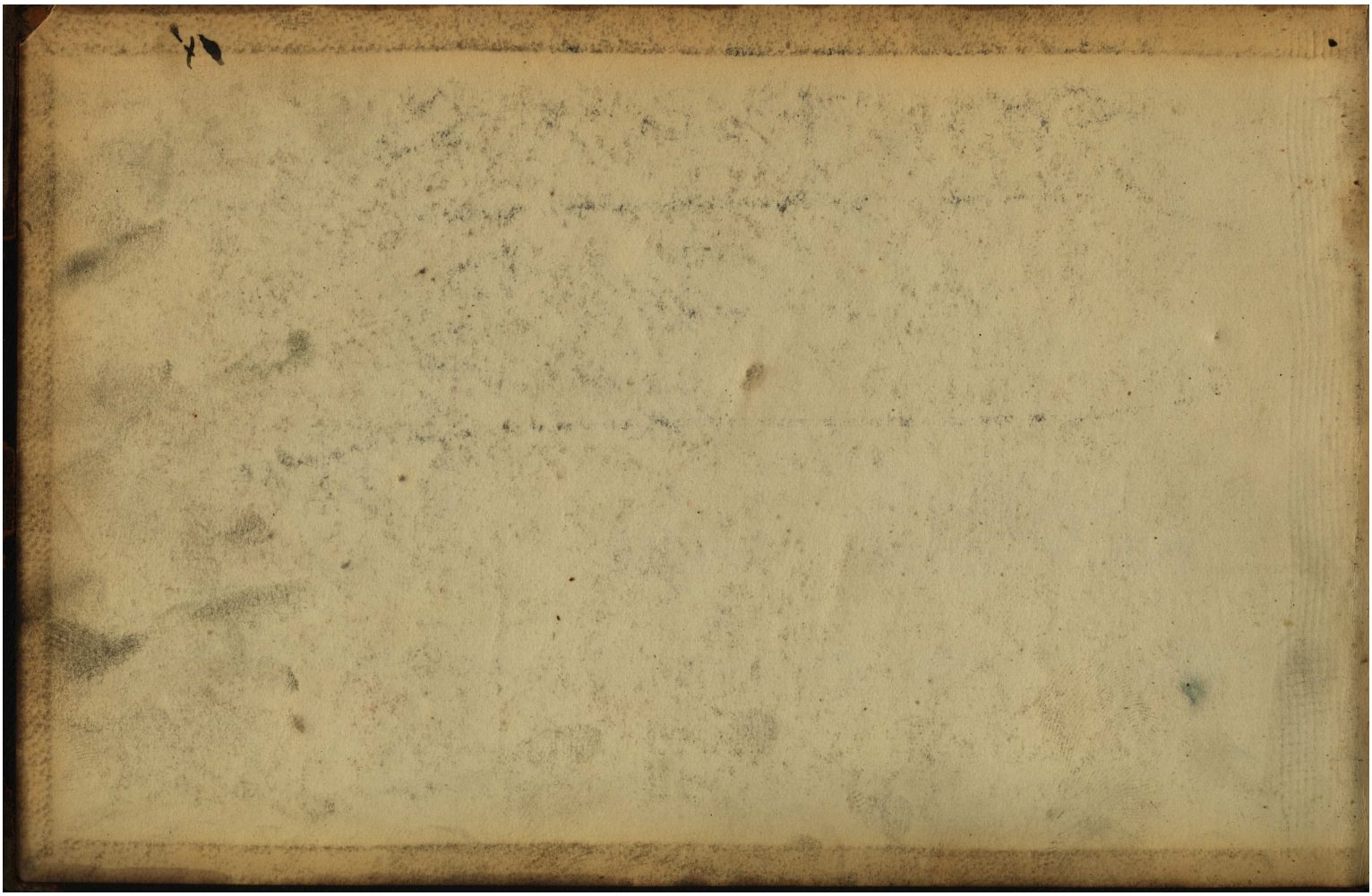
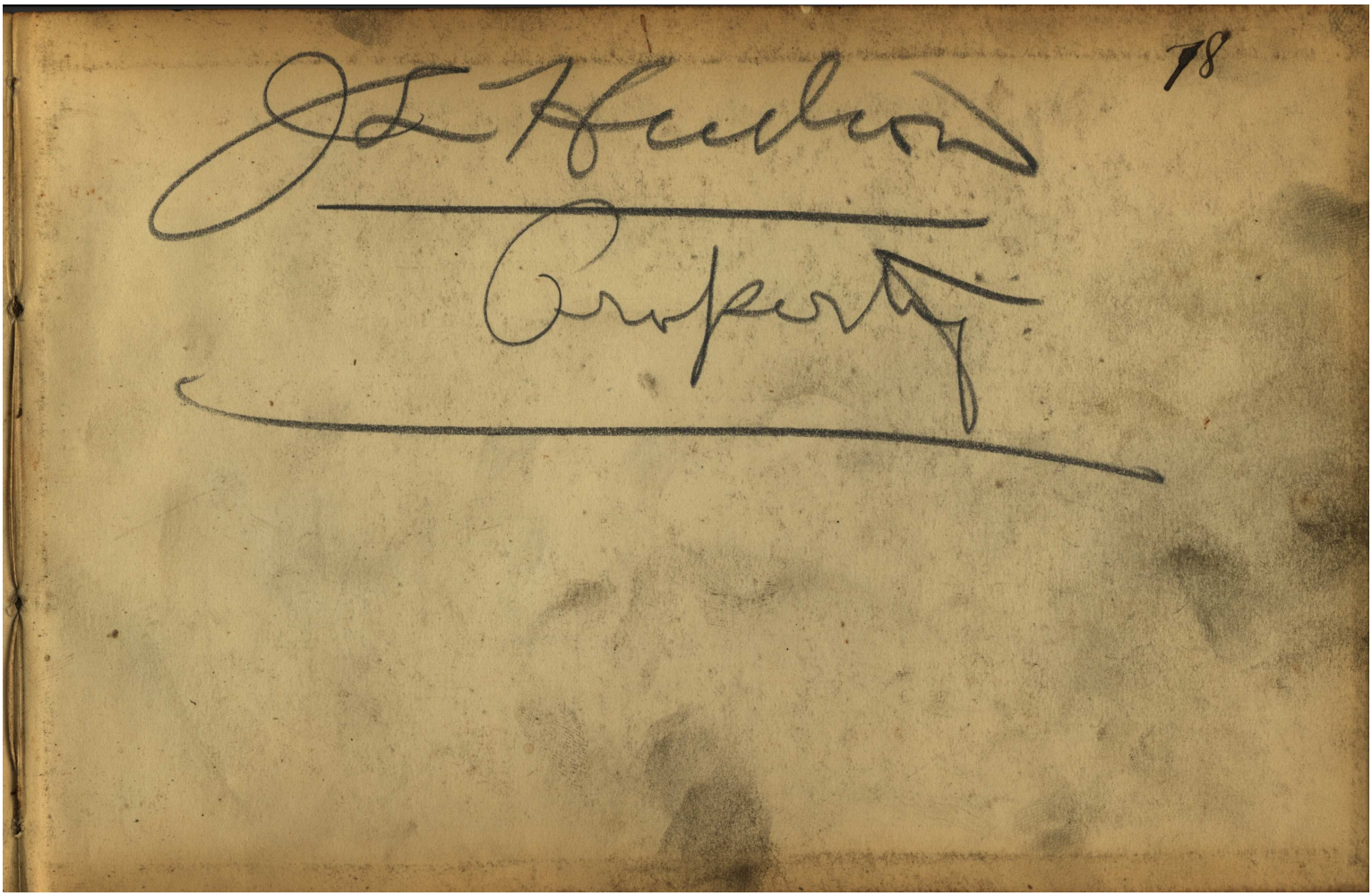
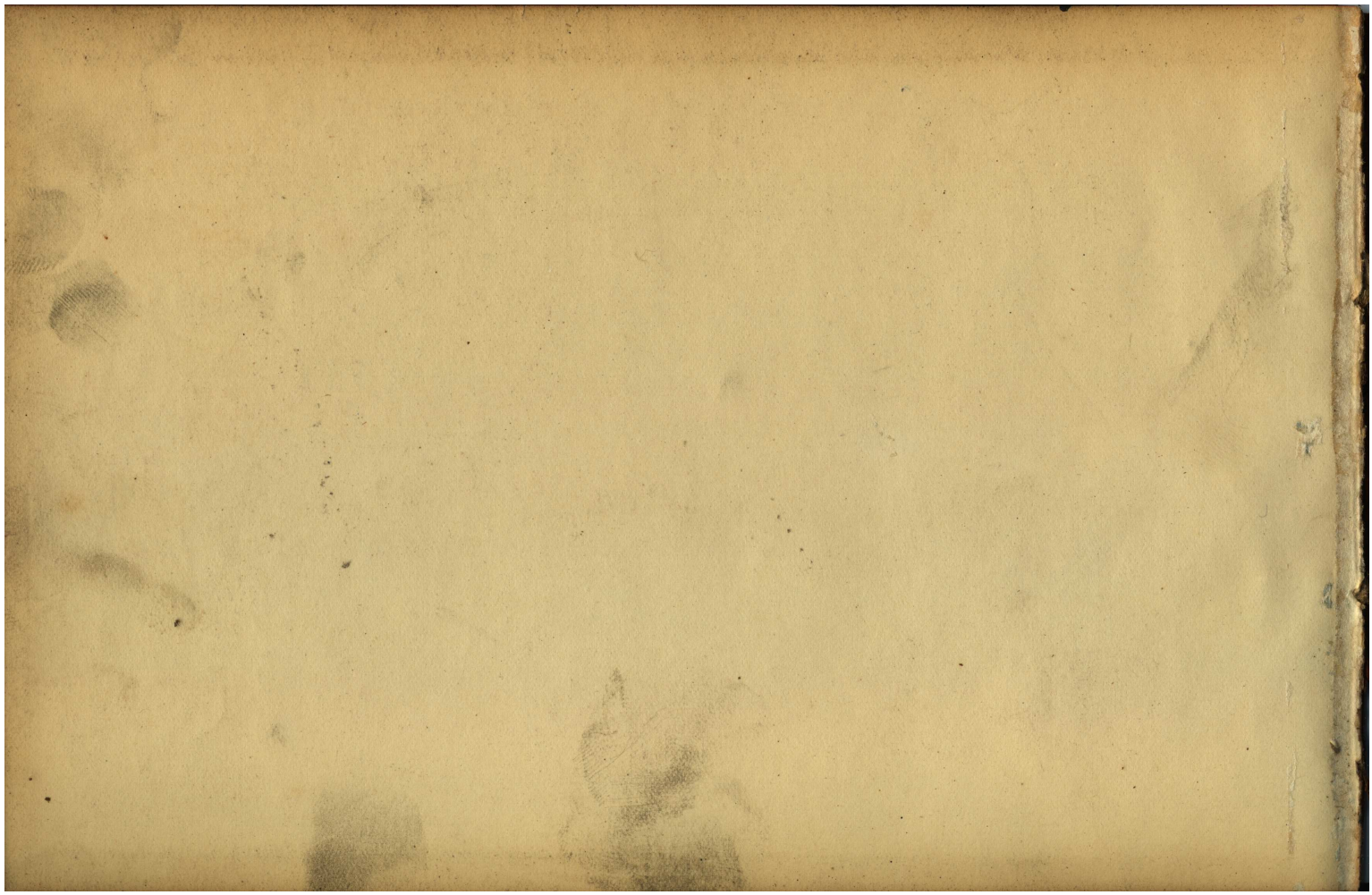
THE LODGE & SHIPLEY MACHINE TOOL CO.,

CINCINNATI, O., U. S. A.

H. PRENTISS.




78



CATALOG R

DECEMBER 1, 1905

MORE
LATHE
WORK
WITH
FEWER
LATHES

THE LODGE AND SHIPLEY MACHINE TOOL COMPANY

LATHES - - - GOOD LATHES ONLY

Designed especially for using High Speed Steels

CABLE ADDRESS "DRILL"

LATHES
GOOD LATHES ONLY
TRADE MARK

CODES USED LIEBERS & OUR OWN

Take Colerain Avenue Car at Fountain Square, it stops at the door

3055 ~ 3065 COLERAIN AVENUE
CINCINNATI, OHIO, U. S. A.

OUR new shops, built by us especially for the manufacture of lathes, are located within about twenty minutes' ride of the center of the city, on a plot of ground of six acres in extent. Shop No. 1 is 90 x 450 feet, brick and steel construction, and is fireproof. Shop No. 2 is 60 x 250 feet and of similar construction, with two floors.

In addition, we have a large warehouse, and a separate building contains the pattern shops, screw machine department, etc.,—a total of about 110,000 square feet of floor space. The shops are fully equipped with the most up-to-date power appliances, including steam, electricity and compressed air. Electric traveling cranes materially reduce the cost of handling.

The machine-tool equipment consists of about two hundred and fifty machine tools of the best makers. *Each size of lathe is manufactured by the use of a separate and complete set of jigs and templates.*

We have ample yard room for storage of castings, etc., which materially aids in prompt delivery.

Our entire energy is concentrated upon the manufacture of lathes and their attachments only.

We manufacture them in large quantities, and do not make drills, milling machines, planers, or any other machine tool than lathes. Each part, no matter how small, has been the subject of careful study and development, and thousands of dollars have been expended in getting ready to manufacture each size, before the first of the size was put upon the market. This concentration of our efforts on the manufacture of lathes *only* has resulted in each of our machinists becoming expert in his especial line; for instance, certain men turn spindles from one year's end to the other, others turn cone pulleys, others plane beds, others scrape and align the lathes, and so on; each man, therefore, becomes expert in the execution of that kind of work to which he devotes his entire attention, as he does not have to jump from one kind of work to another. All these advantages combine to enable us to sell a really good lathe at a reasonable price.

General Information

Patents—Our lathes are made under patents either taken out by ourselves or purchased.

Delivery—Quotations cover delivery free on board cars or boat at Cincinnati. Here our responsibility ceases. Delivery in good order to railroad or boat is considered as delivery to purchaser.

Terms—Thirty days net cash where credit is satisfactory to us.

Boxing—Machines ordered for domestic shipment will be crated free of cost.

Export Boxing—As this is much more expensive than crating, it is charged for at cost.

Allowances—No allowance will be made by us, except by agreement, for any expense incurred by purchaser in repairing or supplying defective or missing parts.

Delays—We disclaim any liability for delays resulting from strikes, acts of Providence, or other unavoidable causes.

Agents—We have agents all over the world, and as most of them ship in carload lots they can often save you money on freights. On request we will gladly give you the name of the agent representing us in your territory.

Catalogs—In ordering, please refer to number of page and catalog edition. The latter will always be found designated on first page. Destroy old catalogs; we are always glad to mail our most recent edition upon application.

Erecting Plans—These show floor space and countershaft arrangement, and will be furnished with lathe if desired.

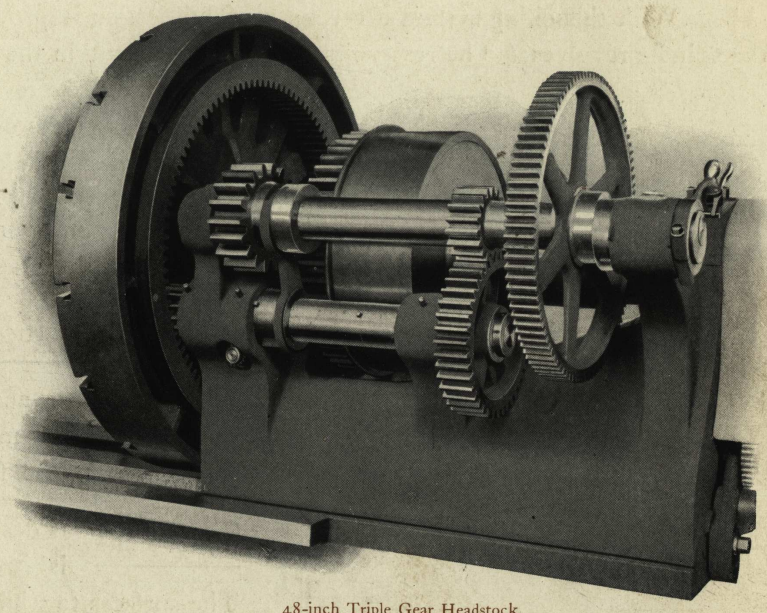
Visitors—Our plant is of interest; visitors are always welcome.

(Original page missing)

(Original page missing)

under heavy feeds. Gear covers are provided for all exposed gears and add greatly to the appearance of the lathe.

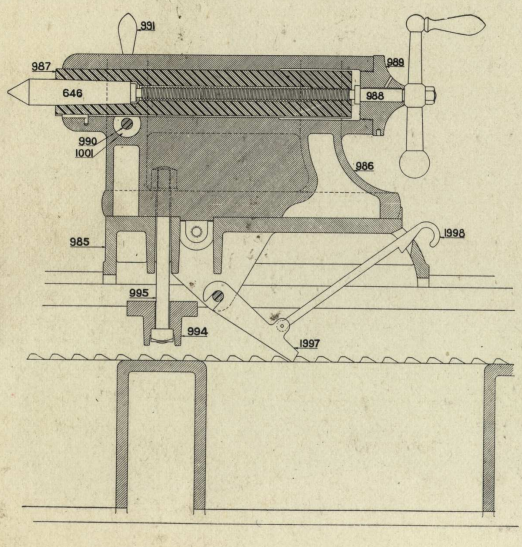
The Spindle is regularly made from .55 carbon steel and has a large hole through its entire length. The journals are made absolutely round and straight by grinding. The bearings are very massive (see page of dimensions for each size lathe), which insures long life and freedom from chattering. The boxes have a deep oil reservoir in each. Attached to the spindle, at the center of each journal, is a brass ring with four projecting buckets. These buckets dip into the reservoirs and at each revolution flood the bearing, the oil returning through



48-inch Triple Gear Headstock

ducts, to be used again and again. Gauge glasses at the front of the headstock indicate the level of oil in each reservoir.

With this oiling system a certainty of lubrication is provided, regardless of the speed at which the spindle revolves. The reservoirs allow any sediment in the oil to settle to the bottom and not be deposited on the revolving journal.



The thrust collar is of steel, hardened and ground. Especial care is taken in facing the surface of the rear housing, with which it comes in contact, so that the bearing is absolutely true. The end motion is taken up by a nut at end of spindle.

Triple Gearing is a regular equipment of our 36, 42 and 48-inch lathes, and can be applied to 24, 27 and 30-inch lathes if desired. The gears are powerful and massive, and are easily engaged or disengaged from the front of the machine.

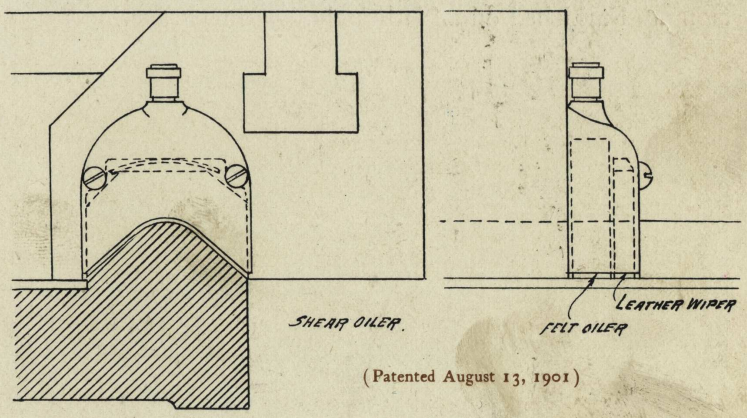
The Bed is designed with ample depth and width, and is strongly braced internally by cross girts. The surfaces to which the lead screw bearings are fastened

are planed to receive them, are tongued and grooved and are in perfect alignment. The Vs are 45 degrees, are large and have the tops rounded to prevent bruising. The feed rack is of steel, accurately cut in one piece (excepting on long beds).

Lathes of 22-inch swing and larger have the beds additionally stiffened by a central longitudinal brace. In the top of this is a rack, into which a pawl on the back of the tailstock engages. A positive brace to the latter is thus provided, the advantages of which, especially when the lathe is engaged on heavy work, are apparent to every mechanic. The rear ends of the beds are also cut out to facilitate the removal of the tailstock or turret when desired.

The Carriage

is extremely heavy and substantial, is provided with liberal tee slots milled from the solid, and is gibbed to the bed its entire length. The bearing on the bed is not recessed, but is in full contact from end to end, with the entire depth of the Vs. Instead of an inside V at the front of the lathe, a flat is used on

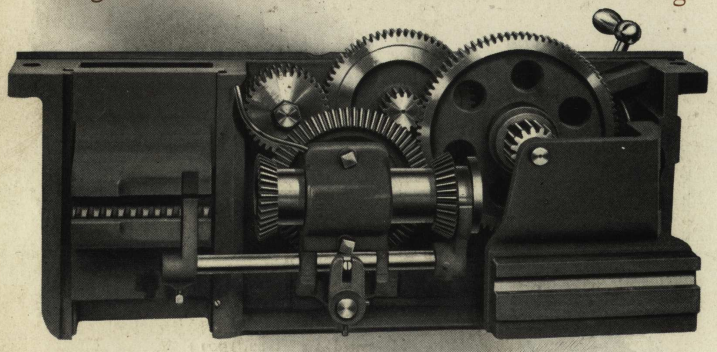


(Patented August 13, 1901)

which the carriage bears. This shortens the "bridge" of the carriage and insures a solid and substantial bearing, immediately under the tool rest; shown in illustration of "The Ledge," page 16. The carriage is provided with a screw and clamp for locking it while using the cross feed.

The Shear Wiper and Oiler

All lathe men know the difficulty experienced by having grit get between the carriage and the ways of the lathe. This device is intended to obviate such occurrences. It is fastened to the ends of the carriage bearings on the shear, and automatically wipes the shear of all dirt and grit, and oils it as the carriage moves along. Furnished on all lathes above 20 inches swing.



24-inch Apron Gears

The Apron

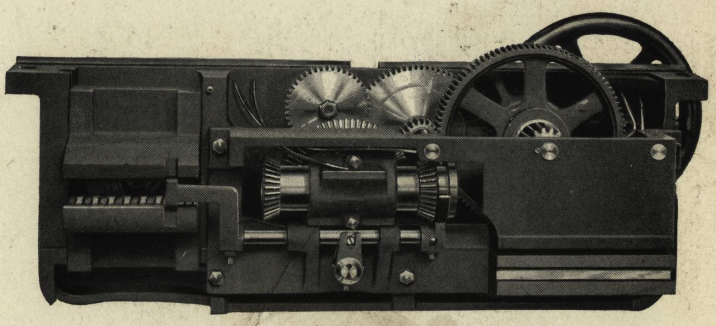
is of ample length, width and thickness, and is very rigid, being provided with three heavy braces through its entire depth and a longitudinal brace across the bottom. It is tongued and grooved into the carriage as well as bolted to it. The feed gearing, with the exception of the frictions, is all cut from steel. The studs are of steel, of large diameter, and are hardened and ground.

The lead screw passes through the double bevel gear and engages with it by a spline and key. This key extends almost the full length of the bevel gear sleeve, and as the edges of the spline are carefully rounded there is no possibility of any cutting of the half nuts. These are chased from solid metal and then split. They are planed to fit directly into substantial bearings in the apron, and, being independent of any cap screws, take prompt hold of the carriage and are in no danger of being twisted out of alignment under heavy pressure. They are operated by a cam, with carefully milled grooves. The whole thread-cutting arrangement is characterized by extreme simplicity and substantiality, and will wear as long as the balance of the machine.

