LeBlond No. 2 Cutter Grinder

has more speeds • more flexibility • more

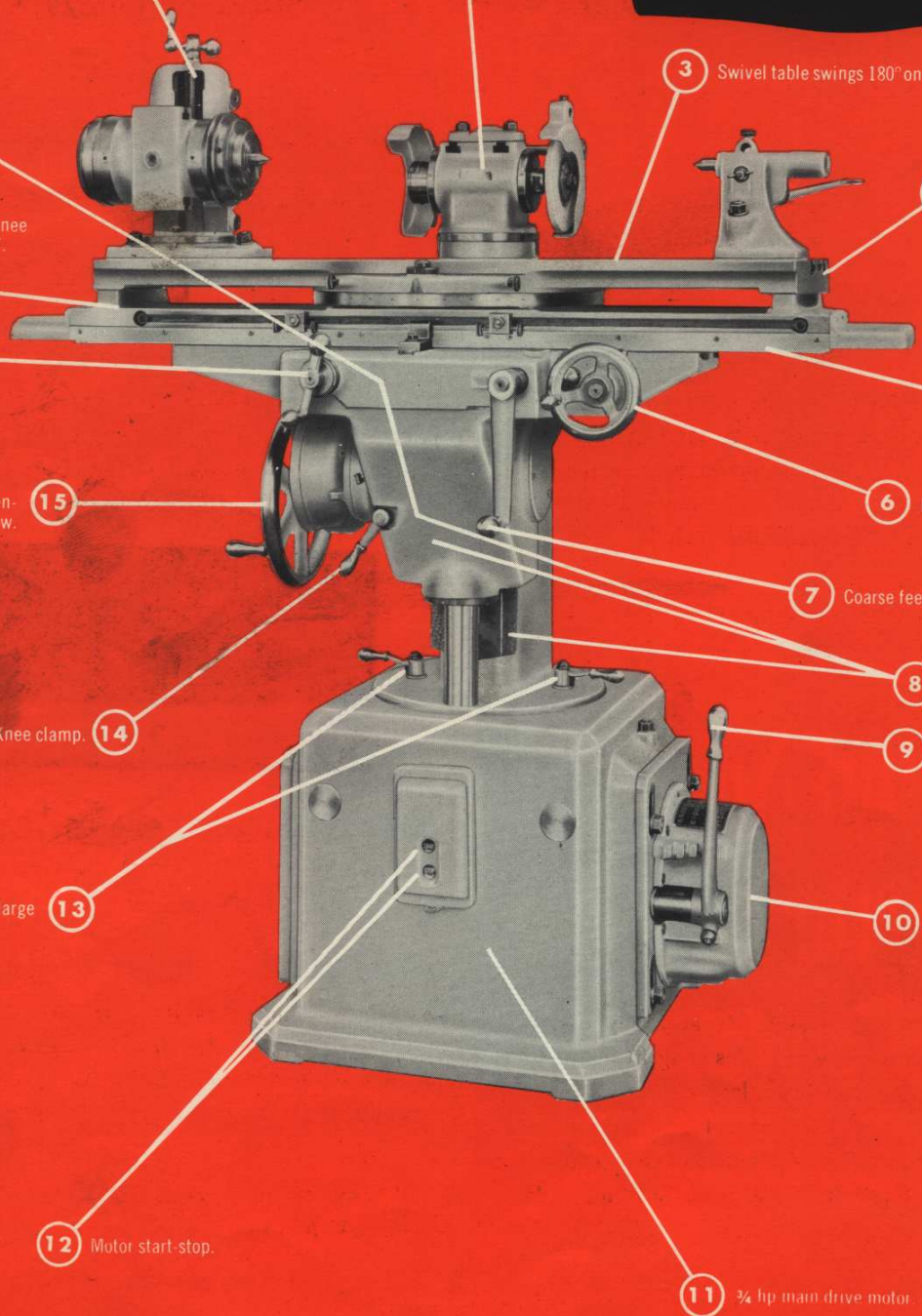
universatility • more of everything you

need for modern tool room grinding

THE R. K. LEBLOND MACHINE TOOL COMPANY, CINCINNATI 8, OHIO, U. S. A. LARGEST MANUFACTURER OF A COMPLETE LINE OF LATHES

BULLETIN CG-251

the LeBlond



1. Universal work head now standard.
2. Stationary 4-speed wheel head.
3. Swivel table swings 180° on sliding table.
4. Three slots correctly position table attachments.
5. Sliding table mounted on double roller bearings.
6. Fine feed table control.
7. Coarse feed table control.
8. Rotating saddle, knee and column.
9. Four speeds with single lever.
10. Variable speed transmission.
11. ¾ hp main drive motor.
12. Motor start-stop.
13. Column clamps on large diameter.
14. Knee clamp.
15. Knee control with enclosed elevating screw.
16. Cross feed.
17. Table, saddle and knee may be lowered 9".
18. Saddle.

