SAW & STAMPING WORKS
BUFFALO, N.Y., U.S.A.

ACCURACY



Because a small diameter screw enters the tapped hole is no guarantee that it fits properly.

The pitch may be long or short, and therefore cause resistance, but be a poor fit.

Cap and Set Screws should fit all the way like a shaft in its bearing.

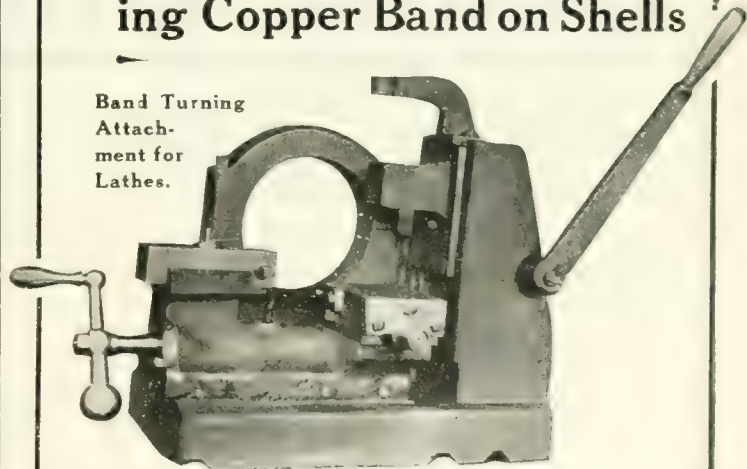
"Galt Screws do. Try them."

Specialists in Cap and Set Screws.

THE
GALT MACHINE SCREW CO.,
LIMITED
GALT, ONTARIO

A Time-Saver for Turning Copper Band on Shells

Band Turning Attachment for Lathes.



This attachment will fit any engine lathe and with its use you can turn the copper band on Shrugged Shells down to size required and burnish them *all in one operation*.

With this device we will guarantee an output of

50 Turned Copper Bands per Hour

Used with a specially constructed steel chuck, casting of which can be finished on the lathe on which the attachment will be used.

Castings are supplied by us.

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LYMBURNER LIMITED
5-15 Commissioners St. Montreal, P. Que.

METAL STAMPINGS

We are manufacturers of stamped parts for other manufacturers.

We do any kind of sheet metal stamping that you require. Our improved presses and plating plant enable us to produce the finest quality of work in a surprisingly short time.

We can finish steel stamping in Nickel, Brass or Copper.

Send us a sample order.

W. H. BANFIELD & SONS
120 Adelaide St. W., Toronto

IMMEDIATE DELIVERY

ENGINE AND TURRET LATHES.

14" x 5' Putnam (2).
16" x 6' Flather (6).
16" x 6' Flather, Taper Atch.
18" x 6' Barker (6).
18" x 8' Barker.
20" x 10' Porter.
28" x 12' Fifield.
2 x 24 Jones & Lamson Turret Lathe.
26" Draper Turret Lathe, 1½" hole.
28" Pond Rigid Turret, 4" hole.
30" Lodge & Shipley Turret Lathe.
2" Bardons & Oliver Screw Machine.
2¼" Pearson Screw Machine.
½" Hartford Automatics (2).

MILLING MACHINES.

Whitney Hand Millers (13).
No. 3 Fox Hand and Power Millers (2).
No. 12 Garvin, Hand and Power (2)
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No. 9 Kempsmith, plain.
No. 6 Grant Manufacturing Miller.

ABOVE PARTIAL LIST ONLY.

A. D. White Machinery Co.
108-114 N. Jefferson St., CHICAGO

Railway, 1882-4, carrying the road to completion; vice-president 1884-8, president 1888-1899, and chairman of the board of directors 1899-1910, after which he continued on the directorate. In recent years he took a leading part in railway development in Cuba, and he has been interested in many large railway, industrial and financial enterprises.

Catalogues

Forcing Presses.—Catalogue No. 92 deals with the line of hydraulic forcing presses made by the Watson-Stillman Co., New York. A number of presses for various purposes are described and illustrated, making altogether a very complete line. Included is a copper hand-press for shell work.

"Wrought Iron Railing, Entrance Gates and Wire Fencing" is the title of a 64-page handsomely illustrated catalogue issued by the J. W. Fiske Iron Works, 78-80 Park Place, New York. This catalogue also includes outside lighting fixtures, mesh wire work for tool and stock room enclosures, and ornamental iron grille work.

Norton Ball Bearing Jack made by A. E. Norton, Ltd., Coaticook, Que. Catalogue No. 28 describes a complete line, featuring the various types of ball-bearing jacks. Tables give the principal dimensions, weight and list price of each size, and are accompanied by illustrations of the different types and repair parts. Interested readers may obtain copies by writing the company.

The Dodge Manufacturing Co., Toronto, have published a report compiled by Professor Price of Toronto University on the properties of wood-split and iron pulleys. The report records a scientific test showing loss from slippage of belts on metal pulleys and the comparative advantages of wood-split pulleys. It also describes the tests in detail and contains a considerable amount of useful information on power transmissions by belts and pulleys. A number of interesting curve and tabulated sheets are included in the report.

Link-Belt and Sprocket Wheels.—The Link-Belt Co., Philadelphia, Pa., are distributing Section A of general catalogue No. 110, dealing with the original "Ewart" detachable link-belt and sprocket wheels. A large number of full-size cuts are shown of standard and special sizes of "Ewart" link-belts and a number of attachments are also illustrated. The catalogue also contains a brief description and price list of attachments, also price lists of sprocket wheels and "Ewart" detachable link-belts.

IMMEDIATE DELIVERY

We always carry a large stock of machine tools for general manufacturing purposes, and solicit inquiries requiring prompt delivery.

We call attention to the following, on which we will quote attractive prices. All in thoroughly first-class condition:

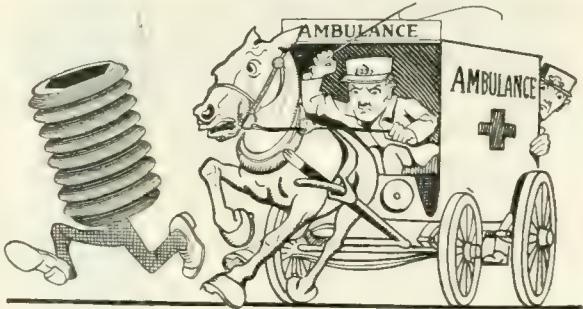
- Three 36" Fellows Gear Shapers.
- Two 36" Brown & Sharpe turret head vertical boring mills.
- One 30" throat Putnam heavy punch and shear, capacity 1" hole in 1" plate.
- One 72" King vertical boring mill with two heads.
- One 48" Bement ear wheel borer with crane.
- One 38" Baush vertical boring mill, two heads.
- One 39" Niles vertical boring mill, two heads.
- Two 36" Snyder upright drills, power feed, etc.
- Two 5' Bickford radial drills.

Girard Machine and Tool Co.
491-493 N. Third Street, Philadelphia, Pa.

RIVETED STEEL TANKS FOR EVERY PURPOSE



**OIL STORAGE - GASOLINE TANKS - AIR RECEIVERS
PNEUMATIC WATER SUPPLY TANKS - SMOKE STACKS
BOILER BREECHING - RIVETED STEEL PIPE - BINS & HOPPERS**



Don't wait till you have an accident, equip your machinery now with Allen Safety Set Screws, and safeguard your workmen.

All sizes from 1/4 inch to 1 inch carried in stock.
See Circular No. 3, and sample screw.

THE ALLEN MFG. CO., Hartford, Conn., U.S.A.
England; 173 Princess Street, Manchester

Machine Tools

Machinery necessary for equipping Modern Machine Shops.

New and Used Tools

Immediate Delivery.

Send for List.

Frank Toomey, Inc.

127-131 N. Third Street
PHILADELPHIA, PA., U.S.A.

Why go to the expense of buying new machines for the manufacture of

SHELLS?

We have already shipped some 75 car-loads of

Rebuilt Machine Tools

to CANADA since the outbreak of the war, with absolute satisfaction in each case.

If you need any equipment it will be to your advantage to get in touch with us as our facilities for furnishing rebuilt machinery are second to none on the continent.

