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# 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.

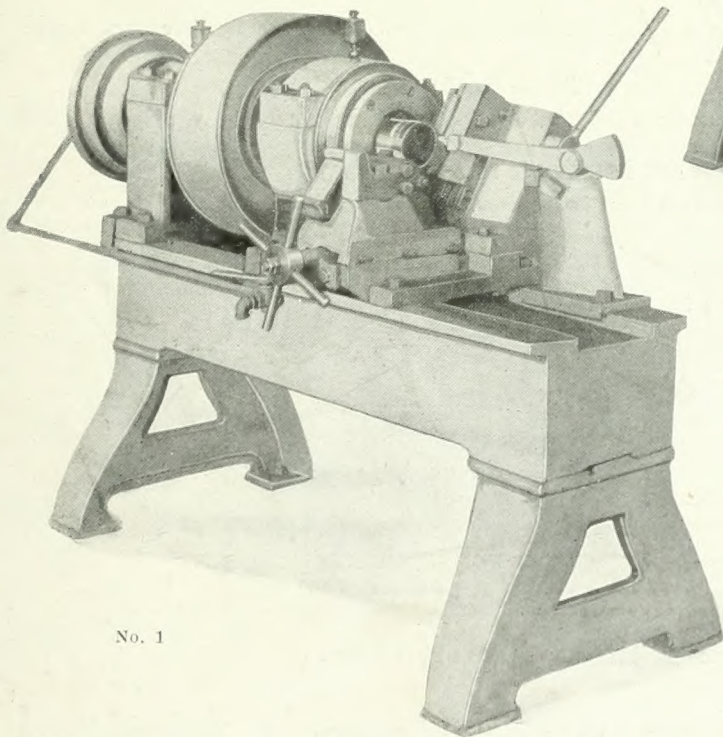
Vol. XIV

Publication Office: Toronto, December 9, 1915

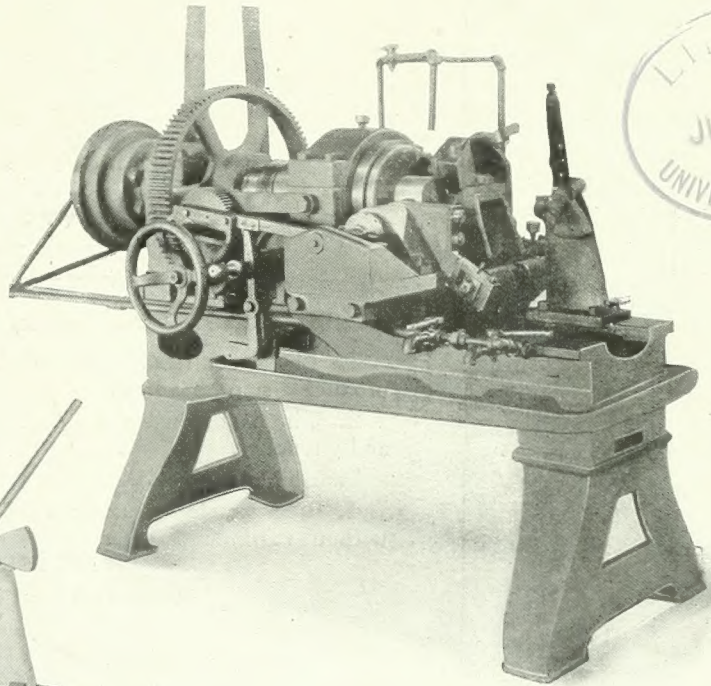
No. 24

## Special Single Purpose Lathes For Shell Work

Cut No. 1 illustrates air equipped lathe for grooving, waving and undercutting 4.5" and 5" British High Explosive Shell for driving band seat. Fast and accurate operation.



No. 1



No. 2

Cut No. 2 illustrates our Single Purpose Lathe for turning and finishing the copper driving band for the 4.5" and larger High Explosive Shells. Equipped with air actuated chuck and friction, and is fast and accurate. Sizes 4.5", 5", 6", 7", 8", 9.2" British Shells and equivalent millimeter sizes in French and Russian shells.

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## THE JENCKES MACHINE CO., LIMITED

Sherbrooke, Province of Quebec, Canada

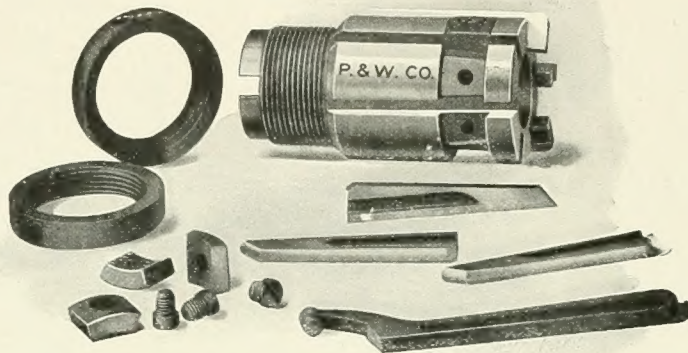
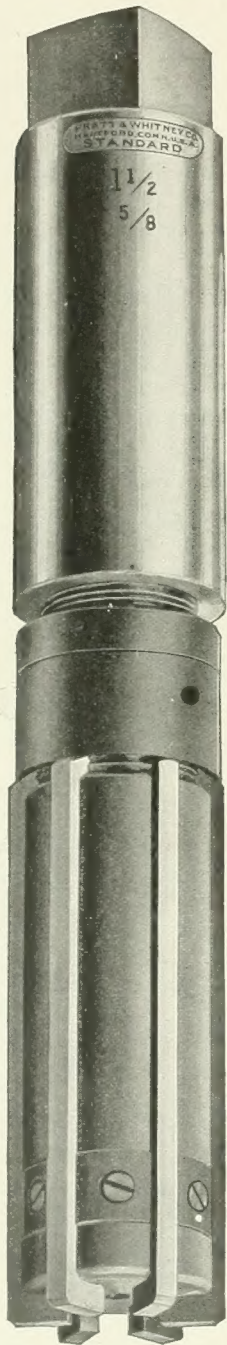
SELLING OFFICES:—Sherbrooke, Que. Montreal, 908 E. T. Bank Bldg. Toronto, Ont., 727 Traders Bank Bldg. Vancouver, B.C., Exchange Bldg.

AGENCIES:—E. T. Bartlett, Savoy Hotel, London, England. Canadian and American Continental Agencies, 126 Rue du Provence, Paris, France.



# REAMERS ALWAYS UP TO SIZE

Make sure that all your reamed holes are smooth and accurate



Parts of P. & W. Solid Adjustable Blade Reamers

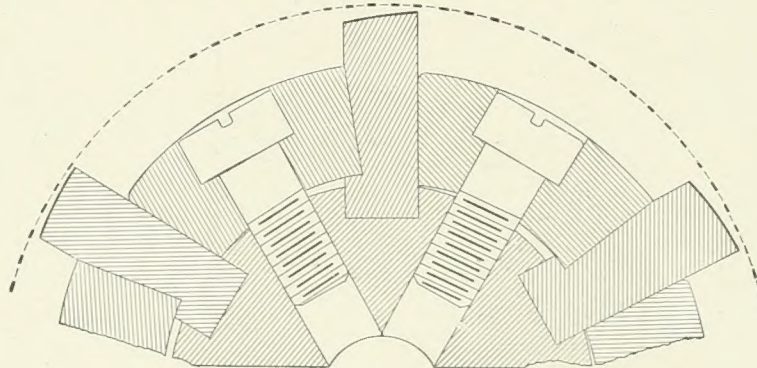
## USE P. & W. SOLID ADJUSTABLE BLADE REAMERS

Unexcelled for Design, Simplicity and Ease of Adjustment

1. The eccentrically relieved blades are stronger than others, do not chatter and produce a smoother hole.
2. The hand, shell and fluted chucking reamers have interchangeable nuts, screws and wrenches.
3. The bottom of a hole can readily be faced.
4. By a simple adjustment of the blades the reamer can easily be set to size without regrinding.

### REDUCE YOUR REAMING COSTS

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



Section showing construction of P. & W. Adjustable Blade Reamers

Place a trial order with our nearest store.

# Pratt & Whitney Company of Canada, Limited

DUNDAS  
Ontario

MONTREAL  
723 Drummond Bldg.

WINNIPEG  
1205 McArthur Bldg.

VANCOUVER  
B. C. Equipment Co.

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





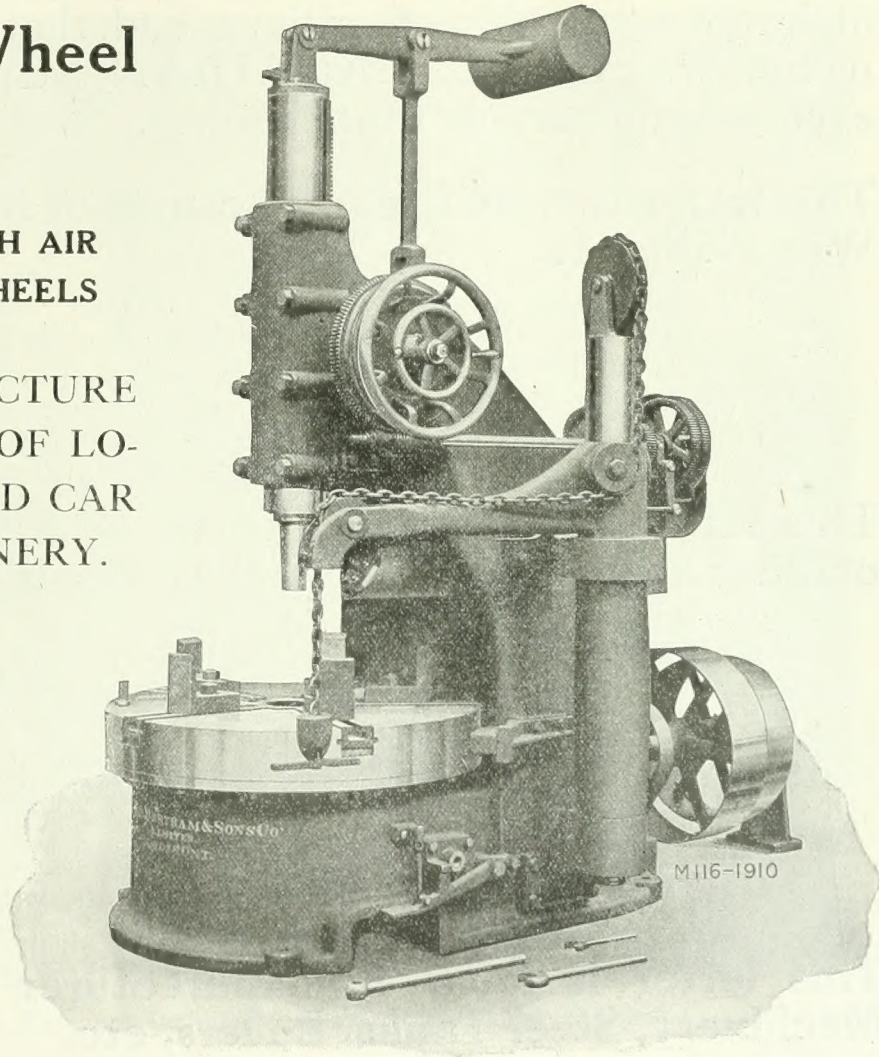
# BERTRAM MACHINE TOOLS

## 42" Car Wheel Borer

EQUIPPED WITH AIR  
CRANE FOR WHEELS

WE MANUFACTURE  
A FULL LINE OF LO-  
COMOTIVE AND CAR  
SHOP MACHINERY.

Write us about the  
machine or ma-  
chines in which you  
are interested—we  
gladly send photo-  
graphs and full  
specifications.



## The John Bertram & Sons Co. Limited

Dundas, Ontario, Canada

MONTREAL  
723 Drummond Bldg.

VANCOUVER  
609 Bank of Ottawa Building

WINNIPEG  
1205 McArthur Bldg.

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



# The Publisher's Page

By B.G.N.

**L**ETTERS like the following never hurt those who write them, and we always appreciate them, and are glad to receive them. There is only one other kind of letter we would rather have, and that is, one telling us how we can make CANADIAN MACHINERY of even greater service to its readers.

## **This letter is from a manufacturer of Screws, Rivets, Wire Nails, etc.**

"We might state that each issue of CANADIAN MACHINERY is looked forward to by our superintendents, and, in fact, by everybody in our factory who can get hold of it.

"We consider the information given in it has been most valuable to us, and we have been able to make many improvements in our factory from suggestions which we have seen in your paper."

## **This letter is from the owner of a large foundry making Steel Castings and War Munitions**

"Weekly we look forward with pleasure to receiving CANADIAN MACHINERY, and we wish to heartily congratulate you upon the extremely interesting and excellent articles which appear in your paper.

"They have, no doubt, been of great benefit to many manufacturers doing work similar to our own, which is that of making munitions of war.

"For some time we have read with pleasure CANADIAN MACHINERY, and it seems to us that its value increases weekly."

## **This letter is from a manufacturer of Hoisting Machinery, Steel Tanks, Boilers, etc.**

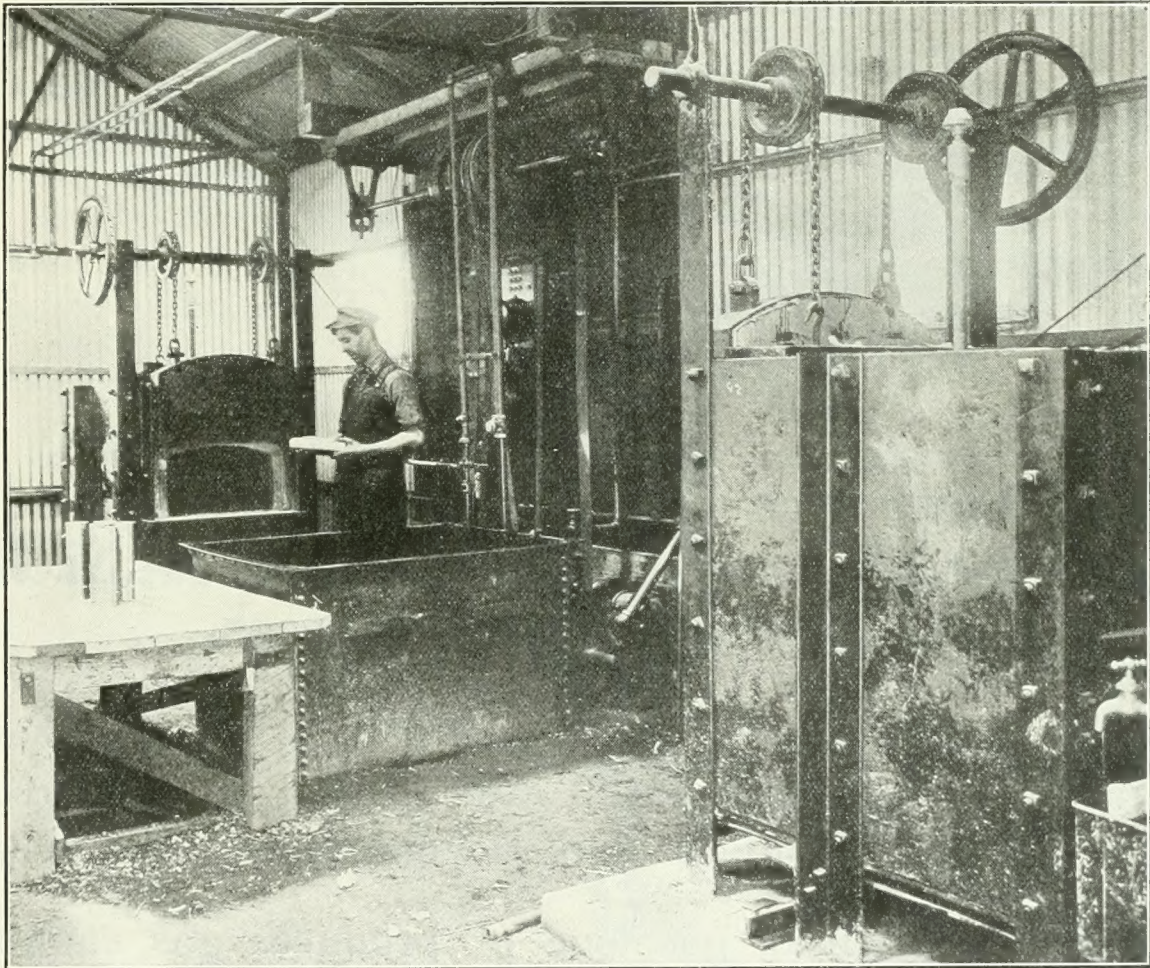
"We would like to say that we consider CANADIAN MACHINERY a splendid medium for the dissemination of new methods of manufacture. It has been of considerable benefit to us, and we believe that in the shell world the ideas it has put before the manufacturer intending to take up the production of munitions have been of incalculable benefit, and the cause of saving of thousands of dollars in experimentation."

CANADIAN MACHINERY  
143-153 University Avenue TORONTO



# HEAT-TREATING FURNACES FOR SHELL WORK

**"MECOL" FURNACES** especially designed for this work  
are giving entire satisfaction with **OIL, GAS, and other fuel**  
DESIGNED AND BUILT IN CANADA



**Mechanical Engineering Furnaces installed in plant of A. B. See Elevator Co., Montreal**

‡ Shell, Howitzers and Cartridge Cases must be accurately HEAT TREATED for successful manufacture.

‡ See our Special Continuous Furnace for annealing Brass Cartridge Cases before buying your equipment.

‡ Largest manufacturers have them in use. Full particulars on request.

*All Furnaces designed and built under personal supervision of F. DITCHFIELD, "THE FURNACE MAN."*

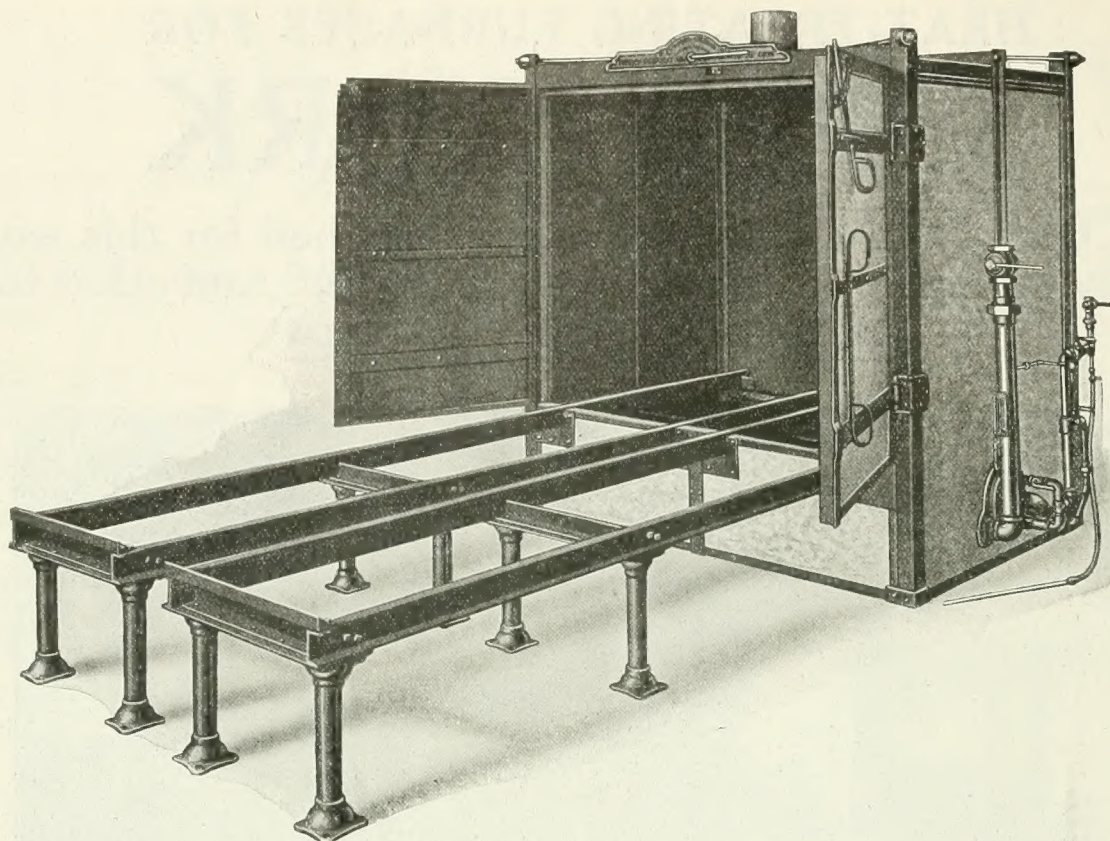
## Mechanical Engineering Company, Limited

55 COTE STREET, MONTREAL, QUE.

PHONE—MAIN 3585

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





**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., U.S.A.

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

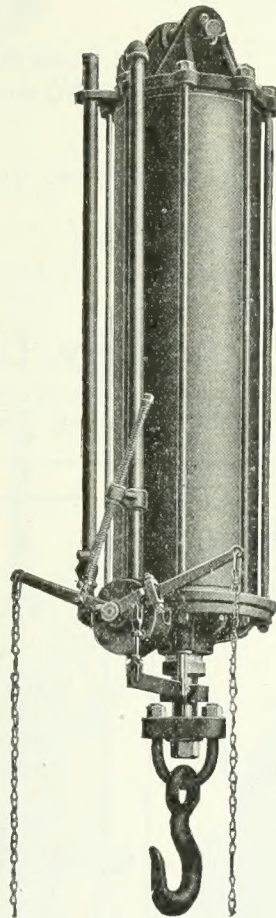
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# QMS AIR HOISTS MADE RIGHT—PRICE RIGHT

MADE IN  
SEVEN STYLES

ANY CAPACITY  
UP TO 28,500 LBS.



SEND FOR BULLETIN

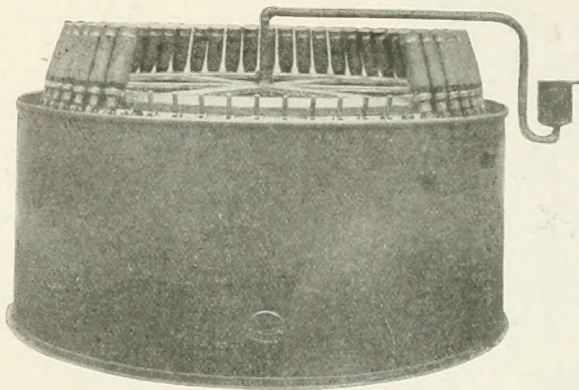
## THE QMS COMPANY

SALES AGENTS  
VULCAN ENGINEERING SALES COMPANY  
2061 ELSTON AVE. CHICAGO, U.S.A.  
AGENT FOR  
HANNA ENGINEERING WORKS, J. C. BUSCH CO.  
MUMFORD MOLDING MACHINE CO.

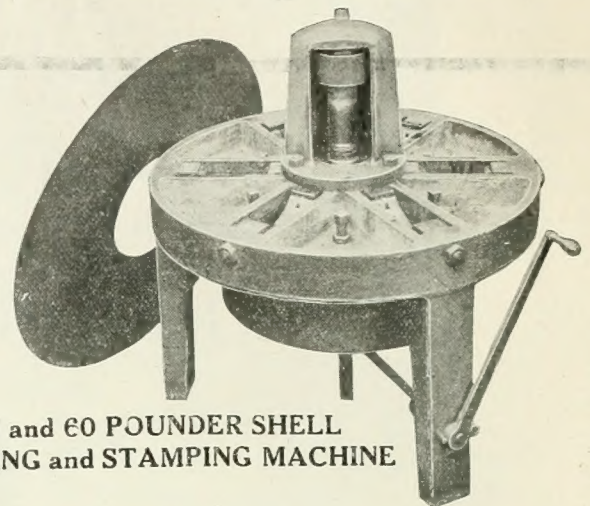
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## Shell Painting, Nosing and Banding Machines



**PAINTING MACHINE**



**4.5 and 60 POUNDER SHELL  
BANDING and STAMPING MACHINE**

**SIMPLICITY:** That is the beauty of these machines; they are so simple that a woman or even a child can control them. This is an important feature in reducing operating expenses.

Banding Press is sold without stamping attachment if desired.

Painting Machine is operated with an ordinary air drill, and, if desired, a heating coil under table, enclosed in a sheet steel shell, can be supplied, as shown in cut.

**Canadian Locomotive Company, Limited, Kingston, Ont.**

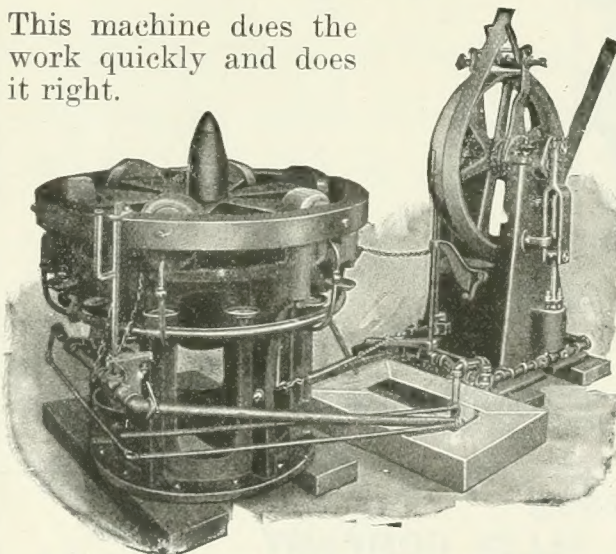
SALES HANDLED EXCLUSIVELY BY

The John Bertram & Sons Company, Limited, Dundas, Ontario, our agents for these machines

### 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.

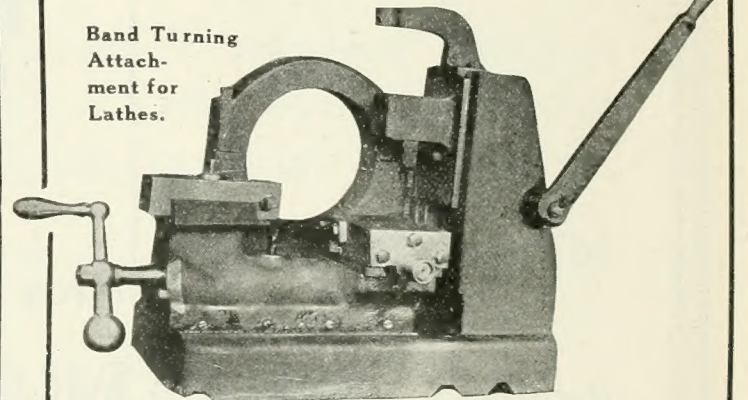
We also manufacture machines for setting wagon and carriage tires, cold.

Please address all communications to our Rochester Office

**THE WEST TIRE SETTER COMPANY**  
ROCHESTER, NEW YORK

### 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 Shrapnel 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.

WRITE FOR PARTICULARS.

**LYMBURNER LIMITED**

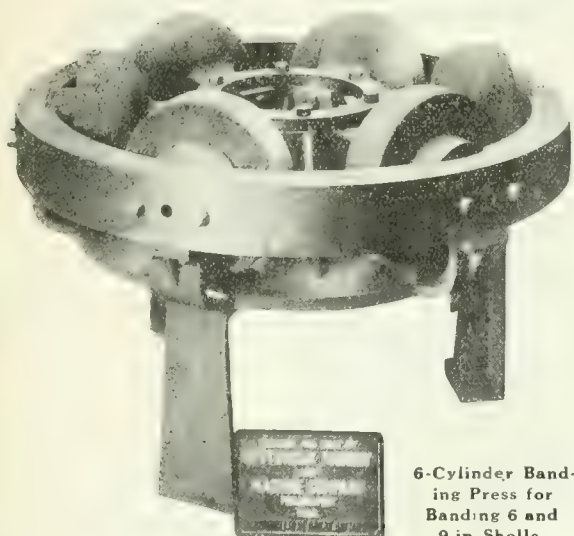
5-15 Commissioners St. Montreal, P. Que.

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# SOUTHWARK

## HYDRAULIC PRESSES



6-Cylinder Banding Press for Banding 6 and 9 in. Shells.

All Types and Sizes

For	For
Flanging,	Banding,
Forcing,	Piercing,
Cupping,	Drawing,
Extruding,	Forging, Etc.

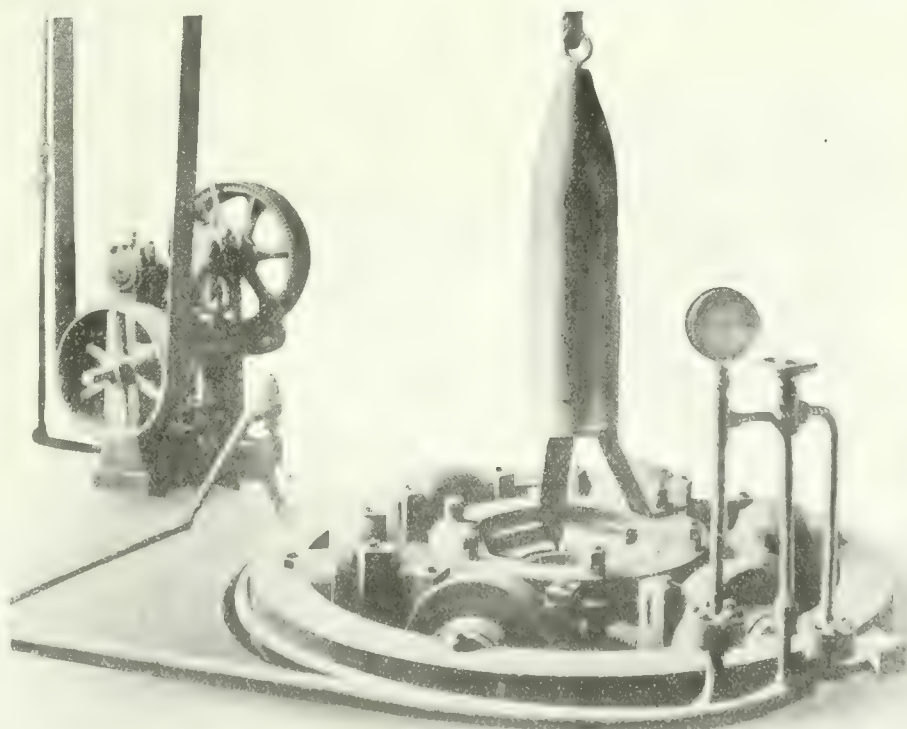
Accumulators and Operating Valves for Hydraulic Systems.

WE here illustrate our 6-Cylinder Banding Press for Compressing Bands on Shells.

We have patterns for banding up to 15-inch Shells. These Presses can be operated either with an individual pump or from an accumulator, or with a hydraulic pneumatic intensifier where air pressure is used for intensifying the water pressure in the press cylinder.

In writing for information, or quotation, please advise width and thickness of bands and diameter of shells to be banded and power available.

CONSULT US ABOUT HYDRAULIC MACHINERY FOR PURPOSES.



6-Cylinder Banding Press for Banding 12 and 15 in. Shells.

Write for bulletin 5 MP.

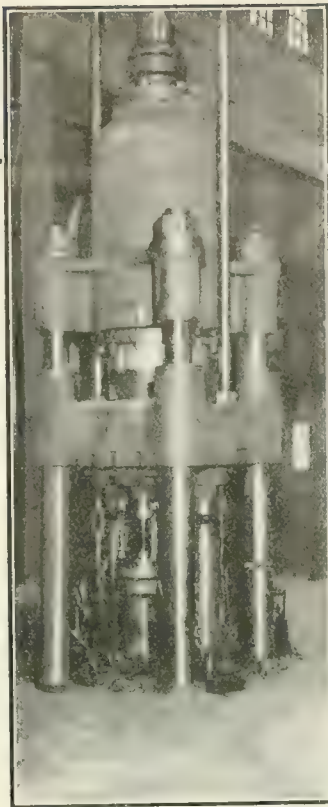
### SOUTHWARK FOUNDRY & MACHINE COMPANY

OLD COLONY BUILDING  
CHICAGO

PHILADELPHIA, PA.