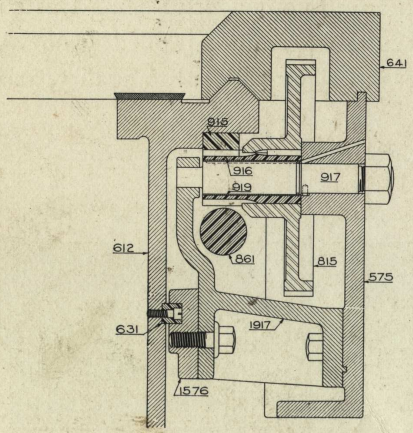
The threads of the lead screw are never in use except when the lathe is cutting screws.

The reverse lever at the front of the apron moves the double bevel gear so that it engages either on the right or left, and feeds the carriage or the cross feed accordingly.

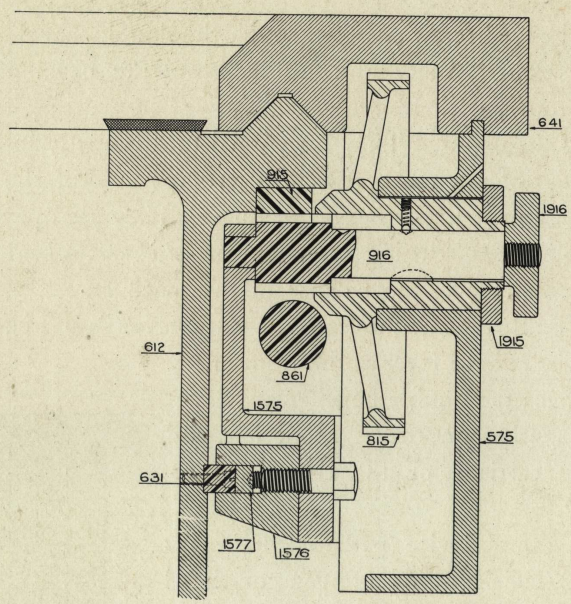
A safety device (patented February 13, 1900), consisting of a finger connected to the reverse lever, is so arranged that when the feed is engaged the finger comes in the path of the half nut and prevents



42-inch Apron Gears



Section Through Apron
22 to 30-inch Lathes



Section Through Apron
36 to 48-inch Lathes

(Original page missing)

(Original page missing)

The top slide is of sufficient width so that in taking heavy cuts at large diameters, the tool has a support close to its cutting edge and need not be projected out from the tool post. The compound rest is graduated so that it can be set at any angle up to 90 degrees, and the compound rest screw and cross feed screw are provided with micrometer adjustment reading to thousandths of an inch.

The illustration on opposite page shows the compound rest furnished on lathes below 36 inches swing. On 24, 27 and 30-inch lathes a step washer is provided in addition to the ring and wedge.

On 36-inch lathes and larger, the compound rest is of the massive type here illustrated, and is provided with power angular feed with long movement. The tool is secured by powerful double clamps. Two flat tool posts are also furnished for light cuts and for use in the full swing rest.

All of our lathes are now provided with hand wheels on the carriage and tailstock. The ball cranks for the cross feed and compound rest are of steel, and the sleeves and knurls on the outside of the apron are made from bar steel. The chances of breakage of these parts is thus greatly decreased.

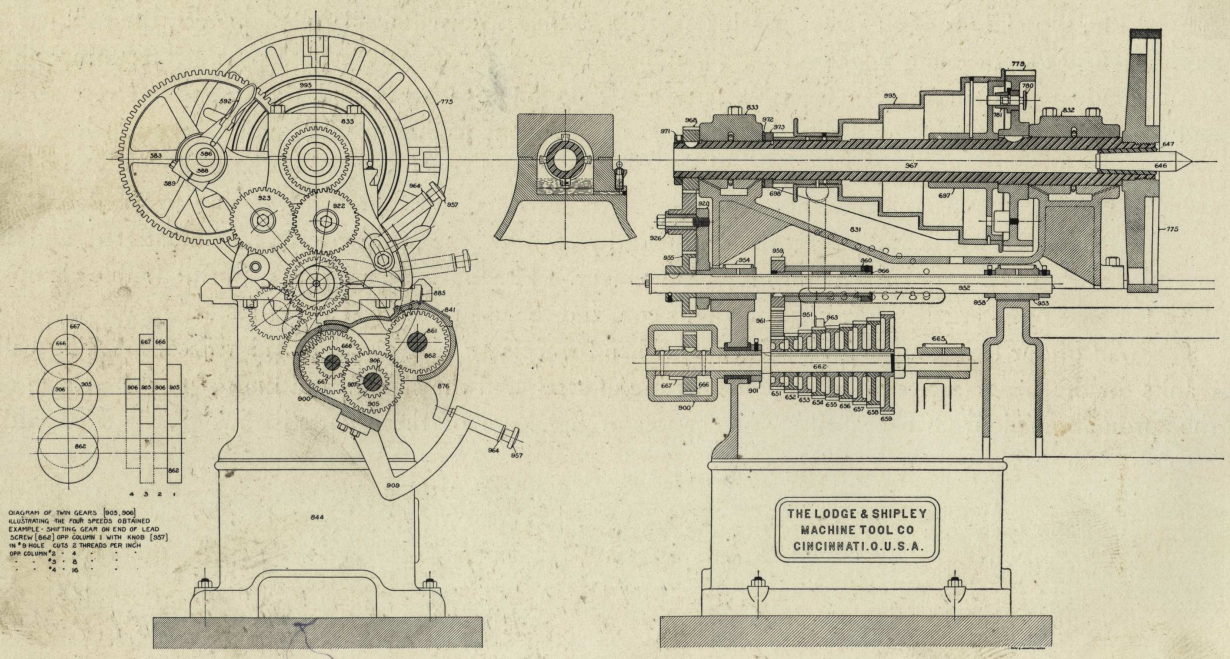
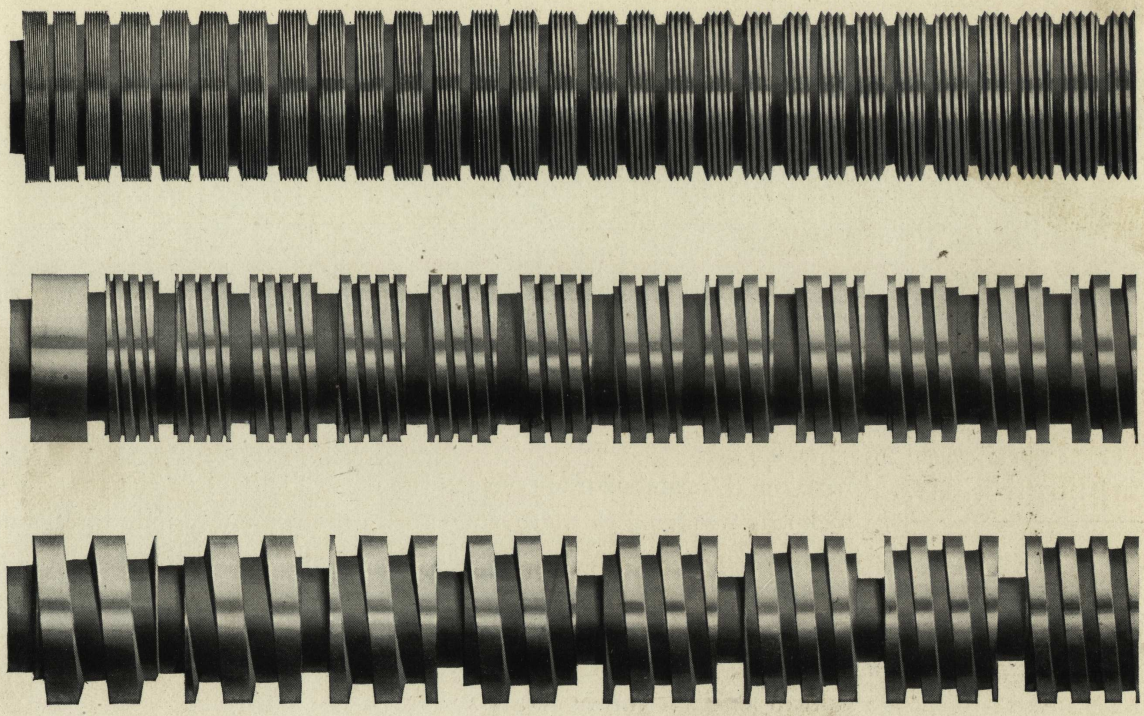


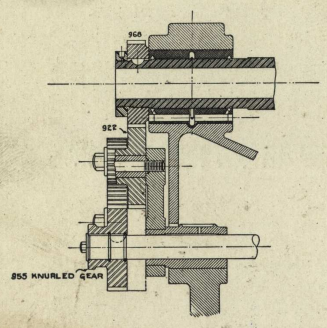
DIAGRAM OF TWIN GEARS [905,906]
ILLUSTRATING THE FOUR SPEEDS OBTAINED
EXAMPLE - SHIFTING GEAR ON END OF LEAD
SCREW [862] OPP COLUMN 1 WITH KNOB [357]
IN "D HOLE" CUTS 2 THREADS PER INCH
OPP COLUMN "3 - 4 - - -
- - "3 - 8 - - -
- - "4 - 16 - - -

(Original page missing)

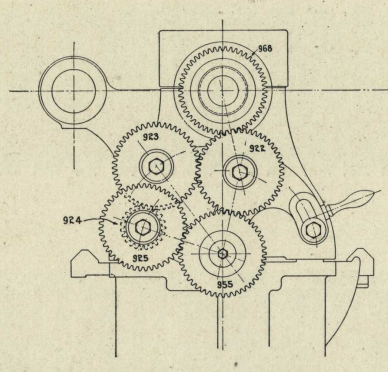
(Original page missing)



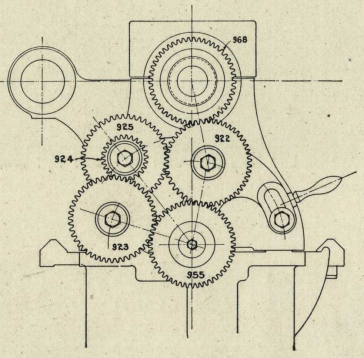
This cut represents the threads that can be cut on our 16-inch lathe without taking off or putting on a gear



POSITION OF KNURLED GEAR WHEN CUTTING EXTRA THREADS.
THE DOTTED LINES SHOW THE POSITION WHEN CUTTING THE REGULAR THREADS OF INDEX.



ARRANGEMENT OF SAME GEARS TO CUT EXTRA COARSE THREADS

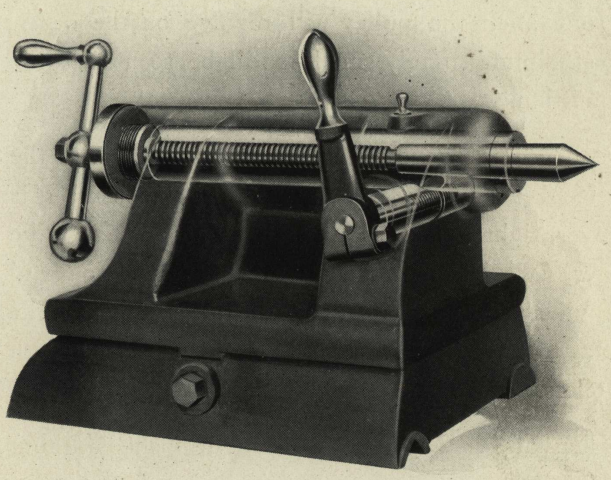


TO CUT EXTRA FINE THREADS

Compound Gears

Provision is made on the reverse plate of each lathe for a compound gear, which may be placed so as to cut either a full column of finer threads or a column of coarser threads, than found on the index plate. This gear is only furnished regularly on the 14, 16 and 36-inch standard, 36-inch massive, 42 and 48-inch lathes, and is set for the finer threads of the index, excepting on the 36-inch standard. This compound gear can be furnished of a ratio suitable for any reasonable odd number of threads per inch, or for coarser fractional pitches. The reverse plate is also used to change right to left-hand thread cutting.

Feeds The range of feeds is very great. At the bottom of each column of the index plate is given the minimum and maximum feeds, which are obtained when the pointer is in that column. Intermediate feeds are obtained by placing the knob in the various holes indicated, the ratio of feeds to threads being constant for each size lathe.



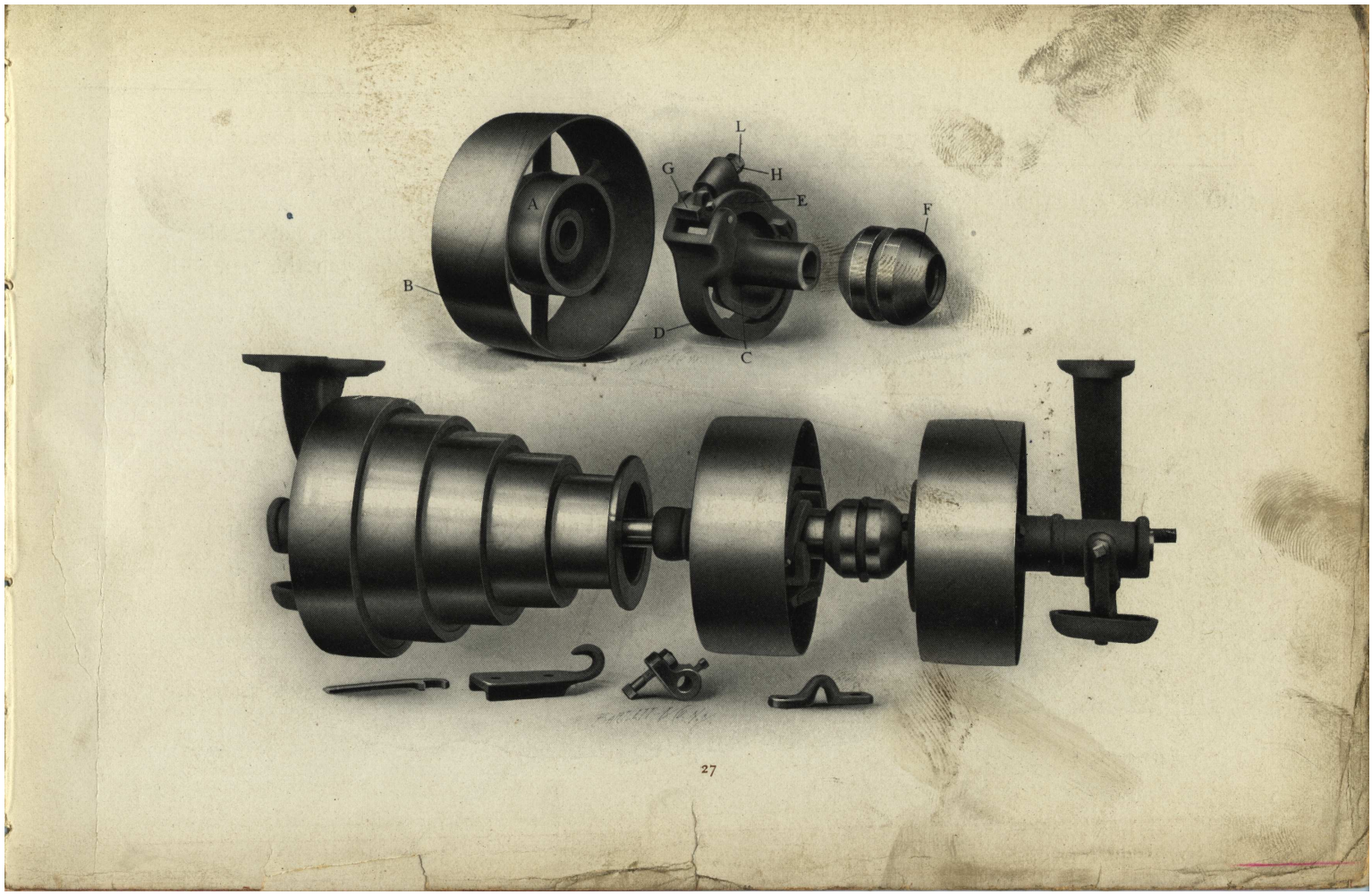
The Tailstock is massive in its proportions, and has a long bearing on the bed. It is shaped so as to allow the compound rest to be set at 90 degrees when using the tool on the smallest diameters. Suitable screws are provided for setting over for taper work, and the base has a 2-inch index graduated to sixteenths of an inch.

A new device, consisting of two plug clamps, is used to lock the tailstock spindle (see illustration). This is accomplished without throwing it out of line, and, at the same time, the device does away with the faulty construction of splitting the tailstock barrel.

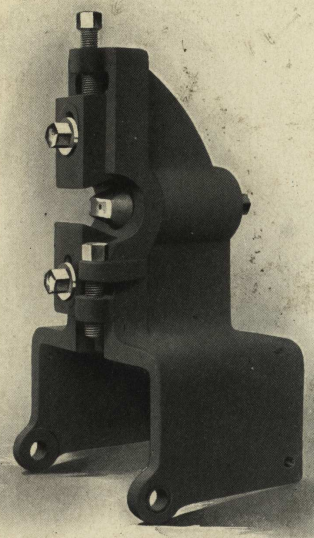
The Countershaft (see opposite page) is provided with a cone pulley of larger diameter than the one on the spindle, in order to give ample belt power. This cone pulley is flanged at the small step. The friction pulleys have very wide faces (see dimensions, pages 30 to 61) and are chambered to receive about a pint of grease. They are mounted on thimbles, upon which they revolve freely, and the thimbles revolve freely on the shaft. Both bearings are thoroughly lubricated by the grease in the pulley, but should one stick, the pulley will revolve on the other. As the chances of both sticking at the same time are immeasurably small, it will be seen that the constant operation of the pulleys is assured beyond question.

The friction clutches are clearly shown in detail. The friction rim *A* is cast integral with the friction pulley *B*. The disc *C* carries the friction band *D* and the finger *E*. When the sleeve *F* is moved so as to raise the finger, the bolt *G* is drawn over, tightening the friction band around *A*. The relative movement of the friction band *D* to the finger *E* is in the ratio of 1 to 8, so that a powerful drive is afforded. Adjustment of the frictions is provided by the nut *H* and the lock nut *L*. The sleeve is tapered from each end toward the center, so as to prevent its working out of engagement with the finger. The bearings are all provided with ring oilers.

When specified, tight and loose pulleys in lieu of friction pulleys will be furnished without extra charge.


L
G
H
E
A
F
B
D
C

The Steady and Follower Rests are both substantial and rigid. The slots in which the jaws move are milled. The follower rest (see illustration) is quickly attached to the bridge of the carriage, and straddles it, so that the work is supported exactly opposite the tool. It is provided with three jaws, adjustable to any diameter within its limit. The screws are accessible from the top, with the tool post wrench.



Detached Parts Every lathe is fitted with large and small face plates, steady rest, friction, or tight and loose pulley countershaft, and all necessary wrenches. Follower rests are furnished with all lathes up to 42 inches swing, and full swing rests with all lathes over 20 inches swing.

The tool post wrench fits all nuts on the lathe requiring adjustment.

Chucks are not included in the price of a lathe. They will be furnished and fitted at a reasonable additional cost.

Taper Attachment turrets and various styles of tool rests are described on pages 78 to 87.

Material and Workmanship

We employ the highest class of labor and material, and aim to obtain the greatest durability as well as accuracy. Plane surfaces requiring fitting are scraped to surface plates, and spindles, important studs and all revolving parts are fitted by grinding. Every lathe is subjected to rigid inspection before leaving the works, being run, and tested by special gauges for the purpose, in the hands of an expert.

Improvements

We are constantly making improvements in the design and capacity of our lathes, in order that they may anticipate the continually increasing demands of shop practice.

Dimensions

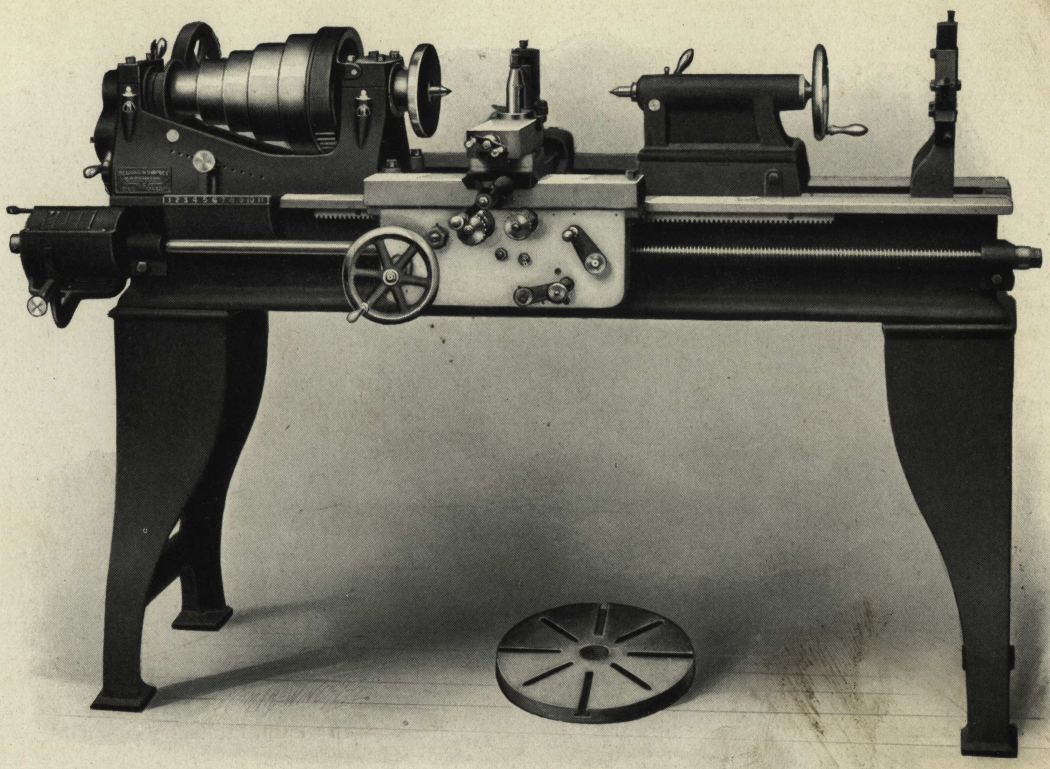
The following pages give the principal dimensions and capacities of the different sizes of standard lathes. Distance between centers is measured with the back of tailstock flush with end of bed. In case of emergency this can be run back from three to six inches, without appreciable loss of rigidity. Swing over compound rest is given for the standard rest without taper attachment. A compound rest with shortened lower slide can be furnished to turn the maximum diameter which can be swung over the carriage, but should be specified in the order.