EVERY MACHINE WE BUY IS PUT THROUGH OUR OWN SHOPS AND COMES OUT IN ABSOLUTELY PERFECT ORDER—AND WE STAND BEHIND EVERY ONE WE SELL.

The demand is enormous, but we are not taking advantage of the war by putting on exorbitant prices—our aim is a good, square deal to everybody all the time. You can often get something practically equal to a new machine at a very great saving in price.

As we carry a large stock, we can likely supply you from stock, or if we cannot do this, we will take your order for future delivery, specifying a definite time when we will supply you with such tools as you may require.

New York Machinery Exchange

50 Church St., New York

If what you want is not advertised in this issue consult the Buyers' Directory at the back.



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GEARS

HAMILTON

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CUT GEARS

The only real gear shop in Canada for specialized work in a large range of sizes.

THE DUPONT
Patent
Power Hammer

BEST FOR Durability, Economy of Power, Simplicity of Adjustment.

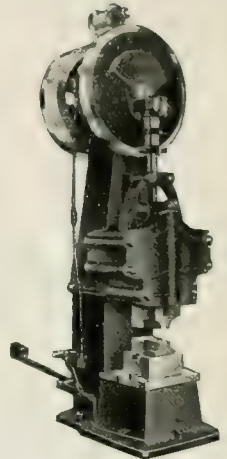
Seven Sizes
from 35 to 300 lbs.

Only High-Class Material Used and Satisfaction Guaranteed.

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SENT FREE

The PLESSISVILLE FOUNDRY
Plessisville, Que.

Ontario and Western Agents:
The General Supply Co. of Canada Ltd.
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Chicago Steel Bending Brakes

We are exclusive Manufacturers of Steel Bending Brakes, and our product shows it.

Only about three horse-power is required to operate this brake full capacity.

Catalog giving full description mailed upon request.

10 ft. for 10 Ga.

The Steel Bending Brake Works, Ltd., Chatham, Ontario

The Garvin Machine Co.

Manufacturers of

Milling Machines; Profiling Machines; Cam Cutting Machines; Screw Machines; Monitor Lathes; Die Slotting Machines; Serew Slotters; Tapping Machines; Duplex Horizontal Drills; Gang Drill Presses; Four-Head Right-Angle Drills; Wrenchless Chucks; Spring Coilers; Cutter Grinding Machines; Surface Grinders; Hole Grinders; Hand Lathes and Special Machinery.

We Want All To Have Our Catalog—Send For It To-day.

Spring and Varick Streets NEW YORK CITY

Genuine Armstrong Stocks and Dies

Hinged Pipe Vises.

Pipe Cutters. Steam and Gas Fitters' Tools.

Pipe Machines for Threading Pipe.

Either Hand or Power.

Manufactured by

THE ARMSTRONG M'F'G CO.

328 KNOWLTON ST. BRIDGEPORT, CONN.
NEW YORK, 248 CANAL ST.

You can afford to use High-Speed Steel in Armstrong Planer and Shaper Tools

They require no forging Minimum Grinding and Mighty Little Tool Steel.

Our complete line is on exhibition in Block 41, Palace of Machinery, Panama-Pacific Exposition, San Francisco.

Catalog sent for the asking.

ARMSTRONG BROS. TOOL CO.
"The Tool Holder People"
306 N. Francisco., Chicago. U.S.A.

The advertiser would like to know where you saw his advertisement—tell him.

"THISTLE" BRAND RUBBER BELTING

"Maintenance of Quality"

Is our motto, and our experience in the manufacture of belting since the year 1856 should be invaluable to you. Let us tell you all about this friction faced belting. The price will appeal to you.

Write to-day.

J. C. McLAREN BELTING CO., LTD.
TORONTO, MONTREAL, WINNIPEG




NORTON JACKS

For all kinds of heavy lifting

Send for complete catalogue showing 50 styles
10 to 100 tons capacity.

Made only by
A. O. NORTON, LIMITED
Coaticook, Prov. Quebec Canada



PULLEYS

ALL WOOD—COMBINATION—IRON—STEEL

Every pulley fully guaranteed.
Write for interesting printed matter.

The Positive Clutch & Pulley Works, Ltd.
Montreal Toronto
Factory: Aurora, Ont.

MAGNOLIA ANTI-FRICTION METAL

Gives Satisfaction Where Other Metals Fail

Sold by Leading Dealers Everywhere,
or by


MAGNOLIA METAL CO.
Office and Factory:
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PRESSES—ALL TYPES

Press Attachments, Automatic.
Metal and Wire Forming Machines.
Tumblers—Large Line.
Burnishing Machines, Grinders.
Special Machines.

Baird Machine Co., Bridgeport, Conn.



Detective and Stop Watch Combined.

"We have a counter on every one of our presses, even the foot presses." This from a satisfied user of our counters. If you use presses our counters would save you money. Ask for catalogue 25.

The C. J. ROOT CO., 125 Bridge Street, Bristol, Conn



IS YOUR RIVETING PROFITABLY DONE?

Our Elastic Rotary Blow Riveting Machine does profitable work, because one machine will do the work of several hand riveters, and do it better.

Every head is perfectly formed, any shape, round, flat, oval, rectangular, etc.

Catalogue C tells more about it.

The F. B. SHUSTER COMPANY
New Haven, Conn.
Formerly John Adt & Son. Established 1866
Also makers of Wire Straighteners and Cutter, Cotter Pin Machines, etc.



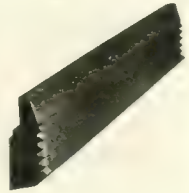
20 TIMES THE SERVICE

That's what this self-hardening, high-speed steel chaser does for the LANDIS DIE.

Four long cutters tangentially disposed to the work carried in suitable holders make an ideal cutting condition. This, along with its many other distinctive characteristics, has established for us a world-wide reputation.

WRITE FOR CATALOGUE NO. 21.

Landis Machine Co., Waynesboro, Pa.
Exclusive Canadian Representatives,
Williams & Wilson, Montreal, Canada.



Taylor-Newbold Milling Cutters



Will outwear and outcut any other milling cutters.
Let us prove this in your shop.

Write for Bulletin R.P. and 30-day trial offer.

THE TABOR MANUFACTURING COMPANY
PHILADELPHIA, PA., U.S.A.

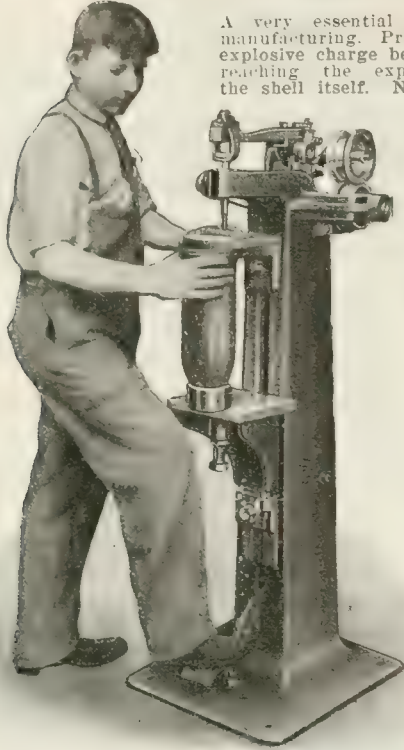
Toronto Testing Laboratory

METALLURGISTS - CHEMISTS - FUEL ENGINEERS
160 Bay St., Toronto.

Tests of Metals, Fuels, Oils, Water, Etc.
SPECIAL ATTENTION TO ALL SHELL MATERIALS

1/16 Page \$1.60 per insertion
on yearly order.

Riveting Base of Explosive Projectile



A very essential operation in shell manufacturing. Prevents gas from the explosive charge behind the shell from reaching the explosive contents of the shell itself. Neglect of this operation would probably cause the shell to explode and kill or injure the gun crew.