No. 2 Cutter Grinder *flexible ... universal*

The LeBlond No. 2 gives you the flexibility, speed, precision, and ease of operation you need for modern universal tool room grinding . . .

FOUR GRINDING SPEEDS: On the LeBlond No. 2 the table—not the wheel head—swings around to give you the required angle. Thus, the driving arrangement from motor to wheel head is permanent, and more speeds can be delivered than on any other cutter grinder.

MORE FLEXIBILITY: Sliding table revolves 360° . . . can be raised or lowered 9″ . . . swivel table swings through arc of 180° on sliding table. Operator can run it sitting or standing, from in front or in rear. Probably the most flexible cutter grinder on the market.

FULLY UNIVERSAL: With the generous equipment furnished as standard, you can grind an almost unlimited variety of reamers, mills, taps, and cutters. In addition, a complete range of attachments is available for cylindrical, gear cutter, internal, and surface grinding.

Three bearings protect the lasting accuracy of the column: a long radial bearing provides snug fit at top of column. At the lower end, a heavy, large-diameter flange provides both thrust and lower radial bearings of the column. In addition, a double flange between column and base prevents dust and grit from working into column bearings.

The knee is rigid with front bearings gibbed to the column with a double angle type gib. The vertical dovetailed bearing on the column is accurately scraped to fit the vee of the knee.

The saddle rides towards and away from the column on the upper cross ways of the knee. It is firmly braced with arched ribs. Has heavy saddle arm bearings on a long flat way, and a vee guide with gib adjustment.

The double roller bearings on which the sliding table is mounted assures easy movement throughout the 28″ range. The handwheel and shaft for fine table traverse are mounted on anti-friction bearings, and operates through a gear train.

All shafts and feed screws are mounted on anti-friction dust-sealed bearings. All vital parts—including motors—are enclosed to assure freedom from dust and grit. The long life accuracy of the LeBlond No. 2 is thus protected indefinitely.

Additional advantages of the No. 2 are shown on opposite and following pages.