14-inch Improved Engine Lathe

Code Word "*Gaandeweg*"

For description of details of design, see pages 9 to 29

Swings over shears	14⅛ inches
Swings over compound rest	9 inches
Swings over carriage	9¾ inches
6-foot lathe takes between centers	2 feet 11 inches
Beds made in lengths of	5 to 12 feet
Weight of 6-foot lathe	1275 pounds
Ratio of back gearing	9 to 1
Cone diameters	8¼ to 3⅛ inches
Width of steps on cone	2⅛ inches
Hole through spindle	1¼ inches
Front bearing of spindle, 2⅝ inches diameter by 4¼ inches long.	
Back bearing of spindle, $1\frac{5}{16}$ inches diameter by 2⅞ inches long.	
Diameter of tail-spindle	$1\frac{7}{16}$ inches
Speed of countershaft	125
Speed of countershaft for high-speed steel	185
Size of pulleys on countershaft	12 x 4½ inches
Lathe cuts the following threads per inch:	2, 2¼, 2⅜, 2½ 2¾, 3, 3¼, 3½, 3¾, 4, 4½, 4¾, 5, 5½, 5¾ 6, 6½, 7, 7½, 8, 9, 9½, 10, 11, 11½, 12, 13, 14 15, 16, 18, 19, 20, 22, 23, 24, 26, 28, 30, 32, 36 38, 40, 44, 46, 48, 52, 56, 60, 64.
Feeds, per inch	16 to 512
Feeds of turret on bed, per inch	14½ to 465
Hex. turret measures in diameter	7¾ inches
Steady rest takes in	3 inches
Follow rest takes in	1⅜ inches
Size of tool	½ x 1 inch
Angular travel of compound rest	2¾ inches
Taper attachment turns 2¾ inches per foot, 16½ inches long at one setting.	
Lead screw, per inch	4 threads
Taper of centers	Morse No. 3



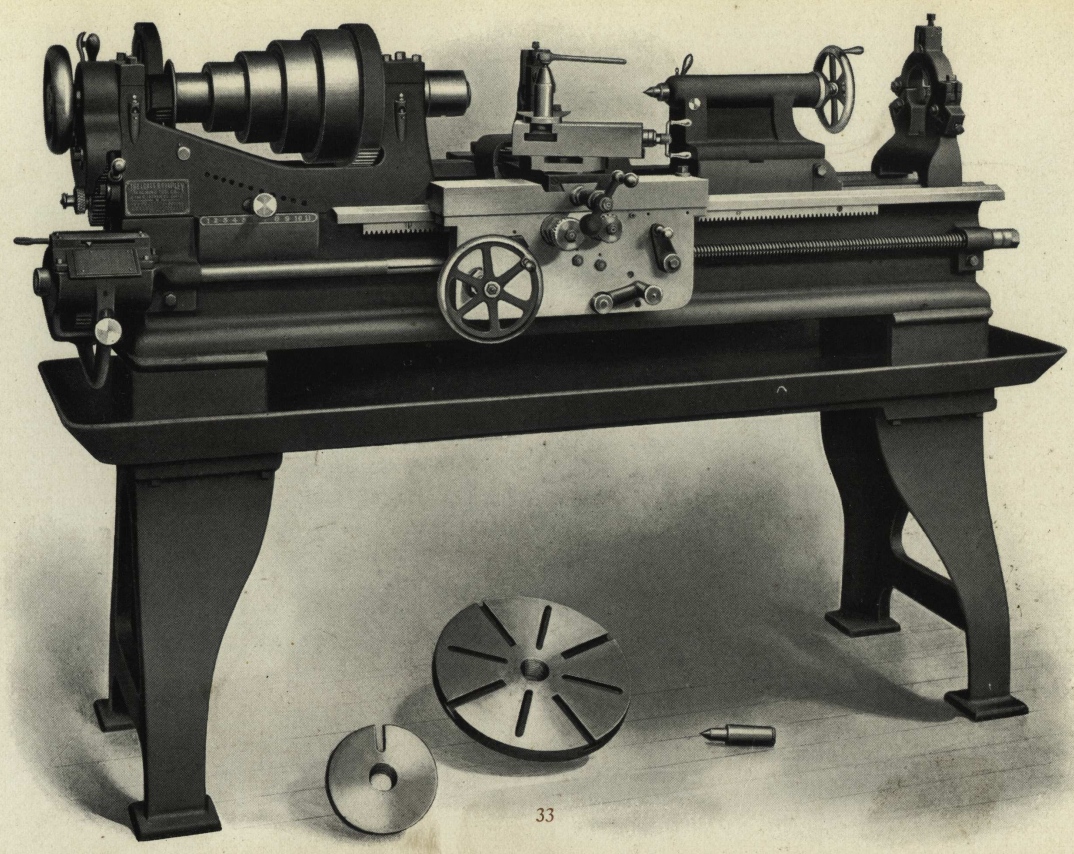
14-inch Improved Tool-room Lathe

Code Word "*Gabkar*"

For description of details of design, see pages 9 to 29

Swings over shears	14⅛ inches
Swings over compound rest	9 inches
Swings over carriage	9¾ inches
5-foot lathe takes between centers	1 foot 11 inches
Beds made in lengths of	5 to 12 feet
Weight of 5-foot lathe	1450 pounds
Ratio of back gearing	9 to 1
Cone diameters	8¼ to 3⅛ inches
Width of steps on cone	2⅛ inches
Hole through spindle	1¼ inches
Front bearing of spindle, 2⅝ inches diameter by 4¼ inches long.	
Back bearing of spindle, $1\frac{5}{16}$ inches diameter by 2⅞ inches long.	
Diameter of tail-spindle	$1\frac{7}{16}$ inches
Speed of countershaft	125
Speed of countershaft for high-speed steel	185
Size of pulleys on countershaft	12 x 4½ inches
Lathe cuts the following threads per inch: 2, 2¼, 2⅜, 2½ 2¾, 3, 3¼, 3½, 3¾, 4, 4½, 4¾, 5, 5½, 5¾, 6 6½, 7, 7½, 8, 9, 9½, 10, 11, 11½, 12, 13, 14, 15 16, 18, 19, 20, 22, 23, 24, 26, 28, 30, 32, 36, 38 40, 44, 46, 48, 52, 56, 60, 64.	
Feeds, per inch	16 to 512
Steady rest takes in	3 inches
Follow rest takes in	1⅜ inches
Size of tool	½ x 1 inch
Angular travel of compound rest	2¾ inches
Taper attachment turns 2¾ inches per foot, 16½ inches long at one setting.	
Lead screw, per inch	4 threads
Taper of centers	Morse No. 3

This lathe is regularly equipped with taper attachment, draw-in chuck and collet, and oil pan. It will be found to be very accurate and especially convenient in the tool-room, where numerous changes are made in the cutting of threads. Extra spring collets can be furnished to take any diameter up to and including ¾-inch.



16-inch Improved Engine Lathe

Code Word "*Haakachtig*"

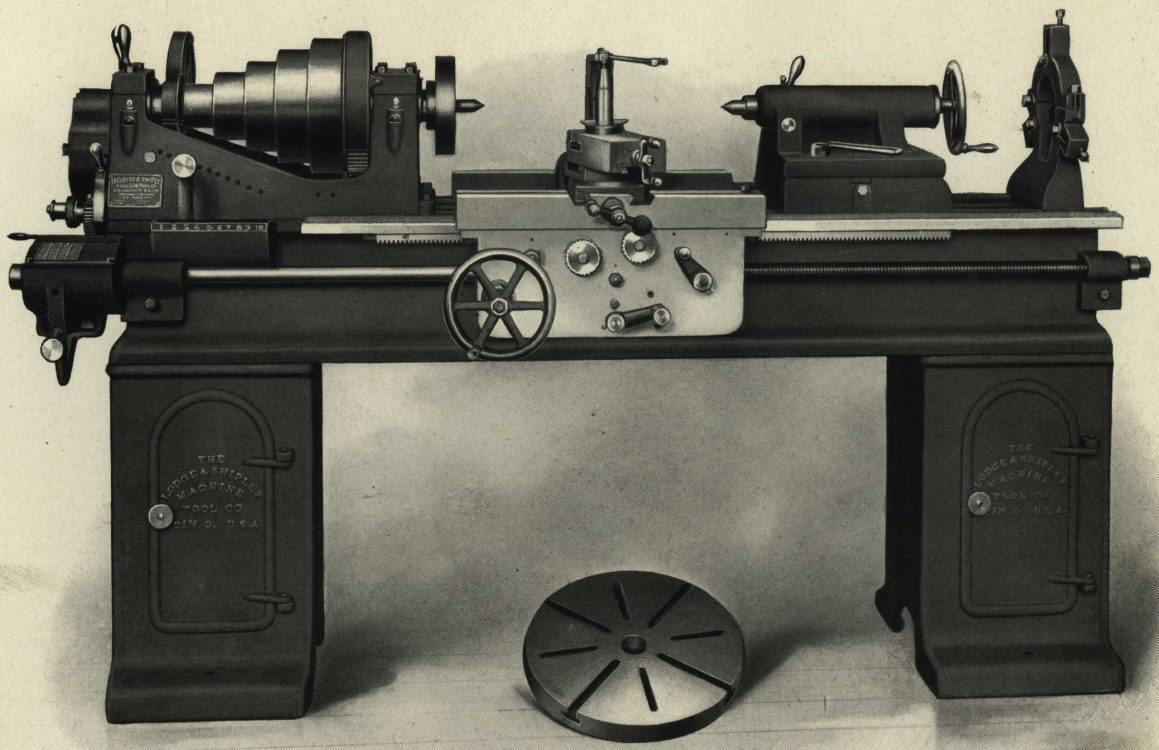
For description of details of design, see pages 9 to 29

Swings over shears . . . . . 16⅜ inches
Swings over compound rest . . . . 10⅝ inches
Swings over carriage . . . . . 11¼ inches
6-foot lathe takes between centers . . . 2 feet 7 inches
Beds made in lengths of . . . . 6, 8, 10, 12 feet
Weight of 6-foot lathe . . . . . 2000 pounds
Ratio of back gearing . . . . . 10 to 1
Cone diameters . . . . . 10 to 3¼ inches
Width of steps on cone . . . . . 2⅜ inches
Hole through spindle . . . . . $1\frac{5}{16}$ inches
Front bearing of spindle, 2¾ inches diameter by 5 inches long.
Back bearing of spindle, $2\frac{1}{16}$ inches diameter by 4 inches long.
Diameter of tail-spindle . . . . . 1⅞ inches
Speed of countershaft 125
Speed of countershaft for high-speed steel . . . 185

Size of pulleys on countershaft . . . 12 x 4½ inches
Lathe cuts the following threads per inch: 2, 2¼, 2⅜, 2½ 2¾, 3, 3¼, 3½, 3¾, 4, 4½, 4¾, 5, 5½, 6, 6½ 7, 7½, 8, 9, 9½, 10, 11, 11½, 12, 13, 14, 15, 16 18, 19, 20, 22, 23, 24, 26, 28, 30, 32, 36, 38, 40 44, 46, 48, 52, 56, 60, 64.
Feeds, per inch . . . . . 4 to 128
Feeds of turret on bed, per inch . . . 12½ to 400
Hex. turret measures in diameter . . . 9½ inches
Steady rest takes in . . . . . 4⅜ inches
Follow rest takes in . . . . . 2⅛ inches
Size of tool . . . . . ½ x 1⅛ inches
Angular travel of compound rest . . . 3 inches
Taper attachment turns 3¾ inches per foot, 24 inches long at one setting.
Lead screw, per inch . . . . . 4 threads
Taper of centers . . . . . Morse No. 3

(Original page missing)

(Original page missing)



18-inch Improved Engine Lathe

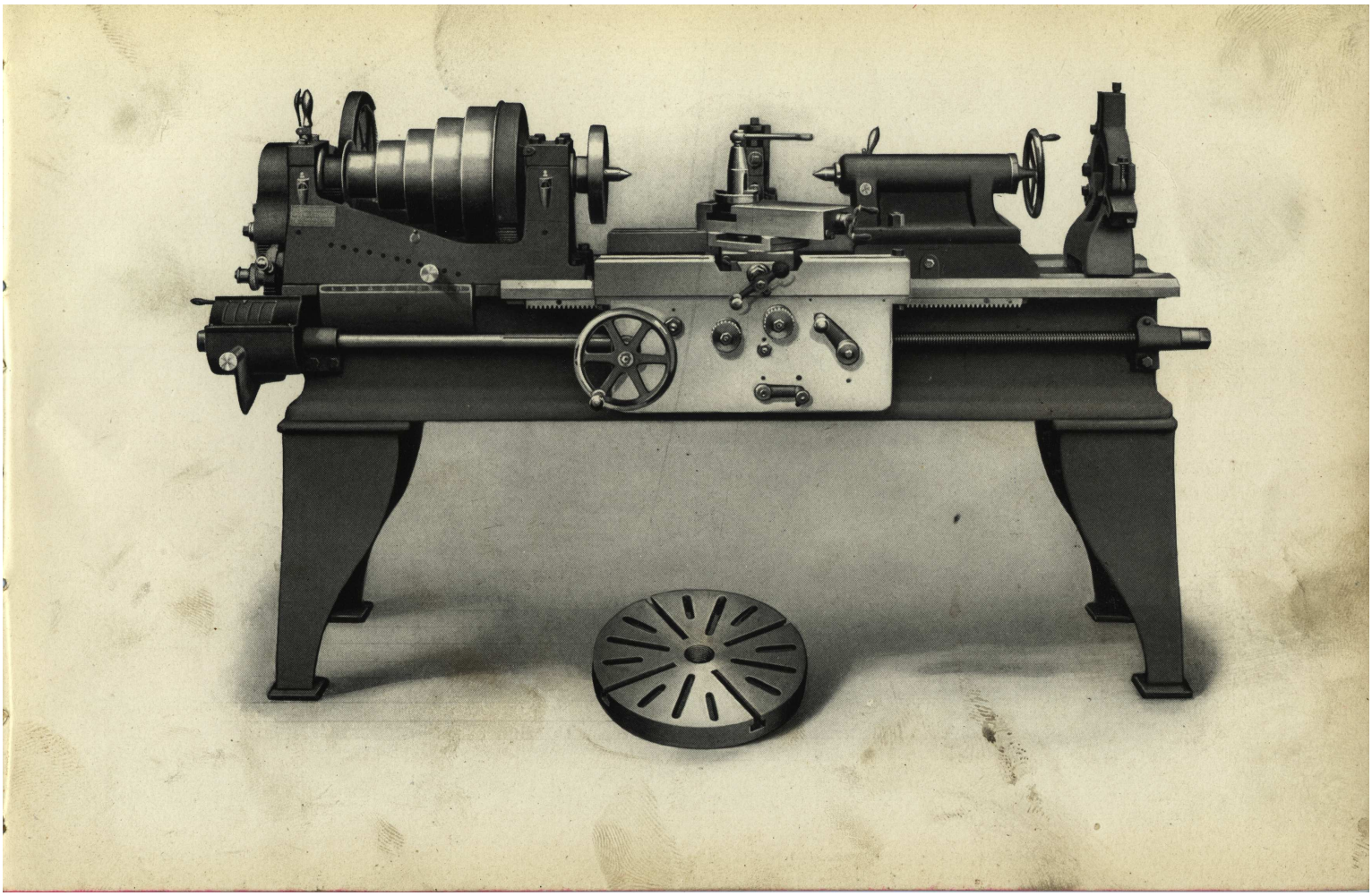
Code Word "*Iacchus*"

For description of details of design, see pages 9 to 29

The great power and stiffness of this lathe make it strictly a manufacturer's lathe.

Swings over shears . . . . . 18⅜ inches
Swings over compound rest . . . . 10⅝ inches
Swings over carriage . . . . . 11¾ inches
8-foot lathe takes between centers . . 4 feet 4 inches
Beds made in even lengths from . . . 6 to 26 feet
Weight of 8-foot lathe . . . . . 3100 pounds
Ratio of back gearing . . . . . 12.1 to 1
Cone diameters . . . . . 12 to 4 inches
Width of steps on cone . . . . . 2⅝ inches
Hole through spindle . . . . . $1\frac{9}{16}$ inches
Front bearing of spindle, 3¼ inches diameter by 5½ inches long.
Back bearing of spindle, 2⅜ inches diameter by $3\frac{13}{16}$ inches long
Diameter of tail-spindle . . . . . 2 inches
Speed of countershaft 125
Speed of countershaft for high-speed steel . . 185
Size of pulleys on countershaft . . . 14 x 6 inches

Lathe cuts the following threads per inch: 2, 2¼, 2½, 2¾ 2⅞, 3, 3¼, 3½, 3¾, 4, 4½, 4¾, 5, 5½, 5¾, 6 6½, 7, 7½, 8, 9, 9½, 10, 11, 11½, 12, 13, 14, 15 16, 18, 19, 20, 22, 23, 24, 26, 28, 30, 32.
Feeds, per inch . . . . . 5 to 80
Feeds of turret on bed, per inch . . . 12½ to 200
Hex. turret measures in diameter . . . 10 inches
Steady rest takes in . . . . . 5 inches
Follow rest takes in . . . . . 2½ inches
Size of tool . . . . . ⅝ x 1⅛ inches
Angular travel of compound rest . . . 4¾ inches
Taper attachment turns 3½ inches per foot, 24 inches long at one setting.
Lead screw, per inch . . . . . 4 threads
Taper of centers . . . . . Morse No. 4
Special steady rests can be furnished, with 7, 9 or 12-inch openings.



20-inch Improved Engine Lathe

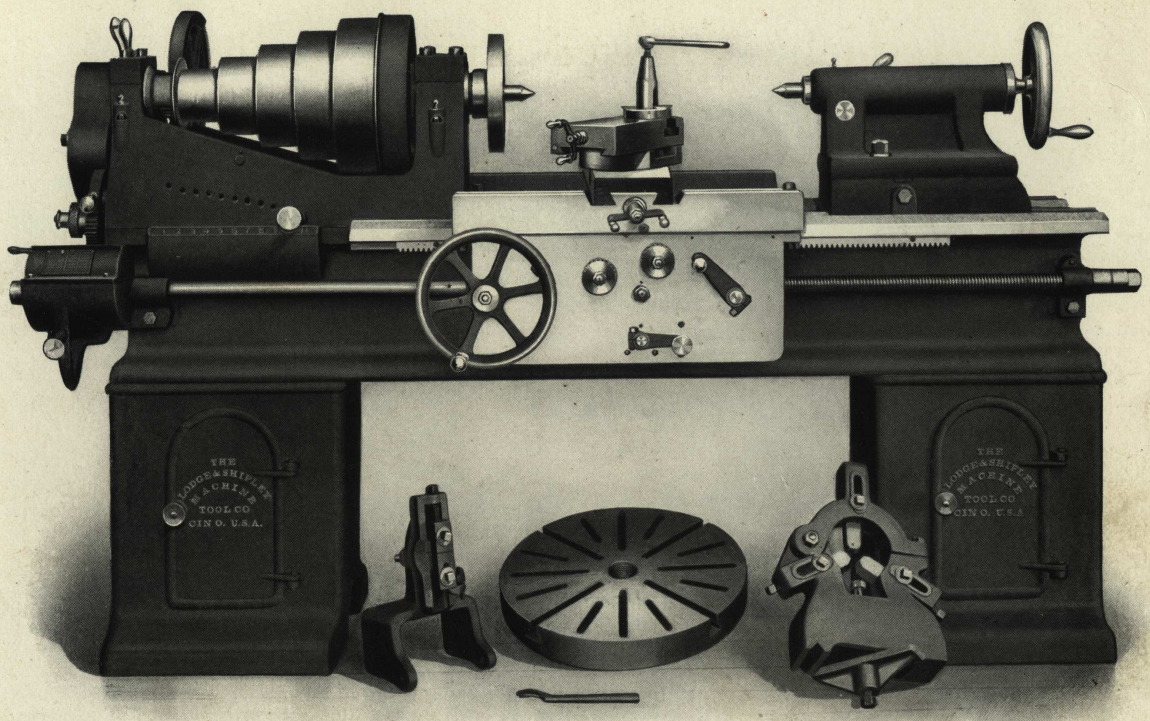
Code Word "*Kaaiboeven*"

For description of details of design, see pages 9 to 29

Swings over shears . . . . . 20¼ inches
Swings over compound rest . . . . 12¾ inches
Swings over carriage . . . . . 14 inches
8-foot lathe takes between centers . . . 4 feet
Beds made in even lengths from . . . 6 to 26 feet
Weight of 8-foot lathe . . . . . 3500 pounds
Ratio of back gearing . . . . . 12.1 to 1
Cone diameters . . . . . 12⅛ to 4¼ inches
Width of steps on cone . . . . . 3⅛ inches
Hole through spindle . . . . . 1¾ inches
Front bearing of spindle, 3½ inches diameter by 5¾ inches long.
Back bearing of spindle, 2½ inches diameter by $3\frac{13}{16}$ inches long.
Diameter of tail-spindle . . . . . 2¼ inches
Speed of countershaft 125
Speed of countershaft for high-speed steel . . 185
Size of pulleys on countershaft . . . 14 x 6 inches

Lathe cuts the following threads per inch: 2, 2¼, 2½, 2¾ 2⅞, 3, 3¼, 3½, 3¾, 4, 4½, 4¾, 5, 5½, 5¾, 6 6½, 7, 7½, 8, 9, 9½, 10, 11, 11½, 12, 13, 14, 15 16, 18, 19, 20, 22, 23, 24, 26, 28, 30, 32.
Feeds, per inch . . . . . 5 to 80
Feeds of turret on bed, per inch . . . 12½ to 200
Hex. turret measures in diameter . . . 10 inches
Steady rest takes in . . . . . 6¼ inches
Follow rest takes in . . . . . 2½ inches
Size of tool . . . . . ⅝ x 1¼ inches
Angular travel of compound rest . . . 4¾ inches
Taper attachment turns 3½ inches per foot, 24 inches long at one setting.
Lead screw, per inch . . . . . 4 threads
Taper of centers . . . . . Morse No. 4
Special steady rests can be furnished, with 7, 9 or 12-inch opening.
Special follow rests can be furnished, with 4-inch opening

All 20-inch lathes and larger are fitted with cabinet legs


THE
LODGE & SHIPLEY
MACHINE
TOOL CO
CIN'O. U.S.A.

22-inch Improved Engine Lathe

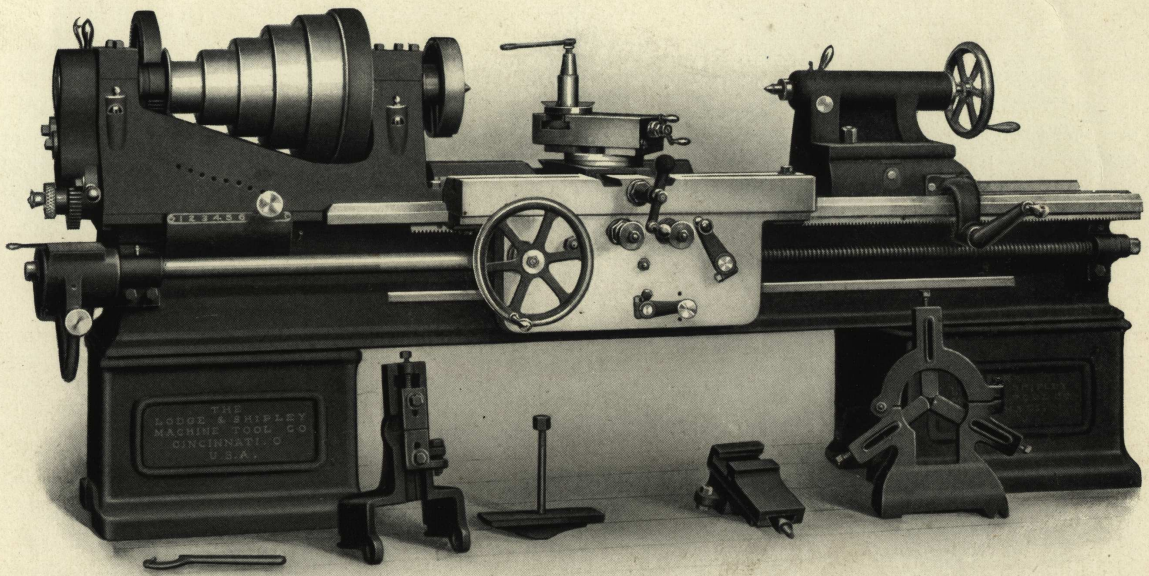
Code Word "*Laadboom*"

For description of details of design, see pages 9 to 29

Swings over shears . . . . . 24⅛ inches
Swings over compound rest . . . . 16 inches
Swings over carriage . . . . . 16½ inches
10-foot lathe takes between centers . . 4 feet 9 inches
Beds made in even lengths of . . . 8 feet and above
Weight of 10-foot lathe . . . . . 5700 pounds
Ratio of back gearing . . . . . 11.85 to 1
Cone diameters . . . . . 14⅝ to 5⅛ inches
Width of steps on cone . . . . . 3¼ inches
Hole through spindle . . . . . 2⅛ inches
Front bearing of spindle, 4⅜ inches diameter by 7¾ inches long.
Back bearing of spindle, 3 inches diameter by 5¼ inches long
Diameter of tail-spindle . . . . . $2\frac{7}{16}$ inches
Speed of countershaft 125
Speed of countershaft for high-speed steel . . 185
Size of pulleys on countershaft . . 16 x $7\frac{5}{16}$ inches

Lathe cuts the following threads per inch: 1, 1⅛, 1¼, 1⅜ 1½, 1⅝, 1¾, 2, 2¼, 2½, 2¾, 2⅞, 3, 3¼, 3½ 4, 4½, 5, 5½, 5¾, 6, 6½, 7, 8, 9, 10, 11, 11½ 12, 13, 14, 16.
Feeds, per inch . . . . . 5 to 80
Feeds of turret on bed, per inch . . . 12½ to 200
Hex. turret measures in diameter . . . 14⅛ inches
Steady rest takes in . . . . . 6¾ inches
Follow rest takes in . . . . . 2½ inches
Size of tool . . . . . ¾ x 1¼ inches
Angular travel of compound rest . . . 5 inches
Taper attachment turns 4 inches per foot, 24 inches long at one setting.
Lead screw, per inch . . . . . 2 threads
Taper of centers . . . . . Morse No. 4
Special steady rests can be furnished, with 10, 12 or 14-inch opening.