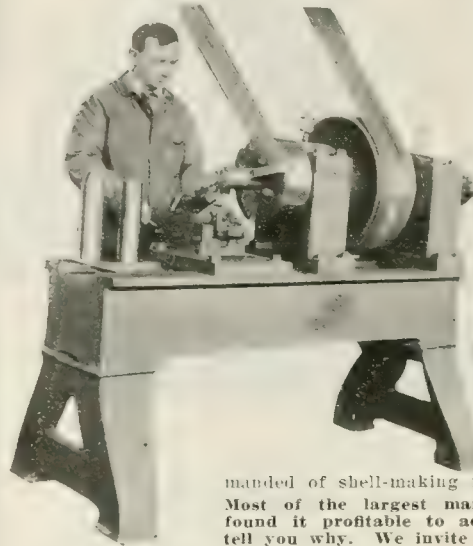
After the shell is in position the machine is started and the shell is rotated one complete revolution by hand and with the machine striking about 2,000 blows per minute, the plug can be riveted perfectly tight into the base in about 10 seconds. CHANGE OF FIXTURE EN-ABLES MACHINE TO BE ADAPTED FOR 45" 38 LBS. OR SHELLS EVEN LARGER THAN 45".

Drop a line for further particulars.

**The Grant
Mfg. and
Machine Co.
Bridgeport, Conn.**

SPEED and ACCURACY

The two most important factors in the machining of shrapnel and 45 shells, speed and accuracy, can be achieved when turning copper bands by using this machine.



The cut at the left shows an operator turning the band on a Russian high explosive shell machine. His daily output averages 40 to 45 shells per hour.

This lathe was designed and built by us especially for this work. It is of sufficiently heavy construction to enable it to stand up under the strenuous work de-

manded of shell-making machinery.

Most of the largest manufacturers have found it profitable to adopt it. Let us tell you why. We invite your inquiry.

**The Jenckes Machine Co., Limited
SHERBROOKE, QUEBEC**

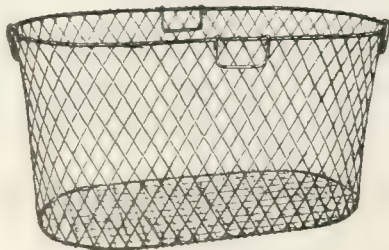
Branches at Toronto, Ontario, 728 Traders Bank Bldg.
Montreal, Que., 303 E. T. Bank Building.
St. Catharines, Ont.; Cobalt, Ont.;
Vancouver, B.C.; Nelson, B.C.

If you are hot-forging SHRAPNEL CASES you cannot afford to overlook the merits of "HAWK" D CHROME VANADIUM STEEL

for both first and second operation Punches. This steel comes to you heat-treated and ready for use. It gives exceptional production. Many cases have been reported to us where each Punch turned out over 2,000 Shells. It does not stick to the work. This enables you to turn out more Shells, per machine, per day.

STEEL OF EVERY DESCRIPTION.

HAWKRIDGE BROTHERS COMPANY, 303 Congress St., BOSTON, MASS.



Dipping Baskets

Our Copper Baskets will withstand ACID. Can be made to any shape or size. Draining facilities of our wire baskets are much greater than sheet metal construction.

**CANADA WIRE & IRON GOODS COMPANY
Hamilton, Ontario**

The advertiser would like to know where you saw his advertisement—tell him.

Anaconda Belting



The service you get from ANA-CONDA is not measured by time alone.

With unusual wearing qualities, it combines better traction, less "come and go" and greater all-round service-ability than any other belt of any kind.

It reduces belt repairs and "take-up" to a minimum and materially increases the mechanical efficiency of the plant.

If you really want all you can get for your belt money, investigate ANA-CONDA—you'll never regret it.

Main Belting Co. of Canada Limited
10½ St. Peter St., Montreal

WATCH FOR OUR MESSAGE IN NEXT WEEK'S ISSUE.



J-M Responsibility — the logical outgrowth of over half a century's progress, achievement, and business integrity — stands as a stronger assurance for your satisfaction than even the most complete written guarantee.

- J-M Asbestos Roofings,
- J-M Pipe Coverings,
- J-M Sectional Underground Conduit,
- J-M Packings,
- J-M Metallic Hose,
- J-M Waterproofing Materials and Mastic Flooring,
- J-M Vitribestos Stack Lining,
- J-M Fire Extinguisher,
- J-M High Temperature Cements, etc.,
- J-M Fireproof Cold Water Paints.

The Canadian H. W. Johns-Manville Co.

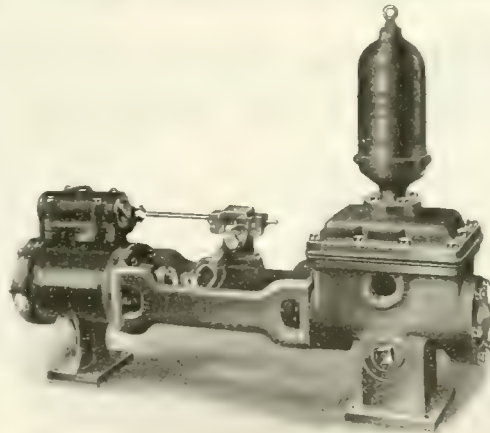
LIMITED
Toronto Montreal Winnipeg Vancouver

182

BURNHAM STEAM PUMP

Of the thousands of steam pumps installed every year, a large percentage of them bear the name of "Burnham," the *Steam Pump* endorsed by leading Architects, Consulting Engineers and Heating Contractors as the best, simplest and most economical pump on the market.

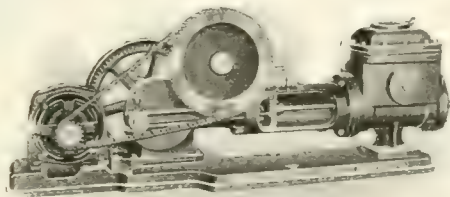
If you want a pump for handling hot water, use the "Burnham."



Thousands of Burnham pumps are in operation in connection with *Vacuum Heating Systems*; they are specially adapted for this service. Standard Burnham Boiler Feed Pumps and Burnham Vacuum Pumps are kept in stock and can be shipped promptly.

Ask for Catalog "P"

Burnham Boiler Feed Pump



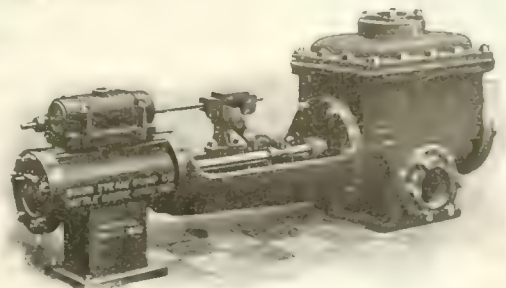
Union Electrically Driven Vacuum Pump

Darling Brothers

Limited

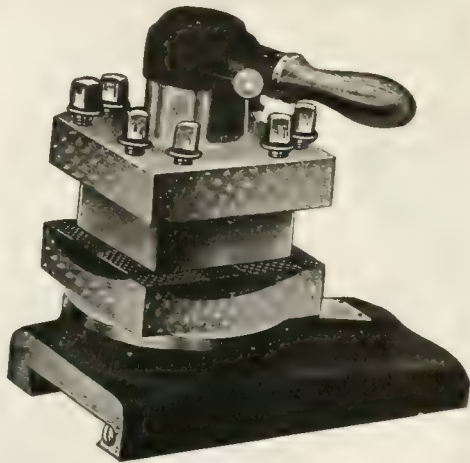
15 Ottawa Street
MONTREAL

Toronto Winnipeg



Burnham Vacuum Pump

If what you want is not advertised in this issue, consult the Buyers' Directory at the back.



Particularly Adapted to the Manufacture of Shrapnel

Your Lathe Needs A NEW TOOL POST. One of the Modern Multiple Type.

You can no longer afford to use the old style single tool holder.