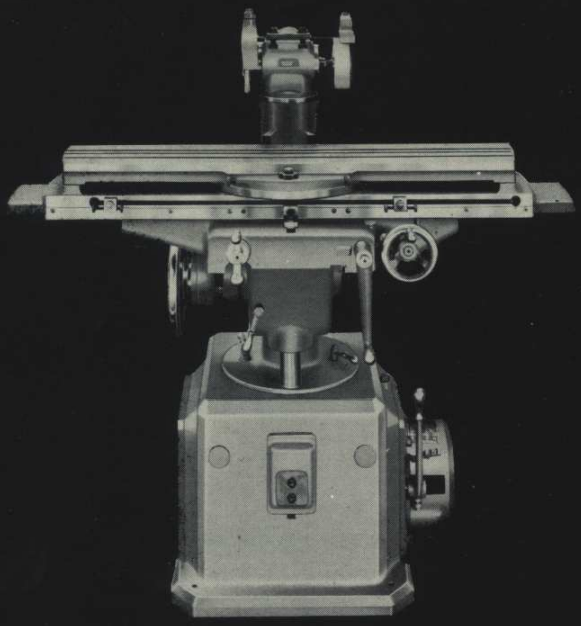


table at 0°

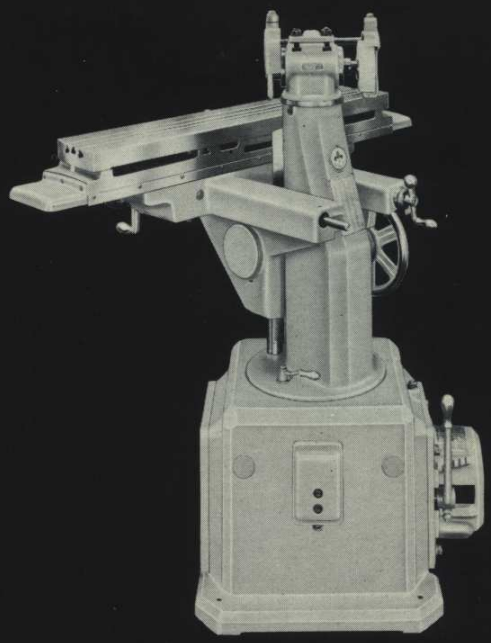


table rotated at 120°

Stationary wheel head design gives you

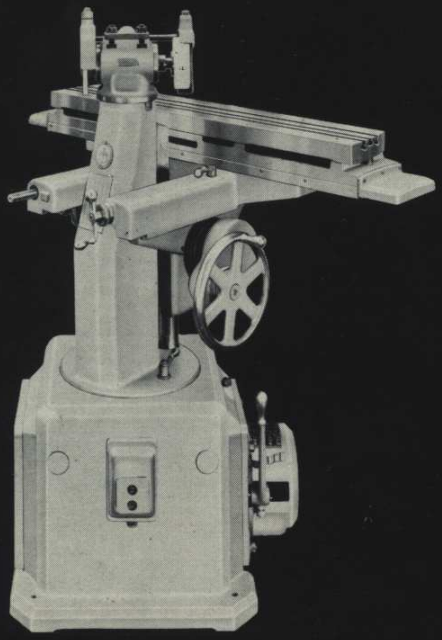


table rotated at 240°

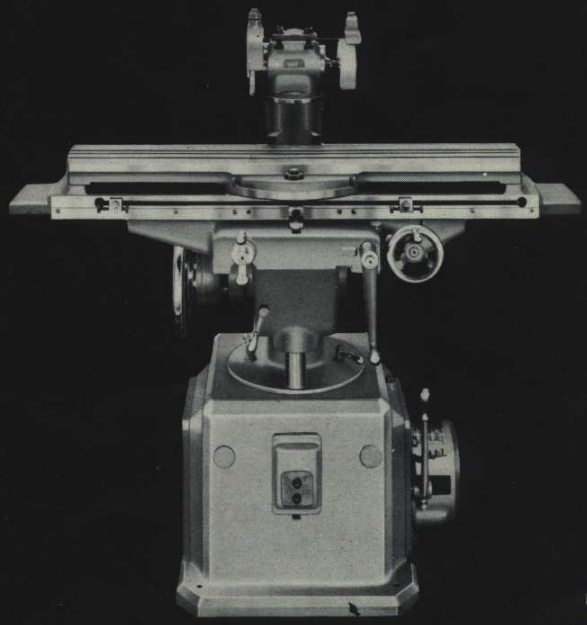
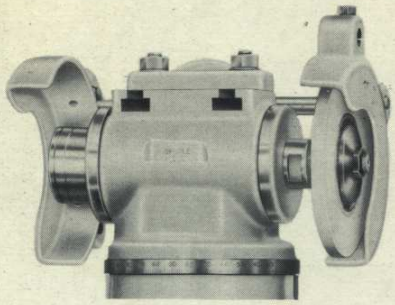


table at 360°



WITH THE STATIONARY WHEEL HEAD—a LeBlond exclusive—it is possible to obtain all the grinding speeds you need easily and quickly. Table, saddle, and knee *revolve around* the wheel head column. Thus, the means for transferring power from the main drive motor to the wheel head is permanent, and you get 3100, 4000, 5100, and 6500 rpm. No lengthy, complicated adjustments required—merely shift a single lever. Only with the LeBlond No. 2 can you be sure your operators will use the correct speed for each job, because each of the speeds are shifted so effortlessly, so quickly.

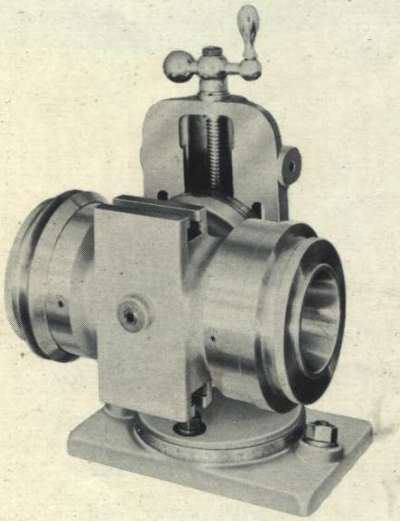
Since motor is mounted permanently in base, you get better performance, more positive delivery of correct speed to wheel head. This in part accounts for the acceptance of the LeBlond No. 2 in the tool rooms of the world.

Micrometer graduations at the wheel head mark the degree of table movement around the column.