All 22-inch lathes and larger are furnished with compound rests and full swing rests


THE
LODGE & SHIPLEY
MACHINE TOOL CO.
CINCINNATI, O.
U.S.A.

24-inch Improved Engine Lathe

Code Word "*Maagader*"

For description of details of design, see pages 9 to 29

Swings over shears	24⅝ inches
Swings over compound rest	15 inches
Swings over carriage	16½ inches
10-foot lathe takes between centers	4 feet 3 inches
Beds made in even lengths of	8 feet and above
Weight of 10-foot lathe	6700 pounds
Ratio of back gearing	13.4 to 1
Ratio of triple gearing	44 to 1
Cone diameters	$15\frac{5}{16}$ to 5 inches
Width of steps on cone	$3\frac{1}{16}$ inches
Hole through spindle	2⅛ inches
Front bearing of spindle, 4⅜ inches diameter by 8⅜ inches long	
Back bearing of spindle, $3\frac{7}{16}$ inches diameter by 5¾ inches long	
Diameter of tail-spindle	2⅞ inches
Speed of countershaft for back-geared lathe	125
Speed of countershaft for triple-geared lathe	160 and 125
Size of pulleys on countershaft	16 x $7\frac{5}{16}$ inches

Lathe cuts the following threads per inch: 1, 1⅛, 1¼, 1⅜ 1½, 1⅝, 1¾, 2, 2¼, 2½, 2¾, 2⅞, 3, 3¼, 3½ 4, 4½, 5, 5½, 5¾, 6, 6½, 7, 8, 9, 10, 11, 11½ 12, 13, 14, 16.

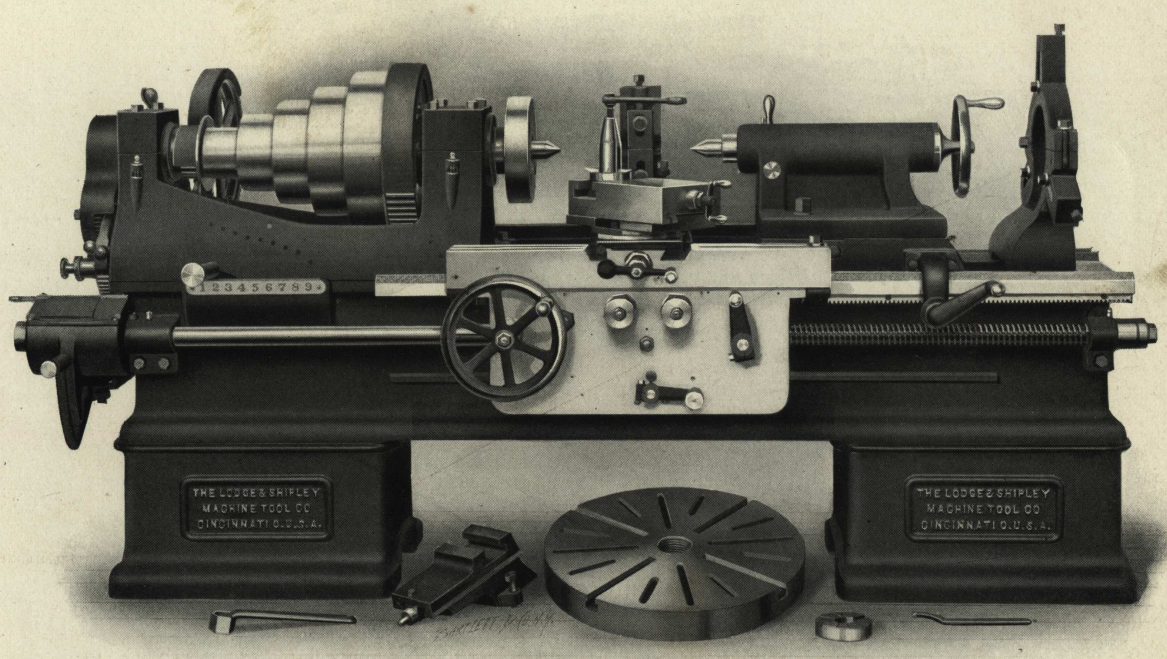
Feeds, per inch	5 to 80
Feeds of turret on bed, per inch	12½ to 200
Hex. turret measures in diameter	14⅛ inches
Steady rest takes in	7½ inches
Follow rest takes in	2½ inches
Size of tool	¾ x 1¼ inches
Angular travel of compound rest	5 inches

Taper attachment turns 4 inches per foot, 24 inches long at one setting.

Lead screw, per inch	2 threads
Taper of centers	Morse No. 5

Special steady rests can be furnished, with 10, 12 or 14-inch opening.

This lathe has been especially designed for adaptation to oil-well work. The taper attachment is massive and arranged for changing from straight to taper, or *vice versa*, by releasing or tightening one screw. See pages 78 and 79 for illustration and description.

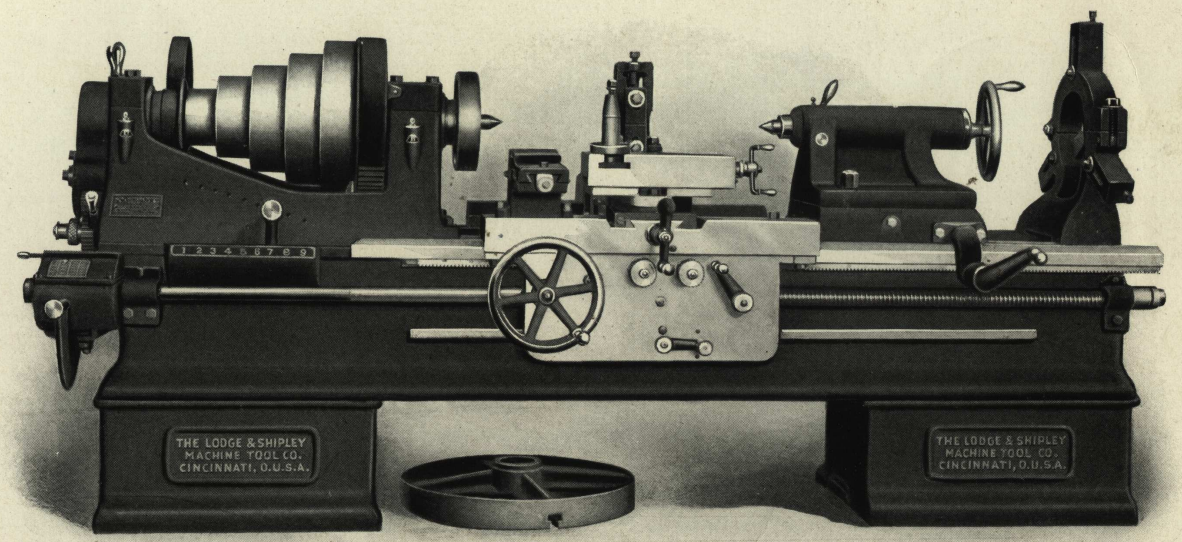

THE LODGE & SHIPLEY
MACHINE TOOL CO
CINCINNATI O.U.S.A.
THE LODGE & SHIPLEY
MACHINE TOOL CO
CINCINNATI O.U.S.A.

27-inch Improved Engine Lathe

Code Word "*Naafboor*"

For description of details of design, see pages 9 to 29

Swings over shears . . . . . 27½ inches
Swings over compound rest . . . 17⅜ inches
Swings over carriage . . . . . 19⅛ inches
12-foot lathe takes between centers . . 5 feet 11 inches
Beds made in even lengths of . . 10 feet and above
Weight of 12-foot lathe . . . . . 8400 pounds
Ratio of back gearing . . . . . 13¼ to 1
Ratio of triple gearing . . . . . 46¼ to 1
Cone diameters . . . . . 17 to 6 inches
Width of steps on cone . . . . . 3¾ inches
Hole through spindle . . . . . 2⅜ inches
Front bearing of spindle, 4⅞ inches diameter by 8¾ inches long.
Back bearing of spindle, 3⅞ inches diameter by 5⅝ inches long.
Diameter of tail-spindle . . . . . $3\frac{3}{16}$ inches
Speed of countershaft for back-geared lathe . . 125
Speed of countershaft for triple-geared lathe . 160 and 125
Size of pulleys on countershaft . . . . 16 x $7\frac{5}{16}$ inches
Lathe cuts the following threads per inch: 1, 1⅛, 1¼, 1⅜ 1½, 1⅝, 1¾, 2, 2¼, 2½, 2¾, 2⅞, 3, 3¼, 3½ 4, 4½, 5, 5½, 5¾, 6, 6½, 7, 8, 9, 10, 11, 11½ 12, 13, 14, 16.
Feeds, per inch . . . . . 5 to 80
Feeds of turret on bed, per inch . . . 12½ to 200
Hex. turret measures in diameter . . . 14⅛ inches
Steady rest takes in . . . . . 8½ inches
Follow rest takes in . . . . . 2⅝ inches
Size of tool . . . . . ¾ x 1½ inches
Angular travel of compound rest . . . 6½ inches
Taper attachment turns 4 inches per foot, 24 inches long at one setting.
Lead screw, per inch . . . . . 2 threads
Taper of centers . . . . . Morse No. 5
Special steady rests can be furnished, with 10, 12, 14 or 16-inch opening.


THE LODGE & SHIPLEY
MACHINE TOOL CO.
CINCINNATI, O.U.S.A.
THE LODGE & SHIPLEY
MACHINE TOOL CO.
CINCINNATI, O.U.S.A.

30-inch Improved Engine Lathe

Code Word "*Oaken*"

For description of details of design, see pages 9 to 29

Swings over shears	30⅜ inches
Swings over compound rest	20 inches
Swings over carriage	21½ inches
12-foot lathe takes between centers	6 feet 2 inches
Beds made in even lengths	12 feet and above
Weight of 12-foot lathe, about	10,000 pounds
Ratio of back gearing	15¼ to 1
Ratio of triple gearing	49¼ to 1
Cone diameters	19½ to 6½ inches
Width of step on cone	4¼ inches
Hole through spindle	$2\frac{9}{16}$ inches
Front bearing of spindle, $5\frac{3}{16}$ inches diameter by 9⅛ inches long	
Back bearing of spindle, 3¾ inches diameter by 5¾ inches long	
Diameter of tail-spindle	$3\frac{3}{16}$ inches
Speed of countershaft for back-geared lathe	125
Speed of countershaft for triple-geared lathe	160 and 125
Size of pulleys on countershaft	18 x 9½ inches

Lathe cuts the following threads per inch: 1, 1⅛, 1¼, 1⅜ $1\frac{7}{16}$, 1½, 1⅝, 1¾, 2, 2¼, 2½, 2¾, 2⅞, 3, 3¼ 3½, 4, 4½, 5, 5½, 5¾, 6, 6½, 7, 8, 9, 10, 11 11½, 12, 13, 14.

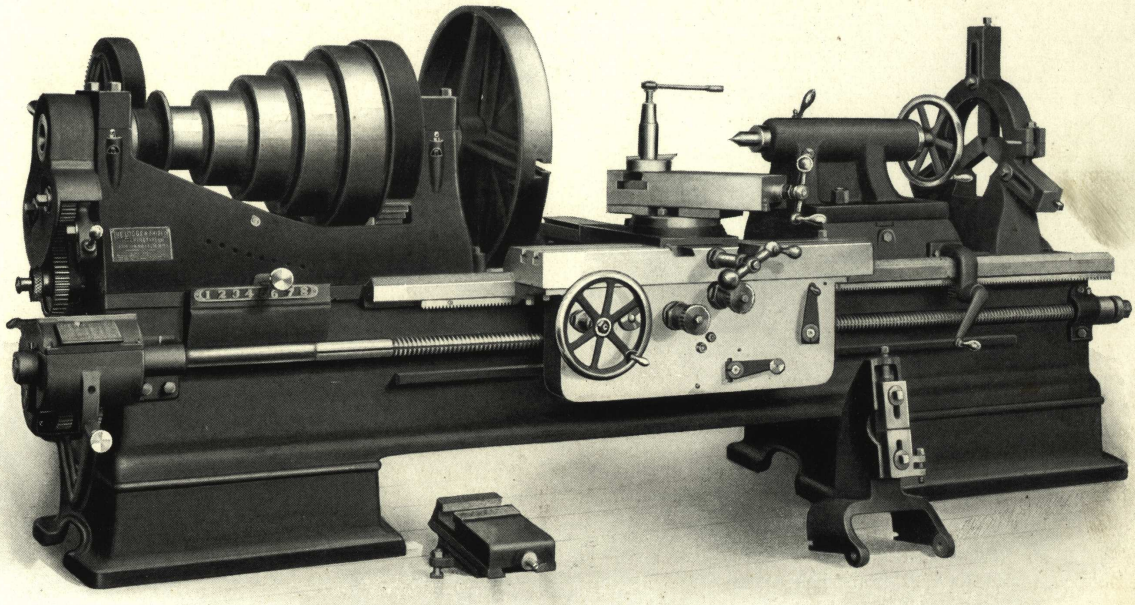
Feeds, per inch	5 to 70
Feeds of turret on bed, per inch	12½ to 175
Hex. turret measures in diameter	18 inches
Steady rest takes in	10½ inches
Follow rest takes in	3¼ inches
Size of tool	⅞ x 1½ inches
Angular travel of compound rest	8½ inches

Taper attachment turns 4 inches per foot, 24 inches long at one setting.

Lead screw, per inch	2 threads
Taper of centers	Morse No. 5

Special steady rest can be furnished, with 16-inch opening

The rack pinion on the 30-inch lathe and larger may be disengaged when thread cutting



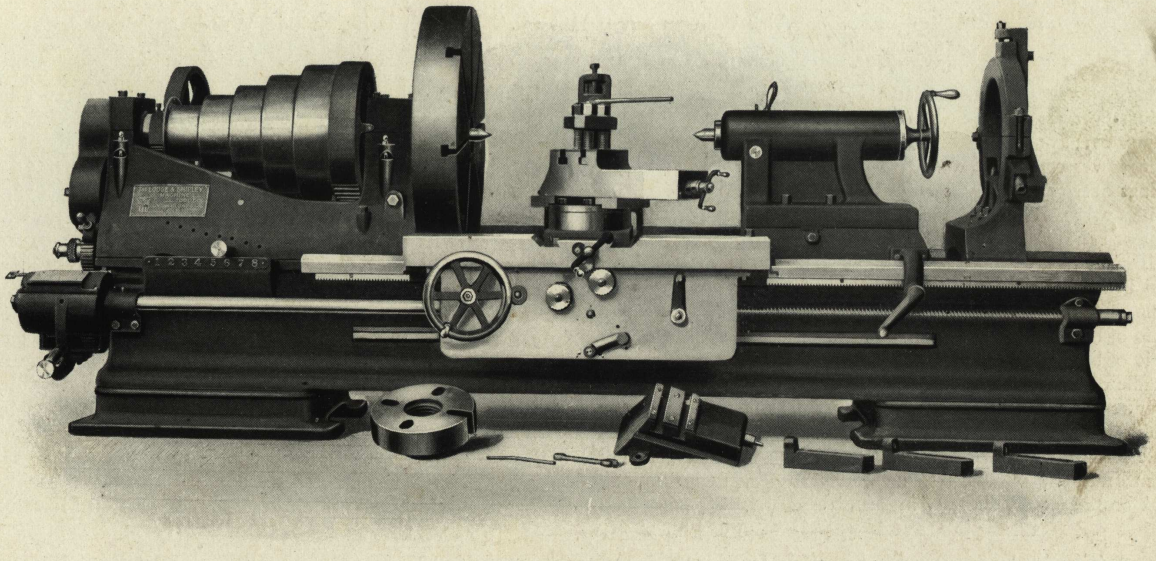
36-inch Improved "Standard" Engine Lathe

Code Word "*Oderkrebse*"

For description of details of design, see pages 9 to 29

Swings over shears	37 inches
Swings over compound rest	24¼ inches
Swings over carriage	26½ inches
12-foot lathe takes between centers	5 feet 2 inches
Bed made in even lengths	12 feet and above
Weight of 12-foot lathe, about	12,500 pounds
Ratio of back gearing	11.1 to 1
Ratio of triple gearing	50.2 to 1
Cone diameters	19⅞ to 7 5/16 inches
Width of step on cone	4⅞ inches
Hole through spindle	2 3/16 inches
Front bearing of spindle, 6 inches diameter by 10 inches long	
Back bearing of spindle, 3¾ inches diameter by 5¾ inches long	
Diameter of tail-spindle	4¼ inches
Speed of countershaft for back-geared lathe	80
Speed of countershaft for triple-geared lathe	155
Sizes of pulleys on countershaft	18 x 9½ inches

Lathe cuts the following threads per inch:	1, 1⅛, 1¼, 1⅜ 1 7/16, 1½, 1⅝, 1¾, 2, 2¼, 2½, 2¾, 2⅞, 3, 3¼ 3½, 4, 4½, 5, 5½, 5¾, 6, 6½, 7, 8, 9, 10, 11 11½, 12, 13, 14.
Lathe cuts following threads per two inches:	1, 1⅛, 1¼ 1⅜, 1 7/16, 1½, 1⅝, 1¾.
Feeds, per inch	2½ to 70
Feeds of turret on bed, per inch	6¾ to 175
Hex. turret measures in diameter	18 inches
Steady rest takes in	15½ inches
Follow rest takes in	4¾ inches
Size of tool	1 x 2 inches
Power feed angular travel of compound rest	14½ inches
Taper attachment turns 4 inches per foot, 24 inches long at one setting.	
Lead screw, per inch	2 threads
Taper of centers	Morse No. 6



42-inch Improved Engine Lathe

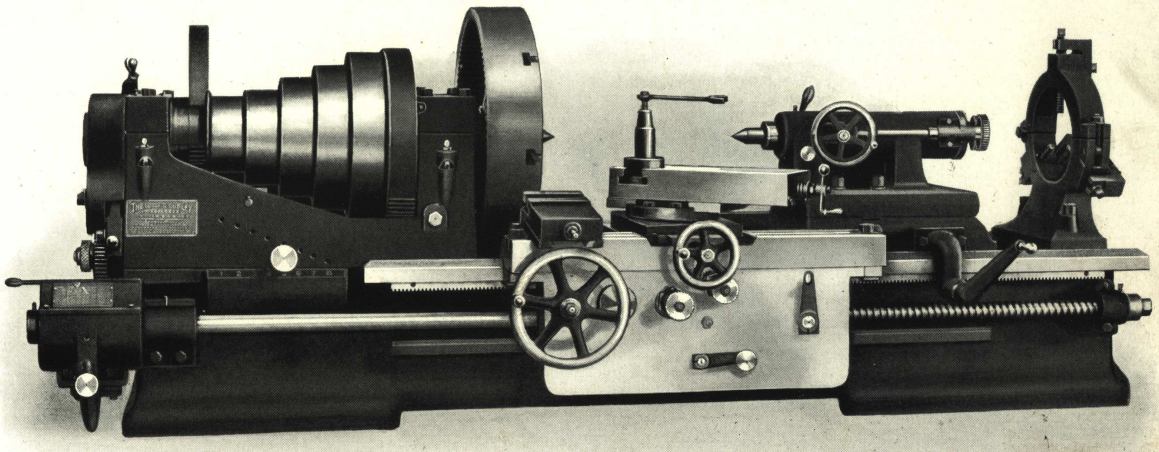
Code Word "*Quabbe.*" Also built as our "Massive" 36-inch lathe—Code Word "*Paaltje*"

For description of details of design, see pages 9 to 29

Swings over shears, 42-inch lathe	43⅞ inches
Swings over shears, 36-inch lathe	37 inches
Swings over compound rest, 42-inch lathe	30½ inches
Swings over compound rest, 36-inch lathe	22½ inches
Swings over carriage, 42-inch lathe	32¾ inches
Swings over carriage, 36-inch lathe	25 inches
12-foot lathe takes between centers	4 feet 1 inch
Beds made in even lengths	12 feet and above
Weight of 42-inch by 12-foot lathe, about	21,000 pounds
Ratio of triple gearing	57.4 to 1
Ratio of back gearing for triple-geared lathe	8.34 to 1
Ratio of back gearing for back-geared lathe	10.67 to 1
Spindle cone diameters	9½ to 24 inches
Countershaft cone diameters	27⅜ to 13¼ inches
Width of step on cone	4¾ inches
Hole through spindle	2⅛ inches
Front bearing of spindle, 6¼ inches diameter by 11 inches long	
Back bearing of spindle, 5¼ inches diameter by 8¾ inches long	
Diameter of tail-spindle	5 inches
Speed of countershaft for triple-geared lathe	110
Speed of countershaft for back-geared lathe	80
Size of pulleys on countershaft	24 x 9½ inches
Lathes cut the following threads per inch:	1, 1⅛, 1¼, 1⅜ $1\frac{7}{16}$, 1½, 1⅝, 1¾, 2, 2¼, 2½, 2¾, 2⅞, 3, 3¼ 3½, 4, 4½, 5, 5½, 5¾, 6, 6½, 7, 8, 9, 10, 11 11½, 12, 13, 14.
Lathes cut the following threads per two inches:	1, 1⅛, 1¼ 1⅜, $1\frac{7}{16}$, 1½, 1⅝, 1¾.
Feeds, per inch	3 to 84
Feeds of turret on bed, per inch	9 to 250
Hex. turret measures in diameter	24 inches
Steady rest takes in	13½ inches
Size of tool	1 x 2 inches
Power-feed angular travel of compound rest at one setting, 19 inches.	
Taper of centers	Morse No. 6

Taper attachment turns 4 inches per foot, 36 inches long at one setting

The lead screw is cut one thread per inch, which enables the half nuts to be withdrawn and dropped into place on all the integral threads the lathe cuts. Rack pinion may be disengaged when thread cutting. Triple gearing easily engaged and disengaged from the front. These lathes are extremely massive and capable of extraordinarily heavy duty.