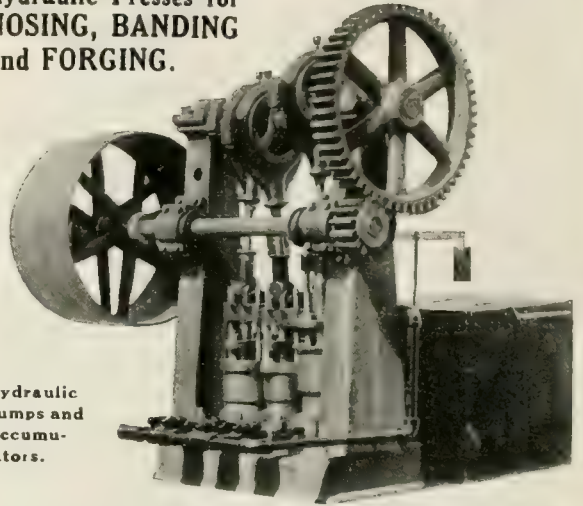
Give us the size of the dovetail on your lathe carriage and height to lathe center; we will quote you price on a Modern Tool Holder that we guarantee will increase your production, and give you some interesting facts about Lathe Turrets.

No matter what make or size of lathe—we can fit it.

Fay & Scott, Dexter, Me.

Presses for Shrapnel

Hydraulic Presses for NOSING, BANDING and FORGING.



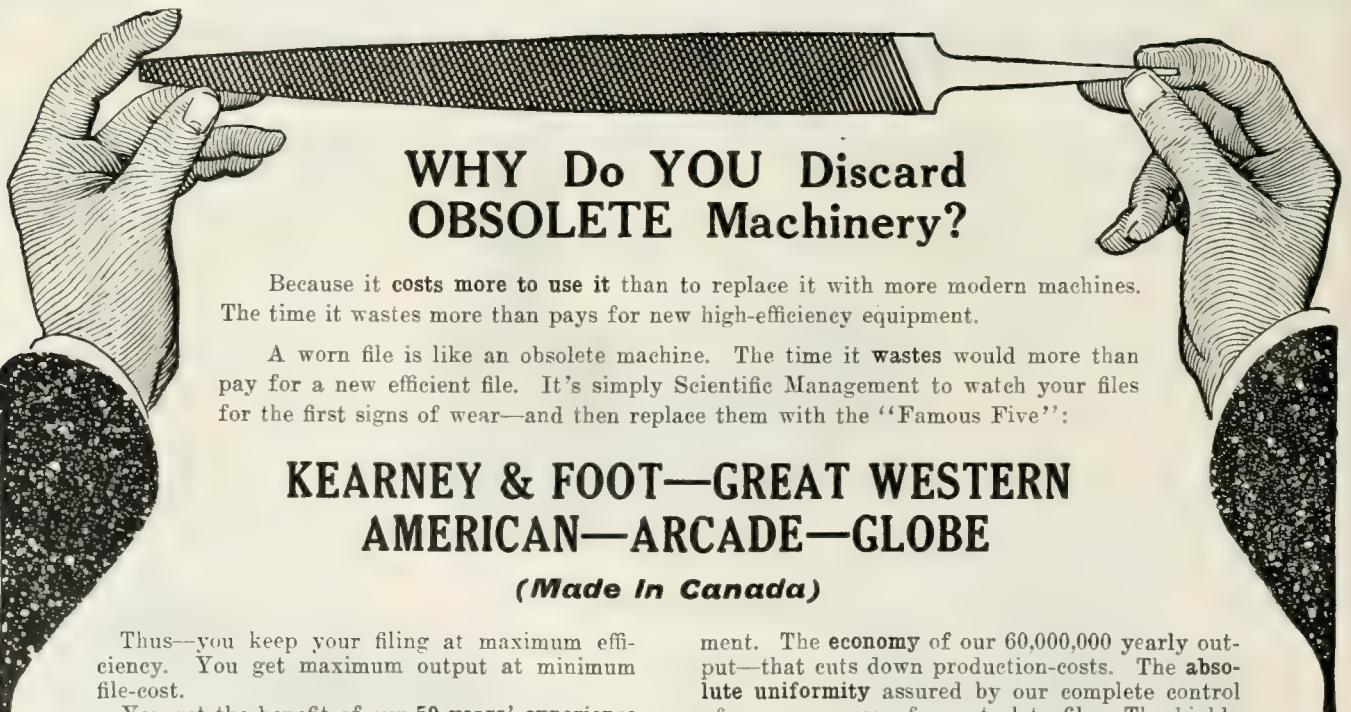
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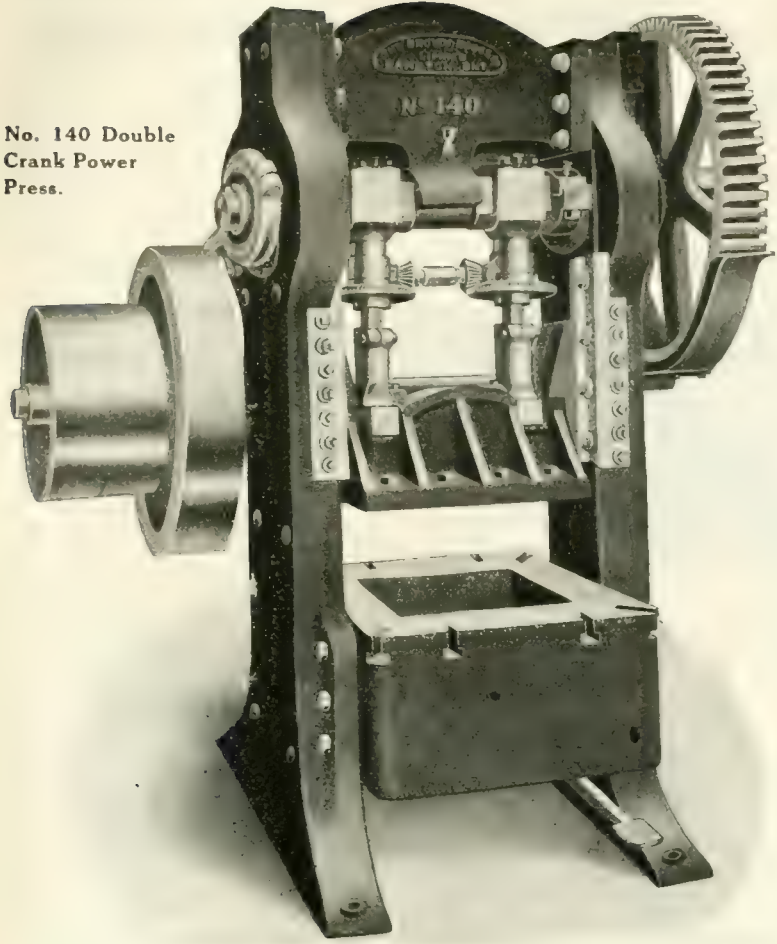
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No. 140 Double Crank Power Press.

Look at
The Entire "SOLIDITY"

THIS COMBINED WITH ACCURACY and SPEED are THREE IMPORTANT FEATURES of "BB" PRESSES. BE CONVINCED BY THE RESULTS OF YOUR OWN TESTS. LET YOUR NEXT INSTALLATION BE A "BB."