BROWN-MARX BUILDING  
BIRMINGHAM

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PIERCING PRESS

# Hydraulic Presses

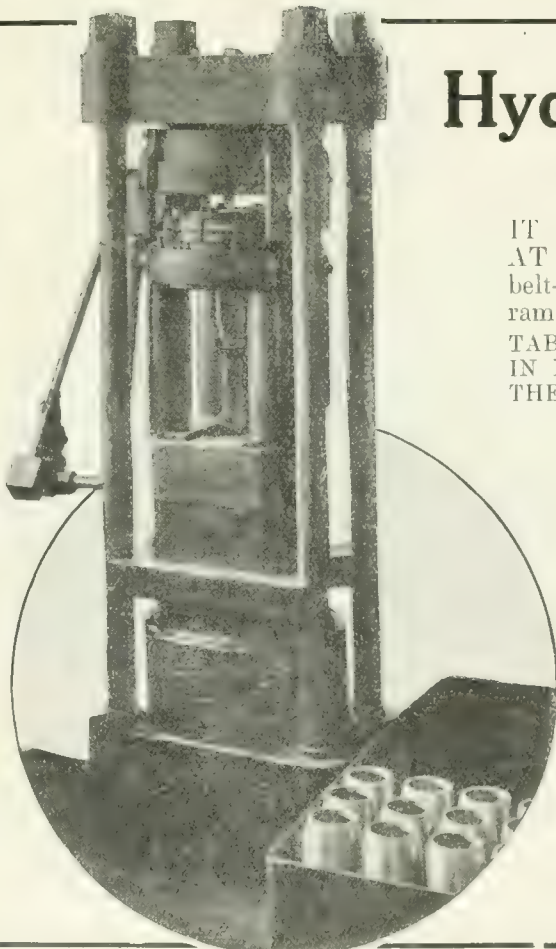
for

## Shell Manufacturing

We are making  
**HYDRAULIC PRESSES**

for Piercing and Drawing  
**Shells and Projectiles**  
and are in a position to give  
**Prompt Delivery**

**The William Cramp & Sons Ship  
and Engine Building Company**  
PHILADELPHIA, PA.



## Hydraulic Banding Press

### That Enlarges Shell Output

IT IS A STRONG, SIMPLE AND RELIABLE MACHINE AT LOW COST. Power is obtained from continuous running belt-driven pump located near the press and is applied to the ram underneath the table.

TABLE RISES AND FORCES STEEL TAPER WEDGES, EIGHT IN NUMBER, UP INTO THE HOLLOW STEEL FORGING AT THE TOP. THE WEDGES CONFORMING TO THE SHAPE OF THE COPPER BAND ARE THUS PRESSED IN EQUALLY AGAINST SAME. PRESSURE IS THEN RELEASED AND THE SHELL READILY TAKEN OUT.

Operates by lever shown on left-hand side.

Pressure gauge behind.

As this machine is a Standard Hydraulic Press, it can be used in any other capacity.

We also manufacture **LOADING FUNNELS, BALL-BEARING TIGHTENING NUTS, BELT-DRIVEN LOADING VIBRATORS, BENCH VISES,** and a universally endorsed **BALL-BEARING ELEVATING TRUCK.**

We shall be pleased to submit prices and give any particulars required.

**The Chapman Double Ball Bearing Co.**  
OF CANADA, LIMITED

339-351 Sorauren Ave., TORONTO, CANADA

Transmission Ball Bearing Co., Inc., 1407 West Ave., Buffalo, N.Y.

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

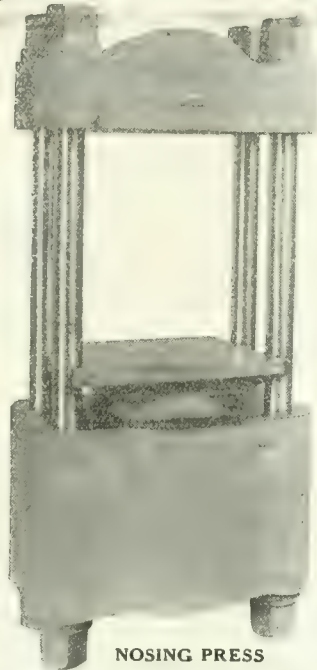


# PRESSES

**Pumps  
and  
Accumulators**

**FOR ALL  
PURPOSES**

**Made in  
Canada**



NOSING PRESS

**WILLIAM R. PERRIN, Limited  
TORONTO**

**A Combination of Rigidity, Accuracy, Simplicity and Ease of Operation**



Bodies are inclinable and convenient for handling dies and material. Slides are long and well gibbed.



**Inclinable  
Power Presses**

reduce the maintenance cost of both machine and tools.

**Built in eighteen sizes.**

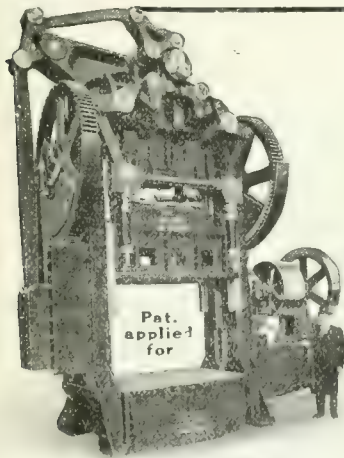
Adapted for many operations in the manufacture of tin cans, pieced tinware, metal packages, brass goods, electrical goods, trimmings, etc.

Catalog 2-G, describing them, sent on request.

*Visit our exhibit at the Panama Pacific International Exposition, Machinery Palace, Block 16.*

**E. W. Bliss Co.,** 20 Adams Street, Brooklyn, N.Y., U.S.A.

CHICAGO OFFICE: 622 West Washington Boulevard  
DETROIT OFFICE: Dime Bank Building



## The Simple, Practical Toggle Mechanism on "TOLEDO" Toggle Drawing Presses

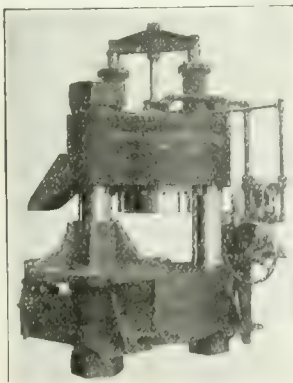
stands absolutely unequalled in efficiency and smoothness of action—in the uniform pressure of blankholder—in the consequent elimination of wasters.

Perfect timing insures safety to operator and silent running.

The scientifically proportioned parts—massive and durable—form a whole that successfully meets all service conditions.

Single and Double Crank—60 sizes—6,550 to 400,000 lbs. wt.

**The Toledo Machine & Tool Co., Toledo, O., U.S.A.**



## 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.*

# SHELL EQUIPMENT

**Hydraulic Presses.** Accumulators and pumps for piercing and drawing blanks. Any size.

**Lathes.** Standard Engine, Turret, Single Purpose with attachments.

**Thread Chasers** for Sockets, Plugs and Gains.

**Drills.** Duplex and Single.

**Cutting-Off Machines.**

WRITE FOR PRICES AND DELIVERIES

## GARLOCK—MACHINERY

197 WELLESLEY STREET, TORONTO

Telephone, North 6849

# A MODERN SAVER

of Time, Money, Space and Labor

Here is a machine that is well worthy of your attention — our "Double C Punch and Shear" with 48-inch throat.

This machine has an enormous capacity for doing rapid, accurate and economical work of quality.

Let us send full description. If you are interested in up-to-date money-saving machinery you cannot afford to remain uninformed.

We manufacture a complete line of

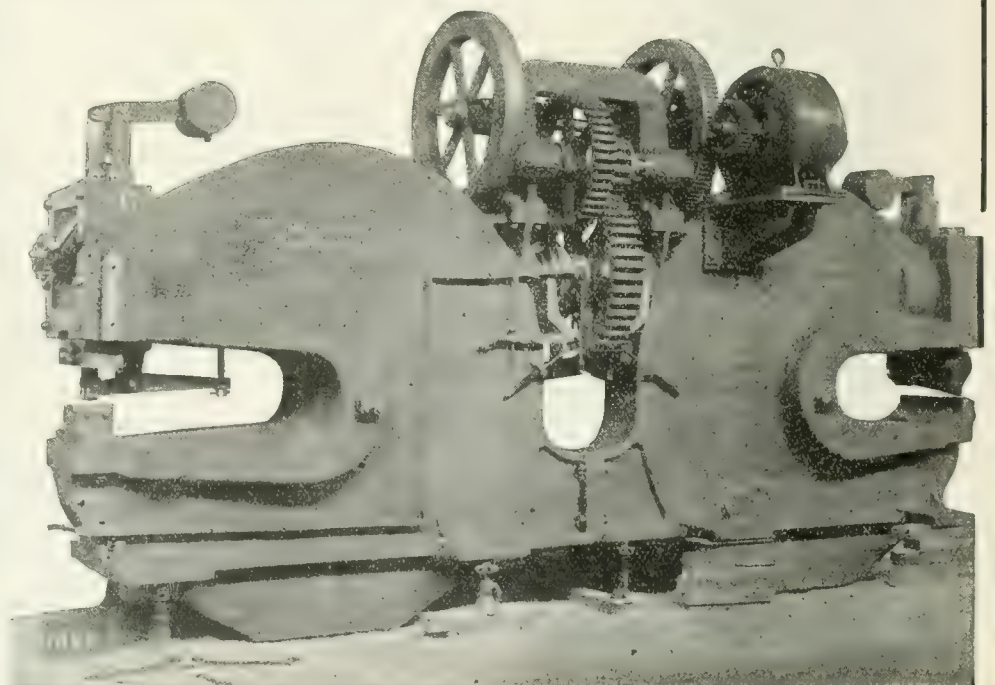
### LABOR-SAVING MACHINERY

all kinds and sizes, for

Structural Iron Works, Railroad and Locomotive Shops, Boiler Shops, Rolling Mills, Agricultural Implement and Plow Shops, etc

**The Long & Allstatter Co.**  
HAMILTON, OHIO

Canadian Representatives  
**RUDEL-BELNAP CO.**  
Montreal, P.Q. Toronto, Ont.



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



# KEMPSMITH

## MILLING MACHINES

Embody the following three distinctive features of construction, which make them unusually rigid and convenient in operation:

### Keyed Overhanging Arm

This patented feature provides for positive alignment of arbor and boring bar, and prevents the cutter being pounded out of line under cut.

### Keyed Spindle Nose

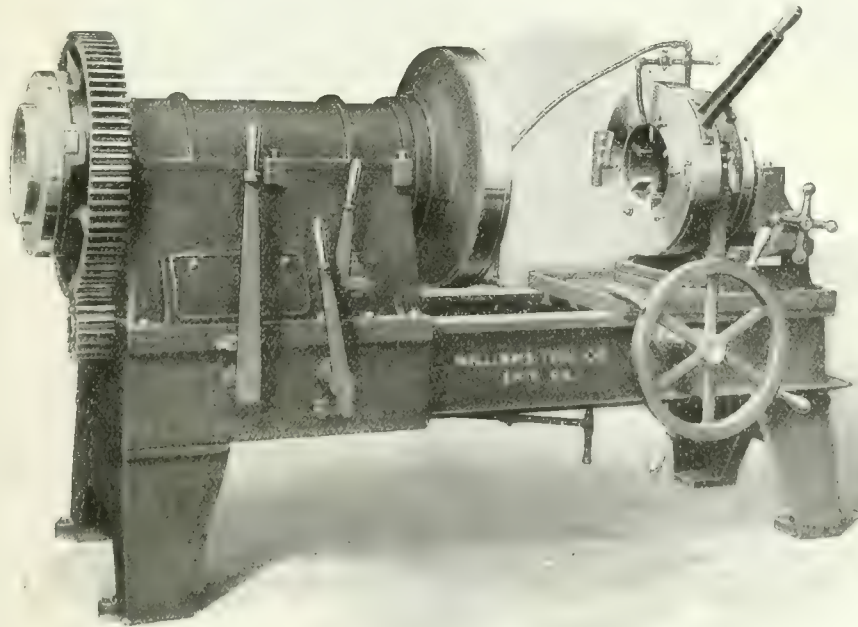
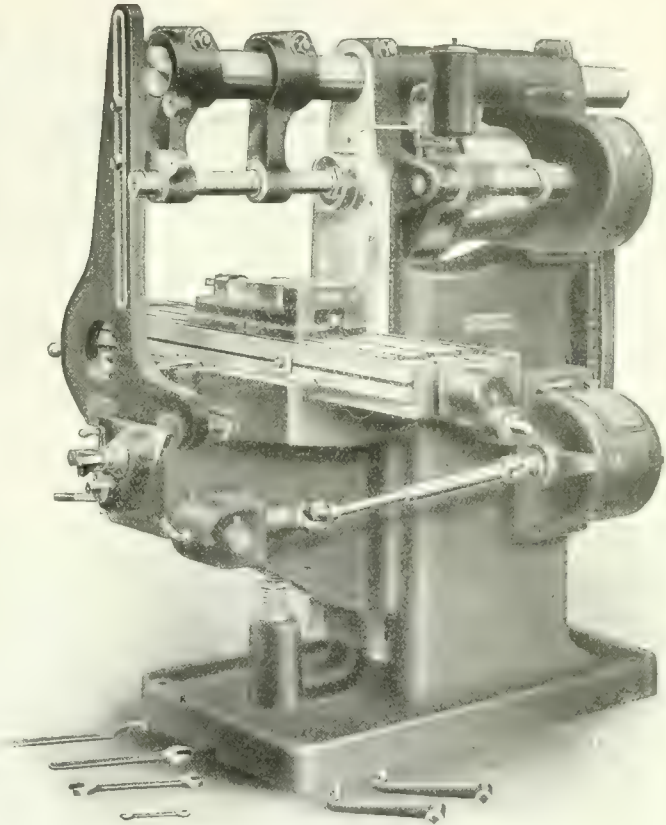
Our patented spindle nose is slotted for positive drive of arbor, and also permits the use of either right hand or left hand face milling cutters.

### Reversible Outboard Support

Outboard support is a rigid one-piece casting, reversible according to direction of cut. It leaves ample room for the operator to handle his work.

Catalog explaining this and other features gladly sent on request.

**KEMPSMITH MFG. COMPANY**  
MILWAUKEE, WIS.



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, and machine to cut 40 sizes of pipe between 1 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.**

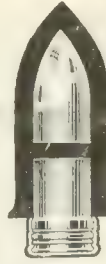
AGENTS:

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

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Quick  
Deliveries  
Guaranteed



# AMALGAMATED AMMUNITION - MACHINERY

Speed  
Strength  
Simplicity

## Has Rapidly Become the Standard for Large and Small Shells

For trimming, straight and form turning, straight and form boring, drilling, reaming, pocket forming, tapping and facing shells of High Explosives and Shrapnel.

Our machines are designed to supplant heavy duty lathes, drilling machines, etc., on duplicate work demanding the severest service and will meet such requirements most satisfactorily.

They have many applications possible other than in the manufacture of ammunition, and will prove highly valuable in every shop doing repetition work.

**In enquiring it will facilitate a full and satisfactory reply if you will kindly give all possible details of your requirements.**

## Amalgamated Machinery Corporation

72 West Adams Street, Chicago, U.S.A.

### Double-Quick Cutting-Off

THE HURLBUT-ROGERS CUTTING-OFF AND CENTERING MACHINE has the advantage of two cutting tools.

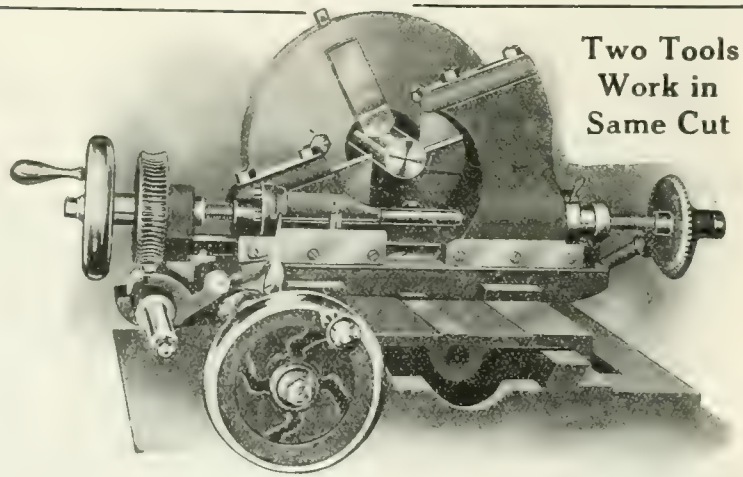
Each tool is rigidly supported in a stationary block at an angle which permits a strong shearing cut.

WITH THIS MACHINE PRODUCTION CAN BE NEARLY DOUBLED, and the utmost accuracy maintained under the hardest of work.

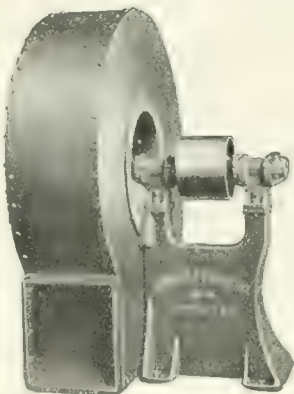
Read full details. Write for catalogue.

**Hurlbut-Rogers Machinery Company**  
South Sudbury, Mass., U. S. A.

FOREIGN AGENTS—England, Chas. Churchill & Co., Ltd., London, Manchester, Glasgow, Newcastle-on-Tyne.  
H. W. Petrie, Toronto, Canada.



Two Tools  
Work in  
Same Cut



### 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

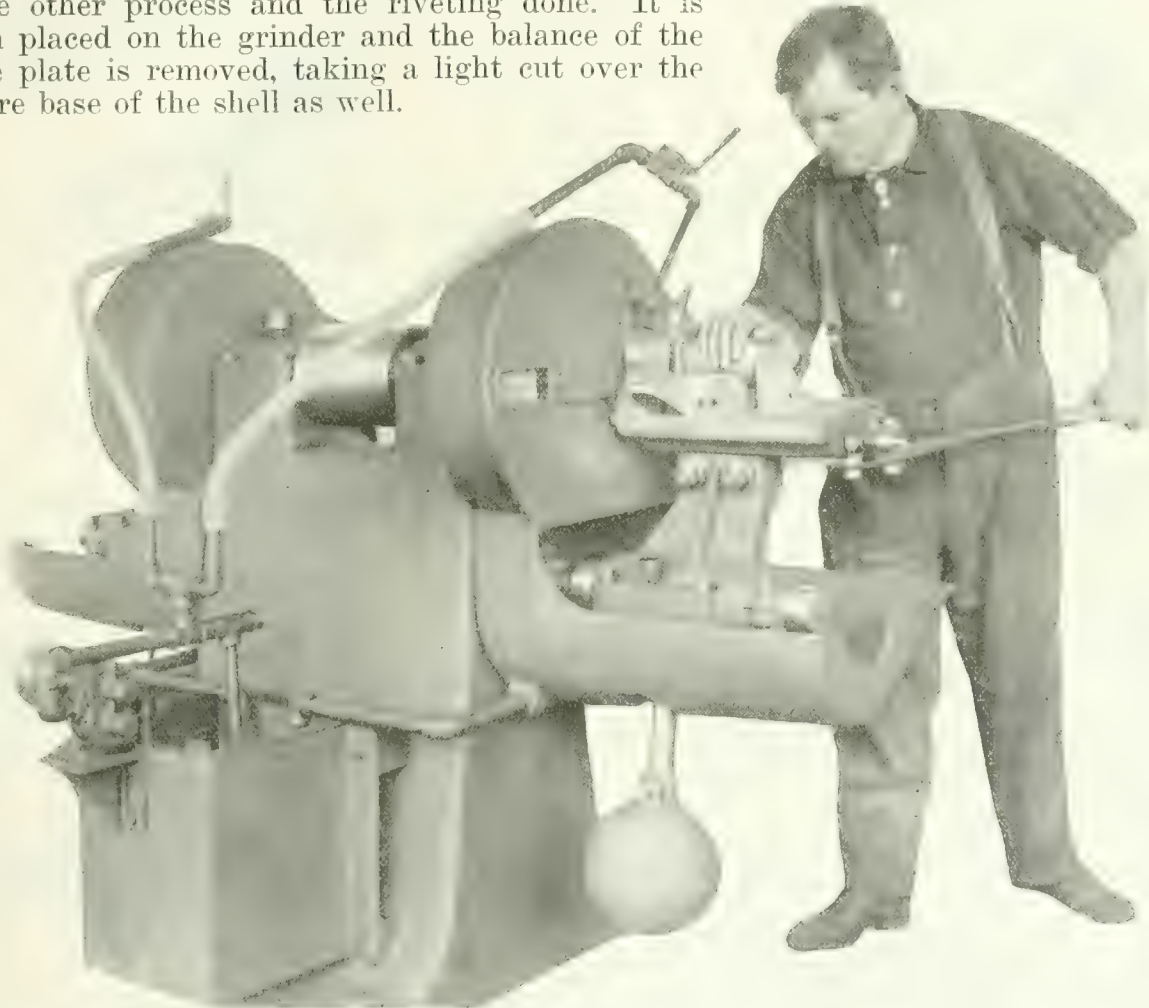
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# GRINDING ENDS OF SHELLS

We have developed a special Grinding machine for removing the hub or centre projection which has to be removed before the shell is completed.

There are various ways of removing this stock, but production is the essential factor. Our Grinder is also used for cutting off the square or angular hubs from High Explosive Shell base plates as well as from shrapnel casings. From a grinding standpoint, the operation is the same in both cases. In some instances the hub is removed by some other process and the riveting done. It is then placed on the grinder and the balance of the base plate is removed, taking a light cut over the entire base of the shell as well.



High-Grade Babbitt Bearings and Lever Feed.

Rapid clamping of Shell into "V" fixture.

Pump and water system driven from countershaft directs the water or grinding compound at point of grinding contact.

Can be equipped and operated at both ends for double output.

Output, according to size of projection to be removed, from 40 to 100 per hour.

Equipment includes two 16" Perfection chucks, two 16" abrasive ring wheels, two semi-universal lever feed work tables, two shell-holding fixtures, water and pump, with connections; countershaft and usual attachments.

Weight, 4,500 lbs.

## FEATURES

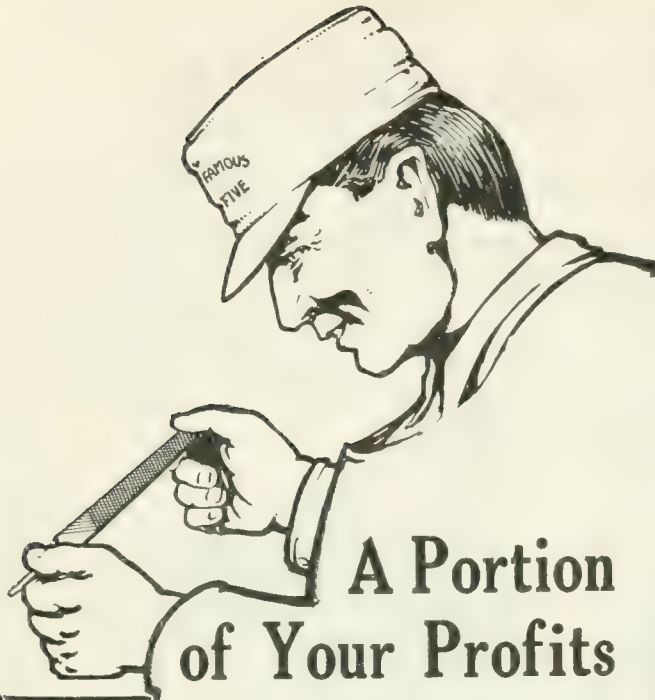
The Gardner Co. also build a No. 50 Grinder which is much heavier and more powerful than the one illustrated herewith. The large grinder is being adopted by manufacturers of 6" Shells for these same operations.

For further particulars write

**The Gardner Machine Company, Beloit, Wisconsin**

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





## A Portion of Your Profits

is being thrown away by allowing your men to use their files too long.

When a file becomes half worn it naturally takes longer to do its work.

Who and what suffers?

You lose money by paying your men for lost time—

Time is lost on completion of the job—

The work suffers through being done with inefficient tools—

And the workmen get slack.

The obvious remedy is to educate your workmen to throw away their files when they become half worn. The money saved in time and labor offsets many, many times the small cost of a new file.

And the files to buy are those used by 90% of Canada's file users:

## KEARNEY & FOOT GREAT WESTERN AMERICAN ARCADE GLOBE

*(Made in Canada)*

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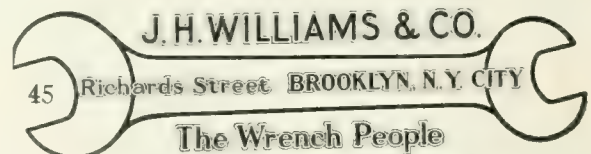


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## Williams' "VULCAN" 100% Safety Lathe Dogs



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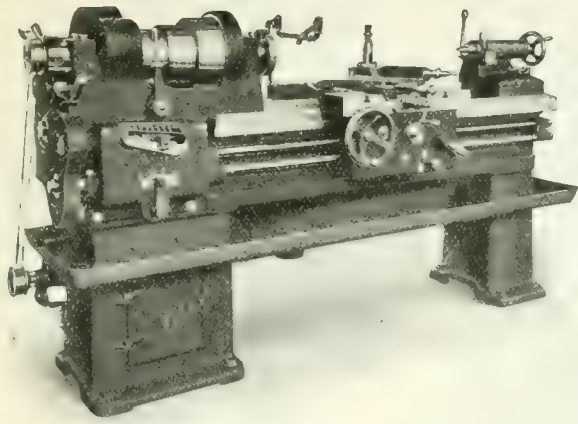
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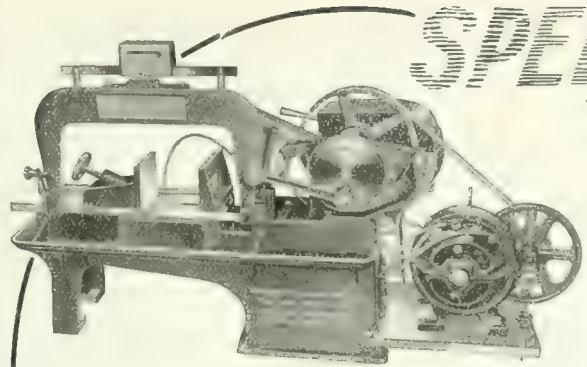


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DOUBLE BACK GEARED  
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Grand Rapids, Michigan, U.S.A.



**SPEED**

**and a clean, straight cut**

If you're interested in speed and accuracy you'll be interested in the

**Racine Metal Cutter**

It goes through angle irons, channels, I-beams, die blacks, pipe, tubing, heavy bars, etc., in a way that wins the enthusiastic endorsement of all users. It is in use in many Canadian shops. One Canadian Steel Company purchased 120 Racine Metal Cutters and has effected a saving of \$11,019.50, full particulars of which will be given interested parties.

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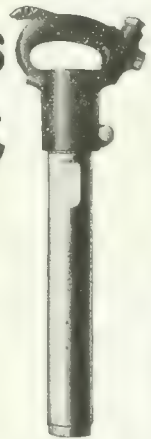
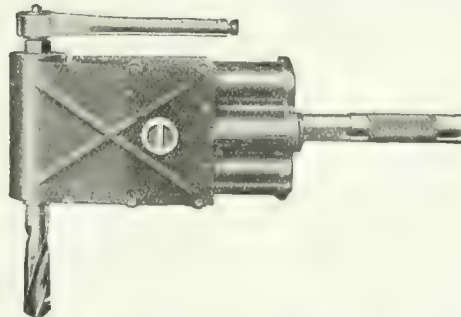
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Fitted with either Inside or Outside Throttle Lever as preferred. They are made in several different sizes and weights for all classes of work. The Riveting Hammers have a range in rivets from 1/4 inch to 1 1/2 inches.

**CLEVELAND CORNER DRILL For Close Quarter Drilling**



The Body of the Cleveland Corner Drill is in one piece with cylinders and valve chambers cast integral which insures absolute alignment of working parts.

The Driving Crank is mounted upon Annular Ball Bearings which reduce friction to a minimum. Made in two sizes, Nos. 38 and 49, with Nos. 3 and 4 Morse Taper Sockets.

Either size machine will drill or ream within 1/8 inch of side wall or corner.

IN STOCK:—Sand Rammers, Bench and Floor, Portable Emery Grinders, Air Drills, etc.

**BOWES AUTOMATIC AIR HOSE COUPLINGS**  
Over 1,000,000 in general use

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- ¶ They are interchangeable in all sizes commonly used.
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**Cleveland Pneumatic Tool Co. of Canada, Ltd., 80 Duchess St., Toronto, Ont.**

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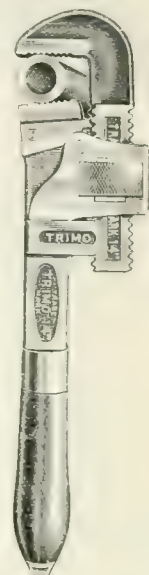
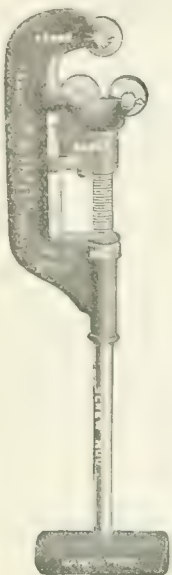


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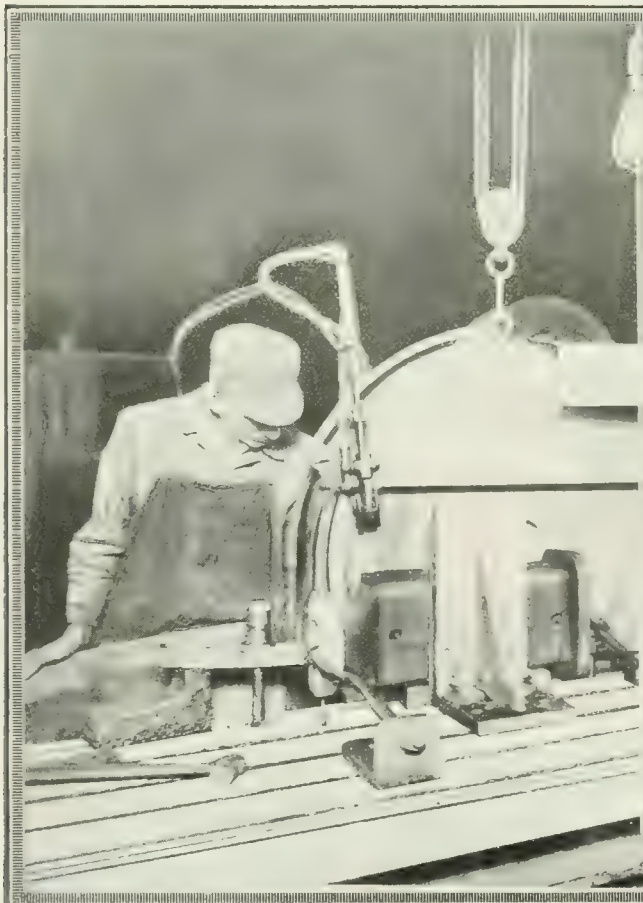
Showing the Official Award Ribbon of the Medal of Honor awarded TRIMO

TOOLS at the PANAMA-PACIFIC INTERNATIONAL EXPOSITION.