48-inch Improved Engine Lathe

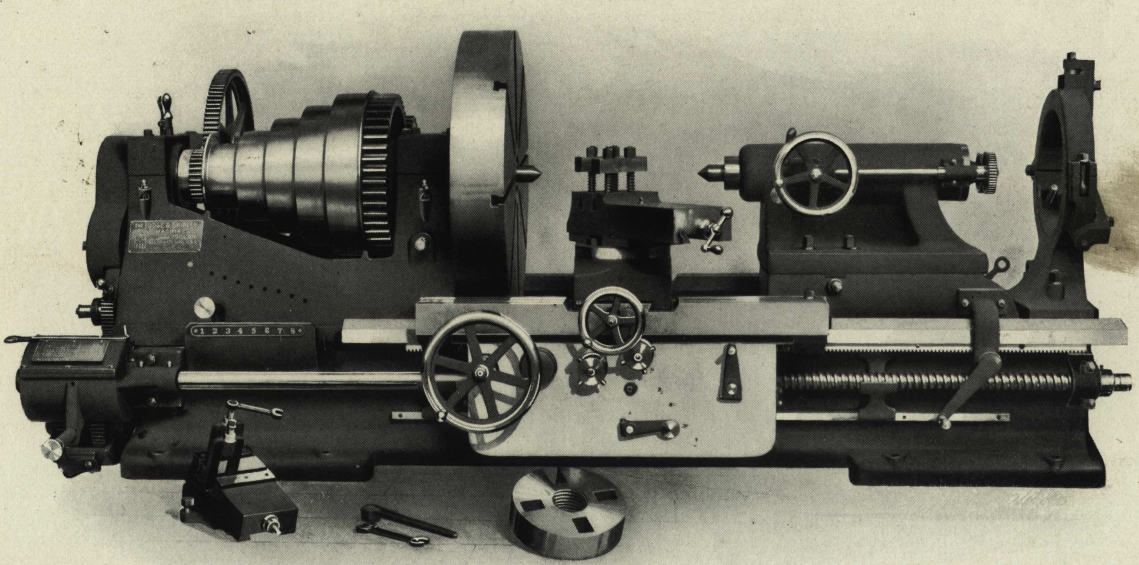
Code Word "*Quietassi.*" Also built as our "Massive" 42-inch lathe—Code Word "*Quehacer*"

For description of details of design, see pages 9 to 29

Swings over shears, 48-inch lathe	50 inches	Diameter of tail-spindle	5 inches
Swings over shears, 42-inch lathe	43⅞ inches	Speed of countershaft for triple-geared lathe	110
Swings over compound rest, 48-inch lathe	35½ inches	Speed of countershaft for back-geared lathe	80
Swings over compound rest, 42-inch lathe	30½ inches	Size of pulleys on countershaft	24 x 9½ inches
Swings over carriage, 48-inch lathe	38½ inches	Lathe cuts the following threads per inch:	1, 1⅛, 1¼, 1⅜ $1\frac{7}{16}$, 1½, 1⅝, 1¾, 2, 2¼, 2½, 2¾, 2⅞, 3, 3¼ 3½, 4 4½, 5, 5½, 5¾, 6, 6½, 7, 8, 9, 10, 11 11½, 12, 13, 14.
Swings over carriage, 42-inch lathe	32¾ inches		
12-foot lathe takes between centers	3 feet 5 inches		
Beds made in even lengths	12 feet and above		
Weight of 12-foot lathe, about	25,000 pounds	Lathe cuts the following threads per two inches:	1, 1⅛, 1¼ 1⅜, $1\frac{7}{16}$, 1½, 1⅝, 1¾
Ratio of triple gearing	57.4 to 1		
Ratio of back gearing for triple-geared lathe	8.34 to 1	Feeds, per inch	3 to 84
Ratio of back gearing for back-geared lathe	10.67 to 1	Feeds of turret on bed, per inch	9 to 250
Spindle cone diameters	9½ to 24 inches	Hex. turret measures in diameter	24 inches
Countershaft cone diameters	27⅜ to 13¼ inches	Steady rest takes in	17½ inches
Width of step on cone	4¾ inches	Size of tool	1 x 2 inches
Hole through spindle	2⅛ inches	Power feed angular travel of compound rest at one setting, 19 inches.	
Front bearing of spindle, 7 inches diameter by 12 inches long			
Back bearing of spindle, 5¼ inches diameter by 8¾ inches long		Taper of centers	Morse No. 6

Taper attachment turns 4 inches per foot, 36 inches long at one setting

The lead screw is cut one thread per inch, which enable the half nuts to be withdrawn and dropped into place on all the integral threads and lathe cuts. Triple gearing easily engaged and disengaged from the front. These lathes are extremely massive and capable of extraordinarily heavy duty.



24-inch Turret Chucking Lathe

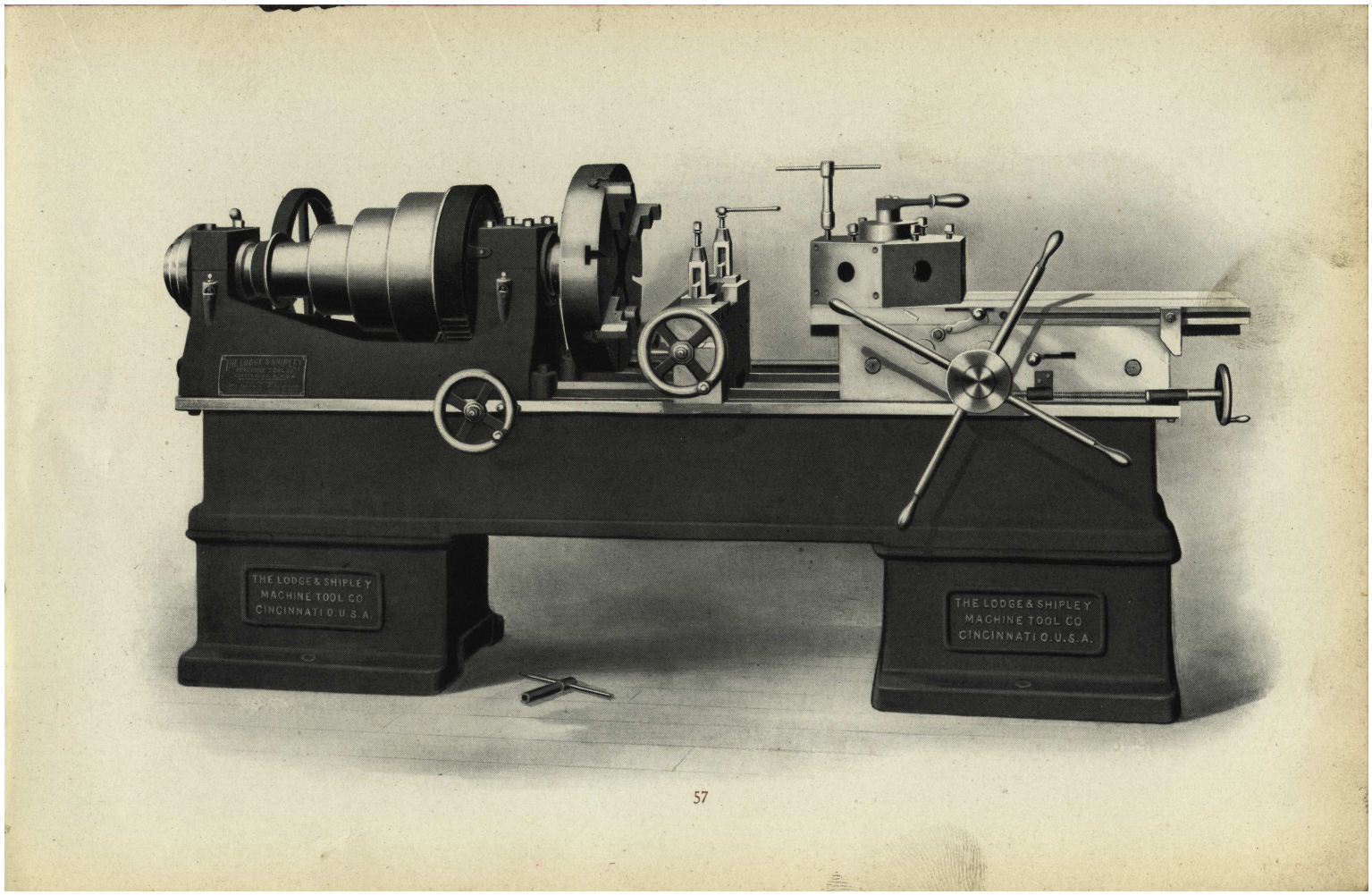
Code Word "*Befehl*"

Swings over shears	24 5/8 inches	Back bearing of spindle, $3\frac{7}{16}$ inches diameter by 5 3/4 inches long	
Length of bed	10 feet	Feeds, per inch	16, 25, 32, 39, 50, 64, 78, 100, 156
Distance between chuck and turret	4 feet	Speed of countershaft	125
Weight with 10-foot bed, about	5500 pounds	Speed of countershaft for high-speed steel	185
Ratio of back gearing	13.4 to 1	Size of pulleys on countershaft	16 x $7\frac{5}{16}$ inches
Cone diameters, 3-step	$7\frac{11}{16}$ to 15 3/8 inches	Hex. turret measures in diameter	14 1/8 inches
Cone diameters, 4-step	5 1/2 to 15 3/8 inches	Holes in turret may be bored	4 inches
Width of step on cone, 3-step	6 1/8 inches	Holes in turret may be bored through stem	2 inches
Width of step on cone, 4-step	4 5/8 inches	Center of turret holes on top slide	4 3/8 inches
Hole through spindle	2 1/8 inches	20-inch 4-jaw independent chuck furnished unless otherwise specified.	
Front bearing of spindle, 4 3/8 inches diameter by 8 3/8 inches long			

The advantages of this tool are known to all live manufacturers. We have incorporated in its design all of the valuable features of those already on the market, and, being fully aware of the importance of time, have added power, weight and stiffness sufficient to make it only a question of what the tools will stand. Four-inch pipe taps are being constantly used on these tools, making a nice, clean thread at one cut.

The turret is hexagonal, 14 1/8 inches in diameter across faces, and is provided with a hardened tool-steel division plate, with hardened locking key. The turret revolves automatically, and a lever is provided to withdraw the locking key by hand, so that the turret may be revolved at any point of its stroke; this permits of using two or more tools alternately as the nature of the work requires, without having to move the turret back to a given point each time the tool is changed.

The turret base has a screw movement of 20 inches along the bed. The double cut-off rest, with two tool posts, has screw adjustment, so that it may be moved longitudinally 18 inches from nose of spindle.


THE LODGE & SHIPLEY
MACHINE TOOL CO
CINCINNATI O. U. S. A.
THE LODGE & SHIPLEY
MACHINE TOOL CO
CINCINNATI O. U. S. A.

24-inch Extra Heavy Screw Machine

Code Word "*Befringe*"

Hole through spindle	3⅞ inches	Feeds of turret per inch,	16, 25, 32, 39, 50, 64, 78, 100, 156
Takes stock through wire feed	3¼ inches	Speed of countershaft	125
Weight with 10-foot bed, about	7000 pounds	Speed of countershaft for high-speed steel	185
Ratio of back gearing	9 to 1	Size of pulleys on countershaft	16 x $7\frac{5}{16}$ inches
Cone diameters	15½ to 7¾ inches	Hex. turret measures in diameter	14⅛ inches
Width of 3-step cone	4¾ inches	Holes in turret may be bored	4 inches
Width of 4-step cone	3⅝ inches	Holes in turret may be bored through stem	2 inches
Front bearing of spindle, 5⅞ inches diameter by 7⅜ inches long		Center of turret holes to top slide	4⅜ inches
Back bearing of spindle, 5⅛ inches diameter by 5¾ inches long		Feed of turret slide	4 feet

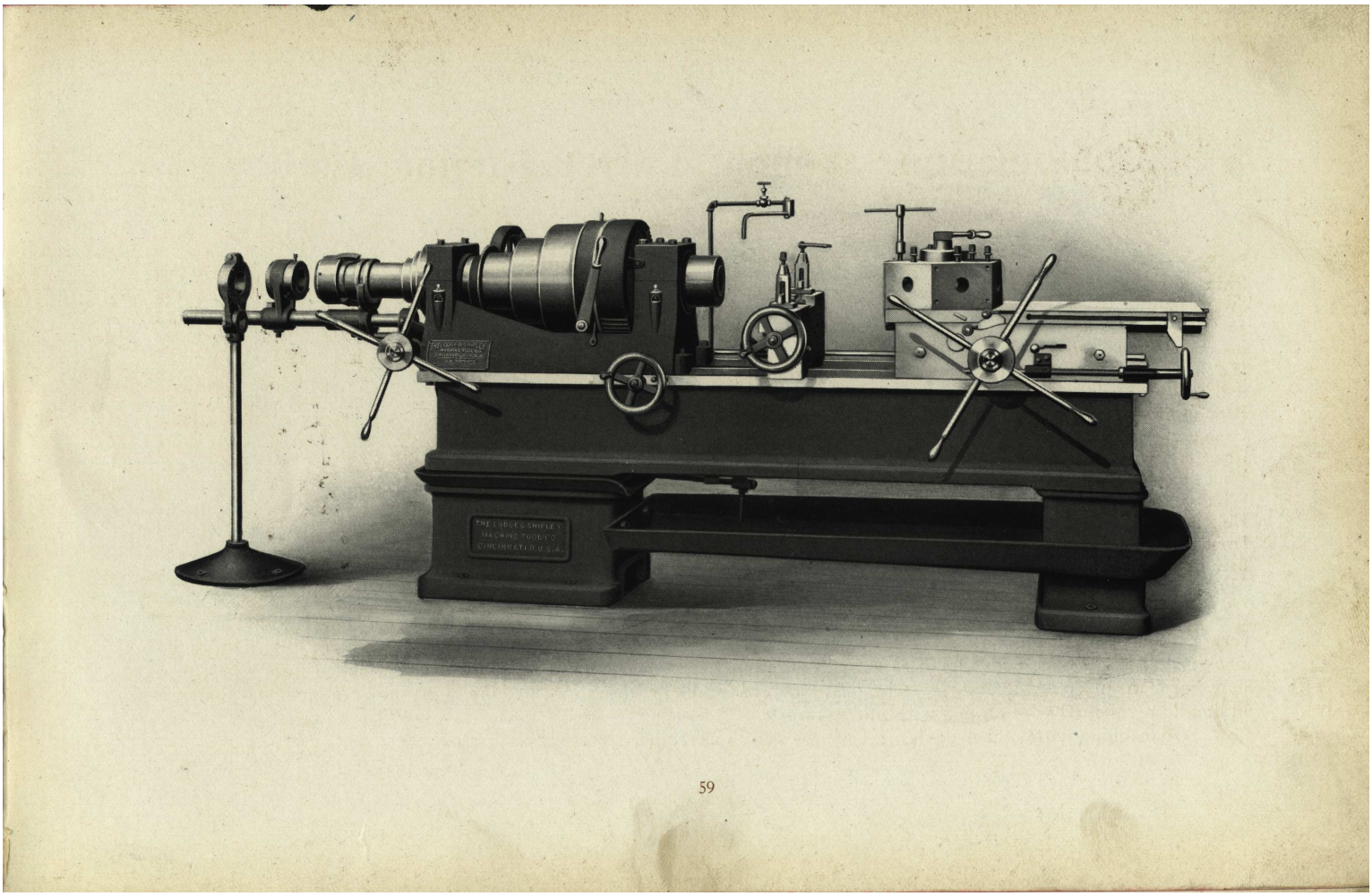
As will be seen from the dimensions above, this machine is intended for a very heavy class of screw machine work. The power, stiffness and general massiveness, together with its facility of operation, enable it to handle such work to the best advantage. The automatic revolving turret is provided with a tool-steel index of large diameter and tool-steel locking pin, which is adjustable by taper gib.

The wire feed is of the well-known Parkhurst design.

The friction head is instantly operated to change from slow to fast or *vice versa*.

A geared oil pump is furnished with each lathe and can be connected with stem of turret for oil-fed drills if so desired, at an additional charge.

The equipment also includes one collet for the chuck; other collets are furnished at an additional charge.


THE LODGE & SHIPLEY
MACHINE TOOL CO
CINCINNATI, O. U.S.A.

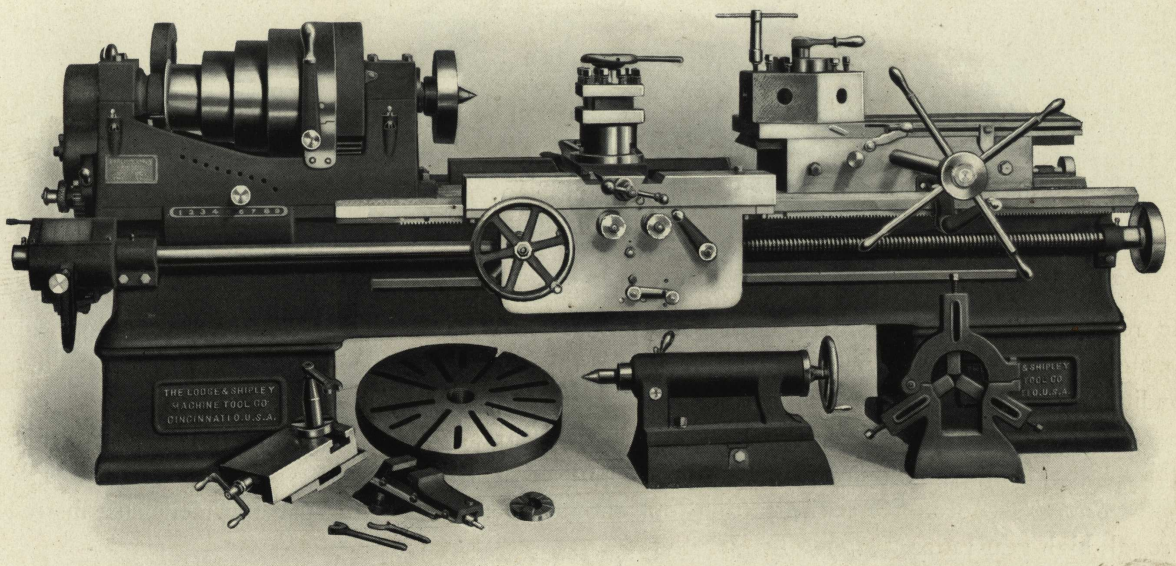
Combination 24-inch Turret Engine Lathe

Code Word "*Begehr*"

Swings over shears	24⅝ inches
Swings over compound rest	15 inches
Swings over carriage	16½ inches
10-foot lathe takes between centers	4 feet 3 inches
Beds made in even lengths	8 feet and above
Weight of 10-foot lathe, about	7900 pounds
Ratio of back gearing	8 to 1
Ratio of triple gearing	26½ to 1
Cone diameters, 3-step	15½ to 7¾ inches
Cone diameters, 4-step	15½ to 7⅝ inches
Width of step on cone, 3-step	4¾ inches
Width of step on cone, 4-step	3⅝ inches
Hole through spindle	2⅛ inches
Front bearing of spindle	4⅜ inches diameter by 8⅜ inches long
Back bearing of spindle	$3\frac{7}{16}$ inches diameter by 5¾ inches long
Diameter of tail-spindle	2⅞ inches
Speed of countershaft for back-geared lathe	125
Speed of countershaft for triple-geared lathe	160 and 125
Size of pulleys on countershaft	16 x $7\frac{5}{16}$ inches
Lathe cuts the following threads per inch:	1, 1⅛, 1¼, 1⅜ 1½, 1⅝, 1¾, 2, 2¼, 2½, 2¾, 2⅞, 3, 3¼, 3½ 4, 4½, 5, 5½, 5¾, 6, 6½, 7, 8, 9, 10, 11, 11½ 12, 13, 14, 16.
Feeds, per inch	5 to 80
Feeds of turret on bed, per inch	12½ to 200
Hex. turret measures in diameter	14⅛ inches
Steady rest takes in	7½ inches
Size of tool	¾ x 1¼ inches
Taper attachment turns 4 inches per foot, 24 inches long at one setting.	

The general power and massiveness of this lathe and its convenience and ease of operation, have made it very popular with manufacturers of engines, and others having quantities of duplicate parts in cast-iron to be machined. It is a complete engine lathe with friction head, making possible an immediate change from a fast to a slow speed or *vice versa;* a turret tool post interchangeable with the compound rest; taper attachment, and an automatic revolving turret on bed with power feed.

A machine with similar equipment can be had in any other size.


THE LODGE & SHIPLEY
MACHINE TOOL CO.
CINCINNATI O. U. S. A.

The Patent Head Lathe

(Patented April 25, 1905)

"More Lathe Work with Fewer Lathes"

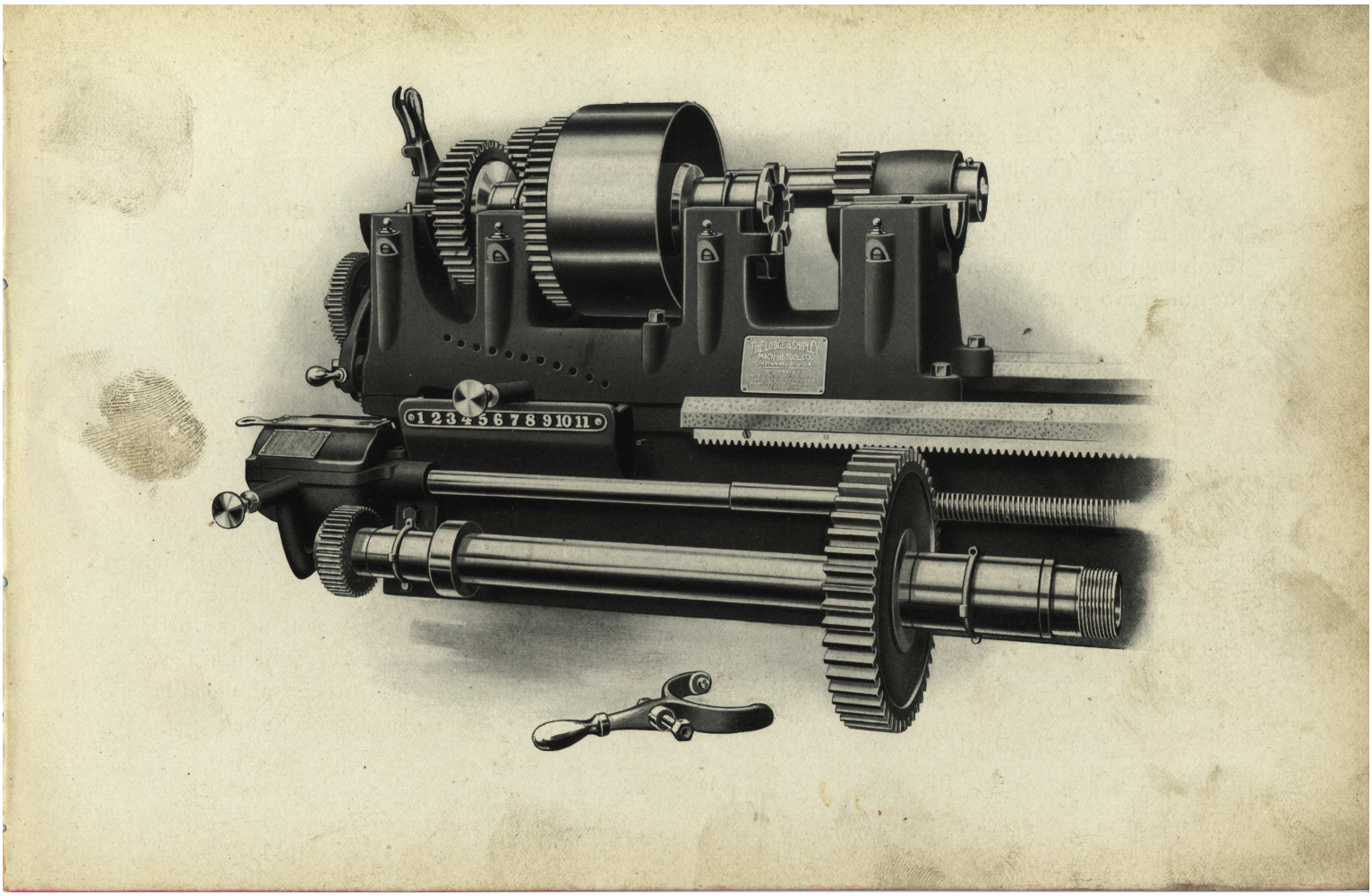
THE patent headstock described in the following pages, has been designed to meet the increased demands of the high-speed tool steels lately placed on the market, and is the result of several years of experimenting with various devices for providing more power in the lathe head than is possible with the ordinary type of cone pulley and its necessarily narrow belt.