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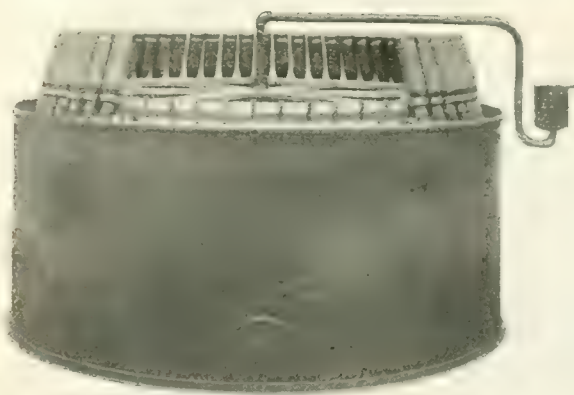
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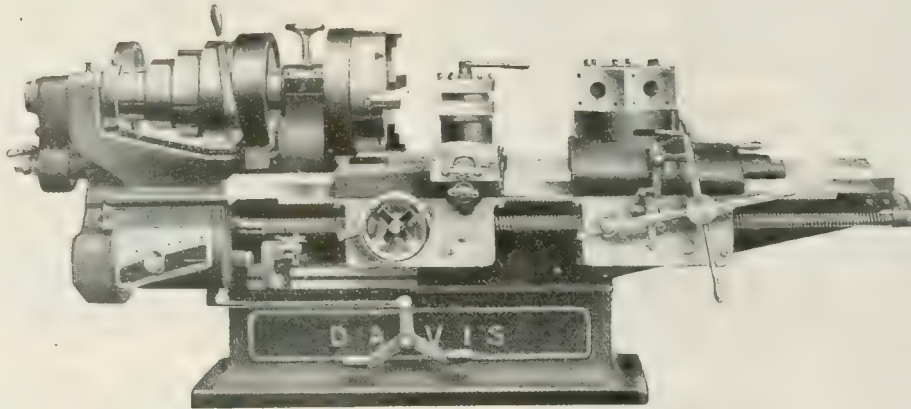
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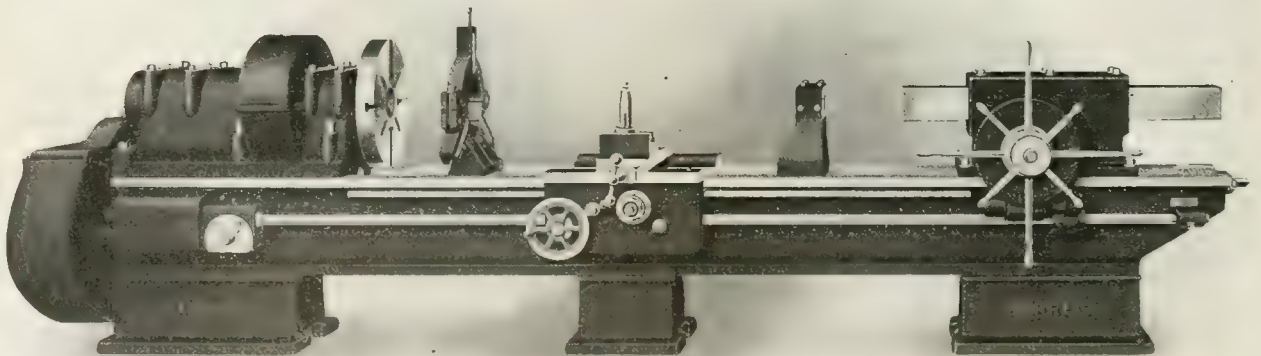
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L'Air Liquide Society, Montreal, Toronto.
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Morse Twist Drill and Machine Co., New Bedford.
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Motch & Merryweather Machy. Co., Cleveland, O.
National Machinery & Supply Co., Hamilton.

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Magnolia Metal Co., Montreal.
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Chapman Double Ball Bearing Company, Toronto.

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Cleveland Wire Spring Co., Cleveland.

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Owen Sound Iron Works Co., Owen Sound.

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Steel Bending Brake Works, Ltd., Chatham, Ont.

Bar Benders, Hydraulic.

Charles F. Elmes Eng. Works, Chicago
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Mesta Machine Co., Pittsburg, Pa.

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Bell Systems.

Lintz-Porter Co., Toronto.

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Graton & Knight Mfg. Co., Montreal.

Belt Lacing, Leather.

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Colburn Machine Tool Co., Franklin, Pa.
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Motch & Merryweather Machy. Co., Cleveland, O.

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Niles-Bement-Pond Co., New York.

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Stow Mfg. Co., Binghamton, N.Y.

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Brown, Boggs & Co., Hamilton, Can.

National Machinery & Supply Co., Hamilton, Ont.

Caissons.

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Mesta Machine Co., Pittsburg, Pa.

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Whiting Foundry Equipment Co., Harvey, Ill.

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Wm. Tod Company, Youngstown, O.

Castings, Brass.

Cunningham & Son, St. Catharines, Ont.
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Owen Sound Iron Works Co., Owen Sound.
Pittsburg Valve Foundry & Construction Co., Pittsburg, Pa.
Plessisville Foundry, Plessisville, Que.
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Castings, Bronze.

Cunningham & Son, St. Catharines, Ont.
Mesta Machine Co., Pittsburg, Pa.
Tallman Brass & Metal Co., Hamilton
Wm. Tod Company, Youngstown, O.

Castings, Copper.

Cunningham & Son, St. Catharines, Ont.
Tallman Brass & Metal Co., Hamilton, Ont.

Castings, Gray Iron.

Brown, Boggs Co., Ltd., Hamilton, Canada.
Erie Foundry Co., Erie, Pa.
Alexander Fleck, Ltd., Ottawa.
Gardner, Robt., & Son, Montreal.
Hull Iron & Steel Foundries, Ltd., Hull, Quebec.
Mesta Machine Co., Pittsburg, Pa.
Owen Sound Iron Works Co., Owen Sound.
Pittsburg Valve Foundry & Construction Co., Pittsburg, Pa.
Plessisville Foundry, Plessisville, Que.
Wm. Tod Company, Youngstown, O.

Castings, Steel Chrome and Manganese Steel.

Hull Iron & Steel Foundries, Ltd., Hull, Quebec.
Mesta Machine Co., Pittsburg, Pa.
Wm. Tod Company, Youngstown, O.

Castings, Malleable.

Galt Malleable Iron Co., Galt.

Castings, Nickel Steel.

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Mesta Machine Co., Pittsburg, Pa.

Cement, Disc Wheel.

Gardner Machine Co., Beloit, Wis.

Cement, Iron.

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Gardner, Robt., & Son, Montreal.
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Morse Chain Co., Ithaca, N.Y.
Plessisville Foundry, Plessisville, Que.

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Garvin Machine Co., New York.

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Cushman Chuck Co., Hartford, Conn.
Gardner, Robt., & Son, Montreal.
Girard Machine & Tool Co., Philadelphia, Pa.
Wells Brothers Co., Greenfield, Mass.
Jacobs Mfg. Co., Hartford, Conn.
Ker & Goodwin, Brantford.
Modern Tool Co., Erie, Pa.
Morse Twist Drill & Machine Co., New Bedford.
National Machinery & Supply Co., Hamilton.
Skinner Chuck Co., New Britain, Conn.
D. E. Whiton Machine Co., New London, Conn.
Wilt Twist Drill Co. of Canada, Ltd., Walkerville, Ont.

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Buffalo Forge Co., Buffalo, N.Y.

Chucks, Ring Wheel.

Gardner Machine Co., Beloit, Wis.

Chucking Machines.

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Girard Machine & Tool Co., Philadelphia, Pa.
New Britain Machine Co., New Britain, Conn.
Niles-Bement-Pond Co., New York.
Turner Machine Co., Danbury, Conn.
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Lintz-Porter Co., Toronto.

Cloth and Wool Dryers.

Canada Wire & Iron Goods Co., Hamilton, Ont.
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Jones & Glasco, Montreal.
Owen Sound Iron Works Co., Owen Sound.
Positive Clutch & Pulley Works, Ltd., Toronto.

Coal Handling Machinery.

Whiting Foundry Equipment Co., Harvey, Ill.

Coke and Coal.

Hanna & Co., M. A., Cleveland, O.

Collectors, Pneumatic.

Can. Buffalo Forge Co., Montreal.
Sheldons, Limited, Galt.

Compressors, Air.

Cleveland Pneumatic Tool Co. of Canada, Toronto.
Independent Pneumatic Tool Co., Chicago.
Mesta Machine Co., Pittsburg, Pa.
National Machinery & Supply Co., Hamilton.
Southark Foundry & Machine Co., Philadelphia, Pa.
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Gardner, Robt., & Son, Montreal.

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National Machinery & Supply Co., Hamilton.

Concrete Reinforcement.

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Can. Buffalo Forge Co., Montreal.
Mesta Machine Co., Pittsburg, Pa.
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Southark Foundry & Machine Co., Philadelphia, Pa.
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Can. Mathews Gravity Carrier Co., Toronto.
National Machinery & Supply Co., Hamilton, Ont.
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The Smart-Turner Machine Co., Hamilton.

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National Machinery & Supply Co., Hamilton, Ont.
Niles-Bement-Pond Co., New York.

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Steel Bending Brake Wks., Chatham.

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C. J. Root Co., Bristol, Conn.

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Morse Twist Drill & Machine Co., New Bedford.
Pratt & Whitney Co., Dundas, Ont.
Wells Bros. Co., Greenfield, Mass.
Whitman & Barnes Mfg. Co., St. Catharines, Ont.
Wilt Twist Drill Co. of Canada, Ltd., Walkerville, Ont.