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## The Story of an Increased Production

**W**ITH a certain make of wheel they were grinding 2,100 large gray iron castings in a Syracuse plant. A Carborundum service man studied the grinding conditions and specified a Carborundum wheel of a definite grit and grade. Now, with the right wheel in the right place, they are grinding 3,900 castings under the same conditions. The Carborundum Wheel cuts faster, cleaner, shows longer life.

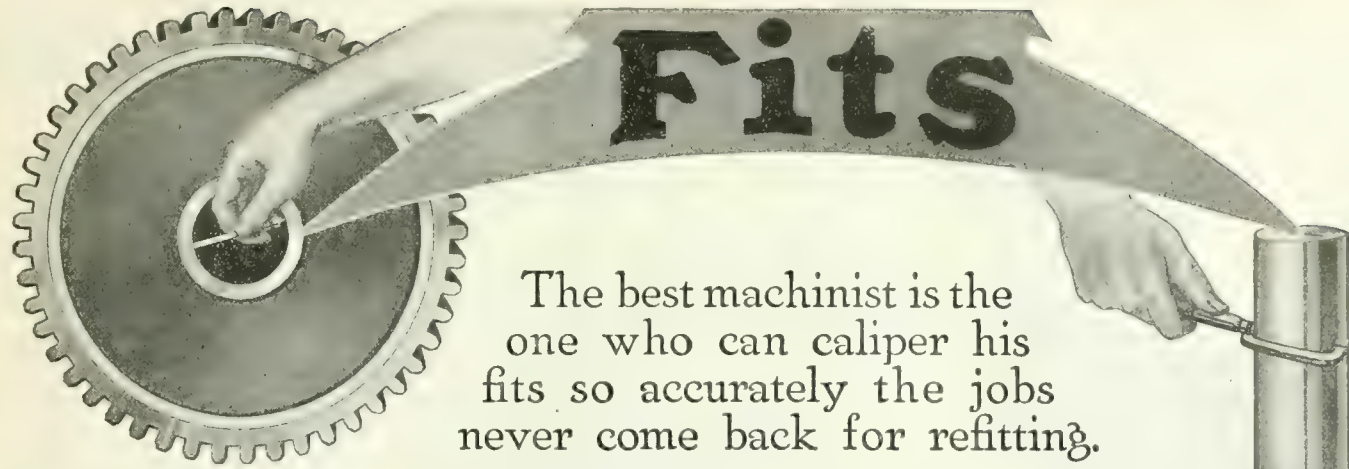
*Carborundum Service will help you to better bigger grinding results*

**THE CARBORUNDUM COMPANY**  
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The best machinist is the one who can caliper his fits so accurately the jobs never come back for refitting.

The limits of tolerance are so small that the greatest accuracy is required. In forced fits 1-1000 of an inch is the limit allowed. This means the machinist must place great dependence upon his instruments.

# Starrett Tools and Instruments of Precision

are absolutely true and are designed for quick, easy adjustment.

For example—the Starrett quick adjusting micrometer can be instantly opened or closed to any point within its capacity. This saves time and combines speed with accuracy. Starrett Tools are well known as standard by all expert machinists and engineers.

2100 styles and sizes—including micrometers, vernier calipers, dividers, combination squares, steel tapes, hack saws. We deal direct with hardware stores. Write for free catalog No. 20-3 terms and prices.

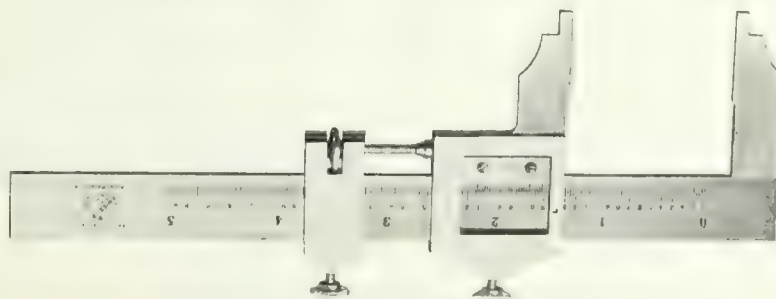
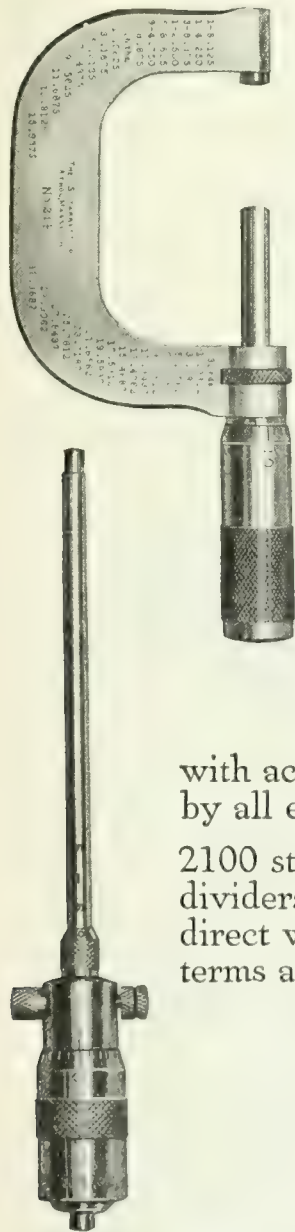
**The L. S. STARRETT CO., Athol, Mass.**

*"The World's Greatest Tool Makers"*

NEW YORK

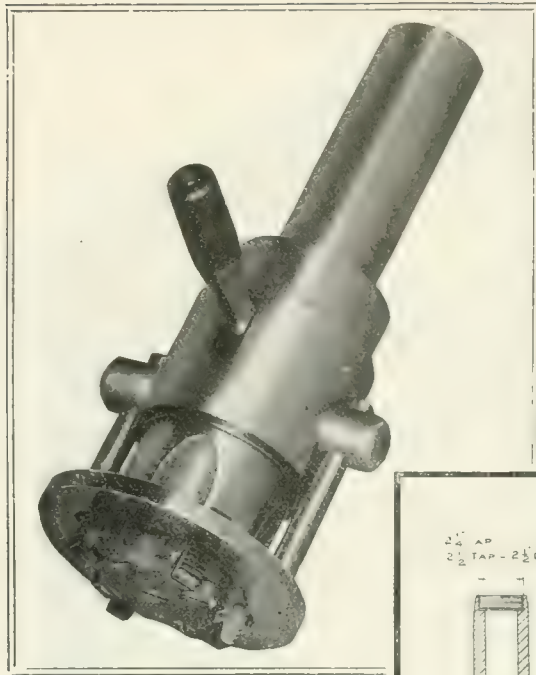
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# “Murchey” Tools

are threading successfully  
all types and sizes of

## High Explosive Shells

English, French, Italian,  
United States and Russian.

### LARGE SHELLS

of 9.2" and  
12" diameter

are calling for improved  
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Tools to produce them.

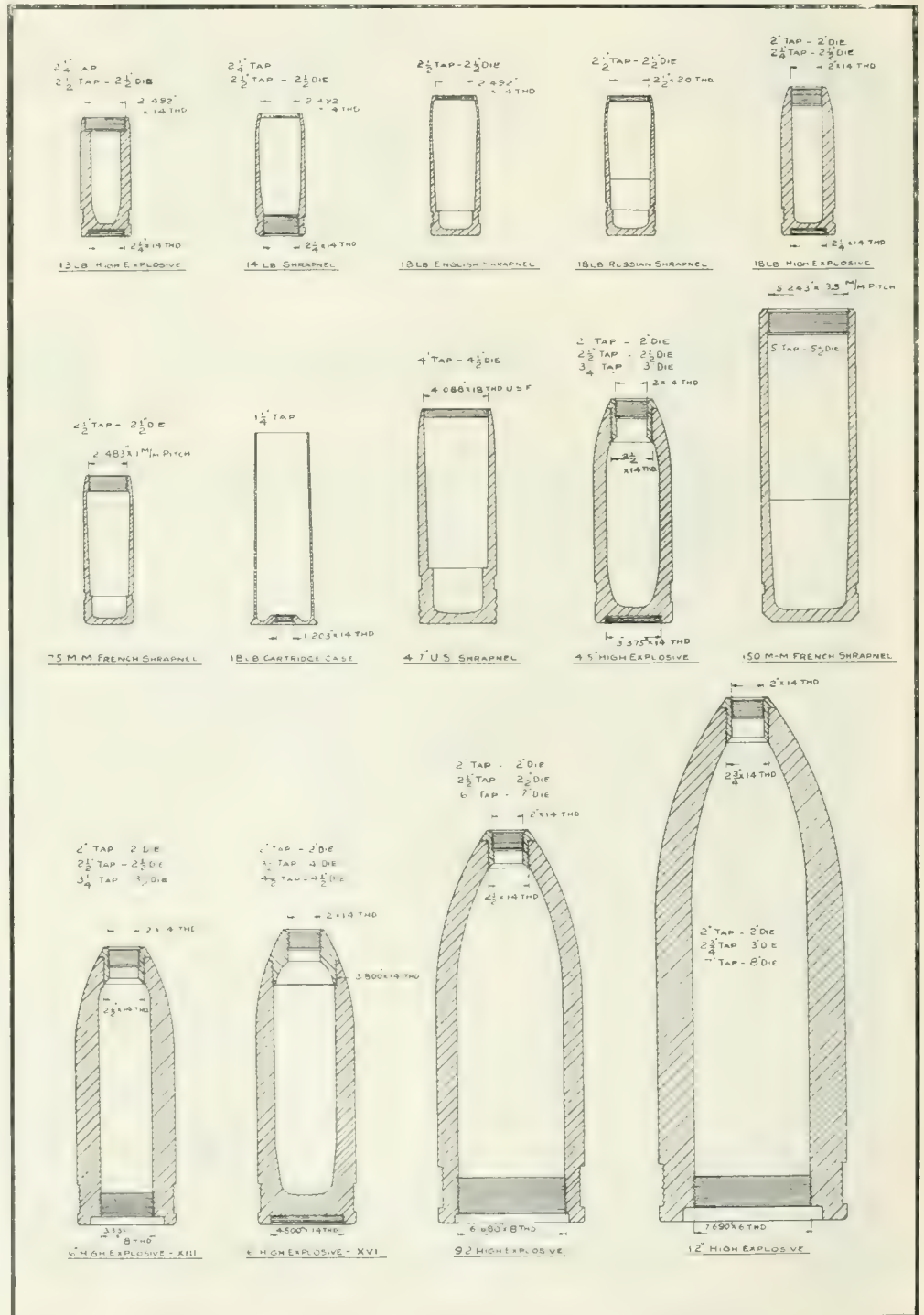
### Murchey Service

which means Murchey  
Collapsing Taps and  
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doing this work NOW in  
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sults.

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quote you on the neces-  
sary tools.

### Murchey Machine & Tool Company

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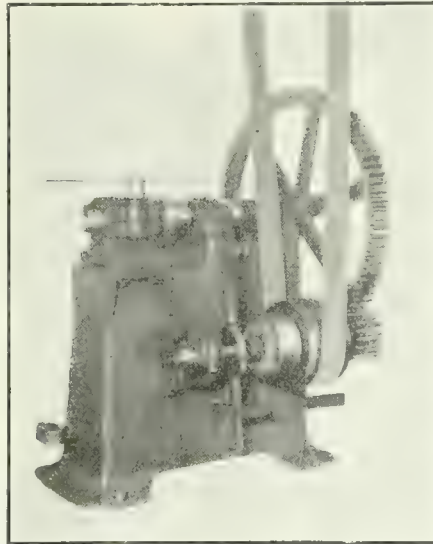
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# Holden-Morgan Mechanical Plug Wrench

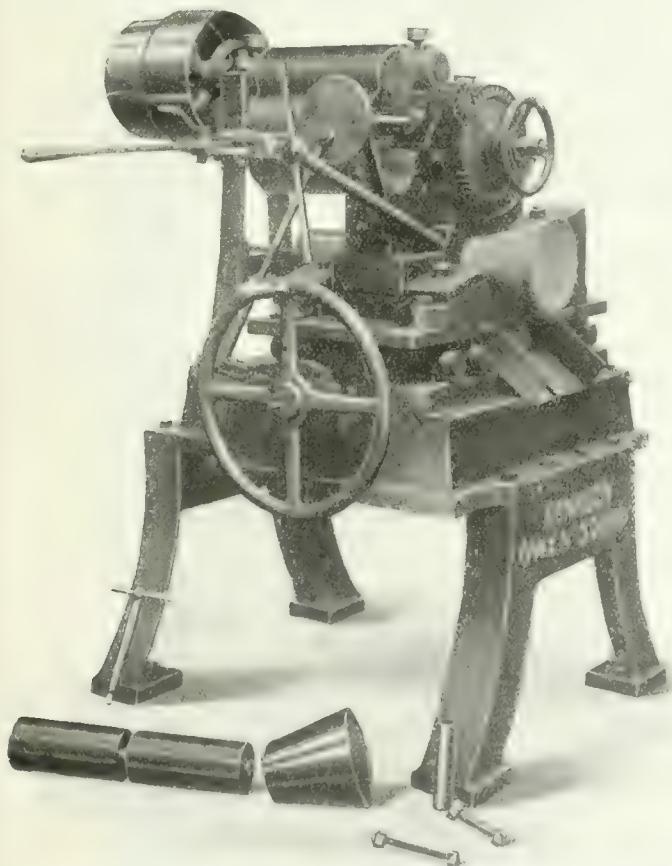
*For Screwing the Base Plugs Into Shells*

Output 120 per hour. One machine with an operator will do the work of four men. Friction device adjustable, and can be set for any required tension, and when set the pressure applied will not vary from the desired adjustment.



Direct driven, no countershaft needed. The plug is screwed in and tightened up entirely by mechanical action, and therefore eliminating the variations that result from hand work.

**THE HOLDEN-MORGAN COMPANY, LIMITED**  
539 RICHMOND STREET WEST, TORONTO



## CUTTING-OFF MACHINES

### Quick Delivery

For cutting off and trimming 4.5" to 9.2" Shell Blanks and Forgings.

Floor space approximately 4 ft. square.

Will cut crooked and short ingots. No loose collars to put on billets.

1 Helper to every 3 or 4 machines.

THE W. W. BUTLER CO., Limited  
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THE  
**Wm. Kennedy & Sons**  
LIMITED  
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## 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 30 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.**

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Where a belt is subjected to extreme conditions of



**DUST, HEAT,  
ACID, MOISTURE**

the durability of Leviathan-Anaconda belts, combined with their lower cost, places them in a class apart.

Let us help you solve your belting problems.

**Main Belting Co. of Canada**

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## BEATH HOISTING AND CONVEYING MACHINERY

Overhead Runways  
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Power Ash Hoists,  
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Gravity Roller and  
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We Are Installing

## BEATH OVERHEAD TRACKS, TROLLEYS AND HOISTS

For Hoisting and Conveying

**5-in., 6-in., 8-in. and 9.2-in. Shells**

in the receiving, forging, machinery and shipping departments. Beath Overhead Runways require no floor space and are particularly adapted for this service.

The weight of these Shells have caused a new problem in handling that will have to be met and overcome by manufacturers of these heavier types of explosives

*Let our engineering department show you how a Beath Overhead Runway can be made to fit into your requirements.*

**W. D. Beath & Son, Limited**

ENGINEERS AND MANUFACTURERS

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# Exposed to Acid Fumes



**S**INCE July, Nineteen Fourteen, this Spartan Belt has been pumping sulphuric acid fumes from the pickling room at the plant of the Halcomb Steel Co., Syracuse, N.Y.

The corrosion, as seen in the photograph, around the blower, indicates the action of the acid fumes and gives some idea of the unusual service conditions under which the Spartan Belt has operated.

This belt has not only withstood exposure to acid fumes for more than a year, but during that time has operated with absolutely no protection from weather extremes.

Notwithstanding the abnormal service conditions existing, Spartan has given perfect satisfaction, which is pretty convincing evidence that this Belting is impervious to conditions which quickly ruin ordinary belting. Why not Spartan Belting as a solution of your transmission problems?

## THE GRATON & KNIGHT MFG. CO.

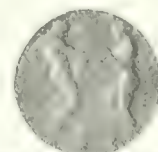
Oak Leather Tanners and Belt Makers  
WORCESTER, MASS., U. S. A.

Representatives in Canada:

THE CANADIAN FAIRBANKS-MORSE COMPANY, LIMITED  
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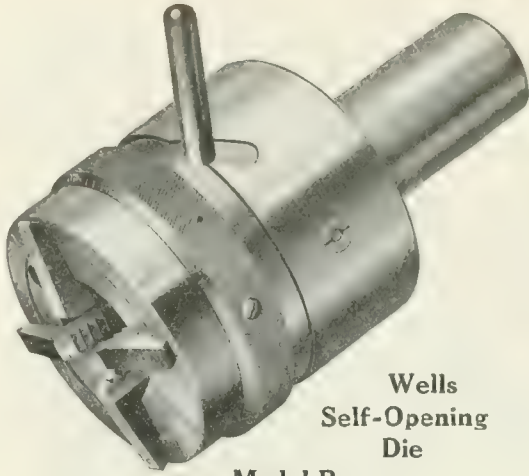


At the Panama-Pacific Exposition we received Gold Medal of Honor, the highest award granted leather belting manufacturers for the excellence of their products.



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Wells  
Self-Opening  
Die  
Model B.

We want to send you the booklet describing the different models. Are you willing to try the W.S.O.D. in your shop under your own conditions?

# W. S. O. D.

We call it the "universal die" because there is not a screw-cutting machine manufactured on which it will not fit.

Its very appearance attracts and holds you—you instinctively know it will do the work—and it will.

It is the simplest and most efficient of all automatic opening die heads.

## WELLS BROTHERS COMPANY OF CANADA, Limited GALT - ONTARIO

Sales Agents:

The Canadian Fairbanks-Morse Company, Limited, Montreal, Toronto, Vancouver, Winnipeg, St. John, Calgary.

Wherever it is essential to obtain big production without sacrificing accuracy or finish—where the output from a long line of machines depends upon the selection of the correct grinding wheel—where grinding is closely studied there you find

## NORTON GRINDING WHEELS

### Alundum

for steel and steel alloys.

### Crystolon

for cast iron, brass, bronze, etc.

Canadian Agents:  
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Co., Limited

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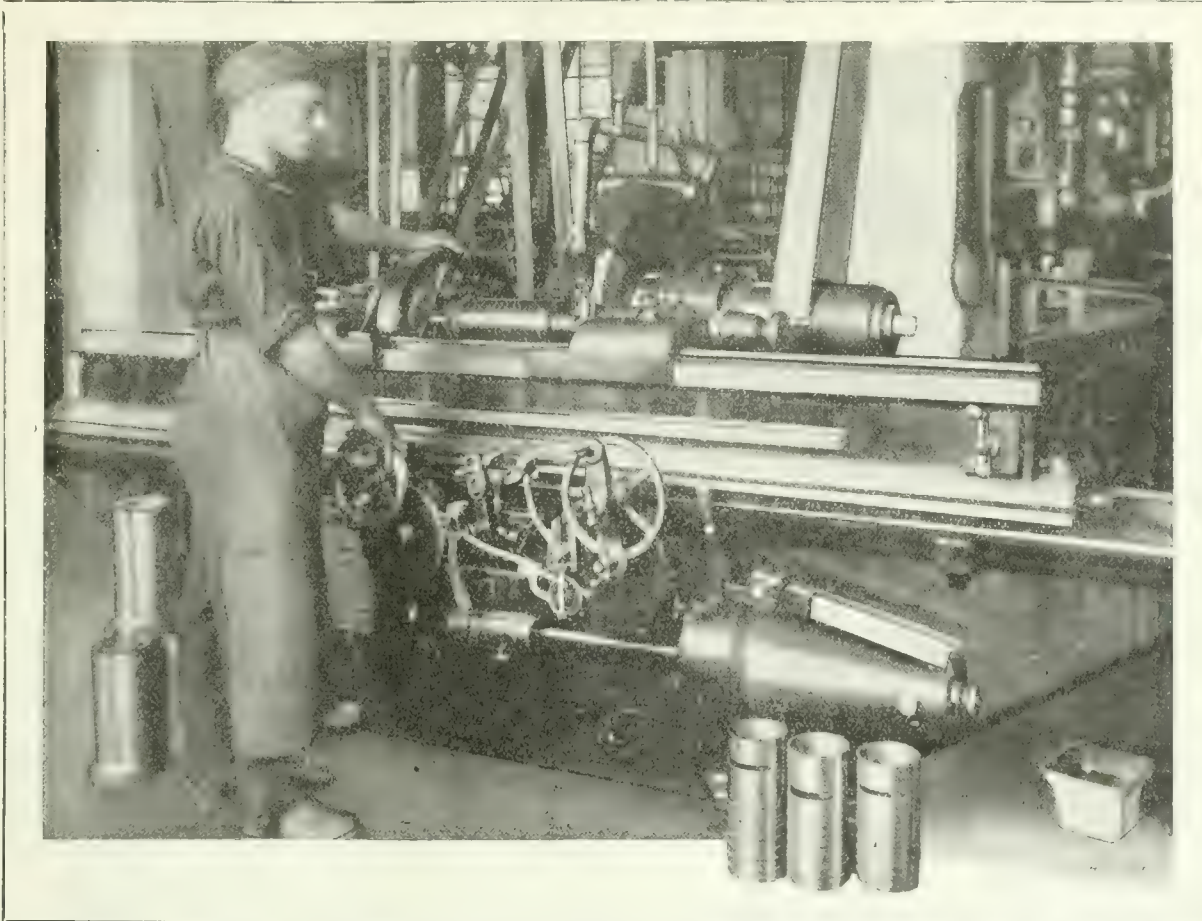


## NORTON COMPANY

WORCESTER, MASS., U.S.A.

742





Grinding sliding sleeves for Willys-Knight Motors on a Norton Plain Grinding Machine. Material, special cast iron, because of the thinness of the sleeves. Finished, outside diameter, 1.022" by 11-17/32" long. Amount of material removed .015 to .018. Time required 15 minutes each. Limit .0005".

## Difficult and Accurate Work Is the Real Test

Norton grinding machines are proving their superiority in every line. If your work is of a more difficult nature than the above, we would like to know it.

One of the best proofs that we have, of the worth of Norton grinding ma-

chines, is the fact that manufacturing plants, as they grow in size and importance, add other Norton grinding machines as part of the equipment.

There is a Norton grinding machine suitable for your work. We are ready to show you its advantages.

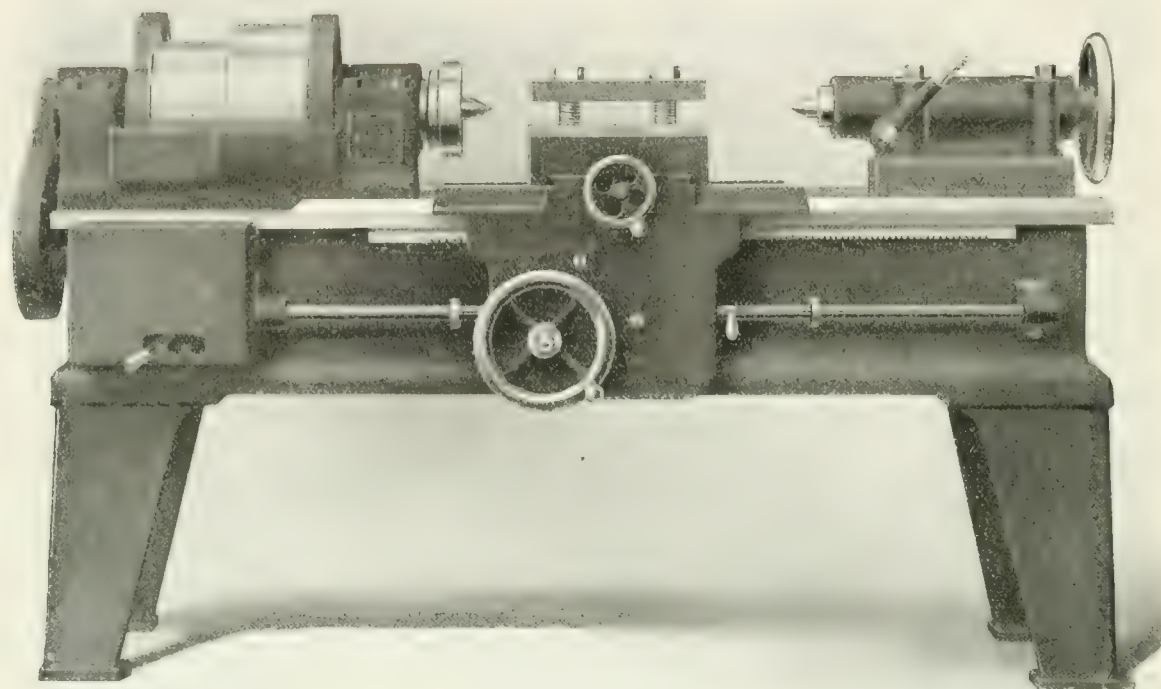
# Norton Grinding Company

## Worcester, Mass.

Canadian Agents:

THE CANADIAN FAIRBANKS-MORSE CO., Montreal, Que.; Toronto, Ont.; Vancouver, B.C.





## This Lathe Will Rough Turn and Bore 6" Shells and Finish Turn Up as High as 8" and 9.2" Shells

The Fairbanks-Morse Manufacturing Lathe in the 16" size has taken so well with manufacturers throughout the country that we have developed a larger lathe along the same lines, with a 20" swing.

This lathe will turn and bore high explosive projectiles up to 8 and 9.2 inches. It will also be found highly efficient for general manufacturing work.

Like the Fairbanks-Morse 16" lathe, it is built from patterns of a much heavier lathe, cut down to a 20" swing, materially adding to the rigidity and convenience of operation.

### 20" Fairbanks-Morse Lathe

#### Specifications

Dia. of Spindle	5"
Swing over bed	20"
Swing over carriage	14"
Distance between centers	40"
Ratio of back gearing	6.25 to 1
Dia. of tailstock spindle	3½"
Travel of tailstock spindle	8"

### 16" Fairbanks-Morse Lathe

#### 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
Dia. of tailstock spindle	3½"
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.

## The Canadian Fairbanks-Morse Co., Limited

St. John, Quebec, Montreal, Ottawa, Toronto, Hamilton, Winnipeg,  
Saskatoon, Calgary, Edmonton, Vancouver, Victoria

Canadian Departmental House for Mechanical Goods

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



# Large Shells : Production Problems and Possibilities--IV.

By C. T. D.

*In preparing to undertake the production of large shells up to 9.2 in. dia., manufacturers will encounter problems of a nature altogether different from those connected with 18 pdr. shells. Automatic machinery will not be so applicable to the larger sizes, and productive ability will centre largely on such points as sequence of operations, tooling methods, etc.*

**T**HE operations referred to in group C present no great difficulty. The principal dimensions and surfaces by which the work is to be held, driven, located or measured have already been established and these operations call for little remark further than indications as to chucking and driving methods.

Operation C 1 can be performed to advantage in any available drill press. A tubular chuck of generous dimensions is accurately located under the drill spindle. This chuck is made with one half hinged to open like a door to admit the shell from the side and avoid having to lift it up and lower it endwise. While the

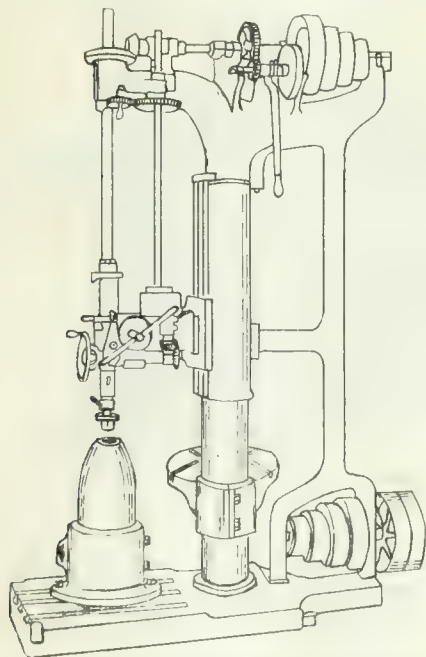


FIG. 9. TAPPING NOSE IN DRILL PRESS

catch-bolt is being tightened, the shell should be shaken so as to ensure its being held perfectly vertical. This may be further insured by relieving the side walls of the chuck so that it grips the shell at the top and bottom of the parallel portion.

A service plug is now inserted in each end of the shell. These plugs should be accurately made to gauge size and hardened. In order to save time later, the nose plug may be made in the form of an eyebolt, or if desired, it may have a substantial boss, preferably of square shape, through which a shackle bolt may be passed.

The simplest form of driving plug for the base end would be provided with a square boss to engage with a driver in the face plate of the lathe. Turning the

efficiently performed on a machine specially fitted up for this operation. Owing to the slight differences in centres and plugs, there may occur variations in the

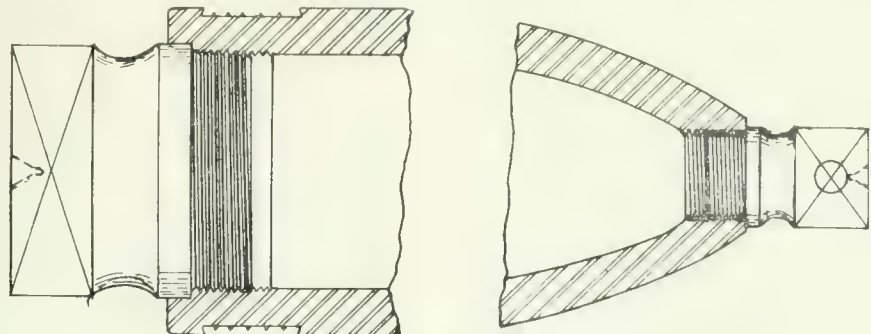


FIG. 10. SERVICE PLUGS FOR BASE AND NOSE.

shell to finished diameter, and forming the profile is accomplished with any of the numerous types of attachments already in use on small shells.

The base end of the shell having been previously faced, so as to bring the overall length of the shell within definite limits, this surface may now be used as a point from which to gauge the form

exact locations of successive shells necessitating the provision of means for adjusting the grooving and waving tools to suit. This is avoided by chucking the base of the shell, with the end positioning from a step in the jaws.

The shell is now ready to receive the driving band after the necessary chisel cuts have been put in the waves. The

### OPERATION TABLE.

Operation Number	Description.
<b>Group A.</b>	
1	Grind off scale on point, forming small flat
2	Place on expanding arbor which locates shell from inside, and positions it lengthwise from inside of nose
3	Face-off nose of shell to necessary thickness.
4	Drill centre with drill in tail stock, remove drill and adjust dead centre.
5	Rough turn body, commencing at nose and traveling to point where open end of shell is cut on.
6	Cut off open end of shell to length measured from nose.
<b>Group B.</b>	
1	Drill hole in nose, leaving stock for final boring
2	Chuck by nose with center and fit steady. Nose of shell in contact with gauge stop on chuck
3	Bore parallel portion with roughing and finishing cutters.
4	Form interior of nose or arch.
5	Finish overall length and counterbore. Tap base.
<b>Group C.</b>	
1	Tap nose.
2	Insert threaded driving plug centre in nose and secure in threaded plug centre in nose.
3	Finish outside to size and shape.
4	Machine and undercut groove. Wave ribs.
<b>Group D.</b>	
1	Press on driving band
2	Machine driving band.
<b>Group E.</b>	
1	Remove service plugs and assemble base plug and nose bushing
2	Face off base and finish bushing
3	Bevel interior and bake.

of the shell, the gauge and method of applying it being shown in Fig. 11.