Our aim in its design has been to provide this power in such a manner that all the functions of the regular type would be retained, but the head would have wearing qualities in addition, proportionate to the increased service expected of it. To this end we believe the observance of the following conditions to be of the highest importance:

First. The spindle bearings, upon which the accuracy of the lathe is dependent, should not be subjected to change of alignment by carrying the pull of the belt.

Second. More force at the cutting tool should be secured by the use of wider belts, instead of through high gear ratios.

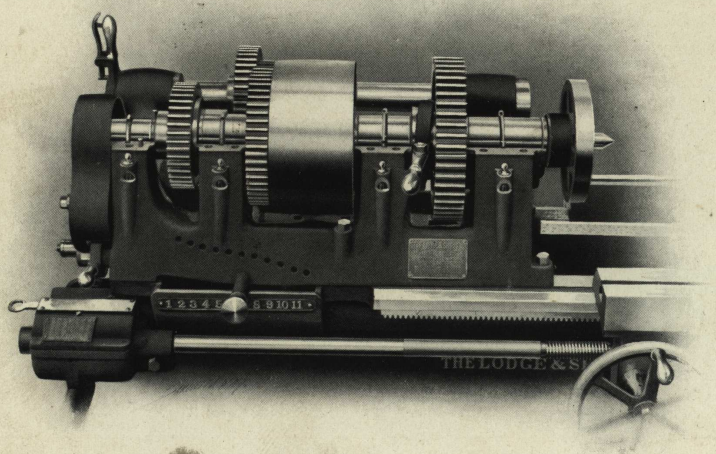
Third. The possibility of running the lathe "out of gear" should be provided for in cases where finishing cuts are desired.


THE LODGE & SHIPLEY
MACHINE TOOL CO.
CINCINNATI, U.S.A.
1 2 3 4 5 6 7 8 9 10 11

Fourth. Speed changes should be secured without the necessity of shifting belts.

Fifth. The lubrication of the bearings should be automatic and positive.

The illustrations on this and the preceding page show the construction. Power is applied through a wide-faced pulley of large diameter (see dimensions on pages 70 to 77), which is keyed to a sleeve revolving in the two central bearings of the headstock. At one end of this sleeve is a jaw clutch, and at the other, two gears of different diameters. The lathe spindle passes through this sleeve *without touching* it, having about one-eighth of an inch clearance, and revolves in the two outer bearings. It is connected to the driving sleeve for direct-belt speeds by the clutch and for back-gear speeds through either back gear. A lever, convenient for the operator, engages or disengages the clutch.



As there is no contact between the driving sleeve and the spindle except through the clutch, the pull of the belt is all carried by the two central bearings.

Sufficient clearance is provided in the clutch to prevent any of the belt strain

being communicated through it to the spindle. The spindle bearings are thus relieved of all wear due to belt pull and their life greatly prolonged.

The following table shows the difference in pressure on the spindle bearings between the cone pulley type and the patent head:

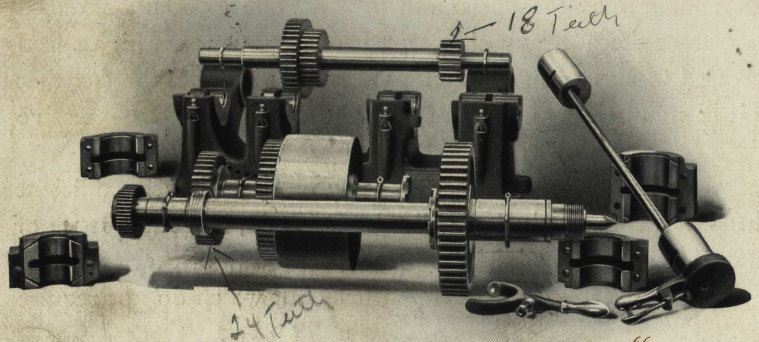
	20″ Lathe with Usual Cone Pulley	20″ Lathe with New Patent Headstock
Pressure exerted by belt on spindle bearings in pounds per square inch of bearing surface	17.6	None
Pressure exerted by belt on spindle between bearings which affect the alignment of the spindle . . .	393	None

In the ordinary type of engine lathe, the narrowness of the driving belt compels the use of the back gears for all cuts except the lightest. To provide sufficient force at the tool for heavy cuts, this back gear ratio must necessarily be a high one, and, as the speed at which the cut is taken is reduced in the same ratio as force is gained, it is apparent that a heavy chip cannot be removed at a high speed unless the speed of the cone pulley is increased to an enormous rate. When this is done, the fact that it revolves directly on the spindle, where it is impractical to keep a supply of oil, soon causes excessive friction and sticks the pulley.

In the patent head lathe, the great width of belt used (see pages 70 to 77) delivers sufficient force at the cutting tool for heavy cuts through a comparatively low back gear ratio, in consequence of which the spindle speeds are proportionately higher. An additional set of back gears of very low ratio is provided for cuts which are slightly beyond the capacity of the open belt, but which do not require

the full force afforded by the high ratio. Thus it will be seen that high speeds can be secured through the back gears without the necessity of revolving the driving pulley at the enormous rate required of a cone pulley to perform the same work. In addition, the construction of its bearings is such as to permit of perfect lubrication (see opposite page).

The Back Gearing is designed with ratios to give a uniform progression of speed from the slowest to the fastest. The two back gears are connected to the back gear shaft by spline and key, and are easily moved lengthwise to engage with their respective gears on the driving sleeve. The back gear shaft and pinion are made from forged steel. The journals for the shaft are placed at either end, where they revolve in bushes provided with oil reservoirs and the same efficient oiling system as the spindle and sleeve. This construction will be at once recognized as a much desired improvement over other existing types.

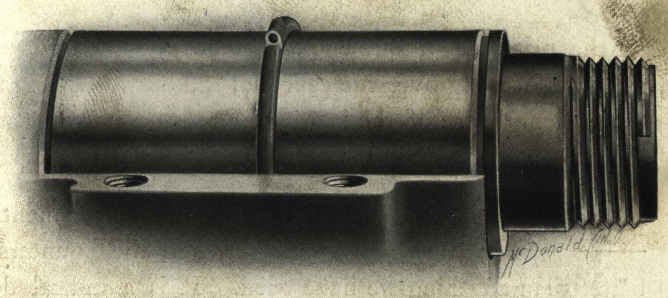


Triple Gearing can be supplied on 36, 42 and 48-inch lathes, and on the patent headstock is placed at the front of the lathe. All gears are of heavy pitch and wide face, accurately cut from the solid.

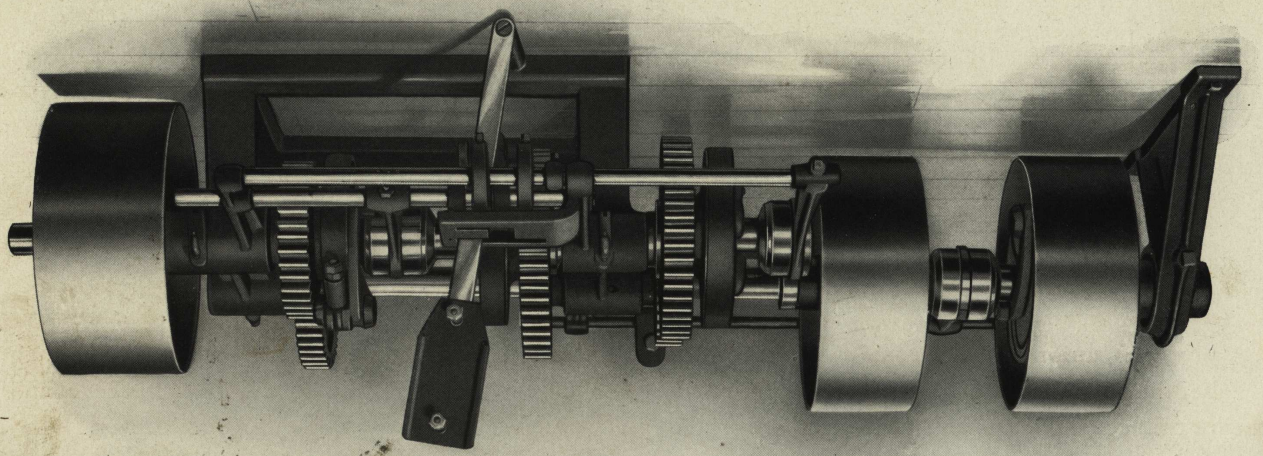
They are well-protected by gear covers and are designed to stand the high speeds and heavy strains of very rapid lathe work.

The End Thrust of the spindle is taken against the rear housing of the headstock by a large cast-iron collar keyed fast to the spindle, between which, and the faced end of the housing, are interposed two bronze washers placed on either side of a hardened steel washer of the same diameter.

Oiling This feature has received a great deal of consideration, and we can now state that we have an oiling device that will run for at least one month at one oiling. Deep oil wells, holding about a pint of oil each, are cast in the center of the bearings for the spindle and driving sleeve, and are connected with gauge glasses at the front of the headstock; thus the height of the oil in the wells is always apparent to the operator. The wells are filled through these gauge glasses, which allows any sediment or dirt in the oil to settle to the bottom and not be deposited on the revolving journals.



At the center of each journal is fastened a brass ring with four projections



on the principle of the bucket pump. As the journal revolves these buckets dip into the oil in the well, and, passing over the center of the bearings, pour the oil over the journal. Suitable ducts distribute the oil lengthwise of the bearing and return it to the well to be used again and again. It will be seen that this system provides a certainty of lubrication regardless of the speed at which the spindle revolves.

The Countershaft

We have been experimenting for several years with various forms of speed variators, and the countershaft shown on this page suits our requirements better than anything we have tried. It is a radical departure from the usual type and is designed to

deliver three or six speeds with only one or two belts to the line shaft, as the case may be. It consists, as shown in the illustration, of two parallel shafts mounted in a self-contained frame work, one shaft receiving the power through either one of two friction pulleys and delivering it to the other shaft by means of three pairs of gears operated by friction clutches. These clutches are very powerful and easily adjusted (see pages 26 and 27). The three frictions on the gears are all operated by one shifter, while another shifter operates the frictions for the driving pulleys. These are of large diameter and very wide face (see dimensions on pages 70 to 77). All the shaft bearings are provided with ring oilers and the pulleys and gears with grease cups surrounding the hubs.

Speeds When one friction pulley is run forward and the other backward, the countershaft will deliver three forward speeds and three backward speeds, which, in combination with the three speeds of the headstock, will give nine forward or backward speeds. When both pulleys are run forward, the pulleys should make 205 and 250 revolutions, respectively. This gives eighteen spindle speeds in the forward direction, none of which overlap.

We do not wish to convey the idea that this is a high-speed lathe only. It can be used to equal or better advantage on any class of work than the old type of cone pulley head engine lathe. *None* of the good qualities of an engine lathe are lost, and many more are gained, notably about double the power.

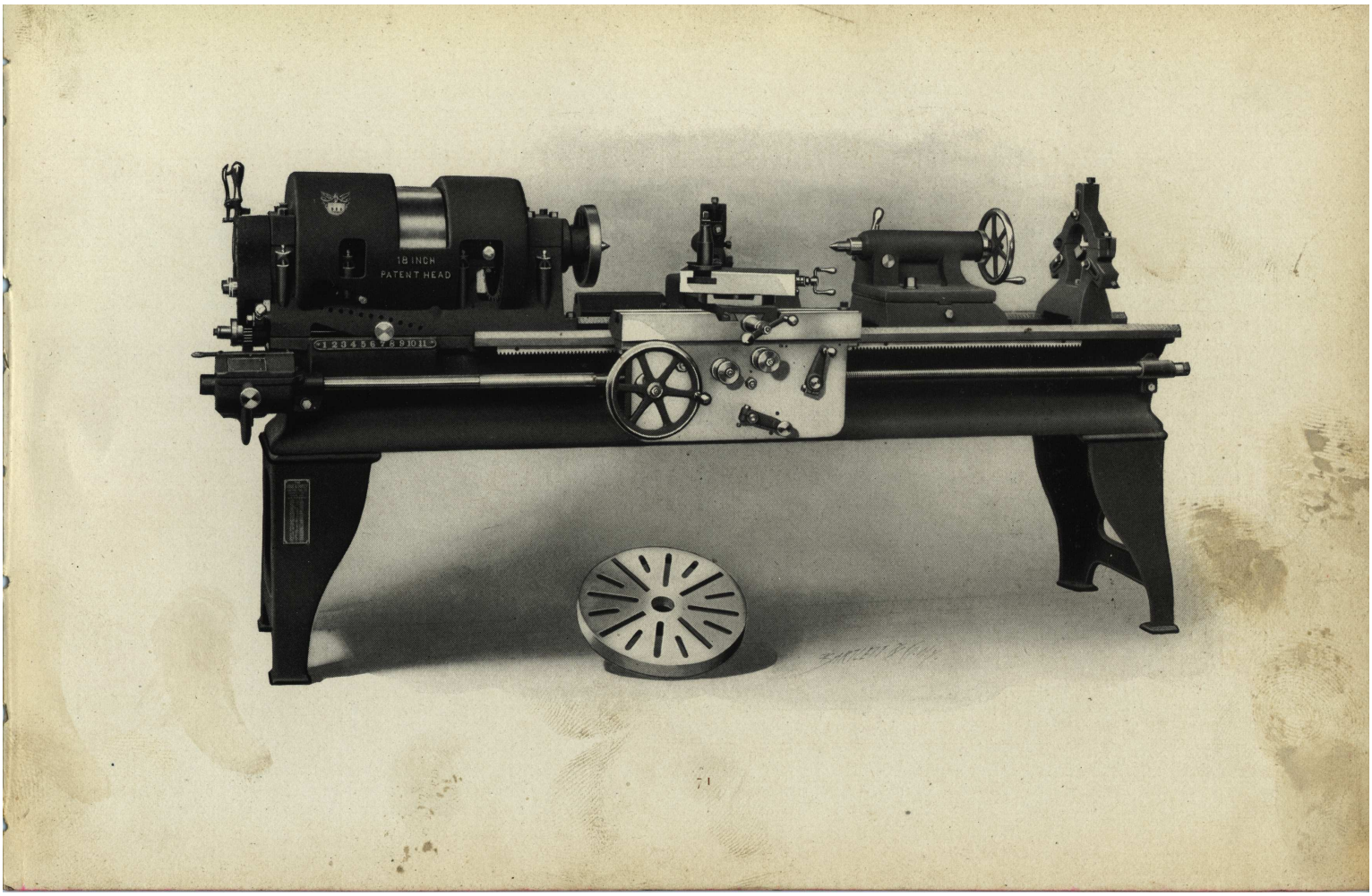
The following pages give dimensions of lathes equipped with the patent head.

14, 16, 18 and 20-inch Patent Head Lathes

For code word, add the word "*Patent*" to code word for lathe with cone pulley headstock

For description of details of design, see pages 12 to 29 and 62 to 69

	14-inch	16-inch	18-inch	20-inch
Swings over shears	14 1/8″	16 3/8″	18 3/8″	20 1/4″
Swings over compound rest	9″	10 5/8″	10 5/8″	12 3/4″
8-foot lathe takes between centers, tailstock flush	4′ 6″	4′ 1″	3′ 9″	3′ 6″
Beds made in even lengths	6′ to 14′	6′ to 14′	6′ to 26′	6′ to 26′
Weight of 8-foot lathe	1350	2300	3100	3500
No. 1 back gear ratio	3.04 : 1	3.12 : 1	3.12 : 1	3.12 : 1
No. 2 back gear ratio	9.6 : 1	9.3 : 1	9.8 : 1	9.8 : 1
Pulley diameter	8″	10″	12″	12″
Width of belt	3 1/2″	4″	4 1/2″	5″
Hole through spindle	1 1/4″	1 5/16″	1 9/16″	1 9/16″
Front bearing of spindle	2 5/8″ x 4 3/8″	2 3/4″ x 5 1/8″	3 1/4″ x 5 5/8″	3 1/2″ x 6 1/2″
Pulley bearings	2 5/8″ x 2 3/4″	2 3/4″ x 3 3/4″	3 1/4″ x 4″	3 1/2″ x 4 1/4″
Back bearing of spindle	1 5/16″ x 2 7/8″	2 1/16″ x 4″	2 3/8″ x 4″	2 1/2″ x 4 3/8″
Diameter of tail-spindle	1 7/16″	1 7/8″	2″	2 1/4″
Speed of countershaft, both forward	205–250	205–250	205–250	205–250
Speed of countershaft, forward and reverse	250–300	250–300	250–300	250–300
Size of friction pulleys on countershaft	12″ x 4 1/2″	12″ x 4 1/2″	14″ x 6″	14″ x 6″
Lathe cuts threads, per inch, from	2 to 64	2 to 64	2 to 32	2 to 32
Feeds, per inch	16 to 512	4 to 128	5 to 80	5 to 80
Maximum and minimum spindle speeds	395—20	409—20	372—17	372—17
Steady rest takes in up to	3″	4 3/8″	5″	6 1/4″
Follower rest takes in up to	1 3/8″	2 1/8″	2 1/2″	2 1/2″
Size of tool	1/2″ x 1″	1/2″ x 1 1/8″	5/8″ x 1 1/8″	5/8″ x 1 1/4″
Angular travel of compound rest	2 3/4″	3″	4 3/4″	4 3/4″

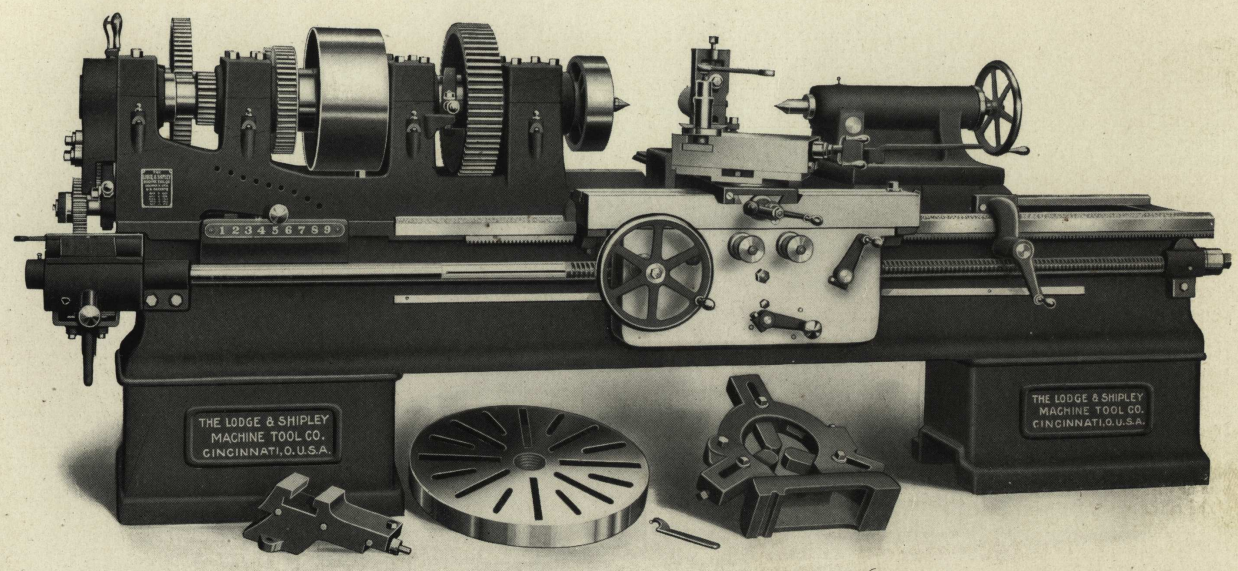

18 INCH
PATENT HEAD

22, 24 and 27-inch Patent Head Lathes

For code word add the word "*Patent*" to code word for lathe with cone pulley headstock

For description of details see pages 12 to 29 and 62 to 69

	22-inch	24-inch	27-inch
Swings over shears	24 1/8″	24 5/8″	27 1/2″
Swings over compound rest	16″	15″	17 3/8″
12-foot lathe takes between centers, tailstock flush	6′ 2″	5′ 6″	5′ 1″
Beds made in even lengths	8′ up	8′ up	10′ up
Weight of 12-foot lathe	6000	7100	8400
No. 1 back gear ratio	3.46 : 1	3.69 : 1	3.75 : 1
No. 2 back gear ratio	11.1 : 1	13 : 1	13.8 : 1
Pulley diameter	14 5/8″	15 5/16″	17″
Width of belt	6″	6 1/2″	7″
Hole through spindle	2 1/8″	2 1/8″	2 3/8″
Front bearing of spindle	4 3/8″ x 7 7/8″	4 3/8″ x 8 1/2″	4 7/8″ x 8 7/8″
Pulley bearings	4 3/8″ x 5″	4 3/8″ x 5 3/4″	4 7/8″ x 5 5/8″
Back bearing of spindle	3″ x 5″	3 7/16″ x 5 3/4″	3 7/8″ x 5 5/8″
Diameter of tail-spindle	2 7/8″	2 7/8″	3 3/8″
Speed of countershaft, both forward	205–250	205–250	205–250
Speed of countershaft, forward and reverse	250–300	250–300	250–300
Size of friction pulleys on countershaft	16″ x 7 5/16″	16″ x 7 5/16″	16″ x 7 5/16″
Lathe cuts threads, per inch, from	1 to 16	1 to 16	1 to 16
Feeds, per inch	5 to 80	5 to 80	5 to 80
Maximum and minimum spindle speeds	368—14	414—13	395—12
Steady rest takes in up to	6 3/4″	7 1/2″	8 1/2″
Follower rest takes in up to	2 1/2″	2 1/2″	2 5/8″
Size of tool	3/4″ x 1 1/4″	3/4″ x 1 1/4″	3/4″ x 1 1/2″
Angular travel of compound rest	5″	5″	6 1/2″



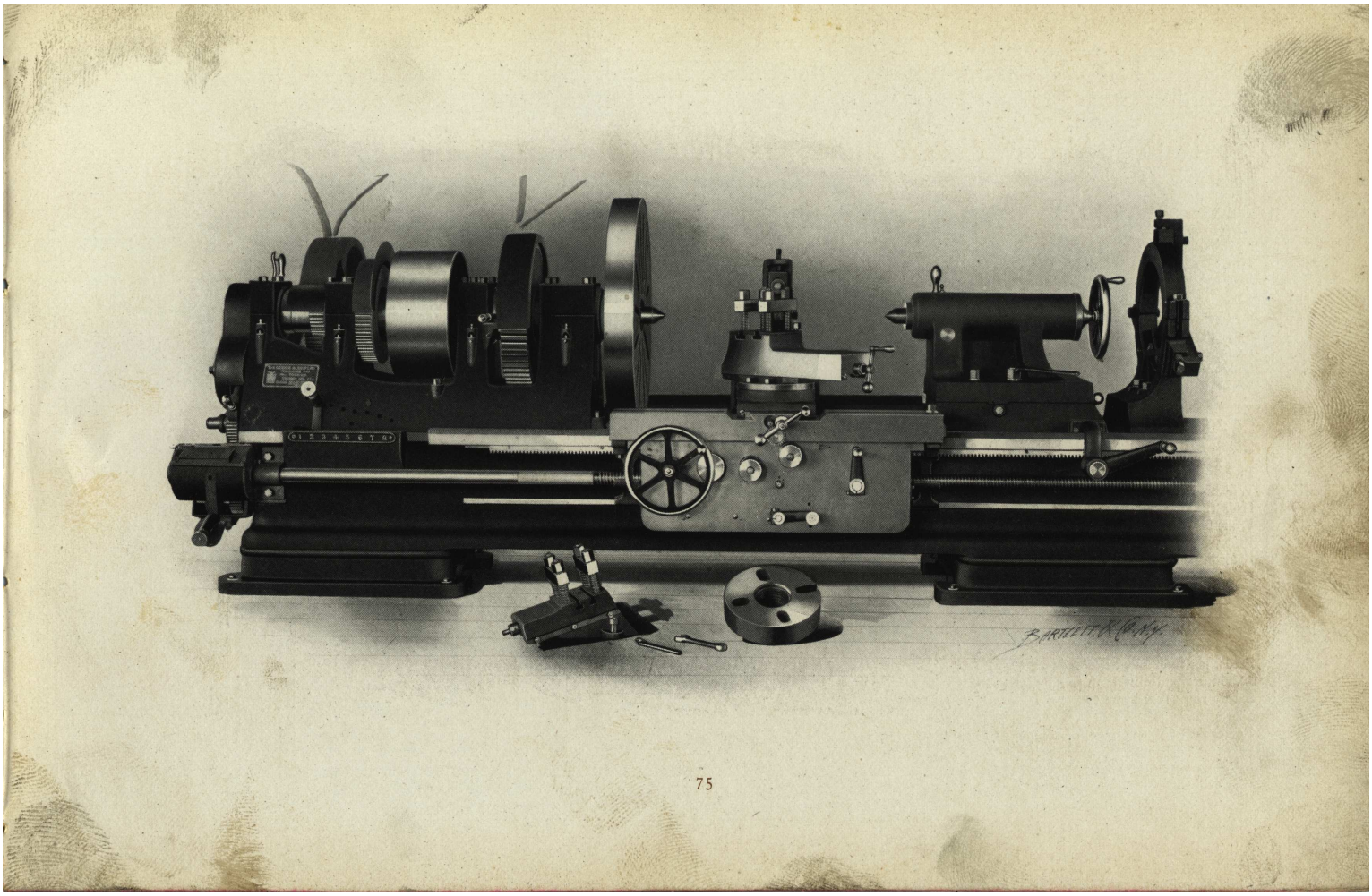
24-inch Patent Head Lathe with Gear Covers Removed

