

## Shop Equipment News

### "Cataract" Quick-Change-Swing Precision Lathe

We are so accustomed to considering a precision lathe as a small machine that it is somewhat startling to find one swinging up to 21 in., equipped with quick-change gears and closely resembling in size a regular tool-maker's lathe. Many of the new features of the quick-change-swing precision lathe, recently developed by Hardinge Bros., Inc., Chicago, Ill., are apparent from Figs. 1 and 2, the guards having been removed to show better the construction of the head.

Openings between the inner shears make it easy to lift the head to put in the raising blocks, which give either 15- or 21-in. swing as desired. The feed gear is on the spindle, and it is only necessary to introduce the idlers *B*, shown in Fig. 2, to engage all feeds, automatic stops, and thread-cutting connections, just as with the smaller swing. By using the bracket *A*, a two-to-one or other connection can be made, securing feeds of 300 and 500 per inch. This is accomplished by throwing in the sector *C* and pulling out the pinion *D*.

The lathe bed is 52 in. long and takes 28 in. between centers. In addition to the two ways, the center is planned to take all makes of standard turret, milling and other attachments. The head is back-geared and has a hardened and ground spindle with a  $1\frac{1}{4}$ -in. hole. The construction of the lathe head is such that there are but two points of contact for end shake. The quick-change gear box gives 27 regular changes, but other threads can be easily obtained through the change gears at *E* and *F*, and, when necessary, by the compounding bracket *A* in Fig. 2. The gears provided cut all standard and many special threads. A bracket is also provided for cutting metric threads.

A precision lead screw, 1 in. in diameter and having six threads per inch, is provided. It is translated through the gear box to ten to the inch, so as to be convenient for fine threads, either English or metric. The lead screw is in two parts, connected at *G*, making it easy to replace a screw which becomes worn in spots. A long nut,  $3\frac{1}{2}$  in. in diameter, presents a large surface to the screw and prevents undue wear.

The carriage has several interesting features. The stop collars *H*, *I*, *J* and *K* allow automatic adjusting stops to throw out the feed. The clutch *L* is interlocking to prevent engaging the lead screw and feed rod at the same time. The power feed controls are shown at *M* and *N*. The friction vernier *O* indicates the carriage travel, magnifying it four times.

The compound slide has a quick-acting nut, so that a half revolution of the handle *P* moves the slide  $\frac{5}{8}$  in. in either direction. This does not interfere with the regular