Wheel head accommodates all types of grinding wheels, one at either end.

four grinding speeds

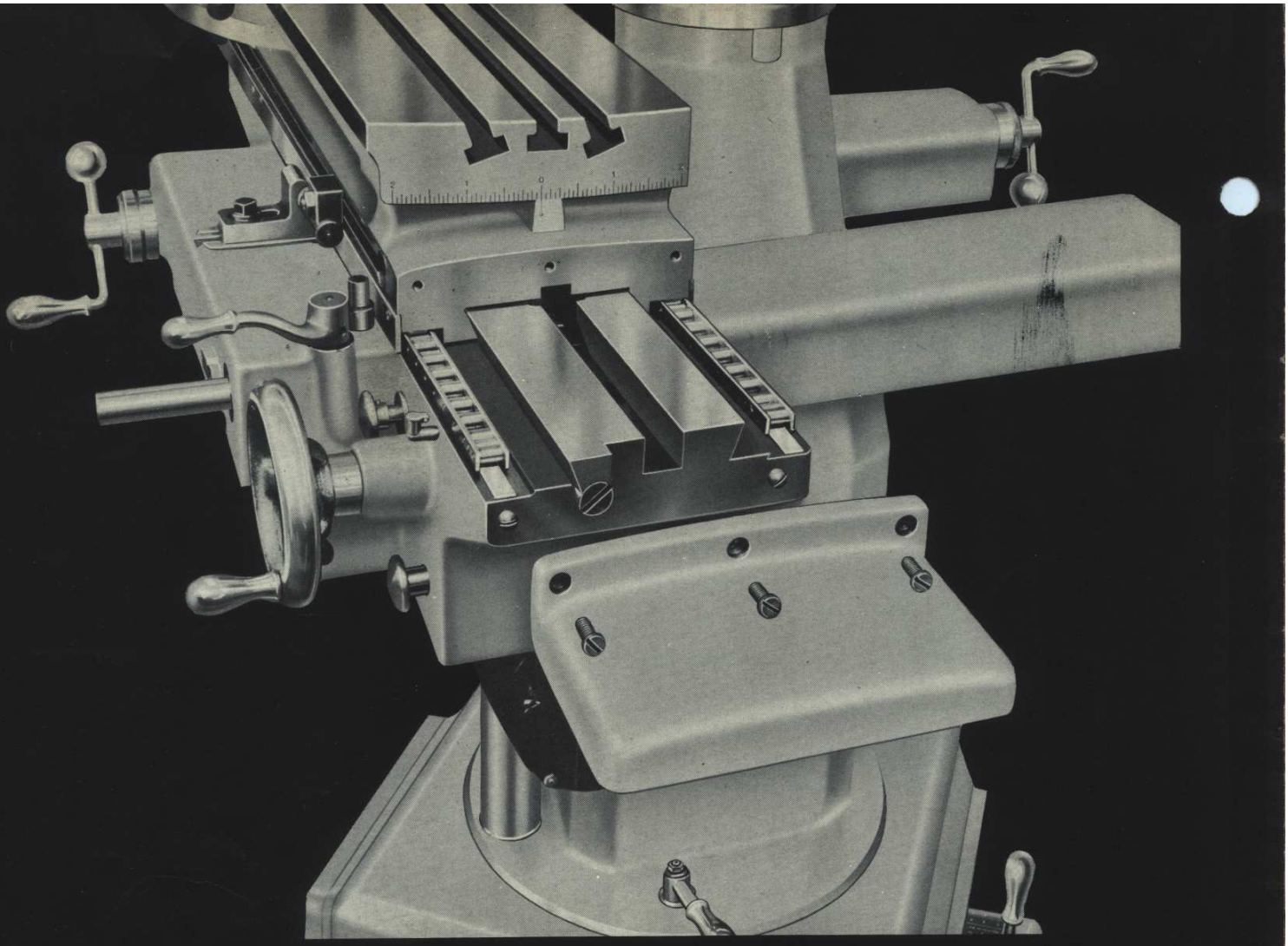
a LeBlond exclusive!



THE UNIVERSAL WORK HEAD—or attachment, as it is sometimes called—is a most useful device. It is furnished at no additional charge on the LeBlond No. 2, and is excellent for face and side grinding, for grinding milling cutters, and the like. Since it will accommodate both B & S and National Standard tapers, most cutters can be chucked right on their own arbors. For representative operations, see pages 8 and 9.