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Raidr Machine Co., Bridgeport, Conn.
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Can. Blaugas Co., Montreal.

Couplings.

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Eastern Machinery Co., New Haven, Conn.
Gardner, Robt., & Son, Montreal.
Owen Sound Iron Works Co., Owen Sound, Ont.

Couplings, Air Hose.

Cleveland Pneumatic Tool Co. of Canada, Toronto.

Crabs, Travelling.

Owen Sound Iron Works Co., Owen Sound.

Cranes, Locomotive.

Northern Crane Works, Walkerville.

Cranes, Gantry.

Northern Crane Works, Walkerville.
Smart-Turner Machine Co., Hamilton, Ont.
Whiting Foundry Equipment Co., Harvey, Ill.

Cranes, Goliath.

Herbert Morris Crane & Hoist Co., Ltd., Toronto.
Northern Crane Works, Walkerville.
Whiting Foundry Equipment Co., Harvey, Ill.

Cranes, Hydraulic.

Watson-Stillman Co., Aldene, N.J.

Cranes, Pneumatic.

Northern Crane Works, Walkerville.
Whiting Foundry Equipment Co., Harvey, Ill.

Cranes, Post Jib.

Northern Crane Works, Walkerville.
Smart-Turner Machine Co., Hamilton, Ont.
Whiting Foundry Equipment Co., Harvey, Ill.

Cranes, Portable.

Northern Crane Works, Walkerville.
Whiting Foundry Equipment Co., Harvey, Ill.

Cranes, Swing Jib.

Northern Crane Works, Walkerville.
Smart-Turner Machine Co., Hamilton, Ont.
Whiting Foundry Equipment Co., Harvey, Ill.

Cranes, Transfer.

Northern Crane Works, Walkerville.
Smart-Turner Machine Co., Hamilton, Ont.
Whiting Foundry Equipment Co., Harvey, Ill.

Cranes, Wall.

Northern Crane Works, Walkerville.
Smart-Turner Machine Co., Hamilton, Ont.
Whiting Foundry Equipment Co., Harvey, Ill.

Cranes, Travelling Electric and Hand Power.

Dominion Bridge Co., Montreal.
Niles-Bement-Pond Co., New York.
Northern Crane Works, Walkerville.
Whiting Foundry Equipment Co., Harvey, Ill.

Crane, Chain.

Northern Crane Works, Walkerville.

Cranes, All Kinds.

Northern Crane Works, Walkerville.
Owen Sound Iron Works Co., Owen Sound, Ont.
Southark Foundry & Machine Co., Philadelphia, Pa.
Whiting Foundry Equipment Co., Harvey, Ill.

Crank Pin Turning Machine.

Niles-Bement-Pond Co., New York.

Crimps, Leather.

Graton & Knight Mfg. Co., Montreal.

Cupolas.

Can. Buffalo Forge Co., Montreal.
Northern Crane Works, Walkerville.
Sheldons, Ltd., Galt, Ont.
Whiting Foundry Equipment Co., Harvey, Ill.

Cupola and Blast Gate Blowers.

Can. Sirocco Co., Ltd., Windsor, Ont.
Cupola Blast Gauges & Blowers, Sheldons, Ltd., Galt, Ont.

Cutters, Angle, Tee Iron and Bar.

Can. Buffalo Forge Co., Montreal.

Cutters, Flue.

Independent Pneumatic Tool Co., Chicago.
Cleveland Pneumatic Tool Co. of Canada, Toronto.

Cutters, Pipe.

Can. Fairbanks-Morse Co., Montreal.
A. B. Jardine & Co., Hespeler, Ont.
Trimont Mfg. Co., Roxbury, Mass.

Cutting Compound & Cutting Oil.

Can. Economic Lubricant Co., Montreal.
Can. Oil Companies, Toronto.
Cataract Refining Co., Buffalo, N.Y.
Crescent Oil Co., New York.
Racine Tool & Machine Co., Racine, Wis.

Cutter Grinders and Attachments.

Cincinnati Milling Machine Co., Cincinnati.
Garvin Machine Co., New York.
Girard Machine & Tool Co., Philadelphia, Pa.

Cutters, Milling.

A. R. Williams Machy. Co., Toronto.
Can. Fairbanks-Morse Co., Montreal.
Cleveland Twist Drill Co., Cleveland.
Garvin Machine Co., New York.
Morse Twist Drill and Machine Co., New Bedford.
Tabor Mfg. Co., Philadelphia, Pa.
Pratt & Whitney Co., Dundas, Ont.
Wilt Twist Drill Co. of Canada, Ltd., Walkerville, Ont.

Cutting-off Machines.

Armstrong Bros. Tool Co., Chicago.
John Bertram & Sons Co., Dundas, Ont.
Can. Fairbanks-Morse Co., Montreal.
Espin-Lucas Machine Wks., Philadelphia, Pa.
Foss & Hill Machy. Co., Montreal.
Gallock-Machinery, Toronto.

Cutting-off Machines.

Garvin Machine Co., New York.
Girard Machine & Tool Co., Philadelphia, Pa.
Geo. Gorton Machine Co., Racine, Wis.
John H. Hall & Sons, Brantford, Ont.
Nutter & Barnes Co., Hinsdale, N.H.
Pratt & Whitney Co., Dundas, Ont.
Tabor Mfg. Co., Philadelphia, Pa.
L. S. Starrett Co., Athol, Mass.

Damper Regulators.

Can. Fairbanks-Morse Co., Montreal.

Derricks.

Dominion Bridge Co., Montreal.
Wilt Twist Drill Co. of Canada, Ltd., Walkerville, Ont.

Designers, Special Machinery.

Raidr Machine Co., Bridgeport, Conn.

Dies and Die Stocks.

Armstrong Mfg. Co., Bridgeport, Conn.
Banfield, W. H. & Son, Toronto.
Butterfield & Co., Rock Island, Que.
Brown, Boggs & Co., Hamilton, Ont.
Can. Fairbanks-Morse Co., Montreal.
Duncan Electrical Co., Montreal.
Gardner, Robt., & Son, Montreal.
Greenfield Tap & Die Corporation, Greenfield, Mass.
A. B. Jardine & Co., Hespeler, Ont.
Modern Tool Co., Erie, Pa.
Morse Twist Drill and Machine Co., New Bedford.
Pratt & Whitney Co., Dundas, Ont.
Wiley & Russell, Greenfield, Mass.

Dies for Bit Brace Use.

Wells Brothers Co., Greenfield, Mass.

Dies Sinks.

Garvin Machine Co., New York.

Dies for Machines.

Wells Brothers Co., Greenfield, Mass.

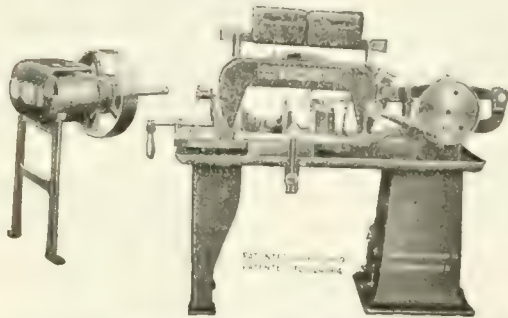
Die Sinking Presses, Hydraulic.

Charles F. Elmes Eng. Works, Chicago.
Watson-Stillman Co., Aldene, N.J.

Dies, Self-opening.