To avoid undue complications on the carriage, grooving and waving are most

radial type of press with converging cylinders is best adapted for work on large shells. The nose gear which has been retained in place is now used for



suspending the shell from suitable tackle. The service plugs may be removed now or left in place till after the band is machined. As a matter of safety both for the operator and the finished band it is preferable to remove the base plug now, replacing it with the proper article. This procedure offers the opportunity of facing off the plate on the machine which turns the band, and if the shell has been thoroughly cleaned out previously, the service plug in the nose

will have prevented the entrance of any foreign matter, so that when it is removed, the shell may be varnished and baked without further delay.

#### Single Purpose and Other Special Machines

As previously mentioned, the operations referred to above are arranged with

is obtainable, both machines and methods will be considerably rearranged so that as facilities for increased output become available, the older type machines

market a line of special ammunition machines, in two sizes, one for shells up to and including 4.5 in., and the other from 4.5 in. up to and including 12 in. These machines are all that are necessary for all roughing and finishing operations where the work revolves against a stationary tool. Strength has been especially regarded in their design and they are amply capable of performing any service required.

For the larger size shells, four machines

have been designed, for turning, boring, drilling, and trimming. These are all single purpose machines, and are naturally more effective than ordinary lathes, drills, etc., on repetition work.

Two of the larger size machines are illustrated herewith. The No. 21 turning machine, see Fig. 12, weighs approximately 18,000 lbs. The carriage has



FIG. 11. GAUGE FOR OVERALL LENGTH AND PROFILE.

will be relegated to such minor operations as they are best suited for.

Single purpose machines for boring, profiling, thread milling, and band turning are being rapidly placed on the market, and with reasonable delivery, manufacturers in this country should be able to proceed with work on the forgings as soon as they are received.

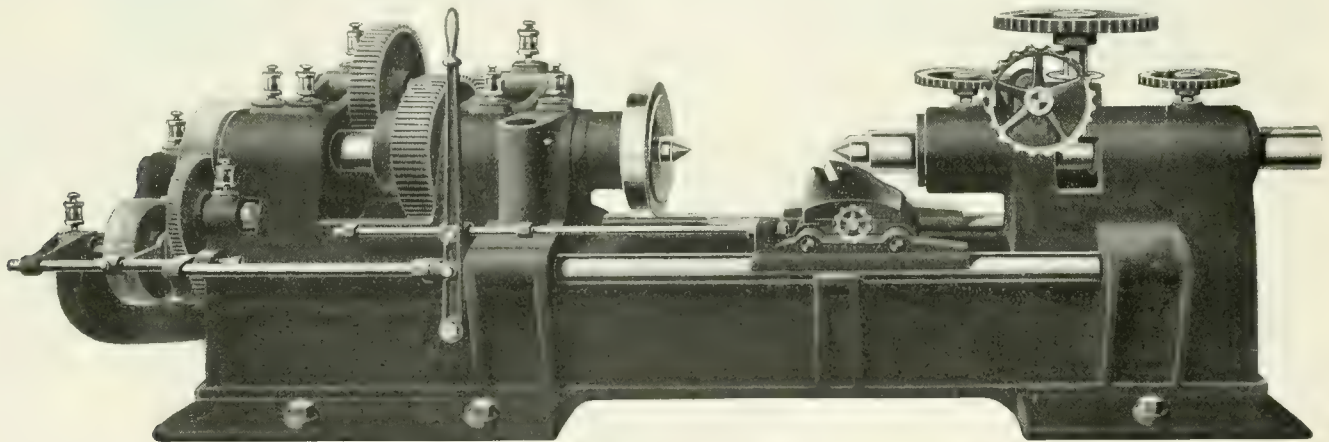


FIG. 12. SINGLE PURPOSE MACHINE FOR TURNING SHELLS FROM 4.5 IN. to 12 IN. DIA.

a view to making immediate use of existing machines. The economies to be affected by the adoption of special purpose machines will not be overlooked

Through the courtesy of various tool building concerns, it is possible to illustrate and describe some of the more interesting machines which have been de-

veloped for handling the larger sizes of shells. The Amalgamated Machinery Corporation of Chicago, have placed on the

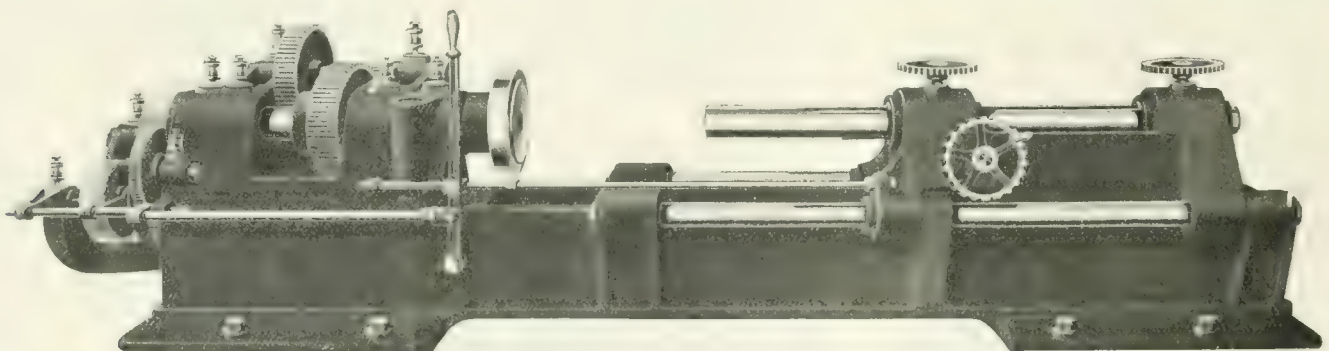


FIG. 13. DRILLING MACHINE FOR BORING LARGE SHELLS

by progressive manufacturers, and the foregoing methods will be adhered to just so long as they serve their purpose, in other words when special machinery

veloped for handling the larger sizes of shells.

The Amalgamated Machinery Corporation of Chicago, have placed on the

geared drive to the spindle, the gear reduction being 16 to 1. A choice of any one of nine feeds is offered, from .026 in. to .200 in. per spindle revolution. The



regular feeds are .031 in. for machines on finishing, and .059 in. on machines doing roughing operations.

A feature of the carriage operation is the independent quick return which is directly driven by belt to friction pulley on the feed screw, and this travel is independent of the spindle and may occur while the spindle and work are at rest. Both feed and quick return are at all times under the control of the operator by means of a single hand lever conveniently placed, and adjustable automatic limit stops are provided for the carriage travel in both directions.

The tool holder will take a 1¼-in. square tool, which is seated in a pocket machined in the tool slide at a suitable angle and inclination, so that forging and grinding on the tool are reduced to a minimum. The spindle, which is 5.15-16 in. dia. of high-carbon steel accurately ground, is furnished with plain nose, attachment face-plate, No. 7 Morse taper centre, plain or with any specified fixture sleeve shrunk on, at purchaser's option. These machines are regularly furnished with former attachment, and one former made to purchaser's requirements.

The tailstock proper is cast integral with the frame and headstock, and is provided with ample clamping facilities to maintain it perfectly rigid. The actual swing over ways is 27½ in., over carriage 13 in., and floor space required is 4 ft. x 17 ft.

The No. 23 drilling machine, Fig. 13, made by the same firm, is similar in general features to the machine just described, the driving gear and headstock being identical. The tailstock is replaced by a carriage having an extreme length of bearing on the ways of 67 in., and a travel of 44 in. Longitudinal feed by hand is provided, which may be operated alone, or at the same time as the power feed, to accelerate or retard the latter, the length of travel being 44 in.

An option of any one of fifteen different power feeds is offered, from .006 in. to .200 in. per revolution of spindle, while an independent quick return by 4-in. belt drive is provided. Two widely separated supports for 5.15-16 in. bar or tool holder with powerful clamping devices are provided on the carriage, which is properly aligned with the spindle. Ample thrust bearings are provided on the spindle and feed screw. The general dimensions, capacity and weight of this machine are similar to No. 21, but the floor space required is 4 ft. x 21 ft., the increased length being due to the boring carriage. A detail in the design of these machines is the provision of a socket on the headstock to receive a crane mast for handling the shells.

### OIL LEAKAGE FROM RING-LUBRICATED BEARINGS

THE leakage of oil from a ring-lubricated bearing may be due to several causes. Sometimes oil leaks through the horizontal keep joint of the bearing. The best remedy for this is to place a lead wire as packing in the joint. Bearings on large motors and generators often have a deep groove in the bottom half of the bearing, which groove, at both ends, communicates with the oil reservoir, and returns such oil as may have reached the joint by splashing out from the well through the motion of the lubricating rings.

Sometimes leakage will be observed along the shafting. It is important that there should be good clearance between the outer lip and the shaft, and if it is too close a fit it should be eased. If the oil still has a tendency to creep along the shaft, an oil-thrower can be made in halves and fitted on the shaft, or it may simply be a piece of steel wire bent round the shaft and clinched so that it will keep its position. Grooves in the bush will arrest the greater part of the oil, whilst the remainder is thrown off the collars. The keep may be fitted with an internal lip, which prevents oil splashing out through the joint.

Ring lubrication is very effective, as the oil is continuously lifted by the ring or the rings over the shaft, and finds its way into the oil-distributing groove, whence the film of oil between the shaft and the bearing is kept amply renewed. Care should be taken that the oil-carrying grooves are well rounded in the direction of rotation, to facilitate the entrance of the oil between the frictional surfaces.—T. C. Thomson.



**Autogenous Welded Joints.**—The strength of the joint produced by autogenous welding, it is pointed out in a paper on high temperature flames in metal working, has been a fruitful source of discussion in the application of the process, and many contentions have been advanced as to the necessity of welds of highest tensile strength. It was early found that 100 per cent. welds, or, in other words, those having a breaking strength equivalent to that of the metal itself, could be produced, but the sacrifice of elongation and reduction of area materially lessened the apparent value of such welds. Present practice is directed towards securing a weld of good tensile strength, as compared with the strength of the plate, with high ductility, since thereby the service conditions are better fulfilled. The growth in understanding of such requirements has resulted in the production of methods which, combined with proper apparatus, may uniformly produce these results.

### THE SUPER-GAUGE

NOT the least of the innumerable engineering problems raised by the war has been the production of a sufficient number of precision gauges to enable munitions to be built to the degree of accuracy demanded by modern warfare and its weapons. To land a shell within a few yards of the intended spot when firing from a concealed battery miles to the rear leaves no room for inaccuracy. The whole of the equipment has to be of the very finest design and construction, and the complexity of those methods of warfare which permit gunners to destroy defences which they cannot even see, introduces innumerable opportunities for error, and, therefore, makes yet more remarkable the extraordinary accuracy actually achieved.

Accuracy, however, is not and can not be easily secured. To take only a single link in the chain of things and events connecting the reconnoitring aeroplane with the destruction of the enemy's works by indirect gunfire, we have in the shell itself a remarkable engineering production consisting in its simplest type of a number of component parts, yet so perfect in its components and in its whole that hundreds of thousands of rounds can be expended with certainty of obtaining the desired results, however the shells be distributed between a thousand guns. Were it not so, warfare as we know it would be impossible, and it is not pleasant to contemplate the possible results of any inaccuracy in production. At the best it could only result in expenditure of ammunition to no effect, at the worst it might cause destruction of our own troops, incapacitation of our guns (by jamming), and even the loss of a minor or major action.

Such possibilities are not pleasant to contemplate, and to the uninitiated it might seem that the worst could so easily happen. In producing shells by the million, at a rate never before attempted, can we be sure that that tiny fraction of error which would spell tragedy or disaster shall never creep in? We trust and believe that we can. On the one hand, we have our best engineering firms making (inter alia) gauges for shop use, and on the other hand, we have the National Physical Laboratory passing under the seal of its authority a vast family of "super-gauges" for use by inspectors of munitions. Surely nothing defective could escape the close drawn meshes of this double screen. The responsibility resting on our engineers is indeed immense. It sobers one to think of it, but every human precaution is being taken, and if there are those who have been a little disheartened by the severity of requirements, let them remember that these requirements are literally essential.—Engineering Review.



# Lathe Centres, Their Design and Application Features

By H. C. Fogarty

*The necessity of maintaining lathe centres in a state of suitable accuracy is not always appreciated to an extent which their importance justifies. Opportunities for the application of special types of centres are more frequent than is generally supposed, and while a small expenditure of time and material is necessary to make them, the increased accuracy of the work produced and other obvious advantages more than repay any small initial cost.*

**T**HE importance of keeping lathe centres in perfect condition is a fact which most mechanics realize and few put into actual practice. Accuracy in lathe work chiefly depends upon the accuracy of centres and upon the

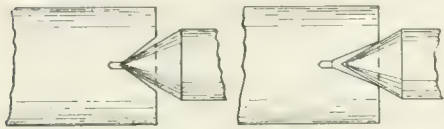


FIG. 1.

way in which the piece to be machined is centred.

### Springing Shafts in Lathe

One of the most common practices which tends towards putting the centres in such a condition that they become practically useless for producing accurate work, is the use of the lathe for springing on straightening shafts. This practice is more or less common in repair shops but also exists in many seemingly well regulated manufacturing plants. The constant pounding and jarring which the lathe and lathe centres, chiefly the lathe, have to withstand under such treatment, and the damage from the same must indeed be evident to every mechanic. A lathe which is used as a straightening machine, can never be depended upon to turn out an accurate piece of work, for the chances are that the centres will be considerably out of alignment.



FIG. 2.

It must be admitted, however, that this manner of straightening shafts gives excellent results—as far as the shaft itself is concerned—but why use a good lathe for accomplishing this end? If the shaft is badly bent or kinked a straightening press, if one is available should be first used and the shaft then tried between centres. If it still requires straightening it should be put in an old lathe—which most shops boast of—and the necessary work done.

### Heavy Cuts and Insufficient Lubrication of Centres

Another practice which proves costly to the centres, especially the dead centre,

is allowing the shaft to run “dry,” thus causing the centre to become cut and scored. The piece to be machined is generally put between centres, the dead centre having been first lubricated and brought up to bear with the desired pressure against the shaft. The lathe is now probably run at a high speed and a comparatively heavy cut taken, and before long it begins to “squeal.” The cause of this is evident. The shaft becomes hot under the heavy cut and high speed and expands thus binding against the centres. The lathe should never be run while the centres are squealing. The tailstock should immediately be released and the centre again lubricated with either oil or red lead the latter giving excellent results.

### Poor Centreing

Lathe centres are frequently put in a poor condition by the lack of common

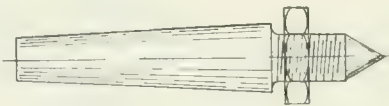


FIG. 3.

sense when the work is being centred. The centre must be drilled to a sufficient depth to clear the point of the lathe centre, and should be countersunk or reamed to the exact angle. The standard angle for lathe centres is 60°. This insures a perfect bearing on all points of the centre. The poor bearing surface which is obtained when the centres are reamed either above or below the standard degree may be seen by referring to the accompanying sketch, Fig. 1.

### Different Styles of Lathe Centres

It might be well to admit at first that the styles of lathe centres differ only in so much as the means of removing them

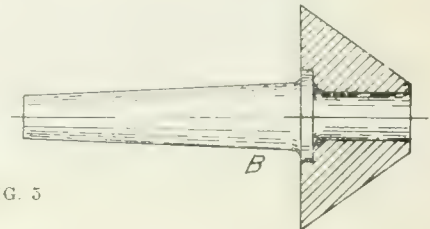
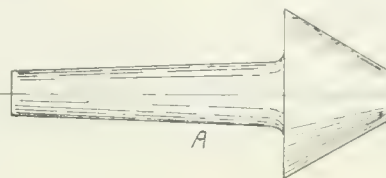


FIG. 5

from the spindle is concerned. Both the centre angle, which as was previously mentioned is 60°, and the spindle taper are standard. The taper used by the majority of lathe builders for their centres is the Morse standard. Among

other standards, however, are the Brown and Sharp, the Reed, and the “Jarno” tapers; the taper ranges in these from about 0.6 inches to 0.625 inches per foot.

### Removing the Centres

In order to remove the centres from the spindle some suitable means must be

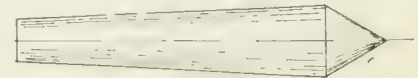


FIG. 4.

provided. As far as the dead centre is concerned it is usually removed by running the tailstock screw back to the limit thus forcing the centre out by means of the screw. In the headstock spindle, however, some other means must be employed. The old style of centre which had no means of being removed except by tapping it with a hammer or wrench until it became loose, has practically disappeared. This was a slow and expensive method at best, for the constant hammering on the centre had the tendency to gradually enlarge the hole in the spindle taper and put the centres out of alignment.

This old style of centre was followed by one which had a square or flat head, as shown in Fig. 2. This style is still used in many shops and it answers its purpose fairly well. To remove one of this style from the spindle, a wrench is placed on the square and by hitting the handle of the wrench a sharp blow, the centre becomes loosened and can be easily removed.

Still another style of centre is that shown in Fig. 3. This style is also used quite extensively, more especially on the older type of lathes. It is made as shown in the illustration, having the end

turned down for a short distance back and threaded, the threads being about 16 or 18 per inch. A nut is fitted to this thread. To remove the centre all that is necessary is to screw the nut up against the spindle. This acts similarly to a small



jack-screw, the tendency being to pull the centre out.

With the advent of the more modern lathes having a hollow spindle came the centre which is used now, most extensively. This is a plain centre as shown

**Special Centres for Drilling**

The lathe is often used as a drilling machine, the drill chuck and drill being held in the chuck of the machine. In such a case a drill pad or centre as shown in Fig. 6 is used for holding the work.

the methods just mentioned, but it is a practice that is not used in a great many instances. The V block is made as shown in the illustration Fig. 9, the base being planed to give a true bearing surface and the two Vs are machined

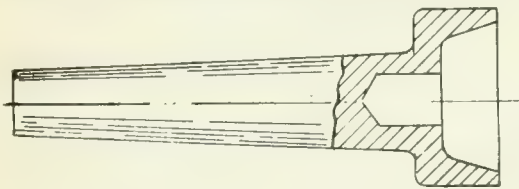


FIG. 6.

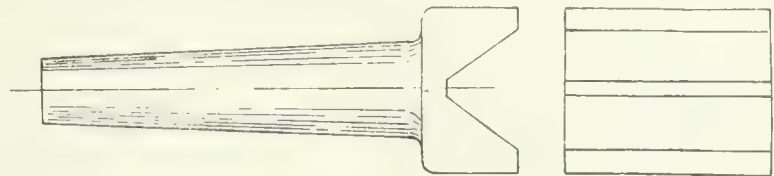


FIG. 7.

in Fig. 4. and to remove it all that is necessary is to insert a light bar into the back of the spindle and hit the centre a slight blow.

**Special Centres**

The centres which we have just referred to are all standard and are used only for straight or taper turning. Besides these there are several special centres in use but only a few of the more important will be mentioned here.

**Pipe Centres**

The pipe centre is one of the most common of these. It is often necessary on special jobs to turn or cut wrought iron pipe and if a plug has not been inserted in one end of the pipe a cone centre is used. Two other important styles of pipe centres are shown in Fig. 5. The one shown at A is turned from the solid; the angle of the bevel being about 60° for the smaller size of pipe, but for pipe of a large diameter a bevel angle ranging from 80° to 90° is advisable. As this style of centre is solid, the rough pipe end revolving on it soon cuts and scours it. The centre shown at B has proved itself most efficient for this particular line of work. The shank is made of steel and is turned down on the end to a suitable distance back leaving a sufficient shoulder or collar for the cone to bear against. The cone is usually made of cast iron and is bored to the size of the end of the shank, being a nice running fit. It might be stated that a fillet left in the shoulder of the flank would be more advisable than a sharp corner as it would insure a certain degree of strength to this part of the centre. When in use the cone revolves on

This centre needs no explanation, the hole being bored to any suitable size to take the work in hand.

Another style of drill centre is illustrated in Fig. 7. This centre is used chiefly for drilling holes through the

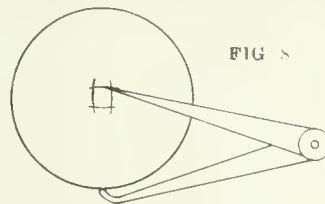


FIG. 8.

cross section of a shaft or bar. To insure that the hole to be drilled will be in the direct centre of the piece considerable care must be taken in laying out the V so that its centre line will be exactly in line with the centre line of the shank.

**Methods of Centreing**

Probably the most common method employed in centreing shafts is by the use of calipers or more preferably the "haemaphrodites," which are made in the combined form of a caliper and divider. In using these the end of the shaft is first chalked so as to show the clear markings, and the calipers are set to a distance slightly greater than the distance to the centre of the shaft. Scratch marks are made from four points on the circumference, the appearance of the markings being similar to those shown in Fig. 8. The centre is easily located between these marks by

in alignment with one another. The surface gauge and block with the shaft in place as shown, are placed on some level surface for instance the table of a planer and the end of the shaft is scratched as shown. The centre is then located by the same means as previously described.

**Self-Centreing or Bell Punch**

An excellent method of centreing is by means of the punch illustrated in Fig. 10. The cone is made of steel and is bored out, as shown, to a suitable bevel, preferably 60° to 70°. A hole is drilled through the centre of the bell casing, in which the centre punch slides. In using this punch all that is necessary is to place the bell or mouth over the end of the shaft and hit the centre punch a blow with a hammer. This gives an accurate centre providing care has been previously taken in holding the punch square with the work. If the punch was placed over the shaft in a tilted position as shown in sketch B, Fig. 10, the accuracy of the centre then marked could not be depended upon.

**Centre Square**

By the use of the centre square, which is included in every combination set, a method of centering either rounds or squares may be employed which is compelled to insure accuracy. No hesitation is necessary in saying that centreing by this method is the best and most economical in every respect. The body of the centre square as shown in Fig. 11, is a 90° angle and a slot is machined through it to take the sliding scale. The scale

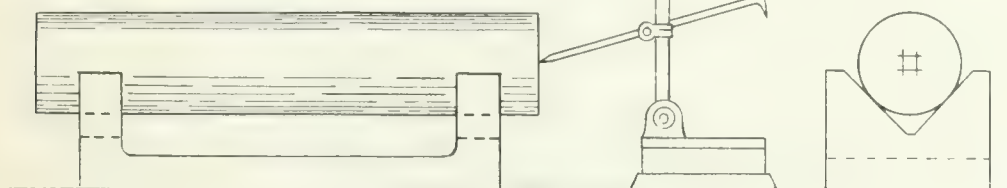


FIG. 9.

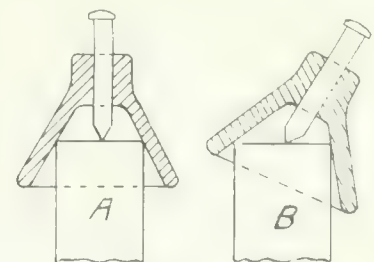


FIG. 10.

the spindle with the pipe thus eliminating the cuts and scores which are common to the solid style of centre.

means of a centre or prick punch. Centreing by means of a V block and surface gauge gives results similar to

is made with a narrow slot cut along its entire length, which engages with a lug in the body of the square. By this means

the scale can be adjusted to any length and is held in any desired position by tightening the knurl screw, which causes the lug to bind against the slot in the scale. All that is necessary in centreing with this tool is to hold the square over the end of the shaft as shown and describe a line. Move the square farther around on the circumference and describe another line. The point where these two lines intersect being the exact centre of the shaft.

**Lathe Centreing**

There are several methods of centreing work in the lathe, the most common practice being by means of the square centre shown in Fig. 12. The square centre A, has a taper turned to fit the spindle of the tailstock. A hole is drilled through its entire length, one end of which is squared in order to take the tool which is made from  $\frac{5}{8}$  in. or  $\frac{3}{4}$  in. square tool steel. This tool is ground to a  $60^\circ$  angle, and considerable clearance is given to the bottom side. This clearance enables the tool to enter the required distance. If the tool is ground otherwise, that is with very little clearance it would only be possible to mark the end of the shaft. This may be readily seen by referring to sketch D, Fig. 12.

In centreing by this method the shaft is first rough centred by means of a heavy centre punch. It is then put in the lathe between the centres, the square centre just described taking the place of the dead centre.

The tool illustrated at C, Fig. 12, is clamped in the tool post, the lathe carriage having been run back so that the fork will come opposite the end of the shaft to be centred. The shaft is then driven by means of the face plate and dog; the square centre is gradually fed in, while at the same time the tool post is fed across, the forked tool

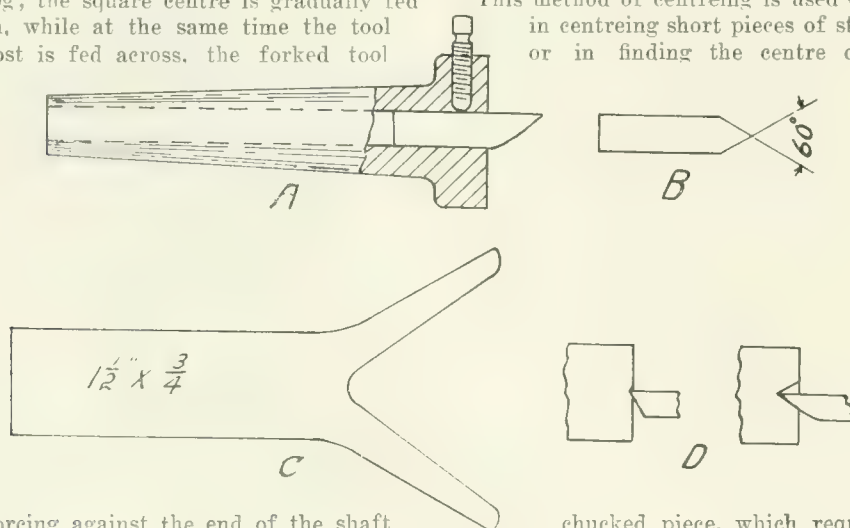


FIG. 12.

forcing against the end of the shaft till it runs perfectly true. The centre thus made is next drilled to the depth which will be sufficient to clear the point of the centre. The most suitable drill to use for this is the well known combination drill, which is made in several different sizes,

the angle of the reamer being the required degree for the centre.

**Chuck and Steady Rest**

This method of centreing bars is also extensively used and is found to give entire satisfaction, especially when

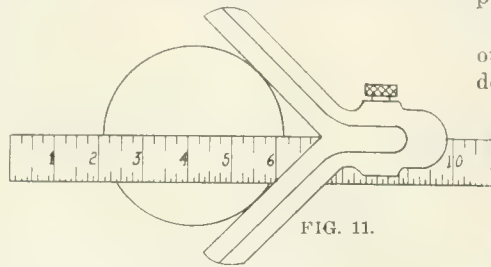


FIG. 11.

several pieces of the same size are to be centred. One end of the bar is chucked true, while the other end is held in the steady rest, the jaws of which are set centrally for the size of the bar. A combination drill is held in the tailstock spindle and this is fed into the stock, thus centreing it. In using this method

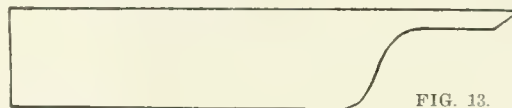


FIG. 13.

a universal chuck is desirable, but either a three or four-jawed independent chuck may be used without the necessity of truing up each separate piece. By loosening one jaw in a three-jaw chuck, or two jaws in a four-jawed chuck, the work will be released and another one can be chucked in exactly the same position.

**Spot Centreing**

This method of centreing is used only in centreing short pieces of stock, or in finding the centre of a

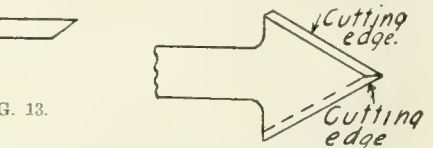
adjusted that it comes in the exact centre line of the work, and in operation the lathe carriage is moved forward till the tool "spots" the centre. A slight pressure will force the point and cutting edges into the work, thus enabling a centre of sufficient depth for the purpose required to be made.

If the foregoing remarks are followed out there is no doubt but that a great deal of the trouble often encountered in securing perfect centreing will be eliminated, and as a result better and more accurate work will be turned out.



**CONCERNING EXPLOSIVES**

IN a paper by Professor Percy F. Frankland, read before the Birmingham Section of Chemical Industry, the author said:—"The disruptive properties of gun-cotton are greatly moderated by gelatinizing by means of solvents—acetone, acetic ester, alcohol, ether, etc.—and by mixing with nitro-glycerine bal-



listic materials like cordite and other smokeless powders are obtained.

There is still another class of explosives which combine great safety in handling with enormous disruptive effect—picric acid, discovered by Woulfe, of London, in 1771, but first used by the French under the name of 'Melinite' for filling shells in 1881, and later by the English under the name of 'Lyddite.' More recently this has been replaced by trinitrotoluene, first proposed by Haeusermann in 1891 for filling shells, and used by our service under the mark 'T.N.T.' It is even less sensitive to shock than picric acid. 'Ammonal,' used by the Austrians for shell-filling, is a mixture of 'T.N.T.' with ammonium nitrate, charcoal and aluminum powder. It is both very safe and very powerful. 'T.N.T.' is much used for demolishing bridges. It is so insensitive to shock that it is not exploded on being struck by a rifle bullet, and when in a shell it withstands the impact of the latter piercing an armour-plate.

"Tetra-nitro-aniline, obtained by Flurscheim, enjoys the unique position among explosives of having been discovered in Great Britain. It is said to be as safe as, and even more powerful than, trinitrotoluene."



The Algoma Steel Corporation, Sault Ste. Marie, Ont., is selling a quantity of electrical equipment formerly used as an auxiliary lighting plant.



# Sheet Metal Elbows, Their Development and Laying Off-V.

By J. W. Ross

*In order to thoroughly understand the principles involved in the development of cylindrical and other forms, such as are met in sheet metal work, a considerable knowledge of geometry is desirable. Through the medium of these articles, the author places practical examples at the disposal of our readers, and the knowledge to be gained by a close and persistent study of the principles and methods employed will well repay the time spent.*

## ELBOW AND OVAL-SHAPED CROSS-SECTION

FIG 24 shows elevation and cross-section plan views of a 90-degree elbow, the cross-section plan being shaped oval fashion, with two flat sides.

The elevation and mitre lines are drawn as in preceding problems. The

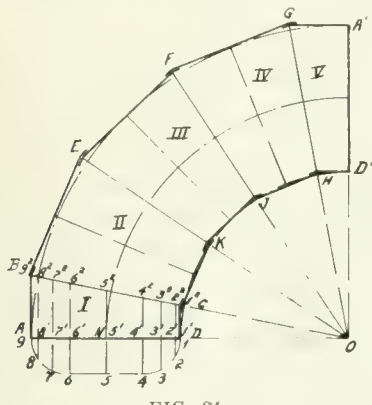


FIG. 24.

neutral diameter AD is equal to 24 inches and the radius OD to 27 inches. Divide AD into 4 equal parts as 6<sup>1</sup>5<sup>4</sup>4<sup>1</sup>. With 6<sup>1</sup> as centre and 6<sup>1</sup>A as radius strike the neutral quadrant A6. Also with 4<sup>1</sup>D as radius and 4<sup>1</sup> as centre draw the quadrant D<sup>4</sup>. Draw the line 6 5 4 parallel to AD and tangent to the two quadrants. The half cross-section plan is shown by A654D. Divide the quadrants A6 and D4 each into the same number of equal parts, projecting these points through and at right angles to AD to the mitre line BC. Number all points in consecutive order and in relation to each intersecting line.

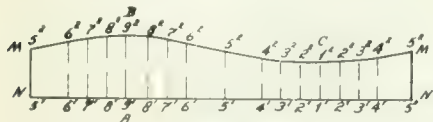


FIG. 26.