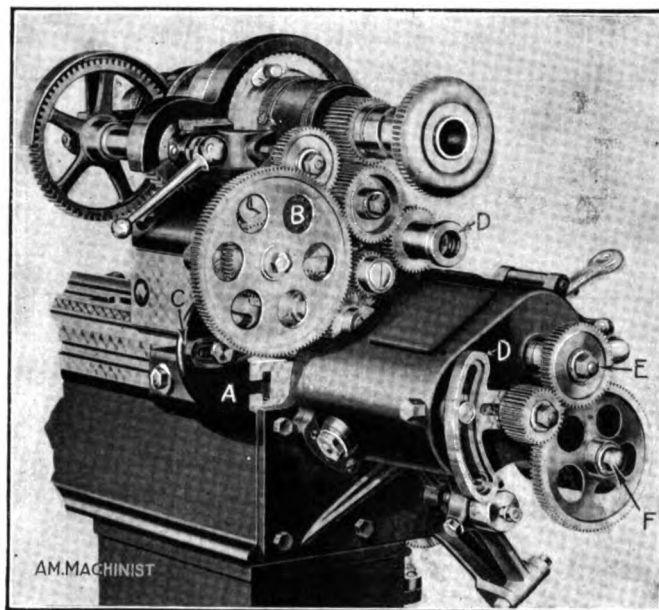


FIG. 2. REAR VIEW WITH ELEVATED HEAD

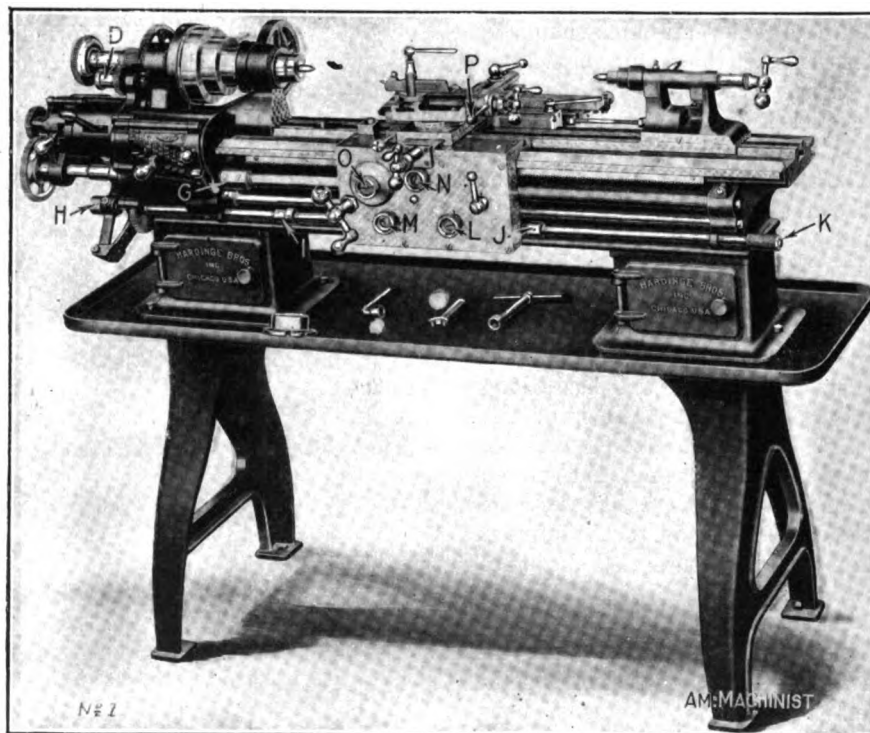


FIG. 1. QUICK-CHANGE-SWING PRECISION LATHE

uses of the slide and is very convenient in thread-cutting and similar operations.

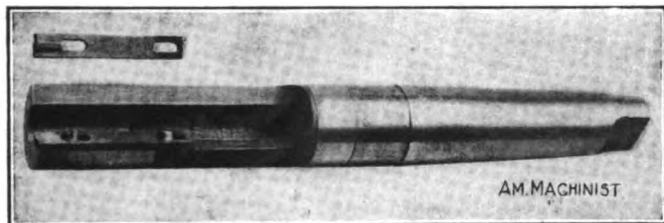
The taper attachment is graduated both in degrees

and taper per foot. It will handle tapers up to 15 in. long and has a fine screw adjustment. The backing-off attachment is driven by a worm gear on the spindle nose and operates the cross-slide through a cam which is timed with relation to the revolutions of the spindle. Both attachments fasten in a T-slot at the back of the bed.

### Core Drill

The core drill shown was designed for rapidly extracting coupons for various tensile and bending tests.

The feature of this drill is the inserted cutter which is adjustable for wear and readily replaced, thereby elimin-



CORE DRILL

ating the necessity for grinding down the end of the tool itself. The cutter holder is made of chrome-vanadium steel and the cutters high-speed steel.

The drill has a No. 5 Morse taper shank and represents a recent product of the Triangular Tool Co., Erie, Penn.

### 16-In. Semi-Quick-Change-Gear Lathe

The lathe shown is the latest production of the Von Wyck Machine Tool Co., Cincinnati, Ohio. It is a 16-in. machine of the semi-quick-change-gear type, and was designed to meet the requirements of a general manufacturing lathe. It is built with either a three-step cone and double back gears or a four-step cone and single back gears.