Duncan Electrical Co., Montreal.
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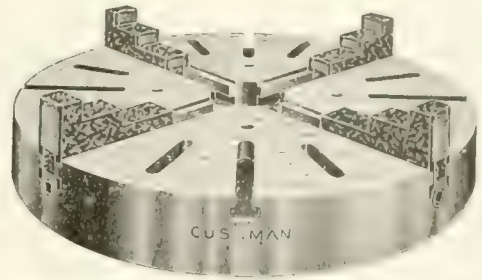
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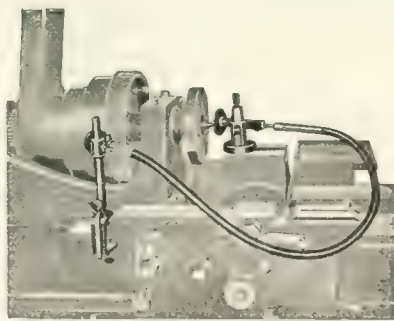
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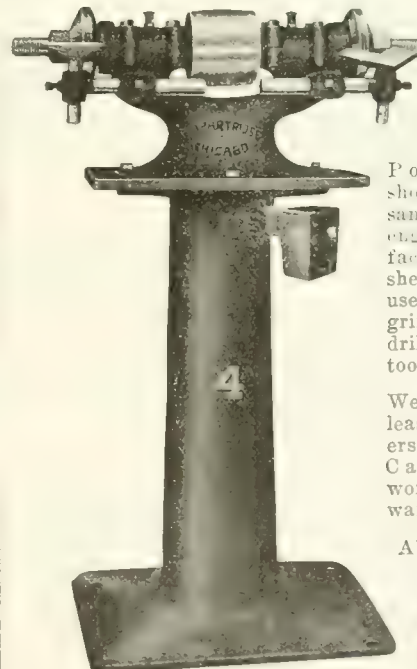
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 Morse Twist Drill and Machine Co.,
 New Bedford.
 Pratt & Whitney Co., Dundas, Ont.
 L. S. Starrett Co., Athol, Mass.
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 Pratt & Whitney Co., Dundas, Ont.
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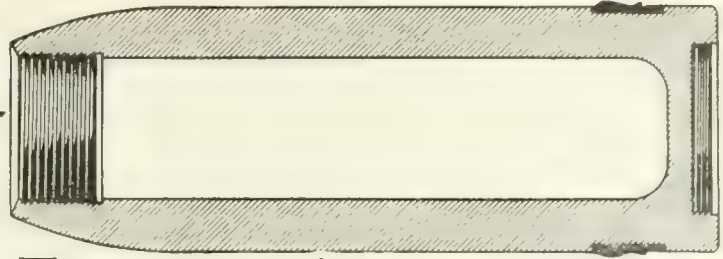
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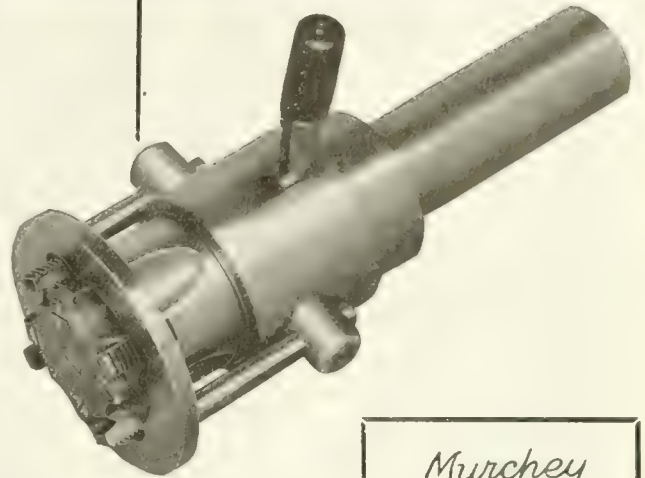
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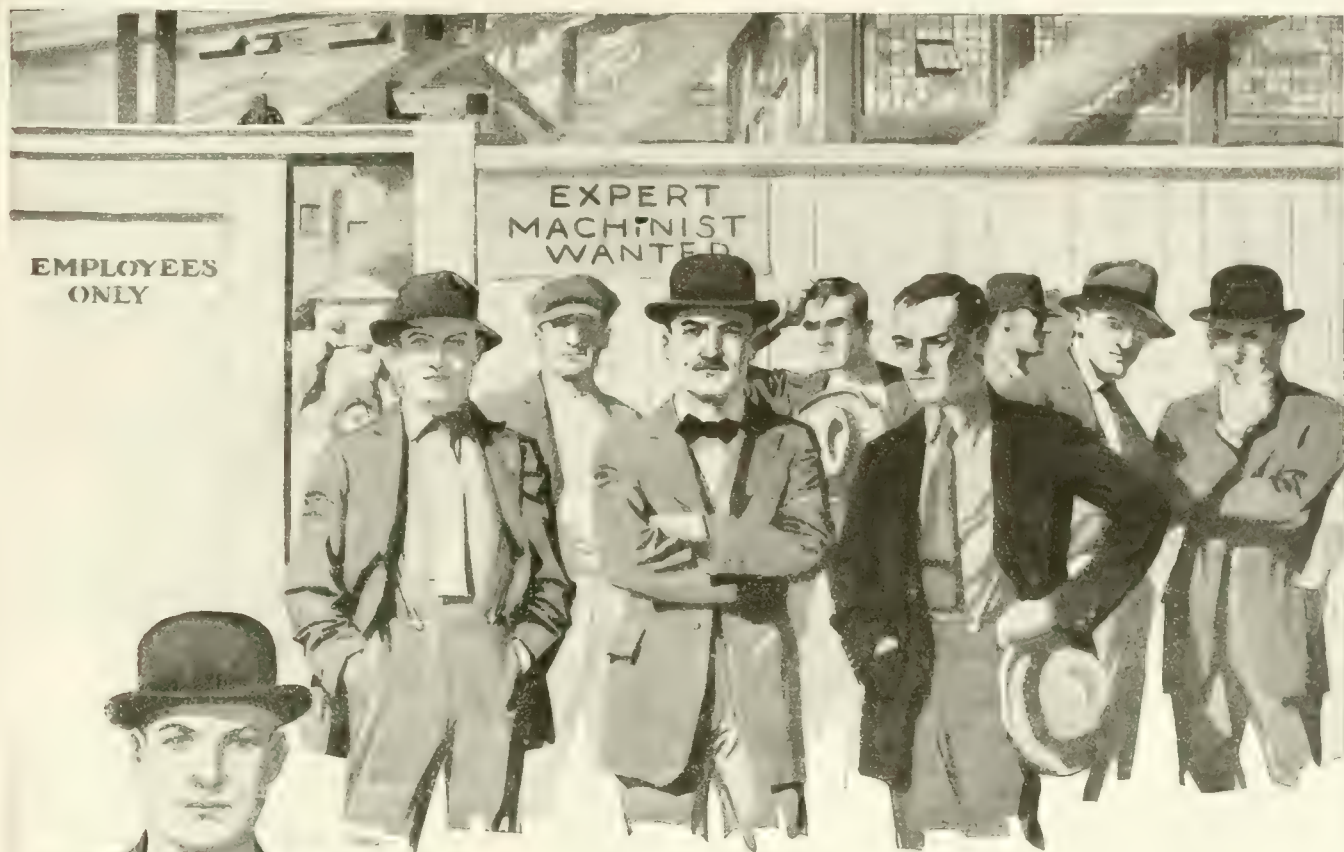
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 A. R. Williams Machy. Co., Toronto.
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 Hamilton Gear & Machine Co., Toronto.
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 Smart-Turner Machine Co., Hamilton, Ont.
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 Philadelphia Gear Works, Philadelphia, Pa.
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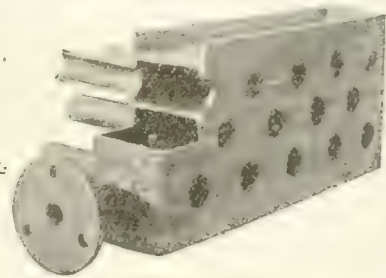
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should be without it.

A Money Saver.
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Apparatus made of I-Beams, welded, to stand high pressure

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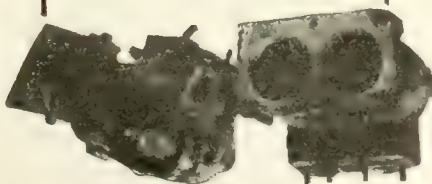
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Head.

Head of Cylinder
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A break in a machine means heavy loss in time and labor and burden.