Twice the length of the flat side 6 5 4 added to the circumference of the circle

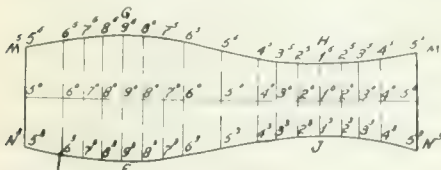


FIG. 27.

obtained from its diameter by the combined radii of the two quadrants as A6<sup>1</sup> and D4<sup>1</sup> will equal the stretchout of the plate, which equals (2×12)+(12×3.14) equals 24+37 11-16, equals 61 11-16 in. Measure 61 11-16 inches along the line N5<sup>1</sup>N, Fig. 26. Bisect at 5<sup>1</sup>. Measure off 5<sup>1</sup>6<sup>1</sup> and 5<sup>1</sup>4<sup>1</sup>, Fig. 26 equal to 5 6 and 5 4, Fig. 24, which equals 6 inches each. Measure of 6<sup>1</sup>6<sup>1</sup> and 4<sup>1</sup>4<sup>1</sup>, Fig. 26, each equal to the quarter circles 9 6 and 1 4, which is 9 27-64 inches. The end distances, 5<sup>1</sup>6<sup>1</sup> and 4<sup>1</sup>5<sup>1</sup>, are then each equal to 6 inches. Divide 6<sup>1</sup>6<sup>1</sup> and 4<sup>1</sup>4<sup>1</sup>, Fig. 26, each into twice the number of parts as in each quadrant 9 6 and 4 1, Fig. 24. Through these points erect perpendiculars, and number accordingly. Transfer the distances as 9<sup>1</sup>9<sup>2</sup>, 8<sup>1</sup>8<sup>2</sup>, etc., Fig. 24, over to their corresponding numbers on Fig. 26.

FIG. 26 shows the full pattern for courses I and V and the half pattern for course III, laps, etc., to be drawn in. Courses II and IV are developed similarly to course W, Fig. 18, using the

the sides of the neutral section. Measure off D<sup>1</sup>D<sup>1</sup>, Fig. 29, equal to 4×24 inches, which equals 96 inches. Divide this into 4 equal spaces representing the 4 sides of the square. Erect perpendiculars through these points as shown by D<sup>1</sup>D<sup>2</sup>A<sup>2</sup>A<sup>1</sup>D<sup>1</sup>, Fig. 29. Make D<sup>1</sup>C, D<sup>2</sup>C, Fig. 29, each equal to the length DC, Fig. 28. Also measure off A<sup>1</sup>B, A<sup>1</sup>B, Fig. 29, each equal to AB, Fig. 28. Connect these points with straight lines as shown in Fig. 29.

The templet without laps for courses I and III is shown in Fig. 29. Fig. 30 shows the pattern for course II and is self explanatory if the preceding problems have been thoroughly understood.

## HARDENING HIGH-SPEED SCREW MACHINE TOOLS

By R. A. Mulholland\*

NOW that the price of high-speed steel is soaring, it behooves the machine shops of the country to give serious thought to

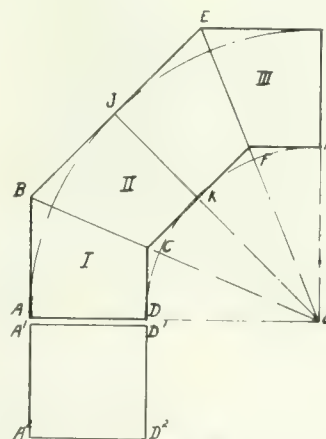


FIG. 28.

the conservation of their present supply. Much good steel is wasted every day through poor practice in heat treatment. A tool improperly hardened naturally has to be ground offener than a properly hardened one, and the result is a serious loss in manufacturing time and a waste of perfectly good high-speed steel.

## Elbow with Square Section

FIG. 28 shows the elevation and square section plan view of a 3-course 90-degree elbow. The neutral diameter AD equals 24 inches and DO 27 inches. The elevation and mitre lines are in the usual manner. A<sup>1</sup>D<sup>1</sup>D<sup>2</sup>A<sup>2</sup> shows the plan view. The stretchout is equal to the sum of all

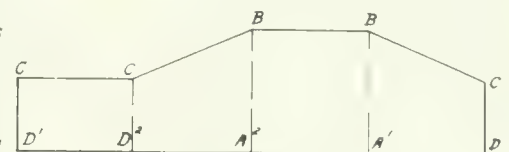


FIG. 29.

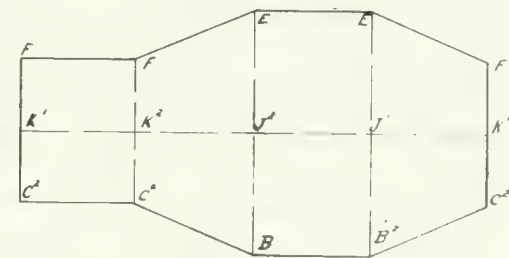


FIG. 30.

All the up-to-date methods may be practised in the hardening, and yet the tool may prove unsatisfactory when run at the speed and feed that high-speed

\*Consulting Metallurgist, Lehigh Valley, Pa.

steel will stand when properly treated. Some of the most serious troubles have been experienced in the hardening of screw machine tools, such as special shaped cutting-off tools, box-turning tools and facing tools—in fact, any tool that is ground from the annealed bars as they are received from the mill, and have one of the cutting edges on one of the sides of the annealed bar. Especially is this true of the box-turning tool where generally little or nothing is ground from the face of the tool stock. Most of these tools are made from  $\frac{1}{2}$  x 1 in. stock, and require no forging before they are ground on the emery wheel.

The practice of making stock-removing screw machine tools should not differ in any essential from the making of taps and the more delicate tools that are made in the tool room. What competent tool-maker would think of making an expensive tool from a piece of stock that was just large enough to "clean up?" Did you ever stop to consider why the experienced tool-maker always turns off at least 5 per cent. of the diameter before attempting to make a tool that must have an enduring cutting edge? The theory is the same for large and small tools. The reason is that the annealed bars as received from the mill have a thin shell of decarbonized scale, so to speak, on the outside. This decarbonized area must be removed before a good cutting edge can be secured that will harden satisfactorily.

A simple method for doing this is to grind the tool to its approximate shape, and then put it in the milling machine and remove about 5 per cent. of the thickness of the stock from the surface that is to be the cutting edge. If this is done, when the tool is properly hardened it will have its maximum cutting capacity and will run longer on fewer grindings than will the tool made from the rough stock without first removing the decarbonized area. The practice of disregarding the decarbonized area in all forms of tool steel has always been and always will be a great source of loss both in the efficiency of the tool and the cause of excessive tool steel bills.

The actual hardening of high-speed steel is a comparatively simple matter, and if the tool is properly prepared for hardening there is little doubt that the result will be better than the average shop is now obtaining from the careless way that high-speed screw machine tools are made in a large number of plants.—  
Iron Age.

### MANGANESE BRONZE

LARGE quantities of non-ferrous scrap must accumulate from time to time, and the problem of its economic disposal is of interest. The methods used at the Washington Navy Yard were re-

cently described in a paper before the American Society of Naval Engineers by Lieut. J. B. Rhodes, U. S. Navy, dealing particularly with manganese bronze. The following materials were available, with the compositions approximately as shown:

1.—Naval brass: Copper, 62 per cent.; zinc, 37 per cent.; tin, 1 per cent.

2.—Cartridge-case metal: Copper, 68 per cent.; zinc, 31.6 per cent.; nickel, 0.4 per cent.

3.—Manganese bronze: Copper, 59 per cent.; zinc, 41 per cent.

4.—Commercial brass can be used in small quantities, but should be avoided, as the lead content is too high.

The results of experiments during about six months have shown that it is practicable to make high-grade ingots in an oil-fired "Rockwell" furnace of about two tons capacity. This has been accomplished in spite of the well-known prejudice against open-flame furnaces in the manufacture of non-ferrous alloys. Oxidation has been reduced to a very small amount by using wood scraps from pattern shop, and salt. The bath is protected by the molten salt, and the wood ensures a reducing rather than an oxidizing atmosphere in the furnace.

In undertaking the manufacture of manganese bronze a special hardener is first made, and is regarded as the secret of the whole process. A satisfactory mix consists of 100 lb. copper, 25 lb. mild steel, 25 lb. of 80 per cent. ferro-manganese, made by melting the steel and alloy together, and then adding the copper as quickly as the melt will take it.

In using the scrap it is necessary to know the approximate analysis. The desired composition is:

	Per cent.
Copper .....	57.0
Zinc .....	40.0
Iron .....	1.0
Manganese .....	0.75
Aluminum .....	0.75
Tin .....	0.50

The usual losses in zinc, manganese, aluminum, and tin are allowed for, and a heat melted and cast. After analysis, the final adjustments are calculated and allowed for (particularly zinc, which must be 41 per cent. in the finished casting) when re-melting for use in the finished casting.

In melting in the oil furnace, the most difficult scrap to melt should be charged first, although all but finals may be charged at once. As soon as melted, the hardener should be added. In about half an hour, charge the remaining scrap (if charge is not made all at the same time) and continue the melt. After the heat is well up, add zinc, then tin (if necessary), and finally aluminum; stir well

and tap. Small ladles are used for pouring the ingots. Ingots are numbered to show the heat, and turned into the store awaiting analysis. The cost of the method is high, on account of the labor in pouring and marking ingots, but, counting in furnace loss, labor, fuel, and upkeep of furnace it is less than 2 cents per lb., so that scrap worth  $7\frac{1}{2}$  cents per lb. can be converted into manganese bronze to cost not over 10 cents per lb.

One of the heats gave 82,000 lb. tensile strength, and 28 per cent. elongation. Quite frequently 75,000 lb. tensile strength and 20 per cent. elongation are obtained in sand castings. If high pouring temperatures are avoided and the metal is poured when it ceases to give off zinc fumes in large volume, excellent values will be obtained so long as the zinc content is kept at 41 per cent.



### PLATING ALUMINUM WITH NICKEL

AN apparently successful method of plating aluminum with nickel is described in a recent number of the Bulletin de la Societe d'Encouragement pour l'Industrie Nationale, by J. Canac and E. Tassilly. The process permits the direct deposition of nickel on aluminum in an adherent form. The metal is cleaned by passing it through a bath of boiling potash and then scrubbed with milk of lime. After soaking in a bath of 0.2 per cent. potassium cyanide for several minutes, it is submitted to the action of an iron-hydrochloric acid bath. 500 parts HCl, 500 part H<sub>2</sub>O and one part iron, until the metal takes on a certain appearance described as metallic "watering." It is washed with water after each of these operations.

The formula found satisfactory for nickel plating is:—Water, 1,000 cu.e.; nickel chloride, 50 grams; boric acid, 20 grams. The current is 1 amp. at  $2\frac{1}{2}$  volts. The plated metal is said to have a pleasing soft gray appearance, easily taking a metallic luster when polished with a wire brush, the plating being remarkably adherent. It is claimed to endure hammering and to bend in sheet form without cracking. The metal, as cleaned in the iron-acid bath, shows under the microscope a surface full of minute cavities in which the nickel deposits and adheres.



**Quarter Turn Drive.**—We are advised by F. Reddaway & Co., Montreal, that for the "Quarter Turn Drive," described and illustrated on page 366, October 14 issue of Canadian Machinery, a "Camel Hair" belt is employed. They further state that an 8-inch belt of same brand takes care of the crossed drive of a heavy planer in the same plant.



# 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

## IMPROVED TYPE POST HAMMER

**T**HE Q.M.S. Co. have placed upon the market an improved type post hammer, as illustrated in the accompanying photograph. The extremely high price of tool steel makes it a valuable adjunct to any machine shop equipment. Short pieces of tool steel, which were formerly scrapped, can be drawn down and used for small lathe tools and in tool holders.

This hammer is particularly adapted for all classes of light forging and can be easily handled by a blacksmith, doing away with the necessity of a helper. The machine can be operated by steam or compressed air. A patented valve movement insures perfect control. If treadle is brought down to the limit, the ram will give a hard, full blow, the same as a drop hammer; or the treadle can be pressed down part way, when the ram will give repeated hard or light blows, as may be required. The change from one kind of blow to another is made instantly and smoothly.

The Vulcan Engineering Sales Co., Chicago, are distributors of this product.



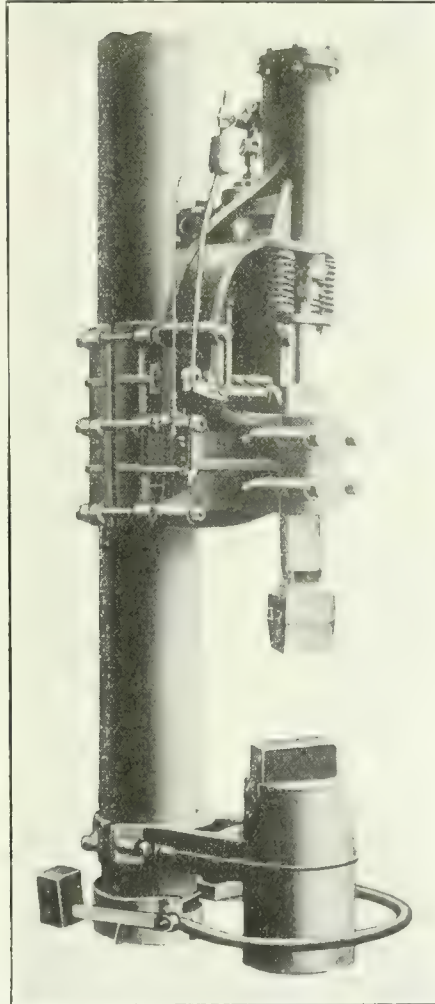
## RAIL ENDING MACHINE

THE accompanying illustrations show a recent design of rail-ending machine for operating on the high carbon, high manganese, open-hearth rails, as made today.

The general outline of the machine, which is produced by the Newton Machine Tool Works, Inc., Philadelphia, Pa., closely follows preceding designs, with improvements in details of construction to provide for the high resist-

ance encountered on the material referred to.

The motor is mounted on the top of the machine and drives through a ten-



IMPROVED TYPE POST HAMMER.

inch wide belt through phosphor bronze worm wheel and hardened steel worm of steep lead, the worm wheel being double-keyed to the spindle. The spindle is one-half the diameter of the cutter head; thus giving a sense of proportion which would not be obtained by quoting figures.

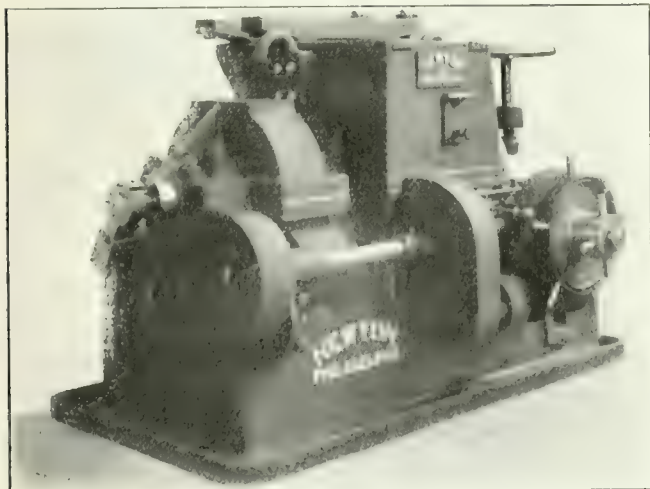
Bearings are capped and bronze bushed, so that compensation for wear is provided.

Feed is by stationary screw and revolving nut, thrust-bearing taken by enclosed ball bearings eight inches in diameter.

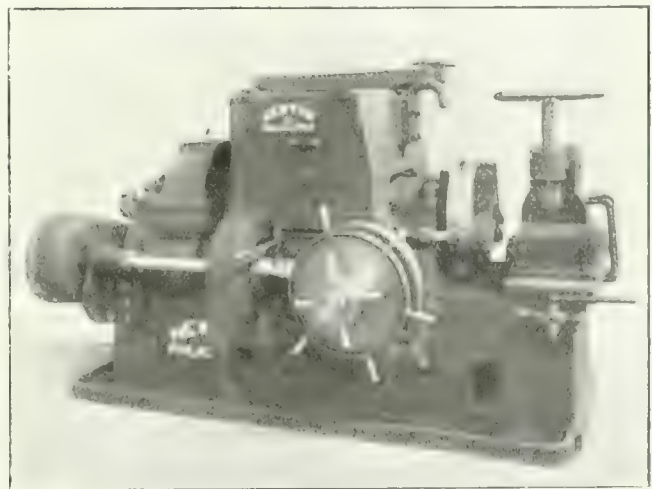
The spindle has a movement of  $2\frac{3}{4}$  in. forward movement, having hand adjustment and four changes of feed amounting to  $1/64-1/32-3/64-1/16$  of an inch per revolution, the revolutions of the cutter head being from five to fifteen per minute. In addition, the spindle has adjustable automatic stop, with safety limits, so that spindle cannot jam at either end, and is also furnished with power quick return motion. All gears are fully enclosed and principal driving and feed gears run in oil.

The base is surrounded by the pan, and a circulating pump and distribution system for cooling the tools is provided. This includes cored openings in the base, which provides for the ready removal of chips. Lifting hooks are fitted so that the machine can be readily transported from one position to another to take care of the different lengths of rails encountered in the mill.

Cutter head is of the three-tool type, and can be used either with solid cutters or with tool-holders. Rails are clamped in a chuck, fitted with hardened serrated plates, the mouth of chuck be-



NEW DESIGN RAIL ENDING MACHINE.



NEW DESIGN RAIL ENDING MACHINE.

ing bevelled in all directions to provide for the ready entrance of rail. The clamp is of a patented clearance air-operated type, providing a clamping pressure of 32 tons, operation being by valve shown in the foreground of photograph. Adjusting screw on the air clamp is provided with hand wheel to take care of the various sections of rail placed in the machine.

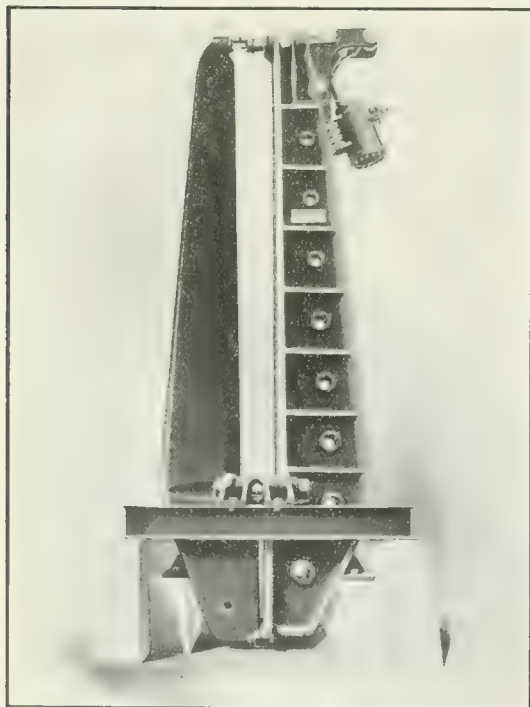
These machines work in conjunction with machines for drilling splice bar holes, and in developing this machine the aim has been to produce a machine with a capacity on tee head rails in excess of that of the drilling machine.



### LARGE PNEUMATIC RIVETER

THERE have recently been built by the Hanna Engineering Works, Chicago, what are believed to be two of the largest pneumatic riveters in existence. Each machine has a reach of 21 ft., and is capable of exerting a pressure of 100 tons on the rivet die at 100 pounds air pressure. An idea as to its size can be obtained when the weight of 40 tons is considered.

In this riveter, have been combined in a simple form, toggles, levers and guide links to give the large opening of the toggle joint movement with its gradually increasing pressure until the desired pressure is reached, and a simple lever movement throughout a considerable space under approximately maximum pressure. This space is sufficient so that there need be no uncertainty about the pressure applied on rivet; and the machine once adjusted for a certain length of rivet and thickness of plate, will require



LARGE PNEUMATIC RIVETER.

no further adjustment for ordinary variations in length of rivets, size of holes, or thickness of plates, thus producing hydraulic results with a pneumatic riveter.

These heavy duty riveters are furnished with cylinders having 22 inches of piston stroke with a relative travel of  $5\frac{3}{4}$  in. of the rivet die. As in the smaller machines, the toggle action takes place during the first half of piston travel, that is 11 inches, which represents approximately the first  $4\frac{3}{4}$  in. of die travel. At this point the mechanism automatically changes into a simple lever action, without a critical point, thus producing the rated tonnage of the machine at the rivet die, and practically uniform for the last inch of the die travel.

By the use of an inexpensive pressure regulating valve in the air supply line to riveter, the pressure of air at the cylinder can be quickly changed to vary the pressure on the rivet dies to produce any tonnage the operator may deem advisable for any size of rivet he may wish to drive.

This is a large machine and marks a new era in the riveting world. The Vulcan Engineering Sales Co., Chicago, are placing these riveters on the market.

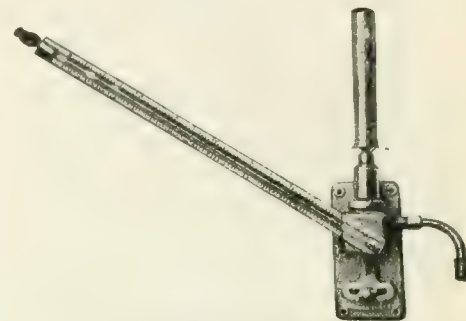


### LIQUID MEASURING DEVICE

A NEW measuring instrument for indicating the quantity of liquid contained in tanks and similar storage receptacles is now being placed on the market. The device operates on what might be termed a hydro-pneumatic principle, and its successful adaptation to industrial requirements will enable the abandonment of floats, gauge glasses, and similar mechanical devices which are not always satisfactory from the point of accuracy, reliability, ease of observation, etc.

Stancliffe's patent liquid measuring device operates through the medium of a metal tube, one end of which is immersed to the full depth of the liquid, and the other end connected to the instrument. The instrument consists of a small pot or vessel containing mercury, thus causing it to ascend a suitably arranged scale according to the degree of pressure. The tube from the mercury chamber to the storage tank is connected above the level of the mercury, so that the air pressure passes through the connecting tube to the bottom of the liquid, where it escapes. The pressure at which this happens is proportional to the height or head of liquid above the bottom of the tube. Consequently as the air pressure

varies with the head of liquid, the mercury column supported by the air pressure will vary correspondingly. The pressure at which the air escapes is determined by the mercury



LIQUID MEASURING DEVICE.

refusing to rise further into the scale tube. This tube is graduated to suit the specific gravity of the liquid being measured.

It is obvious that this instrument can be placed above or below, or at any distance from the liquid to be measured, and as the connecting pipe contains air only, it is not affected by frost.

The patents in connection with the device are controlled by the Universal Liquid Measuring Devices, Ltd., 125 Isabella Street, Toronto, Ont.



### ELECTRICITY FROM BELT SLIP

THAT the unavoidable slight slip of all running belts on their pulleys produces static charges of electricity in these two bodies has often been remarked, and it has sometimes been suggested that this has been the cause of mysterious explosions in powder works. Interest, therefore, attaches to a simple device for removing this charge, described by W. T. Estlick, in the Electrical Review and Western Electrician.

It was used in a textile mill where cotton looms were running with rubber work, so that it was necessary to keep the room perfectly dry. These conditions caused the accumulation of large charges of electricity in the belts of the motors driving the looms, with the result that the belts attracted all the particles of lint floating about, eventually shaking them on to the yarn and making the work dirty. The bits of lint would also gather in the motor, and when this was blown out would settle on the work.

On two occasions also a squirrel-cage motor burnt out, apparently from no other cause than that of the charge in the rotor discharging to earth by sparking across on to the stator winding and puncturing the insulation. Copper strips connected to earth were then placed above and below the belt, brushing lightly against it. After this no more burning out occurred, and the collection of the particles of lint was also prevented.



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**SLANDERING OUR SHELL MANUFACTURERS**

**W**ITHIN the past few weeks, attempt has been made to discredit the success achieved by Canadian manufacturers of munitions. Information reached us that American manufacturers of machine tools and other equipment were being zealously plied with tales of

the tremendous losses being suffered by Canadian shell producers, on account of the unprecedented number of rejections which the Imperial Government had found to be necessary. Since the war started, it has become quite proper to speak in millions—it is so much more impressive. Naturally, then, a million rejected shells of one firm's manufacture made a ready weapon for the detractors of our operative and administrative staffs.

We have taken some pains to prove the truth of the assertion or uncover its falseness, and are now in a position to say authoritatively that there is absolutely no foundation for the statement.

The evident intent of spreading broadcast among American manufacturers the tale that one Canadian firm of itself had a million shell rejections was to create distrust regarding payments for machine tool equipment supplied or on order, and incidentally to hamper not only the maintenance of the production standard we have already attained, but offset further progress and development.

Most people have the impression that shell manufacture as prosecuted in Canada is a profitable undertaking, the suggestion of bankruptcy which the rejection of a million shells portends savors therefore more or less of grim humor.



**THE COMMERCIAL PROSPECTS OF NEUTRALS**

**T**HAT efforts to skim the cream of European business after the war will be made by all parties capable of doing so, goes without saying, but just how far European nations in general and the Allies in particular will submit to this process is a matter which will be settled by the European nations themselves.

The resumption of ordinary commercial production by our manufacturers will be accelerated according to the rate at which material and labor return to their former basis. That such return will be gradual and perhaps prolonged is more than probable, consequently a considerable proportion of Canada's industrial activity will be available for use in the rebuilding of Europe.

The recent action of the Central States in abolishing the tariff between Germany and Austria will not be overlooked by the British Empire and its associates, and the present union of nations which has been consecrated with the blood of the proudest and best of their manhood may well be expected to have a strength and closeness which will be proof against unlimited exploitation.

In these days it is deeds, not words that count, and if the deeds of powerful neutrals are limited to the laying of plans whereby they may profit from the misfortunes of others, we may rest assured that the plans will meet with just such success as they deserve, no more and no less.

Nations which are able and willing to fight for the rights and liberty of weaker nations are more than likely to see that the credit, thanks and opportunities offered in return are duly received by the proper parties.

The recently announced organization of leading business men in New York for the express purpose of capturing trade after the war seems rather like a case of the wish being father to the thought. That the Allies will be in a state of exhaustion after the war, is without doubt, but that they will allow an onlooker to approach from a place of safety and offer help at a price after the danger has been averted, is most unlikely.

Current events prove that anything worth having must be fought for, and neutrals who anticipate prosperous times as the result of other people's misfortunes may find their overtures appraised at their true value, and received just for so long as they may be acceptable to the parties concerned.

# 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 .....	\$16 95
Lake Superior, char-coal, Chicago .....	17 75
Ferro nickel pig iron (Soo) .....	25 00
	<b>Montreal. Toronto.</b>
Middlesboro, No. 3 .....	\$24 00
Carron, special .....	25 00
Carron, soft .....	25 00
Cleveland, No. 3 .....	24 00
Clarence, No. 3 .....	24 50
Glegarnock .....	28 00
Summerlee, No. 1 .....	30 00
Summerlee, No. 3 .....	29 00
Michigan charcoal iron. 28 00	
Victoria, No. 1 .....	24 00 23 00
Victoria, No. 2X .....	23 00 23 00
Victoria, No. 2 plain.. 23 00	23 00
Hamilton, No. 1 .....	23 00 23 00
Hamilton, No. 2 .....	23 00 23 00

## FINISHED IRON AND STEEL.

	<b>Cents.</b>
Common bar iron, f.o.b., Toronto..	2.50
Steel bars, f.o.b., Toronto.....	2.75
Common bar iron, f.o.b., Montreal	2.50
Steel bars, f.o.b., Montreal .....	2.75
Twisted reinforcing bars .....	2.55
Bessemer rails, heavy, at mill....	1.25
Steel bars, Pittsburgh .....	
Tank plates, Pittsburgh .....	
Beams and angles, Pittsburgh.....	
Steel hoops, Pittsburgh .....	
	<b>Cents.</b>
<b>F.O.B., Toronto Warehouse.</b>	
Steel bars .....	2.75
Small shapes .....	2.75
	<b>Cents.</b>
<b>Warehouse, Freight and Duty to Pay.</b>	
Steel bars .....	2.20
Structural shapes .....	2.30
Plates .....	2.30
	<b>Cents.</b>
<b>Freight, Pittsburgh to Toronto.</b>	
18.9 cents carload; 22.1 cents less car-load.	

## BOILER PLATES.

	<b>Montreal</b>	<b>Toronto</b>
Plates, 1/4 to 1/2 in., 100 lb. \$2 75	\$2 50	
Heads, per 100 lb. ....	3 00	2 75
Tank plates, 3-16 in. ....	3 00	2 80

## OLD MATERIAL.

	<b>Montreal.</b>	<b>Toronto.</b>
Dealers' Buying Prices.		
Copper, light .....	\$13 75	\$12 75
Copper, crucible .....	16 25	15 00
Copper, unch-bleed, heavy 15 75	14 50	
Copper, wire, unch-bleed.. 15 75	14 50	
No. 1 machine compos'n 12 00	11 75	
No. 1 compos'n turnings 11 00	10 00	
No. 1 wrought iron ....	10 00	10 00
Heavy melting steel ....	9 00	9 00
No. 1 machin'y cast iron 13 50	13 00	
New brass clippings ....	11 50	11 00
No. 1 brass turnings ...	9 50	9 00
Aluminum .....	27 00	27 00
Heavy lead .....	5 25	5 00

Tea lead .....	4 25	\$ 1 00
Scrap zinc .....	12 75	12 00

## W. I. PIPE DISCOUNTS.

Following are Toronto jobbers' discounts on pipe in effect Nov. 5, 1915:

	<b>Buttweld</b>	<b>Gal.</b>	<b>Lapweld</b>	<b>Gal.</b>
	<b>Black</b>	<b>Standard</b>	<b>Black</b>	<b>Gal.</b>
1, 3/8 in. ....	62	38 1/2		
1/2 in. ....	67	47 1/2		
3/4 to 1 1/2 in. ..	72	52 1/4		
2 in. ....	72	52 1/2	68	48 1/2
2 1/2 to 4 in. ...	72	52 1/2	71	51 1/2
4 1/2, 5, 6 in. ...			69	49 1/2
7, 8, 10 in. ....			66	44 1/2
	<b>X Strong</b>	<b>P. E.</b>		
1, 3/8 in. ....	55	38 1/2		
1/2 in. ....	62	45 1/2		
3/4 to 1 1/2 in. ..	66	49 1/2		
2, 2 1/2, 3 in. ..	67	50 1/2		
2 in. ....			62	45 1/2
2 1/2 to 4 in. ...			65	48 1/2
4 1/2, 5, 6 in. ...			65	48 1/2
7, 8 in. ....			58	39 1/2
	<b>XX Strong</b>	<b>P. E.</b>		
1/2 to 2 in. ....	43	26 1/2		
2 1/2 to 6 in. ...			42	25 1/2
7 to 8 in. ....			39	20 1/2
	<b>Genuine Wrot Iron.</b>			
3/8 in. ....	56	32 1/2		
1/2 in. ....	61	41 1/2		
3/4 to 1 1/2 in. ..	66	46 1/2		
2 in. ....	66	46 1/2	62	42 1/2
2 1/2, 3 in. ....	66	46 1/2	65	45 1/2
3 1/2, 4 in. ....			65	45 1/2
4 1/2, 5, 6 in. ...			62	42 1/2
7, 8 in. ....			59	37 1/2
	<b>Wrought Nipples.</b>			
4 in. and under .....				77 1/2%
4 1/2 in. and larger .....				72%
4 in. and under, running thread. 57 1/2%				
	<b>Standard Couplings.</b>			
4 in. and under .....				60%
4 1/2 in. and larger .....				40%

## MILLED PRODUCTS.

Sq. & Hex Head Cap Screws 65 & 50	
Sq. Head Set Screws .....	70 & 5%
Rd. & Fil. Head Cap Screws....	45%
Flat & But. Head Cap Screws....	40%
Finished Nuts up to 1 in. ....	70%
Finished Nuts over 1 in. ....	70%
Semi-Fin. Nuts up to 1 in. ....	70%
Semi-Fin. Nuts over 1 in. ....	72%
Studs .....	65%

## METALS.

	<b>Montreal.</b>	<b>Toronto.</b>
Lake Copper, carload ...	\$21 50	\$20 75
Electrolytic copper .....	21 25	20 50
Castings, copper ..	21 00	20 50
Tin .....	45 00	45 00
Spelter .....	20 00	20 00
Lead .....	6 75	7 00
Antimony .....	42 00	40 00
Aluminum .....	65 00	65 00

Prices per 100 lbs.