30 and 36-inch Standard Patent Head Lathes

For code word, add the word "*Patent*" to code word for lathe with cone pulley headstock

For description of details of design, see pages 12 to 29 and 62 to 69

	30-inch	36-inch
Swings over shears	30 3/8″	37″
Swings over compound rest	20″	24 1/4″
12-foot lathe takes between centers, tailstock flush	5′ 2″	4″ 5″
Beds made in even lengths	12′ up	12′ up
Weight of 12-foot lathe	10,000	12,500
No. 1 back gear ratio	3.9:1	3.98:1
No. 2 back gear ratio	14.4:1	14.9:1
No. 1 triple gear ratio	22.4:1	. . .
No. 2 triple gear ratio	62.3:1	. . .
Pulley diameter	18″	20″
Width of belt	8″	9″
Hole through spindle	2 9/16″	2 13/16″
Front bearing of spindle	5 3/16″ x 9 1/4″	6″ x 10″
Pulley bearings	5 3/16″ x 5 3/4″	6″ x 5 3/4″
Back bearing of spindle	4 1/8″ x 5 3/4″	4 3/4″ x 5 3/4″
Diameter of tail-spindle	3 3/16″	4 1/4″
Speed of countershaft, both forward	200–250	200–250
Speed of countershaft, forward and reverse	250–300	250–300
Size of friction pulleys on countershaft	18″ x 9 1/2″	18″ x 9 1/2″
Lathe cuts threads, per inch, from	1 to 14	1/2 to 14
Feeds, per inch	5 to 70	2 1/2 to 70
Maximum and minimum spindle speeds	300—8	270—7
Steady rest takes in up to	10 1/2″	15 1/2″
Follower rest takes in up to	3 1/4″	4 3/4″
Size of tool	7/8″ x 1 1/2″	1″ x 2″
Angular travel of compound rest	8 1/2″	15″

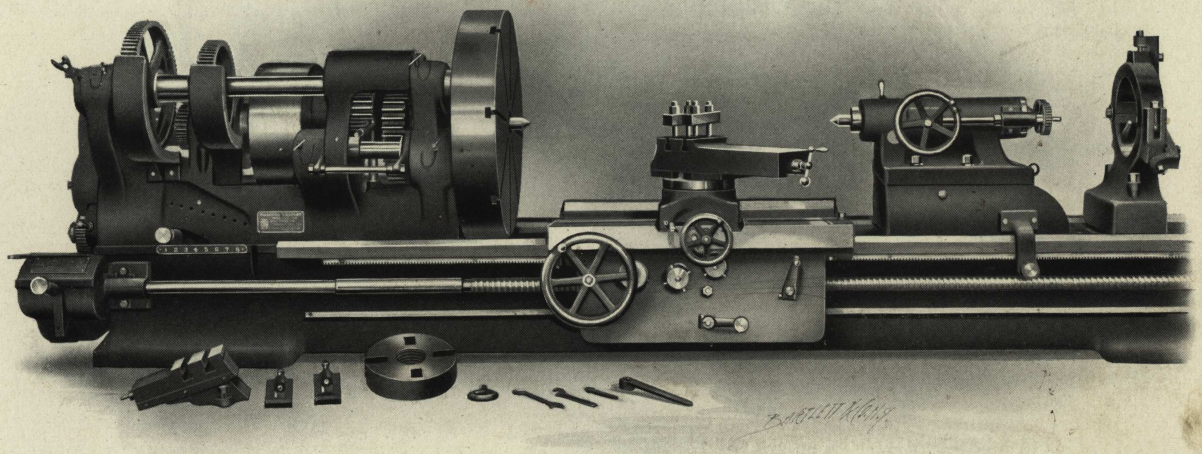


36-inch "Massive," 42-inch, 42-inch "Massive" and 48-inch Patent Head Lathes

For code word, add the word "*Patent*" to code word for lathe with cone pulley headstock

For description of details of design, see pages 12 to 29 and 62 to 69

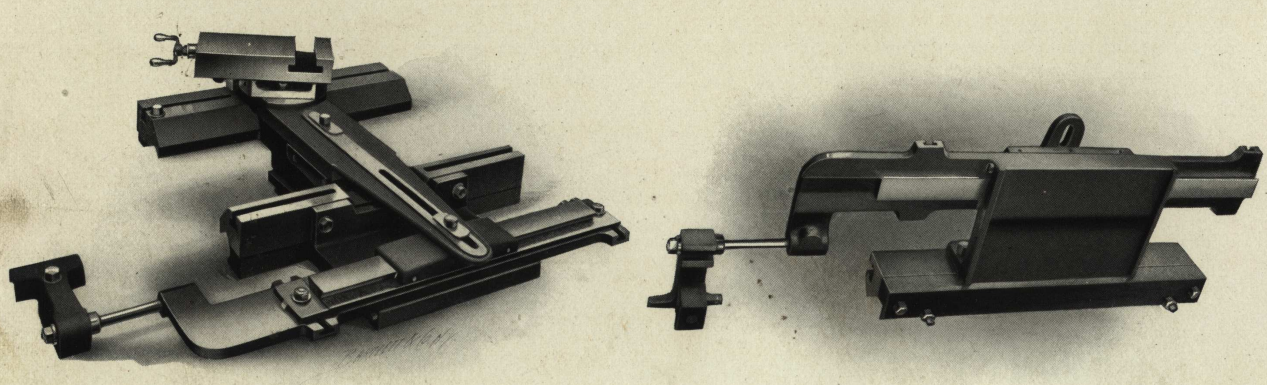
	36-inch Massive	42-inch	42-inch Massive	48-inch
Swings over shears	37″	43¾″	. . .	50″
Swings over compound rest	22½″	30½″	. . .	35½″
14-foot triple-geared lathe takes between centers	4′ 3″	4′ 3″	3′ 10½″	3′ 10½″
Beds made in even lengths	12′ up	12′ up	12′ up	12′ up
Weight of 14-foot lathe	21,500	22,000	23,000	25,000
No. 1 back gear ratio	2.94 : 1	2.94 : 1	2.94 : 1	2.94 : 1
No. 2 back gear ratio	8.29 : 1	8.29 : 1	8.29 : 1	8.29 : 1
No. 1 triple gear ratio	21.97 : 1	21.97 : 1	21.97 : 1	21.97 : 1
No. 2 triple gear ratio	61.92 : 1	61.92 : 1	61.92 : 1	61.92 : 1
Pulley diameter	24″	24″	24″	24″
Width of belt	9½″	9½″	9½″	9½″
Hole through spindle	2⅛″	2⅛″	2⅛″	2⅛″
Front bearing of spindle	6¼″ x 11″	6¼″ x 11″	6¼″ x 11″	6¼″ x 11″
Pulley bearings	6¼″ x 7″	6¼″ x 7″	6¼″ x 7″	6¼″ x 7″
Back bearing of spindle	5¼″ x 8¾″	5¼″ x 8¾″	5¼″ x 8¾″	5¼″ x 8¾″
Diameter of tail-spindle	5″	5″	5″	5″
Speed of countershaft, both forward	200–250	200–250	200–250	200–250
Speed of countershaft, forward and reverse	250–300	250–300	250–300	250–300
Size of friction pulleys on countershaft	24″ x 9½″	24″ x 9½″	24″ x 9½″	24″ x 9½″
Lathe cuts threads, per inch, from	½ to 14	½ to 14	½ to 14	½ to 14
Feeds, per inch	3 to 84	3 to 84	3 to 84	3 to 84
Maximum and minimum spindle speeds	250–2	250—2	250—2	250—2
Steady rest takes in up to	13½″	13½″	17½″	17½″
Size of tool	1″ x 2″	1″ x 2″	1″ x 2″	1″ x 2″
Power feed angular travel of compound rest	19″	19″	19″	19″



42-inch Massive Triple-geared Patent Head Lathe

Accessories

The following attachments are not furnished regularly on our lathes, but can be supplied at an additional charge with either the cone pulley pattern or the patent head :



Patented April 7, 1891, and November 9, 1897

The Taper Attachment is clearly shown in the illustrations on this page. It is extremely simple and composed of less parts than any other in the market. In operation it is set for tapers by simply loosening the cross-feed screw and tightening

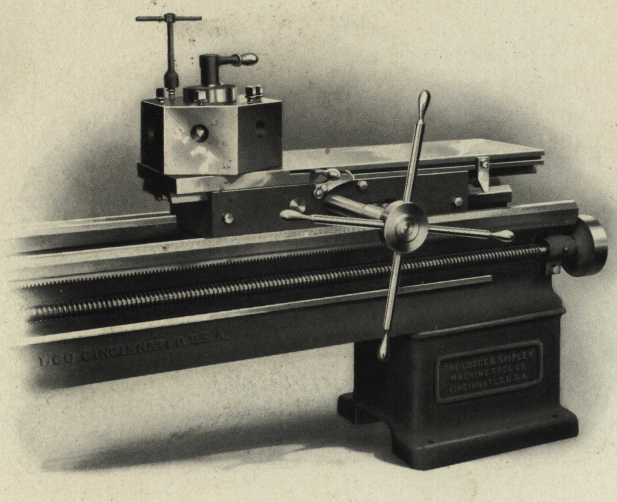
the screw in the sliding block and the screw in the dog. It may be instantly changed back to turn straight by releasing the screw in the dog. When attached for taper work, the sliding shoe connects directly with the compound rest, and not with the screw, making its operation instantaneous. The cross-feed nut is never disconnected, but slides in a slot (patented) and cannot fall over to one side, as in the ordinary taper attachment.

The bracket carrying the swivel bar is bolted to and travels with the carriage, so that at whatever part of the bed the carriage may be, the taper attachment may be instantly engaged.

No planed strip on the back of the bed is necessary; therefore a special bed is not required, and the taper attachment can be applied to any one of our lathes. The carriages are regularly drilled so it can be readily added at such time as the purchaser may desire.

Turret on Shears

Turrets for the shears can be supplied for all sizes of lathes, and are indispensable where quantities of duplicate parts are to be machined. The top slide carrying the revolving head is of ample width and thickness to afford stiffness, and is provided with a long movement either by hand or power. When power feed is supplied, the feed rod for the turret is driven from the rear end of the lead screw, providing as many variations in feed as for the carriage. An automatic stop to the power feed is also provided.



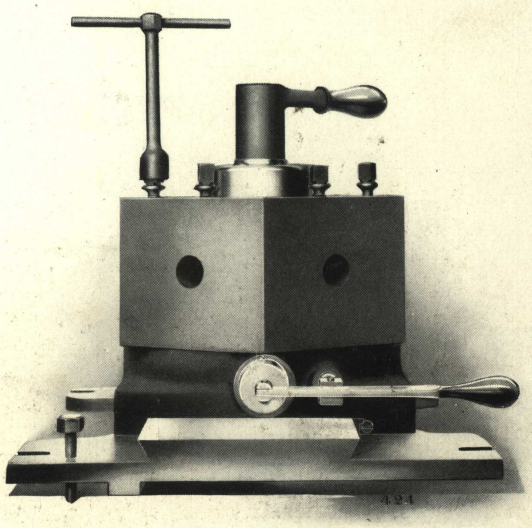
The turret head is hexagonal in shape, adapting it to the use of box tools; revolves automatically when slide is run back, and is provided with means for taking up the wear of the stud upon which it revolves.

The index plate is of hardened tool steel.

A lever is provided for withdrawing the locking plunger by hand, so that in using two or more tools alternately, they can be swung into position without having to make a complete revolution of the turret.

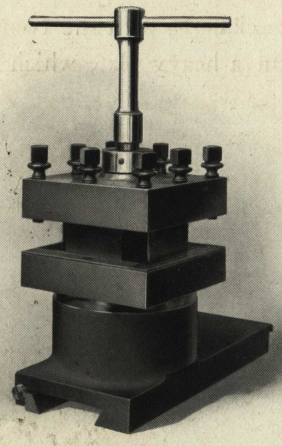
Turret on Carriage

This has been lately re-designed, so as to afford greater stiffness and rigidity than the usual type which interchanges with the compound rest. As will be seen from the illustration, the turret head is mounted on a heavy plate which is bolted to the wings of the carriage. The plate is aligned by a planed tongue on its under side which rests against the regular carriage dovetail. No movement of the plate takes place on this dovetail. It is slotted to allow the cross-feed nut to extend up through it and be attached to the turret slide for cross feeding.

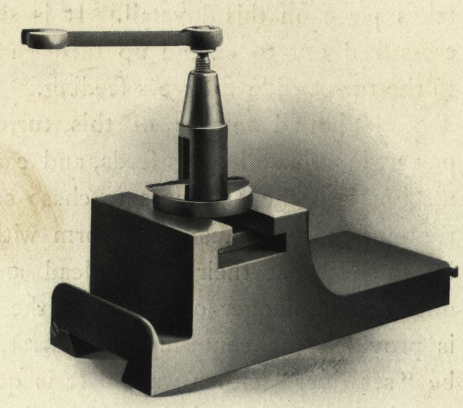


The advantages of this turret are that it has power, length and cross feeds, and can be used in connection with the half nuts to chase screws. It permits running in such taps as conform with the threads cut by the lathe at their proper lead and bringing them out without danger of stripping the threads. A stop is provided for centering the turret, and it may also be "set over" either way. It is quickly attached or detached and is much less expensive than the turret for shears.

(Patented August 2, 1904)

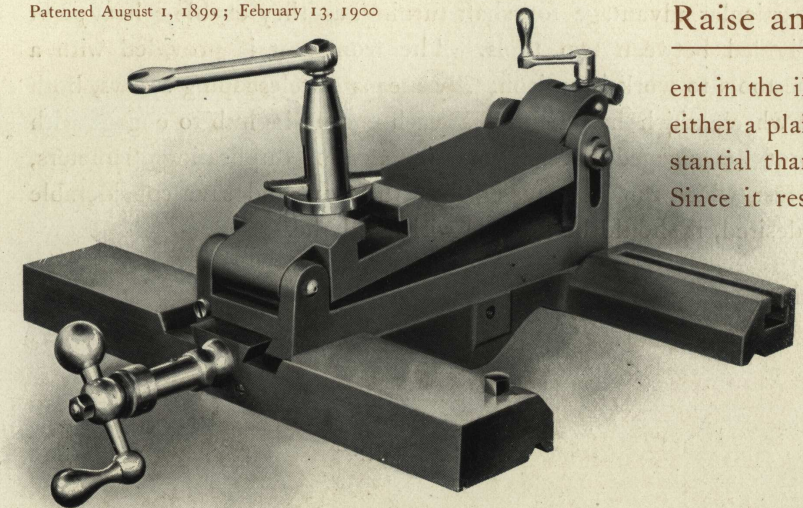


The Turret Tool Post holds four tools, either at the corners or sides. The locking-pin withdraws automatically when the clamping bolt is released to revolve the turret. It is interchangeable with the compound rest, simple in design, rigid in construction, and a great time-saver where the number of pieces reduced to the same dimensions permits the several tools in the tool post to be used alternately.



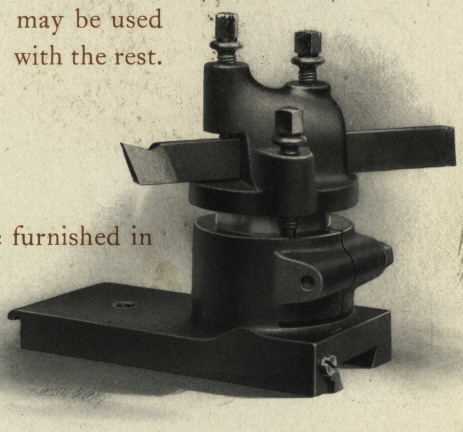
Plain Rests are unsurpassed for rigidity under heavy cuts. They are supplied when so ordered on all sizes of lathes.

Patented August 1, 1899; February 13, 1900



Raise and Fall Rest

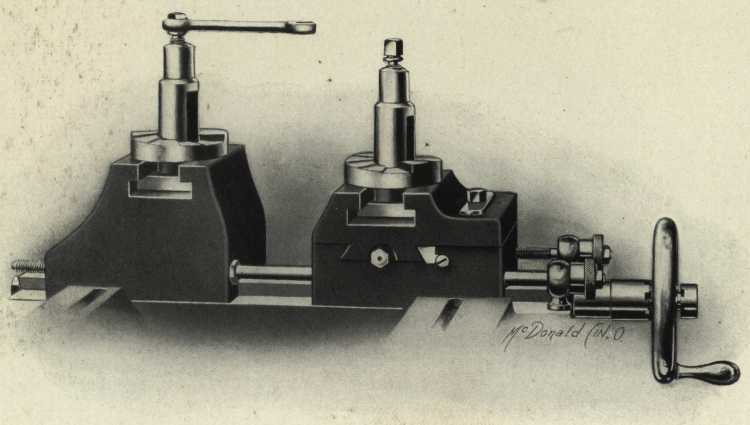
The advantages of this rest are apparent in the illustration. It is interchangeable with either a plain or compound rest and is more substantial than the standard type raise and fall rest. Since it rests solidly on the bridge, there is no spring and it may be locked firmly for the cut. Taper attachment may be used with the rest.



The "Lipe Elevating Rest"

as here illustrated, can be furnished in place of the compound rest on all lathes below 36-inch swing, or interchangeable with it. In this respect the tool can be rigidly clamped in place and then elevated or swung into position. It forms a very powerful tool holder.

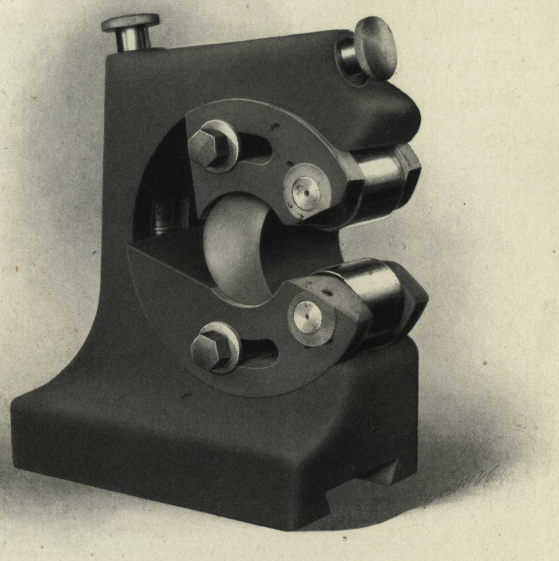
Double Tool Posts are of particular advantage for shaft turning, as they enable a heavy cut to be divided between two tools. The front rest is provided with a cross adjustment to facilitate setting the tools to work in unison. By means of telescoping screws, both rests are operated by the same hand wheel, which has a clutch at each end of its hub to engage with either screw. Both movements cannot be engaged at the same time. For duplicating diameters, graduated stops are provided for each rest, which can be adjusted from the front and save considerable calipering. When this attachment is desired, it should be ordered with the lathe.



Special Roller Follower Rest

Those having quantities of shafts, with a number of shoulders, to turn, will recognize in this rest, an attachment entirely new in principle and of the greatest importance in the saving of time.

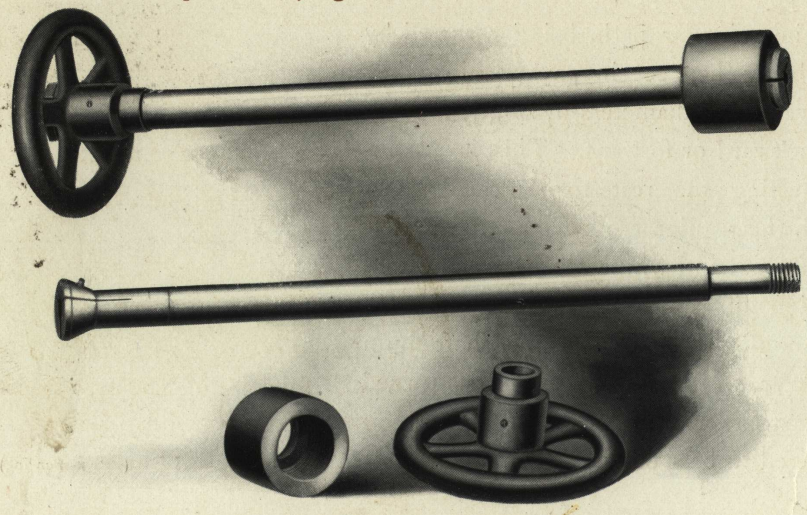
The two jaws carrying hardened-steel rollers move in and out in a circular path, being actuated by a worm and knob. When set in any position, they are adapted for a variety of diameters by simply moving the entire rest backward or forward. This is accomplished by connecting the rest to a screw which telescopes through the regular cross feed screw and is operated by the same hand wheel which sets the tool rest. The position of the rollers is such that in approaching a shoulder they support the shaft upon the smaller diameter until the cutting tool has turned a portion of the next larger diameter, when the position of the rest is changed to bear on that portion.



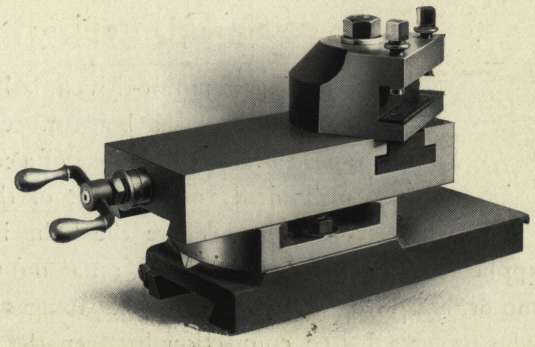
(Patent Pending)

Draw-in Chuck and Collet

This attachment is only furnished regularly on the 14-inch tool room lathe, being charged for additionally on all other sizes. Its construction is clearly shown in the illustration. The spring collets may be furnished to receive any diameter up to a maximum of ½-inch less than the diameter of the hole through spindle of the lathe for which it is intended. Only one collet is furnished with the draw-in chuck at the price named. Additional ones are furnished at prices varying with the size of the lathe.