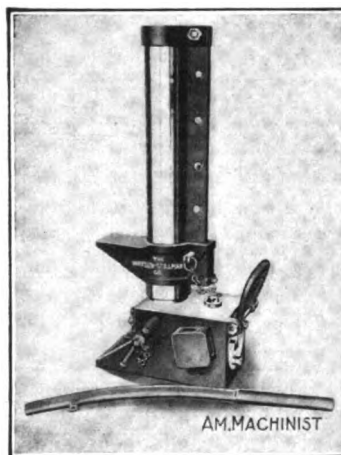
The feed box gives four quick changes of speed, and it is so arranged that only six additional loose gears are required to cut a range of threads from 3 to 42. The large quadrant on the end of the bed allows any odd pitch or metric thread to be cut with special gears. The headstock is massive and has a long bearing on the bed. The spindle is of high-carbon, hammered crucible steel, accurately ground, and runs in phosphor-bronze boxes. The carriage has four bearings on the bed and is equipped with chasing dial and holes for a taper attachment, which may be put on at any time. The apron is of the double-plate type, with all gears and pinions cut from solid steel. It also has the usual non-interfering device, making it impossible to simultaneously engage the feeding and thread-cutting mechanism.

The principal dimensions and specifications are: Swing over bed,

16½ in.; swing over carriage, 11¼ in.; turns between centers, 6 ft. bed, 36 in.; front spindle bearing, 2¼x4 in.; rear spindle bearing, 1¼x3 in.; hole through spindle, 1¼ in.; spindle bushed for Morse No. 3 taper; geared feeds, 9 to 126; cuts threads, 3 to 42; single back-gear ratio, 10 to 1; double back-gear ratio, 12 and 3½ to 1; net weight, 6-ft. bed, 1700 lb.

### Hydraulic Jack

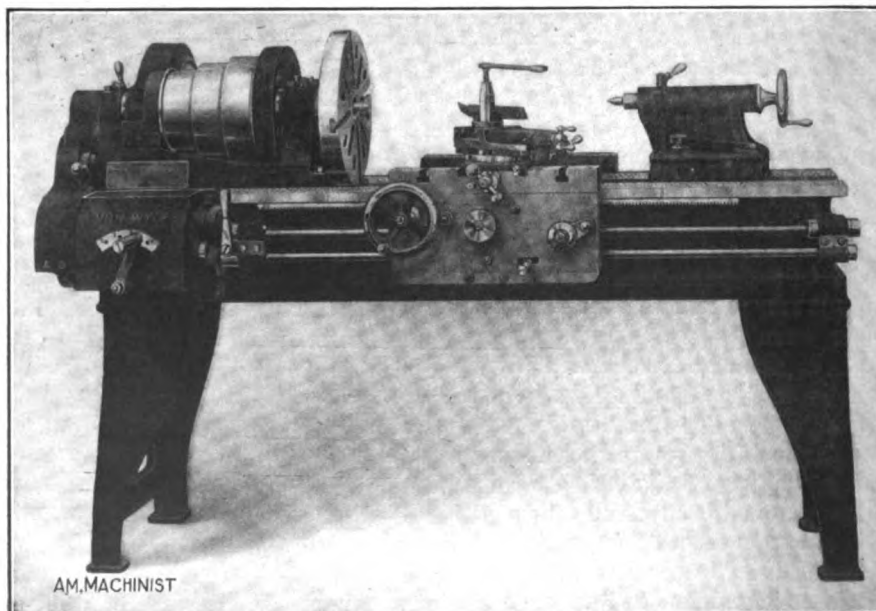
While the jack shown was intended primarily as an emergency jack for street-railway service, its operating features make it adapted for shop use.



HYDRAULIC JACK

The claw can be moved vertically and adjusted to the most convenient height and can be swung with the cylinder in a complete circle without changing the position of jack or of the pump level. The cylinder is the moving part of the jack, instead of the ram, as in the ordinary type, thus allowing the pump mechanism to stay in a fixed vertical position and permitting working parts of the jack to be made more compact.

This jack is operated with a special oil, which is calculated to act not only as a lubricant but to prevent the formation of rust on the working parts and the possibility of freezing. This has no detrimental effect on the packings. The releasing of the pressure is by a key operating a small needle valve. While the operating lever is but 18 in. long, one man weighing 125 lb. can obtain the maximum pressure with



16-IN. SEMI-QUICK-CHANGE-GEAR LATHE