## BILLETS.

	<b>Per Gross Ton</b>
Bessemer billets, Pittsburgh....	\$29 00
Open-hearth billets, Pittsburgh..	30 00
Forging billets, Pittsburgh .....	52 00
Wire rods, Pittsburgh .....	38 00

## NAILS AND SPIKES.

Standard steel wire nails, base .....	\$2 80	\$2 85
Cut nails .....	2 90	2 90
Miscellaneous wire nails..	75 per cent.	
Pressed spikes, 5/8 diam., 100 lbs.	3 25	

## BOLTS, NUTS AND SCREWS.

	<b>Per Cent.</b>
Coach and lag screws .....	60 and 5
Stove bolts .....	82 1/2
Plate washers .....	40
Machine bolts, 3/8 and less .....	65
Machine bolts, 7-16 and over ....	50
Blank bolts .....	50-71 1/2
Bolt ends .....	50-71 1/2
Machine screws, iron, brass....	35
Nuts, equare, all sizes ....	3 3/4c per lb off
Nuts, hexagon, all sizes... 4 1/4c per lb. off	
Iron rivets .....	67 1/2
Boiler rivets, base, 3/4-in. and larger .....	\$3.75
Structural rivets, as above .....	3.75
Wood screws, flathead, bright .....	.85, 10, 10 p.c. off
Wood screws, flathead, brass .....	.67 1/2 p.c. off
Wood screws, flathead, bronze .....	.60 p.c. off

## LIST PRICES OF W. I. PIPE.

	<b>Standard.</b>	<b>Extra Strong.</b>	<b>D. Ex. Strong.</b>
	<b>Nom. Price.</b>	<b>Size Price</b>	<b>Size Price</b>
	<b>Diam. per ft.</b>	<b>Ins. per ft.</b>	<b>Ins. per ft.</b>
1/8 in	\$.05 1/2	1/8 in \$ .12	1/2 \$ .32
1/4 in	.06	1/4 in .07 1/2	3/4 .35
3/8 in	.06	3/8 in .07 1/2	1 .37
1/2 in	.08 1/2	1/2 in .11	1 1/4 .52 1/2
3/4 in	.11 1/2	3/4 in .15	1 1/2 .65
1 in	.17 1/2	1 in .22	2 .91
1 1/4 in	.23 1/2	1 1/4 in .30	2 1/2 1.37
1 1/2 in	.27 1/2	1 1/2 in .36 1/2	3 1.86
2 in	.37	2 in .50 1/2	3 1/2 2.30
2 1/2 in	.58 1/2	2 1/2 in .77	4 2.76
3 in	.76 1/2	3 in 1.03	4 1/2 3.26
3 1/2 in	.92	3 1/2 in 1.25	5 3.86
4 in	1.09	4 in 1.50	6 5.32
4 1/2 in	1.27	4 1/2 in 1.80	7 6.35
5 in	1.48	5 in 2.08	8 7.25
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 .....	\$6.25
Connellsville Foundry Coke .....	5.65
Yough Steam Lump Coal .....	3.63
Penn. Steam Lump Coal .....	3.63
Best Slack .....	2.99
Net ton f.o.b. Toronto.	

**COLD DRAWN STEEL SHAFTING.**

At mill .....	25%
At warehouse .....	20%
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.	9.65
Glue, French medal, per lb. ....	0.15
Tarred slaters' paper, per roll ...	0.95
Motor gasoline, single bbls., gal. ..	0.25½
Benzine, single bbls., per gal. ....	0.25
Pure turpentine, single bbls. ....	0.85
Linseed oil, raw, single bbls. ....	0.85
Linseed oil, boiled, single bbls....	0.88
Plaster of Paris, per bbl. ....	2.50
Plumbers' Oakum, per 100 lbs....	4.50
Lead Wool, per lb. ....	0.11
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
Impèrial quenching oil.....	0.35

**POLISHING DRILL ROD**

Discount off list, Montreal and To-	
ronto .....	40%

**PROOF COIL CHAIN.**

¼ in. ....	\$9.00
5-16 in. ....	5.90
¾ in. ....	4.95
7-16 in. ....	4.55
½ in. ....	4.00
9-16 in. ....	4.20
⅝ in. ....	4.10
¾ in. ....	3.95
7/8 in. ....	3.80
1 inch .....	3.70
Above quotations are per 100 lbs.	

**TWIST DRILLS.**

Carbon up to 1½ in. ....	55%
Carbon over 1½ in. ....	25
High Speed .....	
Blacksmith .....	55
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 50	\$3 50
Canada plates, dull.		
52 sheets .....	3 25	3 25
Canada Plates, all bright..	4 60	4 75
Apollo brand, 10¾ oz.		
galvanized .....	5 50	5 50
Queen's Head, 28 B.W.G.	6 00	6 00
Fleur-de-Lis, 28 B. W. G....	5 75	5 75
Gorbal's Best, No. 28 ...	6 10	6 10
Viking metal, No. 28 ...	5 25	5 25
Colborne Crown, No. 28..	5 70	5 80
Premier No. 28 .....	5 40	5 50
Premier, 10¾ oz. ....		5 75

**BOILER TUBES.**

Size	Seamless	Lapwelded
1 in. ....	\$14 25	.....
1¼ in. ....	15 00	.....
1½ in. ....	15 00	.....
1¾ in. ....	15 00	.....
2 in. ....	15 00	10 00
2¼ in. ....	16 50	11 00
2½ in. ....	17 50	12 85
3 in. ....	25 00	13 20
3½ in. ....	28 00	16 25
4 in. ....	33 00	20 75
Prices per 100 feet, Montreal and Toronto.		

**WASTE.**

	WHITE.	Cents per lb.
XXX Extra .....		0 11½
X Grand .....		0 11
XLGR .....		0 10½
X Empire .....		0 09½
X Press .....		0 08¾

**COLORED.**

Lion .....	0 07¾
Standard .....	0 07
Popular .....	0 06¼
Keen .....	0 05½

**WOOL PACKING.**

Arrow .....	0 17
Axle .....	0 12
Anvil .....	0 09
Anchor .....	0 07

**WASHED WIPERS.**

Select White .....	0 08½
Mixed Colored .....	0 06¼
Dark Colored .....	0 05¼

This list subject to trade discount for quantity.

**BELTING RUBBER**

Standard .....	50%
Best grades .....	30%

**BELTING—NO. 1 OAK TANNED.**

Extra heavy, single and d'ble, 40 & 10%	
Standard .....	50%
Cut leather lacing, No. 1.....	\$1.20
Leather in sides .....	1.10

**ELECTRIC WELD COIL CHAIN B.B.**

1/8 in. ....	\$12.75
3-16 in. ....	8.85
¼ in. ....	6.15
5-16 in. ....	4.90
¾ in. ....	4.05
7-16 in. ....	3.85
½ in. ....	3.75
⅝ in. ....	3.60
¾ in. ....	3.60

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 .....	.15
Potassium carbonate .....	.40
Potassium sulphide (substitute)..	.20
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 .....	.07

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 .....	4½ 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., Dec. 6, 1915.**—General conditions are unchanged and the improved situation still continues. Shell-making industries are still very busy and the preparation of plant and equipment for the production of the heavier shells is nearing the stage when machining operations will be in progress. Added to the former duties of the old Shell Committee, the distribution of orders for the other allies may be placed in the hands of the newly organized Munitions Committee. This continent, and particularly Canada, is now more than ever placing herself among the older nations of the world in the supplying of necessities for foreign consumption. That we will retain our position following the war is generally conceded, but to maintain this place which present circumstances have almost forced upon us, there must needs be no cessation of effort. The cessation of hostilities is sure to usher in an era of prosperity and we must be prepared to take our proper place in the re-constructed distribution of trade between the Eastern and Western hemispheres.

Many lines of activity have been opened to Canadian manufacturers which a year or two ago were almost unknown. The chemical industry has been revolutionized in the past year and remarkable strides are being taken in the production of what a few years ago were the secrets of European nations only.

The manufacture of high-speed and special steels are also receiving attention. Again, many firms have branched out into the manufacture of machinery and other utilities which for decades had been solely monopolized by Austria and Germany. During the winter and spring shipbuilding will receive much attention provided the necessary steel for construction can be obtained. The prospects for the coming winter are brighter than a year ago, and the cry of the unemployed will be less heard than in previous times.

### Pig Iron

Producers are still striving to keep up with the pace being set by the steel manufacturers and are on the whole very successful. Production still continues with unabated energy. Market prices in the States show advances, but local conditions remain unchanged.

### Steel

The unsettled state of the market still continues with prices advancing steadily. Quotations made to-day may not be in

force to-morrow, and price lists are no longer to be relied upon. In some instances steel for war munitions is booked a year in advance, and with the mills producing maximum capacity in the majority of cases it is apparent that little opportunity is imminent for the supply of steel shapes and bars for domestic purposes. The latter begins to assume greater importance than a few months ago indicated.

What the situation will be in a short time is at present difficult to determine, but that prices will advance still further is quite evident. Some of the large producers in the States have refused large export orders for plates and bars, even at a price much higher than that now quot-

### 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.

ed, and with the possibility of foreign countries requiring large shipments of steel from this continent, for several years to come, the conclusion is that the current high prices will be maintained for an indefinite period.

The market in steel bars, plates and structural shapes is very active and prices are advancing daily. Bars show an increase, and are now quoted at 2.55 cents per pound. Shapes are 2.30c, being an advance of one-tenth cent per pound. Plates are also strong at 2.30c. Boiler heads have advanced and this week's quotation is \$3 per hundred pounds. Lap-welded boiler tubes have taken another jump and an advance of 6 to 10 per cent. is noted in this week's list.

### Machine Tools and Supplies

Added to the already high pressure being placed upon the machine tool builder for the output of shell making machinery, are the inquiries that are now coming in for equipment for the production of domestic specialties. Complaints are still being received from customers regarding delivery on certain machines ordered months ago, and now long overdue. The return of normal con-

ditions in industrial spheres outside of those bearing on the war situation is tending to create a high optimistic outlook, and the prospects for the coming year are that the machinery trade will maintain for a long time its present activity. All lines of the metal working trade are more or less affected by the scarcity of high-speed steel, and in some cases very abnormal prices have been offered for this much-needed accessory to finished production. High-speed steel is quoted from \$2.50 up. Supplies of all kinds are still in demand with prices firm.

### Metals

The close approach of the end of the year finds the market in a quiet and inactive condition, and the prospects for the remainder of the year are that little change need be looked for. The feature of the week has been the unstable position of spelter, this being the outcome of speculators trying to deceive the market.

**Copper.**—Very little activity is noted in copper; the market is dull with prices holding firm. Foreign markets in some quarters are showing weakness while others appear stronger.

**Tin.**—The present state of the market shows plenty of tin on hand; in fact, the visible supply is in excess of the demand. Reports of the sinking of vessels in the Mediterranean, one or more of which may have cargoes of tin aboard, has created some excitement among buyers. However, unless these reports should be followed by increased activity among the dealers, no advance is looked for. The local market for the past week has been dull and a decline of \$20 a ton is quoted, the price this week being 45c per pound.

**Spelter.**—The sand foundation upon which the spelter market has been resting for the past few months is beginning to totter. Owing to speculation on the part of large buyers and also the holding back of available supplies by producers the situation at the present time shows some signs of demoralization, and a decline in prices is daily expected. Quotations in foreign markets are showing sharp declines, and it is anticipated that local dealers will follow suit shortly. Last week's prices prevail at 20c per pound.

**Lead.**—Little change is noted in the position of lead over that of last week, and the market is quite dull, with a tendency to decline. No change in price has taken place in local markets and dealers are quoting \$6.75 per hundred.

**Antimony.**—Local dealers are quoting last week's prices, but the market generally is showing weakness and a decline is looked for any time. Inquiries are fairly good at 42c per pound.

**Aluminum.**—Increased demand for aluminum has advanced the price this



week and dealers in this district are asking 65c per pound, being an increase of 3c.

**Old Material.**—The scrap metal market continues to retain a steady tone, and prices are holding firm. Dealers report good business in copper and heavy melting steel, with prices unchanged. The general situation remains the same as last week with the exception of scrap zinc, which is weaker, being now quoted at \$12.75. Scrap aluminum is very strong at 27c per pound, with little on the market.

**Toronto, Ont., Dec. 7.**—Industrial conditions continue to show a decided improvement and a better feeling prevails in business circles. The success of the war loan is gratifying, and, representing a response far ahead of expectations, it cannot help but stimulate the returning confidence of the public generally in the financial and business outlook. The trade returns issued by the Department of Trade and Commerce for the month of November show an increase in revenue of over 7½ million dollars over that of November, 1914. The total revenue for November, 1915, was just over 17 million dollars, and the largest of any month in the history of the Dominion. For the eight months of the present fiscal year ending Nov. 30, the total revenue aggregates \$104,750,000 as against \$90,400,000 for the corresponding period in the last fiscal year.

The steel trade continues very active and the mills, although operating at capacity, are getting behind on deliveries. Forging plants and machine shops are getting behind on deliveries. Forging plants and machine shops are also working at full pressure and preparations are being made to handle the large shells. Machine tool builders are very busy turning out machines for shell plants. Prices of all machinery is advancing due to the increased cost of raw materials. There is a good demand for ingot metals for munitions, but the market is dull and weaker. Tin and spelter are lower.

#### Steel Markets

The market is very firm and prices have a higher tendency all round. The volume of business being done is larger than it has ever been and the mills are unable to meet all the demands. The steel companies are booked up for months ahead, principally on tonnage for shells, although a large export business is being done in other lines of steel products. The steel trade is passing through a period of prosperity, the like of which was never before experienced. The steel companies, although working night and day, cannot keep pace with the demand and are therefore getting behind on deliveries. The demand for steel for shells

is taking the capacity of mills to the limit, but plants are being extended to take care of the increased business.

Prices on finished and semi-finished steel products are very firm, with a higher tendency for most lines. A few advances have to be noted such as lap-welded boiler tubes, wood screws, wire nails, cut nails, grey forge pig iron and Lake Superior charecoal iron. Warehouse prices for Pittsburgh bars, etc., are higher. Steel bars are still being quoted at 2.75c and iron bars at 2.50c, but higher prices are expected in the near future. Wrought iron pipe is very firm and may go higher. Smooth steel wire has advanced 15c and

business from one country in Europe. The market for large rounds is very strong, but rather less active.

Other small steel bars are still being quoted at 1.70c Pittsburgh, but this figure is more or less nominal, 1.80c being nearer the market, Pittsburgh. Buyers of billets are experiencing considerable difficulty in getting their needs supplied. There is a big demand and the scarcity is getting more acute. Prices continue to advance. Bessemer billets are now quoted at \$29, open-hearth billets at \$30, and forging billets \$52 base, f.o.b. Pittsburgh. Steel hoops have advanced to 1.90c Pittsburgh.

#### Pig Iron

The market continues very strong and prices of all American brands of pig iron have advanced. It is reported that a shortage of iron is threatened, particularly at Buffalo. All quotations on charecoal irons have been withdrawn by the principal Lake Superior district producing interests. Lake Superior charecoal iron has advanced to \$17.75 Chicago, and grey forge to \$16.95 Pittsburgh. Hamilton and Victoria brands are firm but unchanged at \$23 per ton.

#### Machine Tools

The situation in the machine tool market is unchanged. Dealers are very busy figuring on shell equipments and have lately sold a number of lathes for machining 6-in. shells. An interesting feature in the trade is the development of special machines for making shells and shell parts. This work is keeping a number of smaller machine shops actively employed and the larger concerns are also very busy turning out machinery for making shells. Machine shops continue to work at full pressure, both those making shells and those making machinery for shells.

#### Supplies

The active demand for machine shop supplies continues and business is very brisk. Prices generally are very firm. Milling cutters have advanced again, and are now practically 150 per cent. higher than they were 12 months ago. There is no improvement in the high-speed tool steel situation and prices now range from \$2.85 to \$3.05 per pound. Tungsten is still very scarce and prices continue to advance. Gasoline, benzine, turpentine and linseed oil are all very firm and higher prices are expected.

#### Old Materials

The market generally has a weak tendency, but prices are unchanged, except for No. 1 wrought iron, which is stronger and has advanced to \$9.50. Heavy melting steel is in good demand, as also are the different grades of copper.

#### Metals

There is an easier tendency in the market this week and both tin and zinc

#### 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 Brevoit, New York; Direction de l'Intendance Ministere de la Guerre, Bordeaux, France; M. De la Chaume, 28 Broadway, Westminster, London.

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

is now quoted at \$3 base. Pressed steel spikes 5/8 in. diameter, have advanced to \$3.25 per 100 lbs. Prices of Pittsburgh bars, plates and shapes are still withdrawn and the situation is unchanged.

The situation in the galvanized sheet trade does not improve. Manufacturers are handicapped by the shortage of steel, the scarcity of sulphuric acid, and high price of spelter. Prices of galvanized sheets are very firm at the advance announced last week, and there is a probability of further advances. Prices of black sheets are strong and are slowly advancing. Black No. 28 gauge are quoted at from 2.40c to 2.50c, Pittsburgh base. Blue annealed No. 10 gauge are quoted at from 2.15c to 2.25c, Pittsburgh base.

In the United States market, the advance in prices continues and the difficulties of quoting the market are increased by the inability of many producers, particularly on billets and wire rods, to take any of the business offered. As regards buying of shell steel, deliveries reaching to November, 1916, are now being considered in connection with

ter have declined. The tin market is dull in London, the weakness being attributed to the increase in visible supplies. The spelter market appears to be demoralized in New York, following a decline in London. The copper market is quiet and prices nominal. There is no change in lead and the market is dull. Antimony has an easier tendency and aluminum is also unchanged.

**Tin.**—The tin market continues to decline to a more normal basis. The recent sharp advance was quite unwarranted and the market will no doubt get back to the price prevailing immediately previous. The visible supply is increasing and there is less fear of any shipments being lost through submarine operations. The local market is weak and has declined 1c, tin being now quoted at 45c per pound.

**Copper.**—The local market is very quiet and will probably remain in this condition for the next two or three weeks. The recent buying movement has died down and the tendency will be for consumers to stay out of the market for the balance of the year. The market has become a purely nominal one and quotations are unchanged at 20¾c per lb.

**Spelter.**—The market is demoralized in New York, and there is a lack of support on the part of the large interests. The market has been following London and a sharp drop there affected New York. Buyers are holding off and prices are nominal. Spelter is weak locally and has declined 1c, being quoted at 20c per pound. Zinc ore is quoted from \$100 to \$115, Joplin, Mo.

**Lead.**—The market is dull and featureless, the "Trust" price of 5.25c being still held at New York. Local quotations are unchanged at 7c per pound.

**Antimony.**—The market is dull and prices remain about the same on all positions. Antimony is unchanged locally at 40c per pound.

**Aluminum.** The market is easier, but prices are unchanged. Supplies of aluminum are coming in rather more freely, which will have a tendency to weaken the market. Local quotations are unchanged at 65c per pound.

**Solder.**—The market is weaker following the decline in tin, and prices have declined. Solder, "half-and-half," is now quoted at 24c per pound.



#### WINTER MAIL PORT CONTROVERSY

IN the annual controversy between Halifax, N.S., and St. John, N.B., as to their respective merits as winter ports, a letter written by Sir Thomas Shaughnessy, president of the Canadian Pacific Railway Co., is taking a very important place this year. The letter was in reply to one from Sir Robert Borden, who had placed before Sir Thomas Shaughnessy

telegrams and letters from the Halifax City Council and Board of Trade registering strong protests against sending the Corsican and other mail ships to St. John without calling at Halifax. The letter of Sir Thomas Shaughnessy to Sir Robert Borden reads as follows:—

"I wish that it were possible to comply with your request to have our passenger ships call at Halifax on the inward and outward trips this winter, but, as I said to you personally, I am convinced that it cannot be done in the interest of the country.

"The war has brought upon us a condition of things with reference to our Atlantic steamship service that could not have been foreseen, and that it will be difficult for us to satisfactorily meet, even with our greatest efforts. As you

#### CANADIAN PURCHASES FOR FRENCH WAR OFFICE

Philippe Roy, General Commissioner for Canada, Paris, advises the Department of Trade and Commerce, Ottawa, that an order has been issued by the War Department to the effect that all purchases made by the Supply Branch in Canada will pass through the Hudson Bay Co. Canadian producers should therefore submit their future offers through the office of that company at Montreal. It is further stated in Mr. Roy's communication that Canadian lumber, steel and meat will find in France an important market for years to come, but it is necessary that Canadian firms should have in Paris representatives entrusted with the necessary authority, especially if it is desired to secure Government contracts.

know, a great many of our ships have been taken by the Admiralty, and we have found it impossible to charter a sufficient number to replace them.

"In these circumstances we must either utilize such steamships as are available to the utmost, or we must permit a substantial percentage of our Canadian exports to be diverted from Canadian ports.

"Apart from all other considerations, the Halifax call would involve a delay to our passenger ships of from two or three days on each round voyage, with a like reduction in their freight carrying efficiency. Our endeavor must be this winter to avoid unnecessary detention of a single hour, so as to secure the fullest advantage of their carrying capacity. By running direct to and from St. John, in these exceptional circumstances to

which I have referred, no precedent is being established.

"When normal conditions return, the Halifax mail service and the terms upon which it is to be conducted will be open for consideration."



#### REMEMBERING EMPLOYEES AT THE FRONT

ARTHUR MARSH, brother of Lt. Col. Marsh, president of Marsh & Henthorn, Belleville, Ont., and Bombardier Ed. Blaylock, a member of the office staff, who spent last Christmas in Salisbury Plain Camp, and who knows the needs of the soldiers at the front have prepared a large number of Christmas boxes, weighing the limit of eleven pounds each, one for each former employee of the firm now on active service. The firm and the entire office and munition staff contributed to the gifts. Each man gets a box containing the following:

Three plugs 10c "Prince of Wales" chewing tobacco.

One 30c plug "T & B" smoking tobacco.

Fifty "Sweet Caporal cigarettes in tin box.

One 25c pipe.

Two small boxes safety matches.

Five packages chewing gum.

Five packages chocolate.

One box "Lifebuoy" soap.

One pad writing paper.

One bundle envelopes.

One pencil.

One tin of sardines.

One tin of condensed coffee.

Half-pound tin Brazil nuts.

Half-pound of shelled walnuts.

One package of dates.

Twenty-five cent tin "Oxo."

One tin of "Paris" pate for sandwiches.

One Christmas cake, 1½ lbs.

One package butter scotch.

One steel mirror in case.

One tin insect powder.

One tooth brush.

One pair leather mitts, oil tanned.

One pair 50c socks.

One package bachelor's buttons.

Two handkerchiefs.

One hand towel.

The men who fire the munitions will certainly be deeply appreciative of the thoughtfulness of their comrades who are making the shells.



#### NOVEMBER REVENUE A RECORD

THE war budget is giving results exceeding the most sanguine expectations of the Minister of Finance. The total revenue for the month of November is \$17,072,456.76, an increase of \$7,576,920.46, over that of November of last



year, and the largest for any month in the history of the Dominion.

For the eight months of the present fiscal year, ended November 30th, the total revenue aggregates \$104,750,000, as against \$90,400,000 for the last fiscal year, when, owing to the effect of the war, trade was badly demoralized during August, September, October and November, of the eight months in question. The estimate of the Minister of Finance that his budget of February last would realize thirty millions of additional revenue is not certain to be substantially exceeded.

The policy adopted by the Government at the outbreak of the war of proceeding only with works actually under contract is now bearing its full fruit. For the first eight months of the current fiscal year the ordinary expenditures show a reduction of over ten million dollars, and the capital expenditures of about three millions. Between increased revenue and decreased expenditure the financial position this year as compared with the previous year shows a favorable balance of twenty-seven million dollars. The Dominion is thus daily becoming stronger to meet the increasingly heavy expenditures of the war.

#### CANADA'S WAR LOAN

THE Government has decided to make the Canadian War Loan one hundred instead of fifty millions. The extra fifty millions will be obtained from the sixty odd millions of the over-subscriptions to the original loan, and will be used as a credit for the Imperial Treasury to pay for shells, munitions and other war supplies ordered by the Imperial Government.

It is the first step towards doing Canada's fair part in helping the motherland to finance the enormous war expenditure of \$25,000,000 per day, which the Imperial Treasury has hitherto borne unaided. It means that the Government has definitely embarked on the policy on helping the motherland not only with men and munitions, but also with money, and of returning, in part at least, the assistance which the Dominion has received from Britain in the way of war loans and through half a billion dollars' worth of war orders. Later on, when the first fifty millions of advances to the Imperial Treasury are exhausted, the Government will "devise a plan whereby with the co-operation of the chartered banks a further credit for the same purpose will be created."

Before the war is over the extent of this financial aid to Great Britain is likely to amount to \$300,000,000 or more—all of which will eventually be paid by the motherland, and is being immediately paid in the shape of war orders,

which are keeping Canadian industries busy.

#### C.P.R. PURCHASES FOR BRITISH GOVERNMENT

THE C.P.R. is providing the British Government with war necessities ranging over a wide field. Excluding horses, fodder, ammunitions and munitions, there is hardly anything that could be mentioned that the company is not interested in purchasing, if it can show relation to the needs of the military in the field. The amount ordered at first was small, because the British authorities did not know to what extent Canada could supply the articles needed. In fact the orders at first did not total \$500,000, but when Sir Thomas Shaughnessy went over to England and consulted with the authorities he was able to inform the latter as to the aptitudes of our Canadian manufacturers.

The orders include millions of pairs of socks and drawers. Shovels and spades are in much demand by the military authorities on the other side, with whom the C.P.R. deals entirely, placing its experience at the disposal of the British War Office, in a spirit of patriotism, rather than in that of a hucksterer. Handled axes have been in great demand; and the country has been scoured for them. Wire cable was badly needed, and hundreds of miles of it have been ordered by the C.P.R. department. Rubber boots of the full hip pattern, snowshoes, cheese, safety matches, shoepacks, evaporated vegetables, including potatoes, which are in great demand, etc.

Cement sacks were secured from the Canada Cement Co., to the number of 8,000,000 chisels, screw-drivers, vises, brass drills, shears, augers, punch cutters, helmets, etc.; in fact, there is nothing which could be included in the necessary outfit of troops in the field which is not in demand.

The British authorities could take many more things which Canada does not, as yet, manufacture, but the C.P.R. has focused every manufacturing interest in the country on Room 114, on Windsor street—a room which displays no sign, hints no business, but in which are thousands of samples, and always a large number of manufacturers, or their agents, for the company deals direct.

To date more than five million dollars' worth of goods and materials have been purchased.

#### BANKERS DISCUSS MUNITIONS' FINANCING

THE Minister of Finance on Dec. 2, conferred with a Committee of the Canadian Bankers' Association whom he had invited to Ottawa to discuss with him the extent to which Canada might

assist in the partial financing of Great Britain's expenditure for shells, munitions and supplies in Canada, and the means by which such assistance could be best afforded.

It is understood that such methods as the issue of Dominion notes against gold deposited in London, acceptances of bills of exchange and advances to manufacturers and others against Treasury bills or other securities, were discussed. It is believed that the Minister of Finance has in mind a plan which will materially assist in the financing of the purchases in Canada by the Imperial Government during the next six months or year.

The suggestion has been put forward frequently since the outbreak of the war that Canada should finance her own war expenditures in their entirety, as well as the purchases of Great Britain and the Allies in Canada. The following figures show the nature of the problem.

Canada's war expenditure from the outbreak of the war until December 31st, 1916, will probably amount to \$400,000,000. The purchase of Great Britain and the Allies of supplies and munitions will probably by that date have exceeded \$600,000,000. The total of Canada's war expenditures and purchases by the Allies will thus be over one thousand million dollars. Up to the outbreak of the war Canada had been, and is still a borrowing country, depending upon outside money markets for the sale of her Dominion, provincial and municipal securities.

As Canada has no international money centre like New York or London, where accumulations of capital are available for short-date Treasury loans or for the sale of Government securities, it is obvious that Canada will not be able to provide funds for the whole, but for only a part of her own war expenditure, and by way of advances for the expenditure in Canada by the Allies for supplies and munitions. Only by production and saving is it possible to increase the supply of Canadian capital available for this purpose.

**Laurentide Power Co. Board.**—J. E. Aldred, president of the Shawinigan Water & Power Co., and Cedars Rapids Power, has been chosen as president of the Laurentide Power Co., while F. A. Sabbaton was elected vice-president. The other members of the board include Edwin Hanson, C. R. Hosmer, George Chahoon, jun., J. H. A. Acer, Howard Murray, Julien C. Smith, and Secretary-Treasurer W. F. Robinson. One vacancy on the board remains unfilled, and it is held for a representative to be named by the Shawinigan Water & Power Co.

# INDUSTRIAL <sup>A</sup><sub>N</sub><sup>D</sup> CONSTRUCTION NEWS

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

## Engineering

**St. Mary's, Ont.**—C. Richardson & Co. are equipping a plant for making shells.

**Hamilton, Ont.**—The Tallman Brass Co. are making an extension to their plant.

**Toronto, Ont.**—The Multipress Co. is in the market for drop hammer and screw presses.

**Lachine, Que.**—The Dominion Bridge Co. are building a brass foundry at a cost of \$20,000.

**Hamilton, Ont.**—The Aeme Stamping Tool Works will make an extension to their plant to cost \$3,000.

**Toronto, Ont.**—The Chapman Double Ball Bearing Co., have started work on a further addition to their plant.

**Elenheim, Ont.**—The Pere Marquette Railway Co. may instal a pumping plant here, taking water from the River Eau.

**Wallaceburg, Ont.**—The Wallaceburg Brick Co. will erect an addition to its plant and will install machinery for the manufacture of tile, etc.

**Waneta, B.C.**—The Waneta Development Co. will construct a hydro-electric power plant at the Columbia and Pend O'Reille Rivers, B.C., to have a capacity of 80,000 h.p.

**Peterborough, Ont.**—The Peterborough Metal Products Co. will take over the premises formerly occupied by the Canadian Cordage Co., and will install machinery for manufacturing metal products.

**Englehart, Ont.**—A representative of the Riordan Paper Mills of Montreal, has closed a deal for the old Foster Mill at Haileybury, and are placing new machinery in it for rossing the pulpwood they expect to purchase in Temiskaming.

**Welland, Ont.**—The Canada Forge Co. will build an extension to their plant. The new building will have an area of 180 x 80 feet, and will be of structural steel. The cost is estimated at \$20,000, and the equipment to be installed will cost \$100,000. T. J. Dillon is manager.