European Tool Block



The European tool block, as here illustrated, was designed to meet the requirements of the European market. It consists of an upper and lower block fitted to the regular T-slot of the plain or compound rest. The tool rests on a serrated hardened plate in the side of the upper block, and is held by two large screws. The block can be swiveled so as to present the cutting point at any angle to the work. The regular tool post wrench fits all the nuts. No extra charge is made for furnishing this form of tool holder *in place* of the American style of tool post, if ordered before the lathes are completed with the American style.

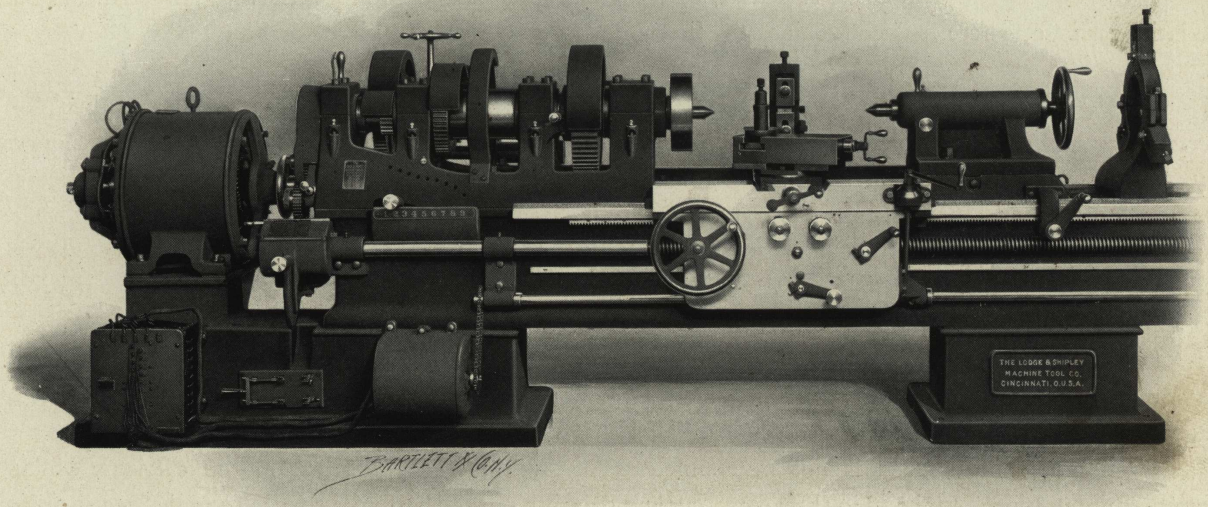
Electrically-driven Lathes

IN buying a motor-driven lathe, the purchaser usually has to decide between a direct-connected and a belt-connected lathe, and between a constant speed and a variable speed motor. The use of a constant speed motor direct geared to the lathe is practically prohibited, on account of the mass of gearing necessary to secure sufficient speed changes. Where the lathe is to be direct-connected, we recommend our system as applied to the patent head lathe, on account of the small amount of speed variation required in the motor, and also numerous other advantages mentioned in the description of this drive. For those who prefer a belted connection between the motor and lathe, we illustrate, also, our cone pulley type lathe driven by both a constant speed and a variable speed motor.

Direct-connected Patent Head Lathe

The illustration on the opposite page shows our method of attaching the motor to the patent head lathe. This system permits the use of any motor having a speed variation of not more than two to one. The motor, as will be seen from the illustration, is mounted on an extended cabinet leg at the head of the lathe, and is connected to the lathe spindle through gearing at the back of the headstock. It is thus placed in a position to be readily accessible to the operator and to obviate the top-heaviness and vibration incident to the prevailing custom of mounting it on top of the headstock. This is especially true on account of the large sizes of motors required by present-day tool steel.

Changes of Speed are secured both by electrical and mechanical means. The electrical changes are obtained either by varying the amount of resistance in the motor field or through the use of one of the multiple voltage systems, and their number depends only on the number of points in the controller. There is a large number of motors on the market, designed to



24-inch Patent Head Lathe, Motor-driven

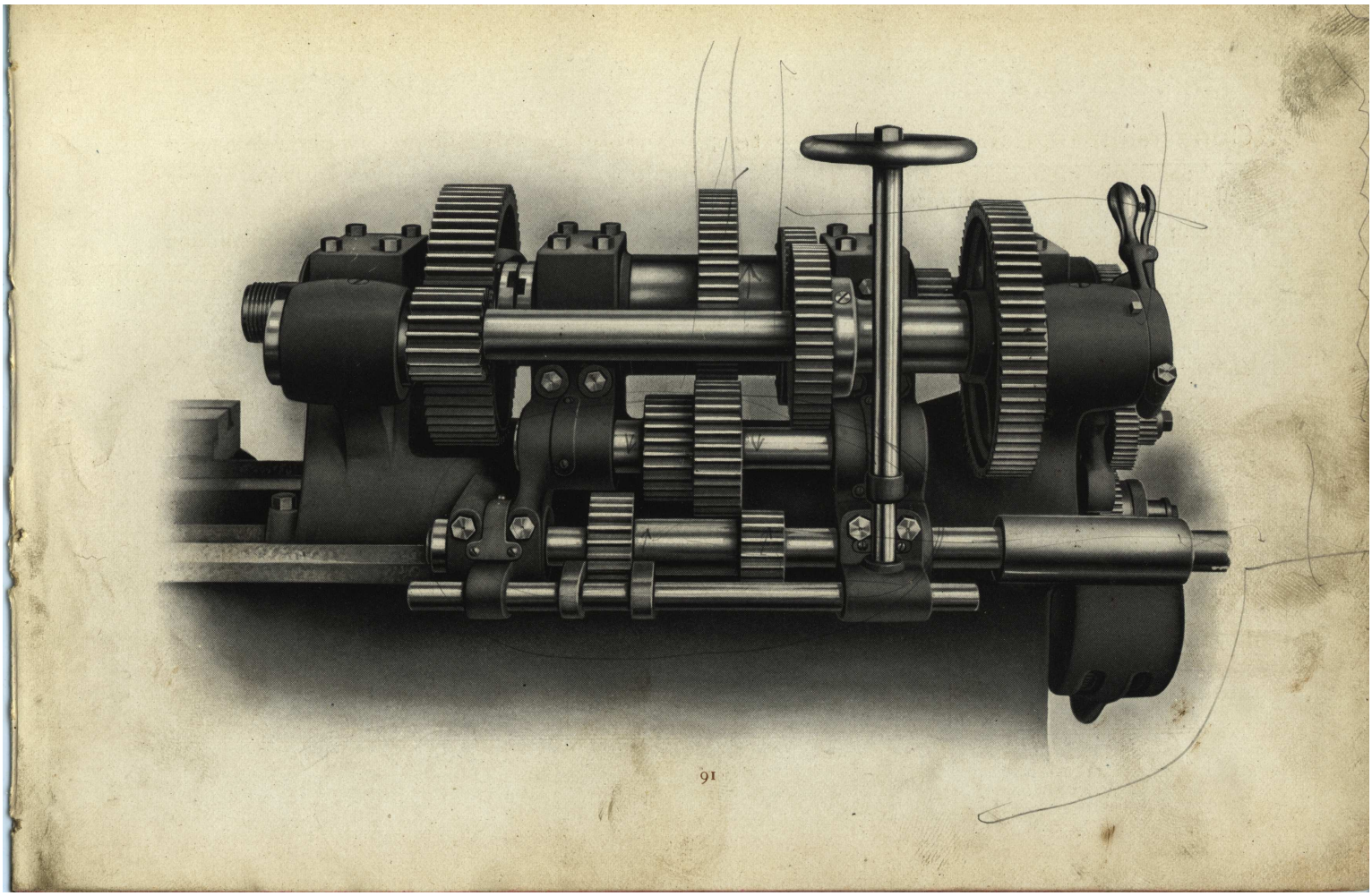
develop practically a constant horse-power, with a speed variation of two to one, so that the purchaser has considerable option in selecting the motor.

The Controller is attached either at the front or back of the cabinet leg and can be connected through sprockets and chain and splined shaft to a lever with graduated dial on the lathe carriage, where it is convenient for the operator.

Mechanical Changes The motor is connected to a short splined driving shaft at the back of the headstock (see opposite page), upon which is mounted a sliding sleeve with two gears of different diameters. These gears may be shifted so that the drive is through either one of them into the main driving gear on the sleeve. In addition to these two changes, two other changes may be obtained with either back gear. Thus it will be seen that six ranges of speed are available. Intermediate speeds in each range are obtained by varying the speed of the motor. With a 20-point controller 120 distinct speed changes are thus secured.

On the 36-inch lathes and larger, triple gearing can be supplied in addition to the double back gears regularly furnished. This will provide, with a geared arrangement similar to the above, ten ranges of speed in the headstock, or 200 changes with a 20-point controller.

Where the motor used is not reversible, we supply a thread indicator on the carriage, which permits running it back by hand in thread cutting and dropping in the half nuts to catch any desired thread.



Conversion of Belt-driven Lathe to Motor Drive

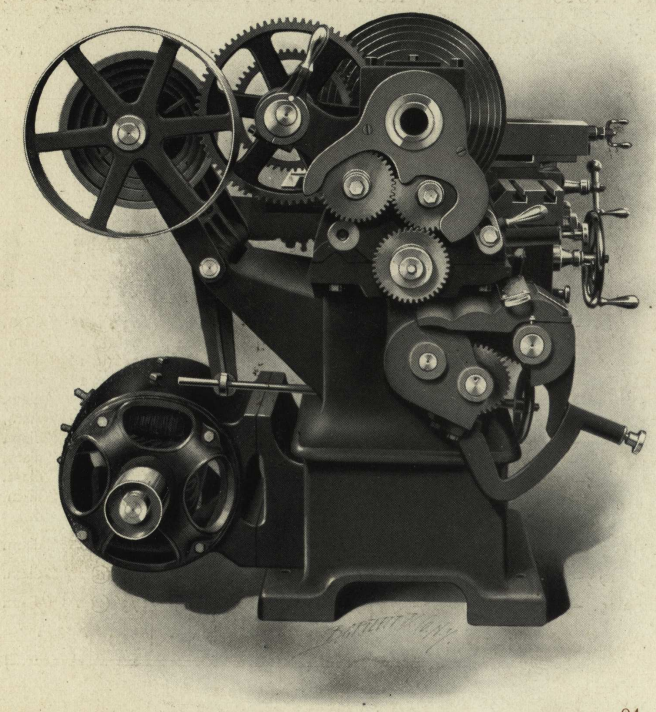
Heretofore, unless a lathe has been built as a motor-driven tool, the attaching of a motor, subsequent to its installation in a shop, has been a somewhat difficult problem, involving fitting and the bolting on of brackets, etc. With the patent head lathe its solution becomes a very simple matter. All patent headstocks are now cast with pads at the back, which are planed and grooved to receive the brackets carrying the train of gears. The brackets and gears are made to template, and can be furnished at any time, to be attached with a minimum of fitting. Cabinet legs with motor extension can also be supplied.

The 2 : 1 variable speed motor, 450–900 revolutions per minute, is best adapted for the various lines of lathe duty. Below we submit the size of motor that should be applied to the Lodge & Shipley Patent Headstock Lathe.

Horse-power of Motor	1	2½	4	5	7½	10	12	15	20
Light duty . . .	14″	16″	18″–20″	22″–24″	36″–42″–48″ Massive 27″–30″–36″	. .	. . .	. . .	. . .
Medium duty . .	. .	14″	16″	18″–20″	22″–24″	27″–30″	36″–42″–48″ Massive 36″ Standard	. . .	. . .
Heavy duty . .	. .	. .	14″	16″	18″–20″	22″–24″	27″–30″	36″–42″–48″ Massive 36″ Standard	. . .
Extra heavy duty .	. .	. .	. .	. .	. . .	. .	. . .	. . .	36″–42″–48″ Massive

The following table shows the maximum motor speed which we recommend for each size lathe and the ranges of spindle speeds obtained therefrom :

Size of Lathe		Speed of Motor	Spindle Speeds of Patent Head Lathes, in Revolutions Per Minute								Minimum Surface Speed at Full Swing of Lathe in Feet per Minute	Maximum Surface Speed at Small Diameters per Minute
			Direct		1st Back Gear		2d Back Gear		1st Back Gear Triple Gear		2d Back Gear Triple Gear			
. .	14	1000–500	470–235	235–117.5	154–77	77–38.5	49.6-24.8	24.8–12.4	. .	. .	. .	. .	45′	123′ @ 1 ″ diam.
. .	16	1000–500	470–235	235–117.5	151–75.5	75.5–37.8	50.4–25.2	25.2–12.6	. .	. .	. .	. .	53′	123′ @ 1 ″ diam.
. .	18	900–450	394–197	197– 98.5	127–63.5	63.5–31.8	40–20	20–10	. .	. .	. .	. .	47′	155′ @ 1½″ diam.
. .	20	900–450	394–197	197– 98.5	127–63.5	63.5–31.8	40–20	20–10	. .	. .	. .	. .	52′	155′ @ 1½″ diam.
. .	22	1000–500	356–178	178– 89	103–51.5	51.5–26	32–16	16– 8	. .	. .	. .	. .	46′	140′ @ 1½″ diam.
. .	24	900–450	360–180	180– 90	97–48.5	48.5–24.3	27.6–13.8	13.8–6.9	. .	. .	. .	. .	43′	141′ @ 1½″ diam.
. .	27	900–450	334–167	167– 83.5	89.5–44.8	44.8–22.4	24.4–12.2	12.2–6.1	. .	. .	. .	. .	43′	175′ @ 2 ″ diam.
Back gear .	30	900–450	330–165	165– 82.5	85–42.5	42.5–21.2	22.8–11.4	11.4–5.7	. .	. .	. .	. .	45′	173′ @ 2 ″ diam.
Triple gear .	30	900–450	330–165	165– 82.5	115–57.5	57.5–28.8	40–20	20–10	14.7–7.35	7.35–3.67	5.3–2.65	2.65–1.32	10′	173′ @ 2 ″ diam.
Back gear .	36	900–450	311–155.5	155.5–77.8	78–39	39–19.5	21–10 5	10.5–5.2	. .	. .	. .	. .	49′	163′ @ 2 ″ diam.
Triple gear .	36	. .	. .	. .	. .	. .	. .	. .	. .	. .	. .	. .	. .	. . . .
Massive triple gear	36	900–450	330–165	165–82.5	112.3–56.1	56.1–28	39.8–19.9	19.9–9.95	15–7.5	7.5–3.75	5.4–2.7	2.7–1.35	13′	173′ @ 2 ″ diam.
Triple gear .	42	900–450	330–165	165–82.5	112.3–56.1	56.1–28	39.8–19.9	19.9–9.95	15–7.5	7.5–3.75	5.4–2.7	2.7–1.35	15′	173′ @ 2 ″ diam.
Massive triple gear	42	900–450	330–165	165–82.5	112.3–56.1	56.1–28	39.8–19.9	19.9–9.95	15–7.5	7.5–3.75	5.4–2.7	2.7–1.35	15′	173′ @ 2 ″ diam.
Triple gear .	48	. .	. .	. .	. .	. .	. .	. .	. .	. .	. .	. .	. .	. . . .



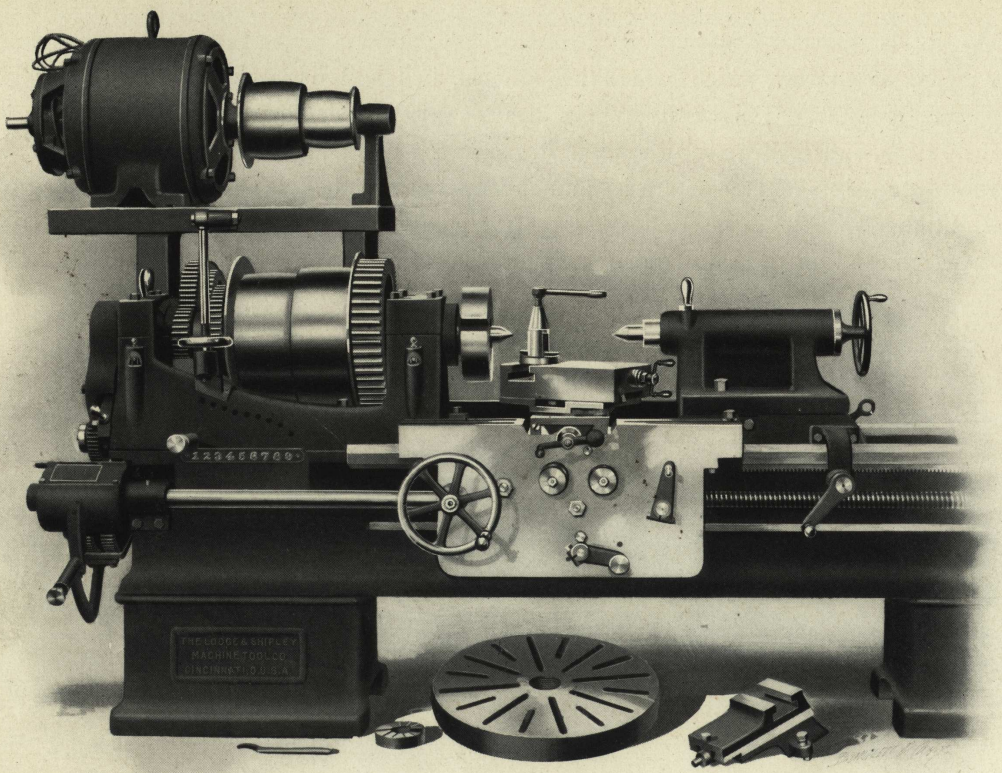
Belt-connected Motor Drive with Constant Speed Motor

The accompanying illustration shows a 24-inch standard cone pulley type lathe, arranged for direct belt drive with a constant speed motor. The motor is mounted on the back of the cabinet leg, and connected by belt to the countershaft suspended in a swinging frame directly above it. A short belt passes from the countershaft to the cone pulley on the headstock, and is shifted in the ordinary manner from step to step to obtain the different changes of speed, which are the same as ordinarily provided by the regular countershaft. The pulley on the countershaft should run between 125 and 200 revolutions per minute. Sufficient tension in the short belt between the countershaft and headstock is

obtained by means of a screw, which passes through the bed and has a hand wheel in a convenient location for the operator. This system provides a very satisfactory drive, with more flexibility than the geared type, and makes use of a much lower priced motor.

The following sizes of motors are recommended, with speeds between 700 and 1000 revolutions per minute. Higher speeds can be used, but are not advisable, owing to the large diameter of pulley which would be required on the countershaft :

14-inch lathe	1 horse-power	27-inch lathe	4 horse-power
16-inch lathe	1½ horse-power	30-inch lathe	5 horse-power
18-inch lathe	2 horse-power	36-inch lathe	6 horse-power
20-inch lathe	2½ horse-power	42-inch lathe	7½ horse-power
22-inch lathe	3 horse-power	48-inch lathe	7½ horse-power
24-inch lathe	3½ horse-power		

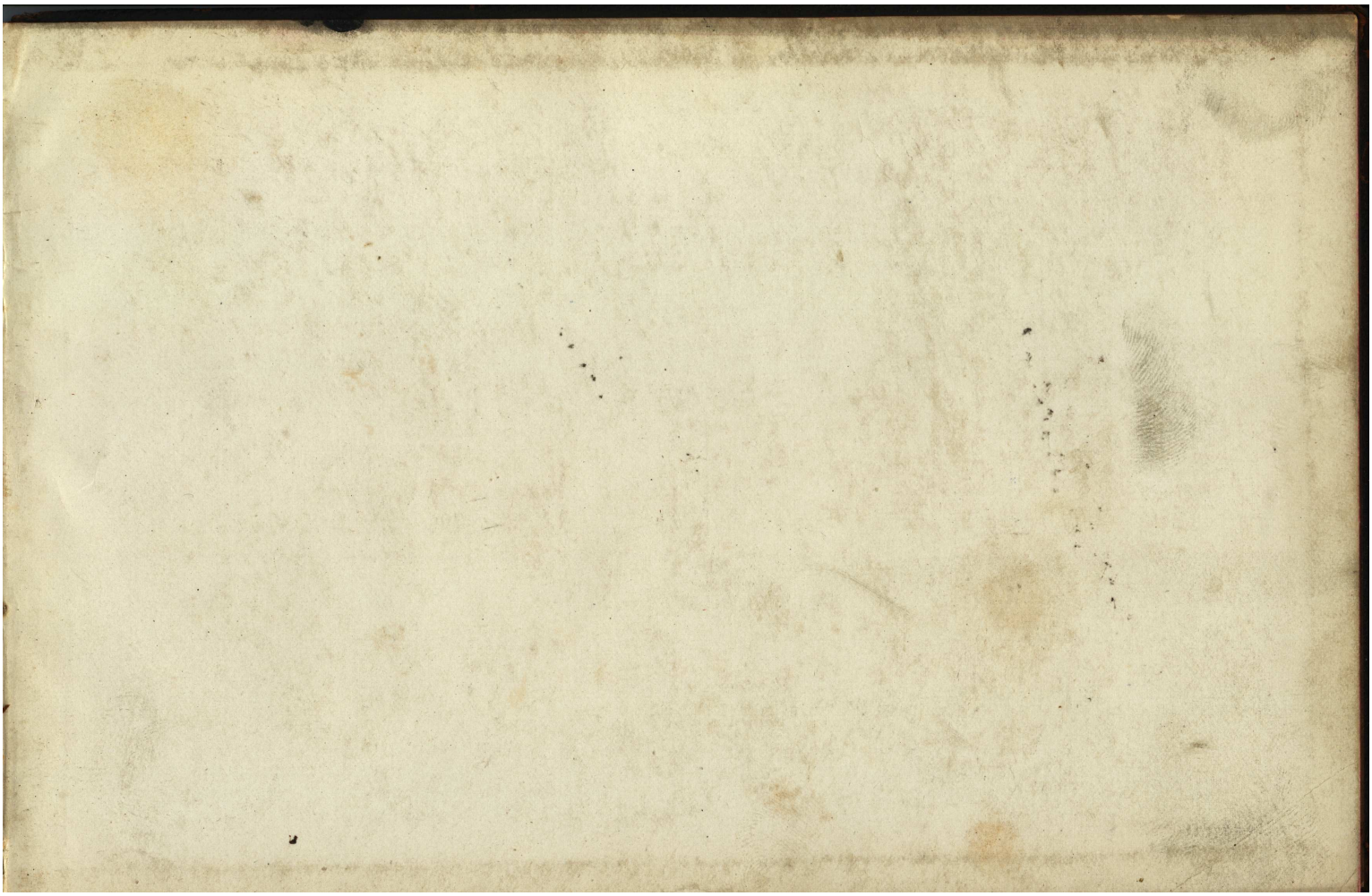

THE GEO. GRAY & SHIPLEY
MACHINE TOOL CO.
CINCINNATI, O. U. S. A.

Belt-connected Motor Drive with Variable Speed Motor

On the opposite page is illustrated a 24-inch lathe driven by a 5-horse-power variable speed motor, with a speed variation of two to one. The motor is mounted on an overhead bracket directly above the headstock, pivoted at the rear to two heavy standards bolted onto the back of the bed, and is connected to the driving pulley by a short, wide belt, in which sufficient tension for driving is obtained by means of the adjusting screw with hand wheel at the front of the headstock.

When this system is used the cone pulley has two steps, and two sets of back gears are provided, so that the combination affords a total of six speed changes; two with the lathe out of gear and two with each of the back gears in. By varying the speed of the motor, either through the introduction of field resistance or by the use of one of the multiple voltage systems, intermediate speeds in each range are obtained, the number of which depends only on the number of points in the controller. With a 20-point controller 120 distinct spindle speeds are thus afforded.

TO keep abreast of improvements, we usually issue two catalogs per year, and we will consider it a favor for firms to write us for our latest edition.



BARTLETT
& COMPANY
CRAFTSMAN
PRESS
NEW
YORK