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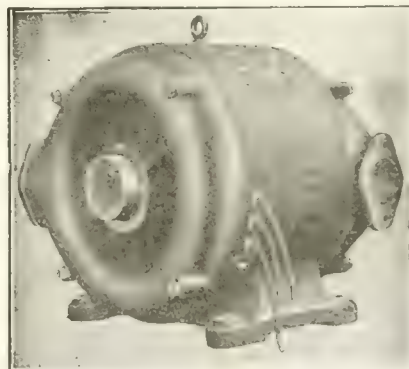


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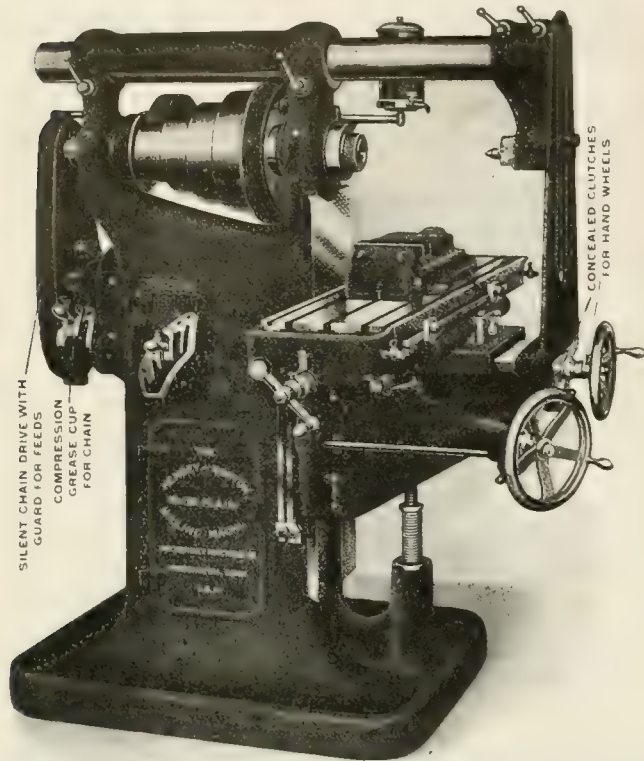
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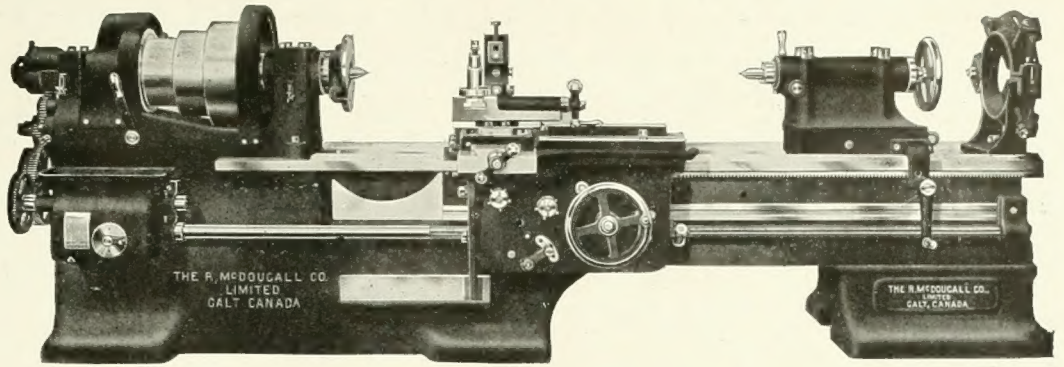
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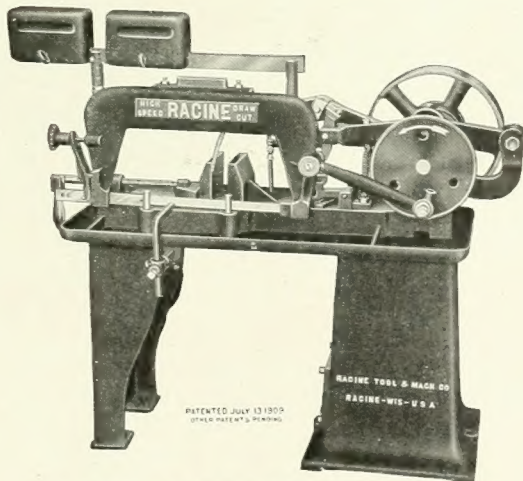
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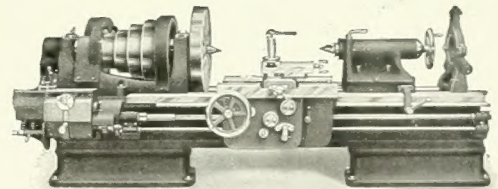
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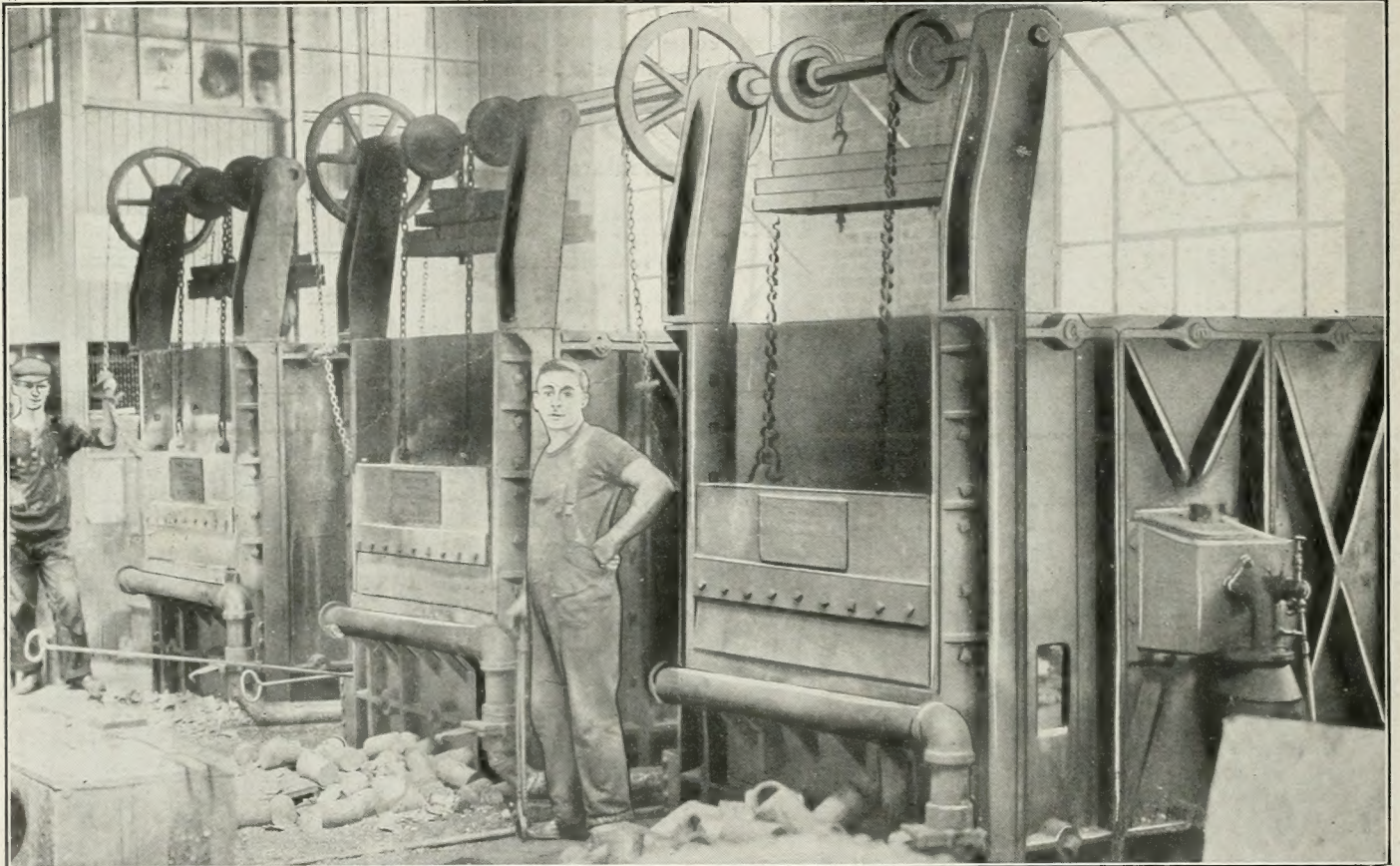
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