**Ottawa, Ont.**—A private concern, the Transeona Shell Company, will make shells in one of the several extensive shops of the Transcontinental Railway, near Winnipeg. The G. T. P. some time ago secured a contract, but has since

transferred it to the Transeona Shell Co. It is understood that Montreal capitalists, headed by Sir Edward Holt and Henry Timmins, are interested.

## Municipal

**Otterville, Ont.**—A hydro-electric system will be installed here to cost \$2,150.

**Lambeth, Ont.**—The town will construct a pump house and install new machinery.

**Huntsville, Ont.**—The town council will build a sub-station and improve the power plant and distribution system.

**Sarnia, Ont.**—The City Council have decided to lay an intake pipe from the third basin of the Point Edward plant out into the lake.

**West Lorne, Ont.**—It is proposed to spend \$8,000 on a hydro-electric power system. A by-law will be submitted to the ratepayers on December 20.

**Sherbrooke, Que.**—The city council are considering alterations and improvements to the water power, electric transmission and lighting plants.

**Edmonton, Alta.**—The City Council contemplate spending \$274,967 on a sewage disposal plant. A by-law will be submitted to the ratepayers on Dec. 13.

**Springfield, Ont.**—A by-law will be voted on by the ratepayers on December 9 to authorize an expenditure of \$5,000 on the installation of an electric light plant.

**London, Ont.**—It is announced that owing to the increase of the consumption of hydro power the rate charged London by the Ontario Commission would be reduced January 1 from \$24 to \$22.

**Cornwall, Ont.**—The town will purchase a new pump and make extensions to its waterworks system to cost \$25,000. A by-law will be voted on by the ratepayers on January 3.

**Sarnia, Ont.**—The city contemplate improvements and extensions to the water distribution system. A by-law will be voted on to sanction the necessary expenditure, which is estimated at \$12,000.

**Berlin, Ont.**—The City Council have decided to submit a hydro-radial by-law for \$779,000 to the ratepayers. Waterloo Town and Waterloo Township Councils

also voted in favor of submitting similar by-laws, the former for \$193,000, and the latter for \$521,903.

**Winnipeg, Man.**—City Engineer W. P. Brereton has recommended the installation of two gas engines at the high-pressure plant on James Ave., to be used to develop electrical energy sufficient to operate two 5,000,000 gallon motor-driven booster pumps at the McPhillips street pumping station. The cost of this stand-by arrangement would be \$21,000.

## General Industrial

**Windsor, Ont.**—The Vacuum Street Cleaning Machine Co. are considering the building of a factory in this district.

**Fort Erie, Ont.**—The International Safe & Register Co., contemplate the erection of an addition to their factory shortly.

**Nelson, B.C.**—Donald Fraser, Ltd., Fredericton, N.B., have commenced the re-erection of their sawmill on the Miramichi River.

**Hamilton, Ont.**—The Proctor & Gamble Co., soap manufacturers, have had plans prepared for an addition to their factory.

**Toronto, Ont.**—A fire last Friday damaged the Gold Medal Furniture Mfg. Co. factory to the extent of \$100,000. W. J. McMurtry is the manager.

**St. Catharines, Ont.**—The Marathon Rubber & Tire Co. have begun the erection of a factory, and expect to have the plant in operation by the first week in March.

**Saskatoon, Sask.**—The Alaska Bedding Co., of Montreal and Winnipeg, have purchased the entire plant of the Stameo Mfg. Co. The building has been taken over by the T. Eaton Co., and the Alaska Bedding Co. will store the machinery until the spring, when it will probably be utilized.

**Moose Jaw, Sask.**—Two large manufacturing concerns, one of Vancouver, B.C., and the other in Iowa, are looking at Moose Jaw favorably at the present time, as a most suitable city in which to establish branch factorires. The Vancouver firm is interested in the manufacture of brushes and brooms, while the Iowa firm manufacture fountain pens.



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They eliminate all risk of having shells rejected on account of thread being stripped, as is liable to be the case when tapped by the old method.

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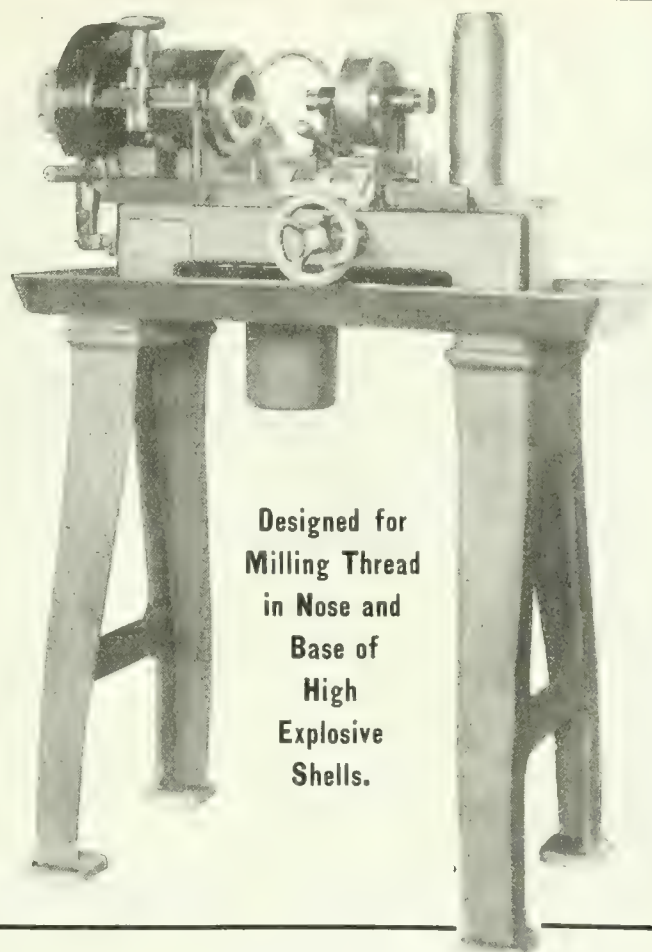
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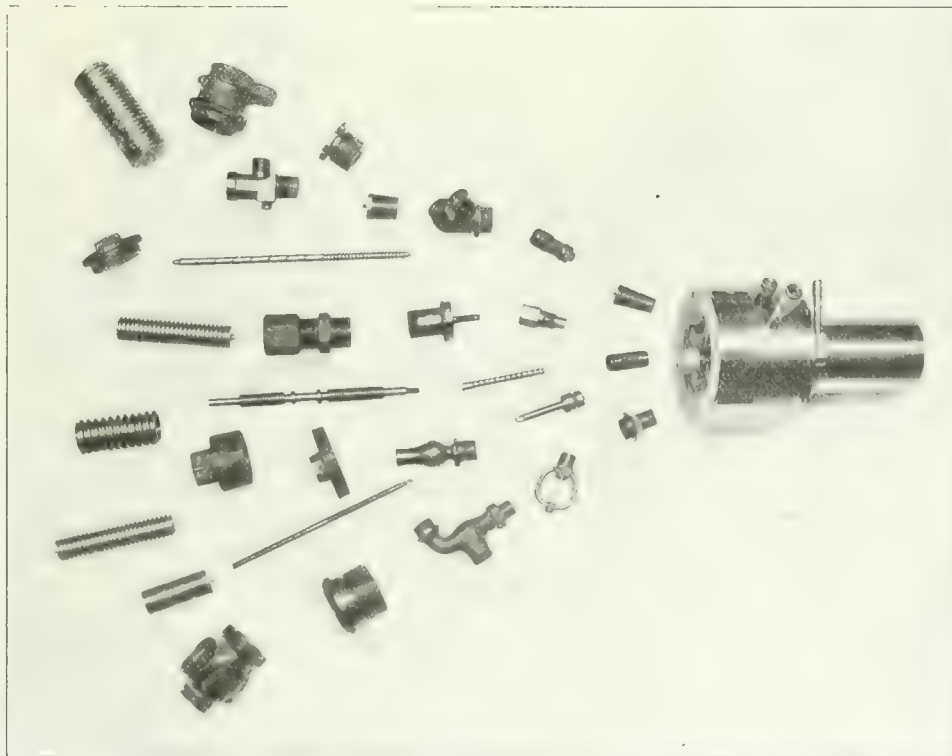
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*If what you want is not advertised in this issue consult the Buyers' Directory at the back.*

## Trade Gossip

**Eden, Ont.**—E. Ketchalaw is in the market for woodworking machinery.

**London, Ont.**—The George H. Beton Lumber Co. will install electrical equipment in its plant to operate woodworking machinery.

**Oakville, Ont.**—The W. H. Carson brick, sash and door factory on Dundas street, north of Colborne street, was damaged by fire last Saturday to the extent of \$10,000.

**The Imperial Oil Co., Sarnia, Ont.,** will increase their capital stock to \$50,000,000, to take care of any future possible growth of business. Walter C. Teagle is chairman of directors.

**The Imperial Munitions Board** have accepted the process of sherardizing cast iron nose plugs for shells as an alternative to nickel-plating. Brass plugs are now being replaced with cast iron ones.

**Demand for Old Rails.**—With reference to an item regarding the demand for old rails which appeared in the Dec. 2 issue of *Canadian Machinery*, a correspondent advises us that he has a considerable quantity of this material in stock and would like to be put in touch with prospective consumers.

**The Canadian Porecelain Co., Hamilton, Ont.,** have presented to the Hamilton Technical School a fine collection of porcelain insulators used on high tension transmission lines, ranging in voltage from 2,000 to 150,000. The collection will be found valuable in the electrical department of the school for construction in high tension work.

**The Canadian Association of Boat Manufacturers** at a meeting held in Toronto, elected the following officers:—Hugh Warnock, Penetang, president; M. L. Butler, Brighton, 1st vice-president; W. R. Richardson, of Peterboro', 2nd vice-president; A. F. Fenton, Toronto, secretary; and Herbert Ditchburn, Gravenhurst, treasurer, succeeding Capt. C. H. Rogers, of Peterboro', who is now in France.

**Tungsten Advancing.**—Prices of tungsten ore and tungsten metal continue to soar. A recent sale of high-grade tungsten ore in the States is noted at \$45 per unit for 60 per cent. ore. In September \$32 per unit was paid, and in August \$16. Tungsten metal or ferro-tungsten is now selling at about \$6 per pound of contained tungsten as against 60 cents to 65 cents before the war, and \$2.50 a few months ago.

**The Steel Company of Canada, Hamilton, Ont.,** as a result of its increasing business, largely due to the big war or-

ders it has received and the prospect for business after peace is arranged, is planning extensive additions to its plant. Three new open-hearth furnaces are to be built at once, the blooming mill extended and two forge plants erected for the manufacture of 8 and 9.2 shells. The improvement will cost several hundred thousands of dollars.

**French Industrial Commission.**—Members of the French industrial and Commercial Commission, which recently arrived in New York to promote trade relations between the United States and France following the war, have arranged a tentative itinerary for the next few weeks that will take them to a number of leading cities of the United States and Canada. About Dec. 15 they have arranged to come to Canada for a stay of a week or ten days.

**Toronto, Ont.**—A by-law seeking permission to guarantee \$3,000,000 of debentures as the city's investment in the proposed hydro-electric radial scheme will be submitted to the ratepayers on January 1st next. This decision was arrived at by the Board of Control after conferring with Sir Adam Beck, chairman of the Provincial Hydro-electric Commission, and his chief engineer, F. A. Gaby, on Dec. 1. This amount does not cover the terminals to be located in the city or that part of those radials which constitute a portion of the city's rapid transit. In short the citizens will be asked to meet the cost of all rapid transit lines within the city limits and invest the suggested \$3,000,000 in the general scheming outside the city.

## Tenders

**St. Hyacinthe, Que.**—Tenders will be received up to January 11, for a mechanical filter plant. Plans and specifications may be obtained at the office of Hector Cadieux, city engineer.

**Halifax, N.S.**—Tenders will be received by the Governor of the Province of Macao, up till January 8, 1916, for the supply of a steel, self-propelling dredge for the use of the Macao Harbor Works. Full particulars may be obtained at the office of Fred H. Oxley, Consul for Portugal, Keith Bldg., Halifax, N.S.

**Winnipeg, Man.**—Tenders addressed to the Commissioners of the Greater Winnipeg Water District will be received up to December 15, 1915, for the supply of miscellaneous bronze castings, brass piping, etc., which enter into the construction of a Venturi meter. Specifications and form of tender may be obtained at the office of the District, 901 Boyd Bldg., Winnipeg.

## Personal

**John Milne,** president of the Burrow, Stewart & Milne Co., Hamilton, Ont., has been appointed to the Senate.

**John Ansley,** at one time county engineer and also proprietor of the local iron foundry, died at Wingham, Ont., on Nov. 28, aged 83.

**P. E. Mercier,** acting chief engineer for the City of Montreal, will probably be appointed to that position in succession to the late Georges Janin.

**C. L. Jobb,** general manager of the Canadian Iron Corporation, has been in Fort William, Ont., for a few days on business connected with the local plant.

**Abraham Van Winkle,** of the Hanson & Van Winkle Co., died at Newark, N. J., recently aged 77. Mr. Van Winkle, who was born at Pompton, N.J., assisted in the development of the first low voltage dynamo made in the United States.

**Charlton James Wollaston,** a pioneer in submarine telegraphy, and who laid the first cable from Dover to Cape Gris-Nez, the nearest point on the French shore to that of Britain, died recently in England.

## Railways—Bridges

**London, Ont.**—The council have decided to submit the by-law requested by the London & Port Stanley Railway to raise \$101,000 for track extensions.

**Brantford, Ont.**—At a special meeting of council, it was decided to give ratepayers of the city a chance to vote on ratification of the sale of the Grand Valley Railway between Paris and Galt to the Lake Erie and Northern Railway, which railway is controlled by the C. P.R. between Galt and Port Dover. The cost will be \$30,000, and electrification of L. E. and N. Railway from Galt to Port Dover.

**London, Ont.**—The first step toward the million-dollar guarantee of bonds for the proposed Hydro-radial railway was taken last Monday by the city council, which gave two readings to the by-law and sent it on to the ratepayers.

**Hydro Radials.**—This proposed Hydro radial scheme includes projected lines running from Western Ontario via London and Guelph, Hamilton to Toronto, Barrie to Toronto, the proposed Markham and Uxbridge line and that section suggested for the connection of Port Perry with Toronto via Whitby. Sir Adam's Beck idea is to make Toronto the real pivotal point of all the adjacent counties, and latterly, the Province for





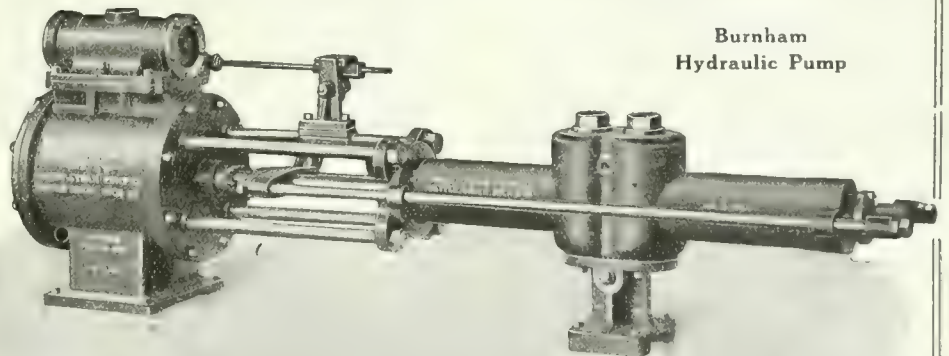
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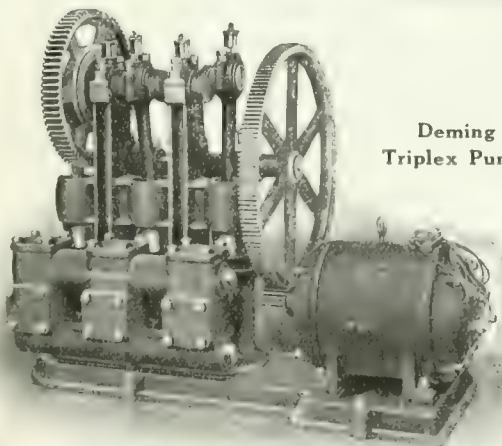
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farming, market gardening and other industries, as well as for passenger traffic.

**Radial Plans Approved.**—The Toronto-Guelph-Berlin-London Hydro Radial project was further advanced on Nov. 23 when a deputation of municipal representatives from Mimico and New Toronto discussed with Chief Engineer Gaby, of the Provincial Hydro-Electric Commission, at Toronto, route plans and other points in connection with the line. This conference was one of a number the commission's engineers are having with the representatives of the various municipalities interested in order to secure approval of plans and details.

## New Incorporations

**The Eclipse Iron Works, Ltd.,** of Vancouver, B.C., has been incorporated with a capital of \$20,000.

**The Eastern Machinery Co.** of Montreal has been incorporated with a capital of \$45,000. Incorporators: A. Lalonde, E. A. Lalonde and D. L. Desbois, all of Montreal.

**The Dominion Shell Mfg. Co.** of Montreal has been incorporated with a capital of \$99,000. Incorporators: H. C. Thorn, L. H. Cote and W. W. Laindon, all of Montreal.

**The Dominion Magnesite Co.** of Calumet, Que., has been incorporated with a capital of \$100,000. Incorporators: F. G. Bush, G. R. Drennan and M. J. O'Brien, all of Montreal.

**The Lachance Nut Lock Co.** has been incorporated with a capital of \$300,000 to carry on business at Montreal, Que. Incorporators, J. A. Bilodeau, M. Lorange and B. Melaveou, of Montreal.

**The Kirkland Lake Gold Mining Co.** has been incorporated at Toronto, with a capital of \$2,000,000, to acquire and develop mineral lands and deposits. Head office at Toronto. Incorporators—David Inglis Grant and Gideon Grant, of Toronto.

**The Triumph Mines, Ltd.,** has been incorporated at Toronto, with a capital of \$3,000,000, to acquire and develop mineral lands and deposits. Head office at Toronto. Incorporators—James Richardson Roaf and John Edward Morden, of Toronto.

**The Canadian Vincent Valve Co.** has been incorporated at Ottawa with a capital of \$25,000 to manufacture the Vincent drain valve and similar appliances at Victoria, B.C. Incorporators: Arthur Newham, R. Powell and E. Bonner, all of Victoria, B.C.

**The Alliance Beverage Co. of Toronto** has been incorporated at Toronto, with a

capital of \$40,000, to manufacture beverages, condiments, preserves, etc., at Toronto. Incorporators—Henry Cresser Haskins and Edward Gowan Russell Aradagh, of Toronto, Ont.

**The Federal Brass Co.** has been incorporated at Ottawa with a capital of \$50,000 to acquire the business now carried on by the Federal Electric & Mfg. Co. at Montreal. Incorporators: Joseph Phillipe Arthur Belanger and Louis Joseph Cyprien Gagnon of Montreal.

**The Canadian Brass Bedsteads, Ltd.,** has been incorporated at Ottawa with a capital of \$45,000 to manufacture household furniture of all kinds and in particular brass and iron bedsteads, at Montreal. Incorporators: Eugene Honore Godin and Joseph Eudore Morier, of Montreal.

**Canadian Cannery, Ltd.,** has been incorporated at Ottawa with a capital of \$1,000,000 to carry on business as manufacturers of all kinds of canned goods, condiments, pickles, etc., at Toronto, Ont. Incorporators: John Dawson Montgomery, Arthur Carson McMaster, of Toronto.

**The Pilcher Mfg. Co.** has been incorporated at Ottawa with a capital of \$50,000 to manufacture metal buttons and other goods, at Windsor, Ont. Incorporators: John Vashe Pilcher and George Pegram Walton, of Louisville, Kentucky, and Thomas P. Archer, of Windsor, Ont.

**The Canadian Electro Products Co.** has been incorporated at Ottawa with a capital of \$500,000 to manufacture all kinds of metals, metallic substances, metallic products, chemicals, etc., at Montreal. Incorporators: Walter Robert Lorimer Banks and Daniel Percy Gillmer of Montreal.

**The Western Sugar Refining Co.** has been incorporated at Toronto, with a capital of \$600,000, to manufacture, refine sugar and by-products at Petrolia, Ont. Incorporators: Ralph Daniel Mitchell and Daniel Joseph Kilby, of Cleveland, Ohio, and David A. Gordon, of Wallaceburg, Ont.

**The Imperial Cordage Co.** has been incorporated at Ottawa with a capital of \$150,000 to manufacture rope, binder twine, and all products and by-products of manila, hemp and sisal, at Walkerton, Ont. Incorporators: John Connor, of St. John, N.B., E. A. D. Morgan and S. Avery of Montreal, Que.

## Contracts Awarded

**Toronto, Ont.**—The city council have awarded a contract, lead-covered under-

ground cable, to the E. F. Philips Electrical Works, Ltd., Montreal.

**Kingston, Ont.**—The City Council have awarded a contract for rubber lined linen fire hose to the Goodyear Tire & Rubber Co., Toronto, at 50c per foot.

**Merrickville, Ont.**—The Rideau Power Co., have awarded contracts for water wheels to the William Hamilton Co., Peterborough, and electrical equipment to the Swedish General Electric Co. The total cost of power house and plant is estimated at \$80,000.

## Catalogues

**Oiling Devices** made by the Canadian Winkley Co., Windsor, Ont., are the subject of catalogue No. 10. A large number of styles are illustrated and described in detail, accompanied by price list and principal dimensions for each size.

**The Canadian General Electric Co.,** Toronto, Ont., have issued a bulletin illustrating and describing a new multi-stage centrifugal compressor set No. 3350. This machine is particularly applicable for use in connection with oil or gas-burning furnaces and a list of operating advantages is given.

**Buffing and Polishing Machinery.**—Bulletin No. 700 on buffing, polishing and burnishing machinery, the latest of the series of "Munning-Loeb" publications on electro-plating and polishing equipment and supplies, fully describes the Munning-Loeb line of buffing and polishing lathes from the small bench lathes to the large double-spindle pedestal lathe, also belt strapping machines, flexible grinders, tumbling barrels, burnishing barrels and sand blast apparatus. This bulletin will be sent to anyone on request.

**Motor Generator Sets.**—Bulletin No. 42,552 issued by the Canadian General Electric Co., Toronto, illustrates and describes an interesting and varied range of motor generator sets adapted for different purposes. The bulletin contains a considerable amount of information covering the operation, field of application, excitation and construction of motor generators, while booster and balancer sets are also dealt with. The bulletin contains a number of excellent half-tones covering the various types and showing in a general way the design and arrangement when installed.

**Lubricators.**—Bulletin No. 60, the Richardson model "M" sight feed oil pump recently issued by the Richardson-Phenix Co. of Milwaukee, Wis., contains much new information concerning the



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well-known model "M" lubricator. Interesting illustrations show the process of manufacture from the raw material to the finished lubricators on the test rack, and give a good idea of the manner in which the pumps are drilled and milled from a solid block of cast iron. An interesting chapter on gas engine lubrication discusses the question of timing the admission of oil so that it is forced directly on to the engine pistons. Other items of interest are a description of the new Richardson air spray attachment; also the steam and electric attachments for heating the oil in the lubricator reservoir. A double-page illustration of the New York sky-line shows that practically all important buildings in the Metropolitan district are equipped with Richardson-Phenix lubricating appliances. Copies of the above bulletin may be had upon request from the company.

**Book Reviews**

The Model T Ford Car, its construction, operation and repair, by Victor W. Page, 300 pages, 5 x 7, 100 engravings and two folding plates. Published by the Norman W. Henley Publishing Co., New York City. Price \$1. This is the 1916 edition of a book which, as the title indicates, is written chiefly for owners, dealers and salesmen of Ford cars. Although the book deals exclusively with one particular make of car, the fact that so many Ford cars are in operation makes the situation somewhat exceptional, and warrants the publication of a special treatise on its repair and maintenance, especially as so many owners of Ford cars possess but little mechanical knowledge. The volume as a practical instruction book is complete and the subject is treated in a comprehensive manner. The construction is fully described and the operative principles made clear to everyone. Complete instructions for driving and repairing are given, while every phase of the subject is treated in a non-technical manner. The book contains five chapters. The first deals with the Ford car with regard to its parts and their functions. Chapter 2 describes the engine and the various auxiliary groups. The details of the Ford chassis parts are dealt with in chapter 3, while chapter 4 contains instructions for driving and the maintenance of the car. The concluding chapter on overhauling and repairing the mechanism is of special value and contains a great deal of valuable information. The diagrams and half-tones, which are full of detail, have been carefully prepared and are very instructive. The book is fully indexed, printed in clear type, and is bound in cloth.

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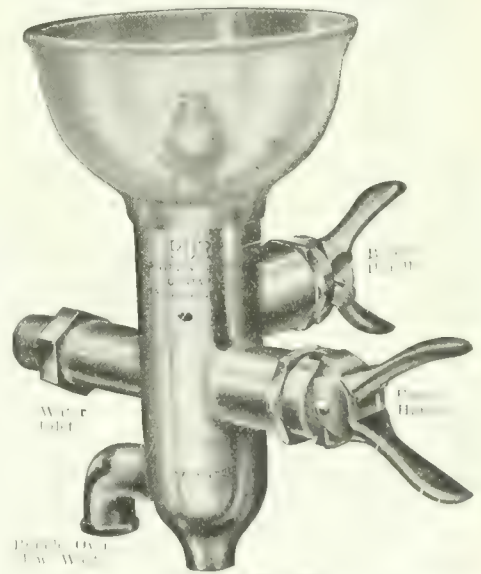
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Eight Gisholt 24" Turret Lathes. Re-manufactured machines with complete standard equipment as supplied by the makers.

Must be guaranteed in first-class working order. Cash will be paid immediately for above.

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WANTED POSITION AS BRASS FOUNDRY foreman. Advertiser has had past experience in high-class valves and plumber supplies, also foundry end of shell work. Can furnish the best of references. H. W. B., care of Canadian Machinery, Montreal.

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STEAM ENGINES FOR SALE—ONE 10 H.P. stationary boiler and settings complete; good working order. Price one hundred dollars. One 3 to 4 H.P. upright; good working order. Price fifty dollars. Apply to H. A. Lawrence, West Shefford, Quebec.

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14 x 6 Prentiss Bros. Lathe, all Geared Head  
No. 6 Brown & Sharpe Plain Screw Machine, Back Geared.  
16 in. Davis & Egan Screw Machine, Back Geared, Friction Head.  
30 in. Lodge & Shipley Pulley Lathe with Turret, 4" Hollow Spindle.

**American Machinery Exchange**  
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## Machinery For Sale

- 1—Automatic Gridley, 1 1/4 capacity.
- 1—16" shaper with countershaft and swivel vise.
- 1—New 4-spindle "Reed Prentiss" Ball-Bearing Drill Press.
- 4—Electric Direct Current Breast Drills, up to 3/4 capacity.
- 1—3-Ton Screw Pulley Chain Block.
- 4—5-Ton Screw Pulley Chain Blocks.
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**Ontario Metal Products Co.**  
Limited  
102 FRONT ST. EAST, TORONTO

# SOME GOOD ONES

### TURRET LATHES

- 3—24" Gisholt motor drive
- 1—24" Steidle belt drive
- 1—No. 2 Warner & Swasey hollow hexagon
- 1—22" Bullard combination
- 2—27" x 24" Jones & Lamson cone type
- 1—24" x 24" Jones & Lamson geared head
- 1—20" Garvin back geared

### SCREW MACHINES

- 1—Pearson 1 1/2" automatic chuck and wire feed
- 1—Pratt & Whitney 1" automatic chuck and wire feed
- 1—Brown & Sharpe No. 0 Hand Screw Machine
- 1—Brown & Sharpe No. 00 automatic
- 1—Brown & Sharpe No. 1 automatic
- 1—Brown & Sharpe No. 2 automatic
- 1—Cleveland 7/8"—1 1/8" automatic
- 1—Cleveland 3/4"—7/8" automatic
- 1—Cleveland 3/4" automatic
- 2—2 1/4" Cleveland automatic
- 2—2 3/4" Cleveland style "B" automatic

### LATHES

- 1—60" x 32 1/2" Pond geared head
- 1—48" x 16" Schumacher & Boye geared head
- 1—36" x 16" Walcott & Wood
- 1—32" Bradford heavy duty
- 1—28" x 14" New Haven, D. B. G.
- 1—24" 10" x 12" McCabe double spindle
- 1—21" x 14" Bradford D. B. G., blocks to make swing 27"
- 1—20" x 12" LeBlond, D.B.G.
- 1—20" x 8" Lodge & Shipley with taper
- 3—20" x 10" Blaisdell
- 1—18" x 10" Schumacher & Boye
- 1—16" x 6" Cincinnati
- 1—15" x 6" Blaisdell with taper
- 1—14" x 6" Carroll-Jamson
- 1—14" x 5" Pratt & Whitney

### LATHES (continued)

- 1—14" x 6" Hendey
- 1—11" x 5" Star
- 1—10" x 5" Pratt & Whitney

### BORING MILLS

- 1—60" Colburn, 2 heads
- 1—42" King, A1 condition, 2 heads
- 1—42" Bullard, 1 swivel and 1 turret head
- 1—42" Wais & King, 2 heads
- 1—50" Niles Pulley Borer
- 1—42" Niles Car Wheel Borer

### PLANERS

- 1—62" x 54" x 12" Gray, 2 heads
- 1—56" x 48" x 8" Belmer, 1 head
- 1—42" x 42" x 12" New Haven, 1 head
- 1—42" x 42" x 14" D & H, open side
- 1—36" x 36" x 14" Cincinnati, 4 heads
- 1—36" x 36" x 12" Cincinnati, 2 heads
- 1—28" x 28" x 8" Wheeler
- 1—26" x 26" x 6" Pond
- 1—24" x 24" x 6" Pond
- 1—24" x 24" x 7" Gray
- 1—24" x 24" x 6" Gray
- 1—24" x 24" x 4" Gray

### SHAPERS

- 1—32" Walcott triple geared
- 1—26" Putnam triple geared
- 1—24" Cincinnati crank B. G.
- 1—20" American crank B.G.
- 1—18" Barker & Chard crank
- 1—16" Aueri an crank
- 1—16" Wheelabrator crank
- 1—15" Hendey friction
- 1—14" Pratt & Whitney

### RADIAL DRILLS

- 1—5" Dresser Universal
- 1—5" Western Universal
- 1—4" Bickford plain
- 1—3 1/2" American, speed box drive

### RADIAL DRILLS (continued)

- 1—3" Fostick—national pattern
- 1—2 1/2" Fostick—national pattern

### UPRIGHT DRILLS

- 1—50" Prentiss Bros.
- 1—34" Barnes
- 1—32" Mechanics
- 1—32" Hamilton
- 1—32" Cincinnati with taper attachment
- 1—28" Hamilton
- 1—28" Barnes
- 1—24" Hamilton
- 1—22" American

Large stock smaller drills  
Several multiple spindle drills

### POWER PRESSES

- 1—Punch and Shear, 36" throat, capacity 1 1/2 x 1 1/4"
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  - 1—No. 5 Ferracute Punch Press
  - 1—No. P3 Ferracute Punch Press
  - 1—No. M5 American Can Co., geared
  - 2—No. 4 American Can Co., inclinable
  - 1—No. 3 Toledo, inclinable
  - 1—No. 15 Bliss, inclinable
  - 1—No. 95 Bliss, straight sided double crank
  - 1—No. 1 Bliss Toggle Drawing Press
  - 1—No. D.A.G. Ferracute Double Action
  - 1—No. 21 Consolidated Horn Press
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- Variety smaller presses

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- No. 2 Hurlbut-Roger Cutting Off Machine
- Style D Matson Cutting Off Machine
- No. 3 Cincinnati Gear Cutter
- Wilmarth-Marmon Drill Grinder
- 2 H.P. 220 volt D.C. Polishing Lathe
- No. 60 Head Cylinder Grinder
- Lincoln Miller (old style)
- 10 20-25-30-35 H.P. 220 volt. A.C. Motors
- No. 1 American Oil Extractor
- No. 200 Oil Extractor
- 30 x 30 x 8 Gray Planer No. 90
- 4 x 24 x 8 Gray Planer
- 32" Triple Gear Shaper No. 40
- No. 1 Grenier Riveting Machine

### BORING MACHINES

- 2 Spindle Newton Horizontal Cylinder Boring Machine
- 42" Bullard Vertical Boring Mill with two heads

### DRILL PRESSES

- 26" Barnes sliding head
- 28" Prentiss sliding head
- 26" Barnes wheel and lever tool
- 2" Kirkhoff lever feed
- 11" 2-spindle Rockford
- 4 ft. Niles Plain Radial
- 4 Spindle Garden Art. gang
- 23" Hofer with tapping attach.
- 3-Spindle Barr (2)
- 2-Spindle Rock (10)
- 3-Spindle Rock (1)
- 1-Spindle Rock (4)

### LATHES

- 2 x 24 Jones & Lamson (old style)
- 10 x 8 Porter (plain rest)
- 18 x 8 Putnam (plain rest)
- 18 x 12 Blaisdell with turret
- 18 x 6-1/2 hole 1/4" turret
- 18 x 8 Lodge & Shipley
- 18 x 8 Davis & Egan with turret
- 18 x 19 American tool room
- 2 x 10 Lodge & Shipley
- 22 x 12 New Haven
- 18" x 8" Lodge & Shipley No. 60
- 18" x 16" Lodge & Davis No. 55
- 10" x 8" Lodge & Davis No. 37
- 18" x 8" Lodge & Davis No. 50
- 22" x 10" Putnam with grinding attachment No. 52
- 26" x 20" Special Shafting Lathe No. 85

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Get our quotations before selling. We are wholesale dealers in all grades of Scrap Iron, Scrap Steel turnings and borings, Scrap Copper, Brass, etc. This week we are paying 27 cents per pound for Scrap Aluminum.

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Second-Hand Steel Tiering Machine, operated by hand.

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This machine is in first-class condition, and is offered at a sacrifice.

**Box 157**  
**Canadian Machinery**

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Of New and Used Machine  
Tools in Stock for  
Immediate Delivery

### Turret Lathes and Screw Machines

- 40" x 12" New Haven
- 26" x 8" Davis
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- 20" x 6" Bridgeport
- 15" x 5 1/2" Fox, American
- 15" x 5" Bardons & Oliver
- 13" x 5" Woods tilted turret
- 2" x 24" Jones & Lamson flat turret
- No. 2 Garvin (3)
- No. 1 Pratt & Whitney
- 7 1/2" Cleveland automatic
- 8 1/2" Cleveland automatic
- 8" x 31" Brown & Sharpe
- 6" x 28" Brown & Sharpe (3)
- Garvin double turret

### Engine Lathes

- 42" x 20" Fifeild
- 32" x 14" Bradford
- 30" x 12" Putnam
- 30" x 10 1/2" Pond
- 26" x 14" McDougall (gap)
- 26" x 14" Gleason (2)
- 26" x 12" Blaisdell
- 25" x 14" Fitchburg
- 25" x 10" Bradford
- 24" x 24" Fifeild
- 24" x 14" Putnam
- 21" x 8" Fay & Scott
- 21" x 8" Fitchburg (2)
- 20" x 10" Powell
- 20" x 8" Bullard
- 20" x 8" Ames
- 20" x 8" Harrington
- 18" x 8" Fitchburg
- 18" x 8" New Haven
- 18" x 6" Ames
- 17" x 8" Blaisdell
- 17" x 6" L. Blair
- 16" x 10" Harrington
- 16" x 8" Harrington
- 15" x 5" Flather

### Upright Drills

- 26" Bickford (2)
- 24" Kern
- 20" Buffalo (4)
- 20" Bertram (2)
- 20" Bickford
- 20" Barnes
- 8 1/2" Bertram universal radial
- 7 1/2" Bertram universal radial
- 6 1/2" Wall radial

### Planers and Shapers

- 52" x 50" x 11" Pond
- 30" x 30" x 17" Wheeler
- 30" x 30" x 16" Putnam (2 heads)
- 30" x 30" x 8" Bertram
- 25" x 25" x 12" Lodge & Davis
- 24" x 24" x 6" Butler
- 10" x 24" Fitchburg traverse
- 26" Smith & Mills
- 24" Hendey
- 20" Barker
- 16" Garvin

### Milling Machines

- No. 4 Brown & Sharpe universal
- No. 12 Brown & Sharpe plain (2)
- No. 3 Cincinnati plain
- 8 1/2" Bertram slab miller

### Presses

- No. 200 Brown-Biggs
- No. 4 1/2 Bliss
- No. 5 Waterbury
- No. 1 Scriba
- No. 52 Ferracute

### Miscellaneous

- No. 1 Rapid back saw
- 11 26 Besta grinder
- 12 x 6 Shaper tooling machine
- No. 1 Dwight-Slate gear cutter
- 12" Bertram slotter
- 11" Bertram bolt cutter
- 11 1/2" Standard bolt cutter

Prices, Descriptions and Full  
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WE CALL ATTENTION TO THE FOLLOWING TOOLS, ALL OF WHICH ARE IN THOROUGHLY FIRST-CLASS CONDITION, READY FOR IMMEDIATE SERVICE

### BORING MILLS.

- 72 inch King vertical boring and turning mill, with two heads.
- 72 inch Niles vertical boring and turning mill, with two heads.

### TURRET LATHES.

- One Garvin No. 3 turret lathe, 18" swing, with 2 1/2" hole through spindle, back gear and friction head.
- One Garvin No. 2 1/2 turret lathe, 16" swing, 1 1/2" hole through spindle, back gear and friction head.
- One American Tool Works Co. turret lathe, 18" swing with 2" hole through spindle equipped with back gear, friction head.
- One Pratt & Whitney No. 3 turret lathe, 14" swing, 1 1/4" hole through spindle, back gear and friction head.
- One No. 3 Pratt & Whitney screw machine, 11" swing, 1" hole through spindle, with vice feed attachment, plain head.
- One Davis & Egan No. 3 screw machine, 12" swing with 1" hole through spindle, complete with vice feed, plain head.
- One Garvin vice feed screw machine, 12" swing with 1" vice feed capacity, plain head.
- One Warner & Swasey plain head turret lathe, 11" swing with 1" spindle capacity.
- One Windsor plain head turret lathe, 14" swing with 1" spindle capacity.
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Why go to the expense of buying new machines for the manufacture of

## SHELLS?

We have already shipped some 75 car-loads of

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**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.**

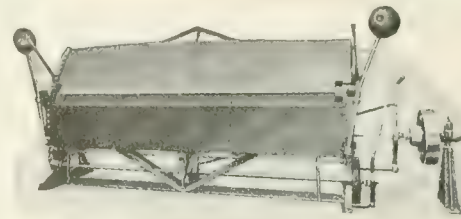
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Catalog giving full description mailed upon request.

10 ft. for 10 Ga.

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A condensed ad. in this paper will bring results from all parts of Canada : : : :

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Malleable

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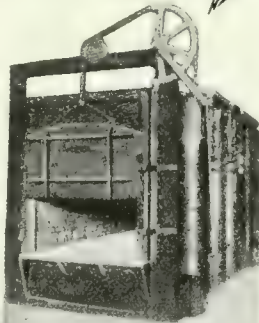
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We can fill all orders promptly.

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We have good quantities in our New York Stock, and can also make Tonnage Delivery from January forward of our Rushitoff No. 6 and No. 7.

**Orders must be to hand before Dec. 15**

We also have complete stocks of Nickel, Chrome Nickel, Chrome Vanadium, and Tool Steels.

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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.

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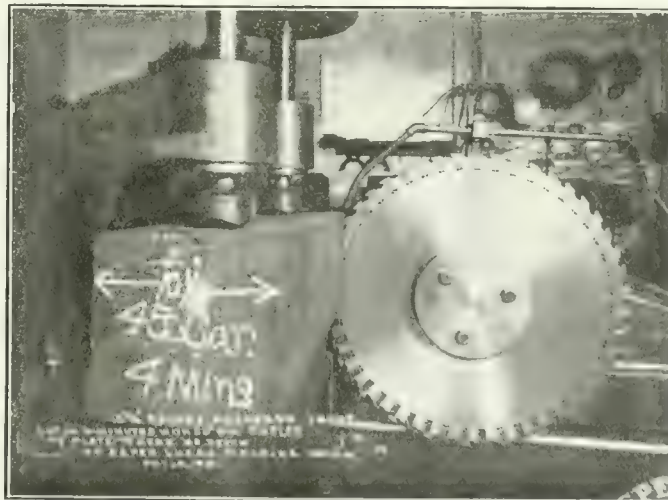
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Tinsmiths' Tools, Sheet Metal Working Machinery, etc.

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***National-Chapman  
Elevating Truck***

will handle more shop products than  
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This is the Elevating Truck that is solving the trucking problems for Canada's largest Shell Manufacturers.

The National-Chapman is the new "Made in Canada" Elevating Truck. It is mechanically correct in design, has four wheels equipped with Hyatt Roller Bearings and heat-treated axles. It has perfect, safe handle control with tremendous leverage. There is a handle release mechanism in addition to the regular foot lever, and a powerful PULL automatic PULL check (always in service) which insures lowering without strain or mishap. The truck will turn in its own length.

It will pay you to investigate!

Note the Prices:—

Size	Capacity	Platform Clearance	Price
17" x 37½"	2,500 lbs.	6½"	\$65.00
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F.O.B. Brantford, Ont., Canada. Larger sizes and capacity accordingly.

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**NATIONAL SCALE CO.**  
BRANTFORD, ONT.

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OIL STORAGE - GASOLINE TANKS - AIR RECEIVERS  
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Hinged Pipe Vises.

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Either Hand or Power.

Manufactured by

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Manufacturers of

Milling Machines; Profiling Machines; Cam Cutting Machines; Screw Machines; Monitor Lathes; Die Slotting Machines; Screw 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.

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### Gives Satisfaction Where Other Metals Fail

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### 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.

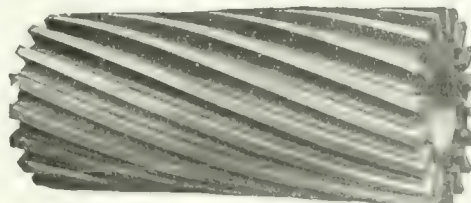
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Also makers of Wire Straighteners and Cutter, Cotter Pin Machines, etc.

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Are scientifically correct. Furnished in 4 in. diameter for general machine shop use.

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



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## HAMILTON GEAR & MACHINE CO.

Cor. Concord  
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**TORONTO**



**CUT  
GEARS**

The best equipped shop in Canada for the production of correct gears at moderate cost.

**YOU WANT TOOL HOLDERS THAT HAVE  
MADE GOOD  
ARMSTRONG TOOL HOLDERS**

Were Awarded The  
**GRAND PRIZE**  
THE HIGHEST POSSIBLE AWARD AT THE PANAMA-  
PACIFIC INTERNATIONAL EXPOSITION.  
THEY ALWAYS MAKE GOOD.



SEND FOR CATALOG.



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"The Tool Holder People"  
306 N. Francisco Ave., CHICAGO, U.S.A

We guard your purchases and tell you if you are getting what you are supposed to get.

Once you have formed the habit of consulting us for expert advice you wonder how you got along without our service.

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**FOR ACCURACY AND  
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DURANT COUNTERS**

To your Presses, Punches, Screw  
Machines, Conveyors, etc.

Built to give correct, readable re-  
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Any of thirty types on 30 Days  
Trial. Send for Catalog No. 12

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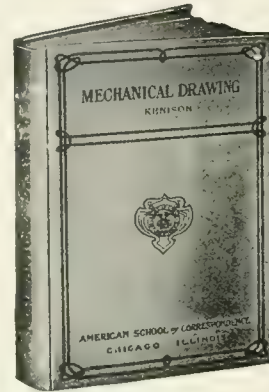
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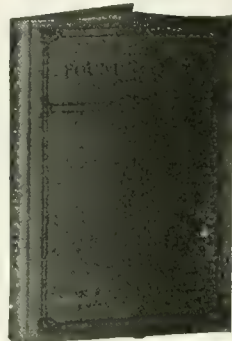


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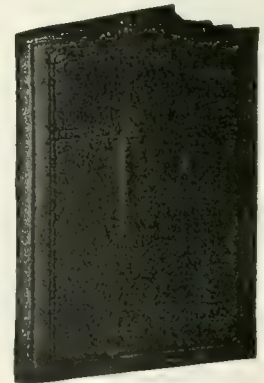


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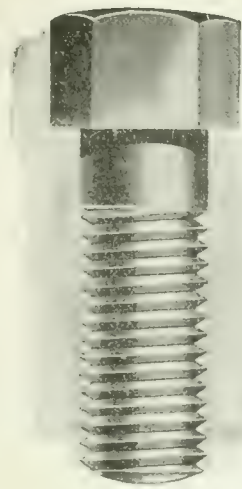
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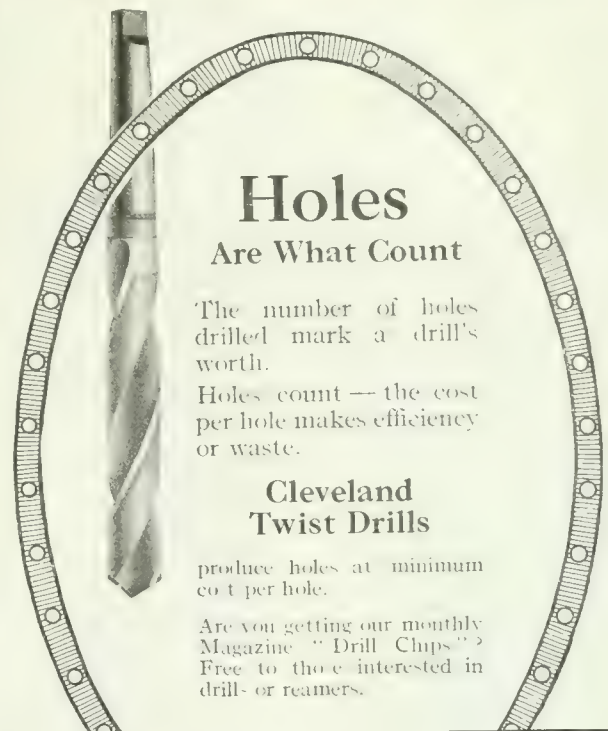
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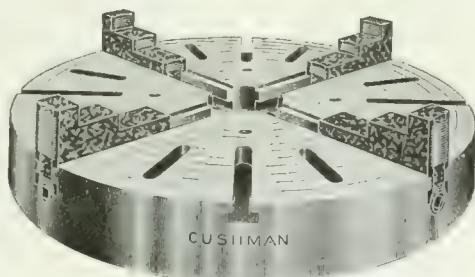
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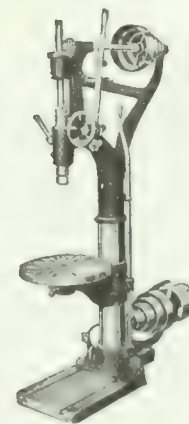
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H. W. Petrie, Toronto.  
Pleassville Foundry, Pleassville, Que.  
Southwark Foundry & Machine Co.,  
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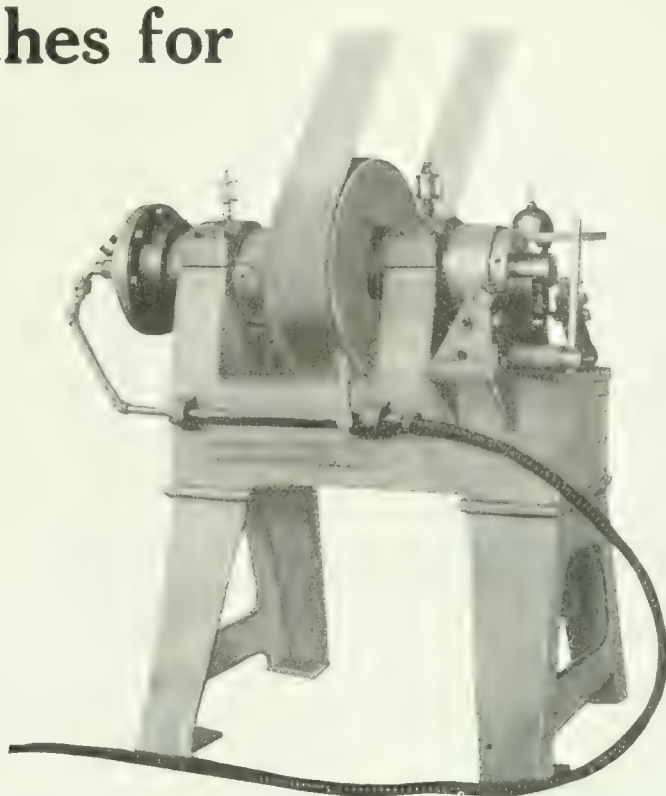
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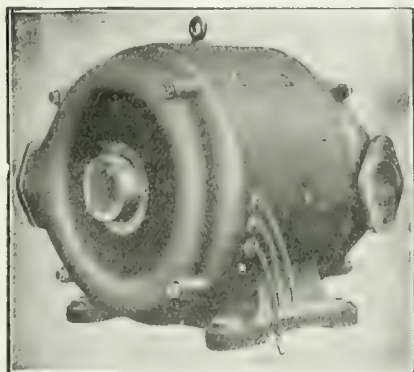
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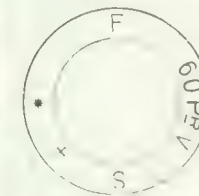
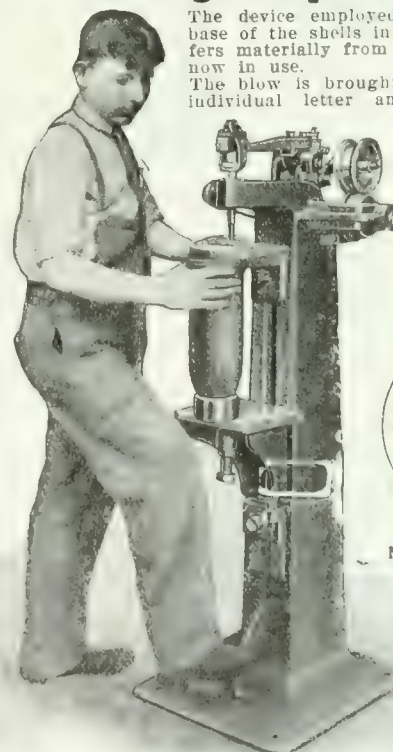
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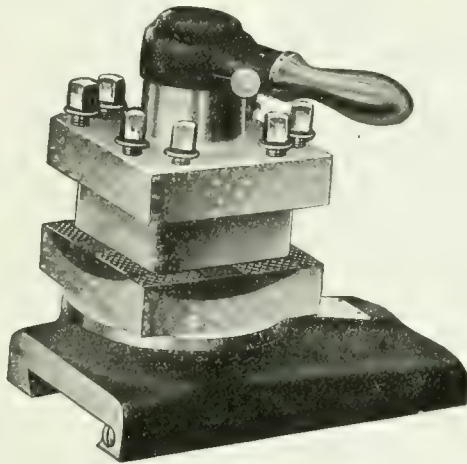


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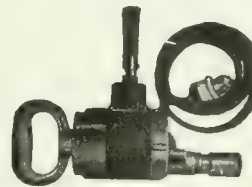
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All motors wound for 110 or 220 volts. Direct or alternating current.

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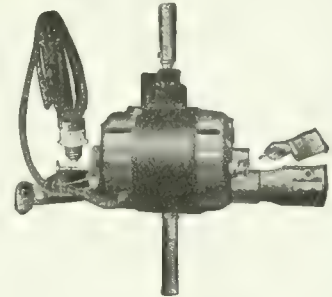
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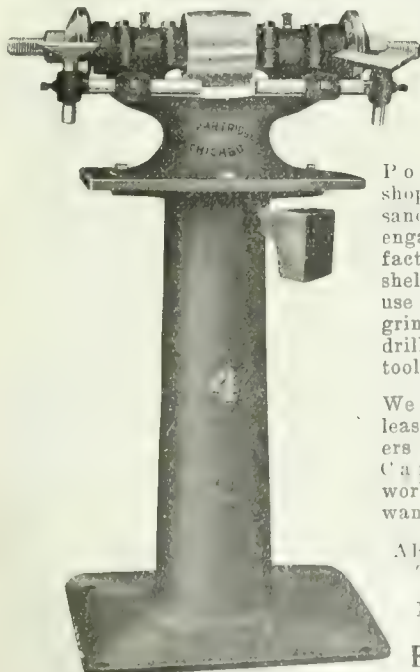
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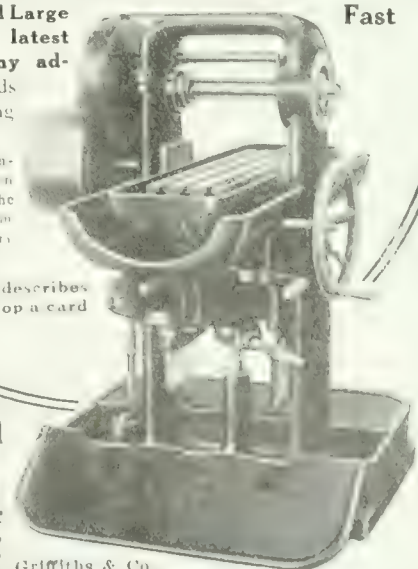
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Charles F. Elmes Eng. Works, Chicago, Ill.
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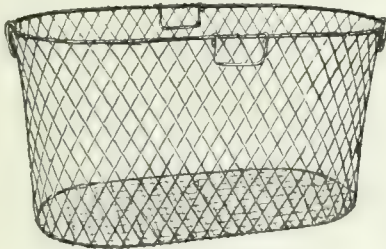
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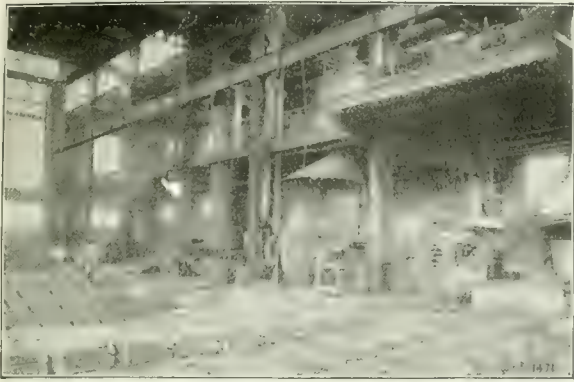
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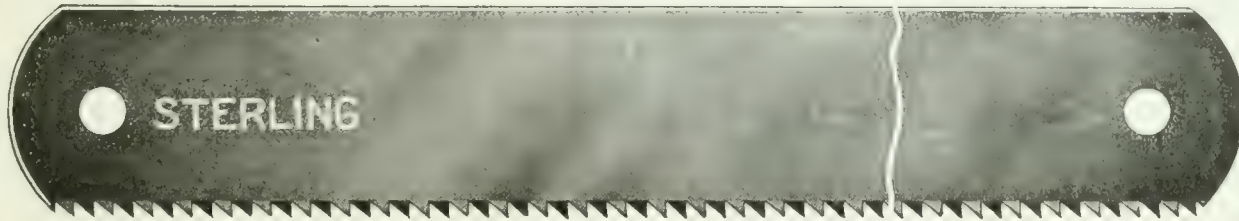
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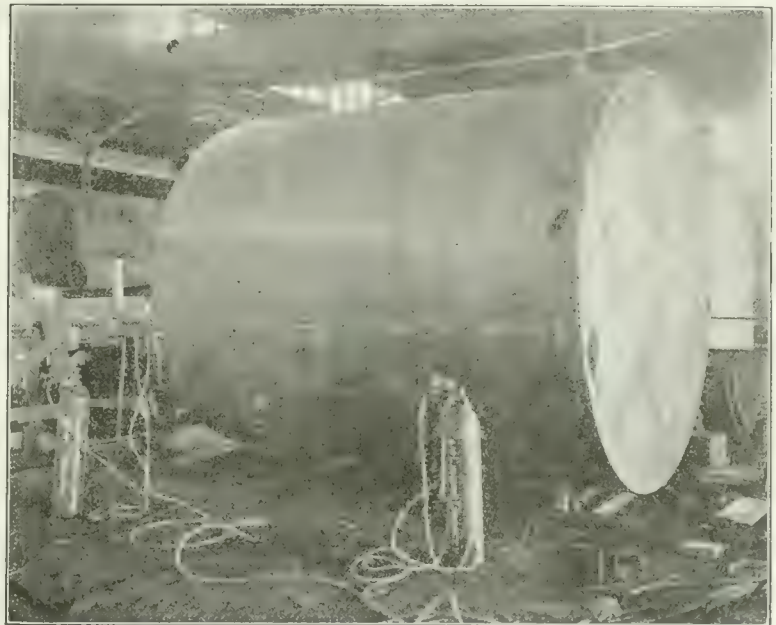
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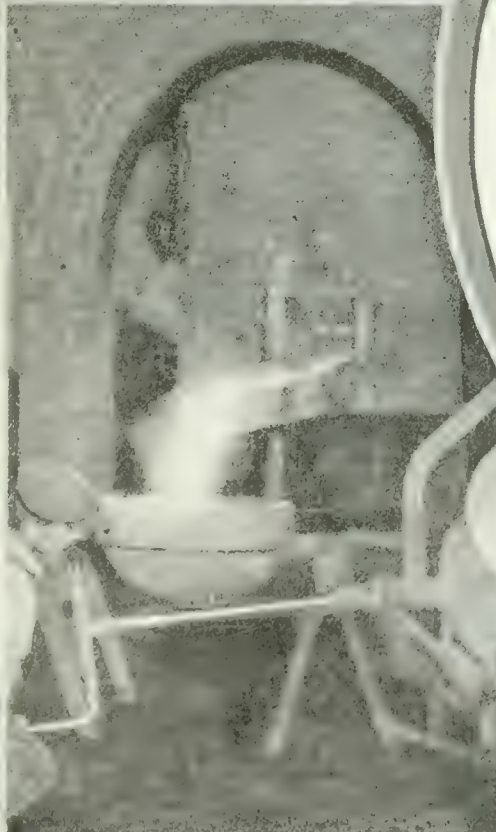
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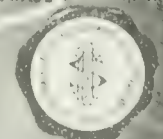
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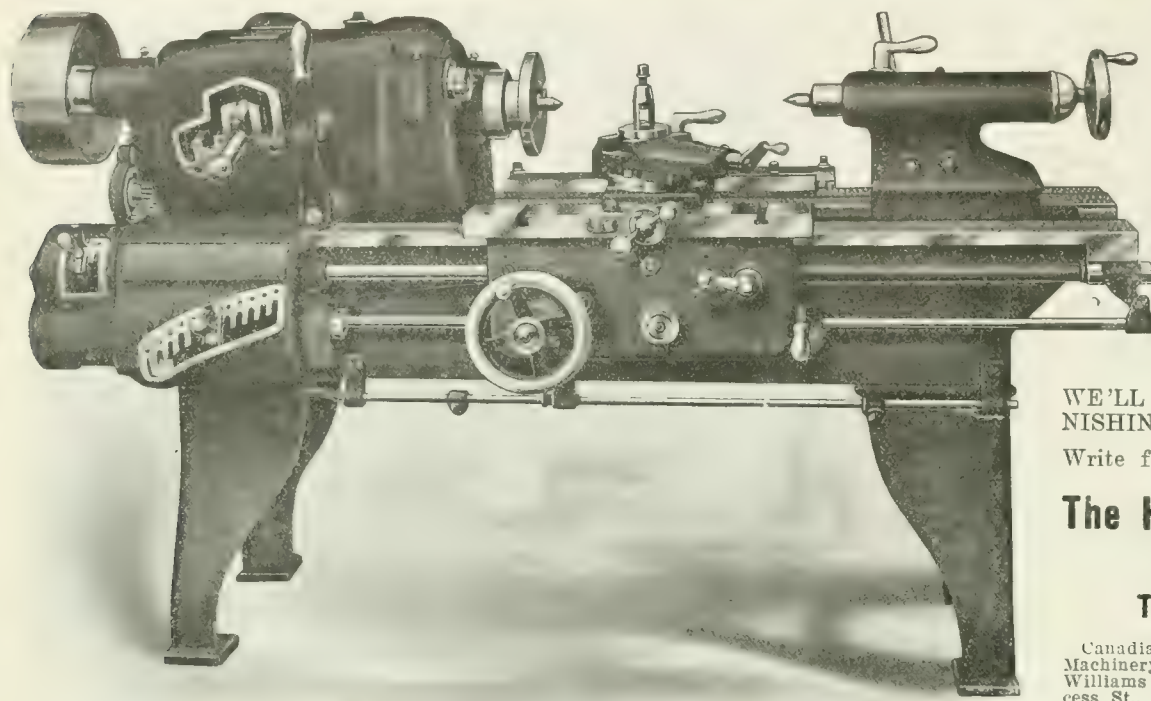


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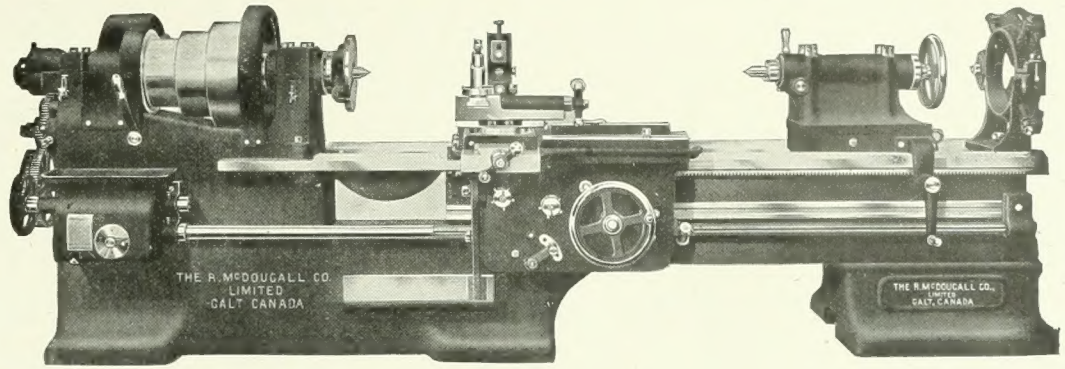
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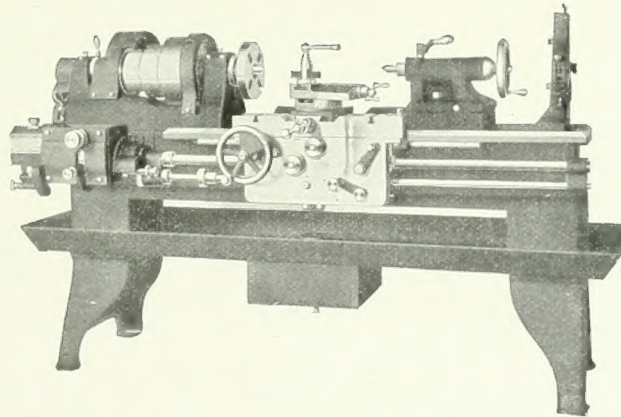
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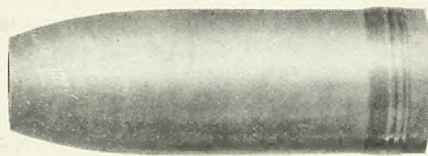
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