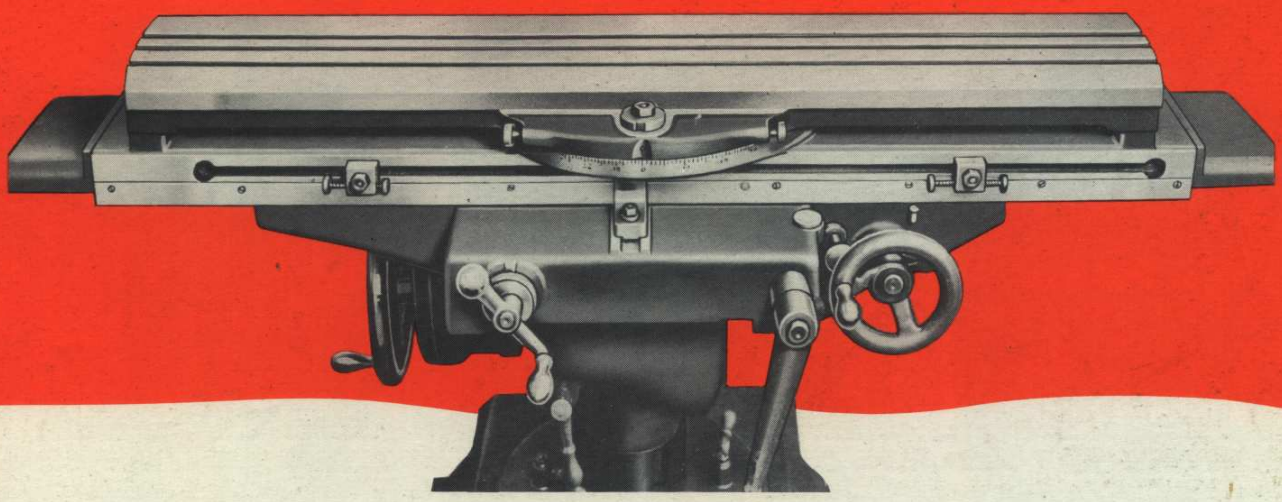
Movement of the universal work head is in two planes with 3½" vertical adjustment.

With a ⅛ hp motor, pulley, and belt added at slight additional charge the universal work head becomes the cylindrical grinding attachment described on page 10.



sliding table, roller bearing mounted

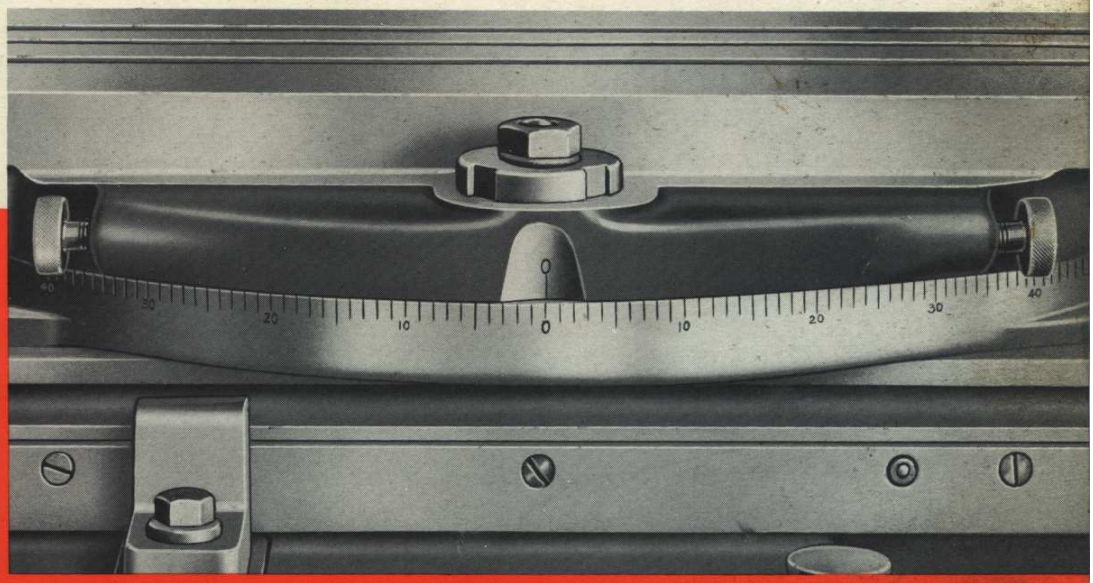
Sliding table rolls smoothly on roller bearings as shown above. With this double in-line mounting, the sliding table can be moved without effort, even under heavy friction loads. Table is held in perfect alignment by dovetail guide. Table may be traversed either by handwheel or by lever which is removable for operation from the front or rear. Traverse: 9/16″ per revolution of wheel; 11″ per revolution of lever. Electric power feed available at slight additional charge. Longitudinal movement of table is 28″ with hand feed, 20″ with power feed.



3-SLOT SWIVEL TABLE

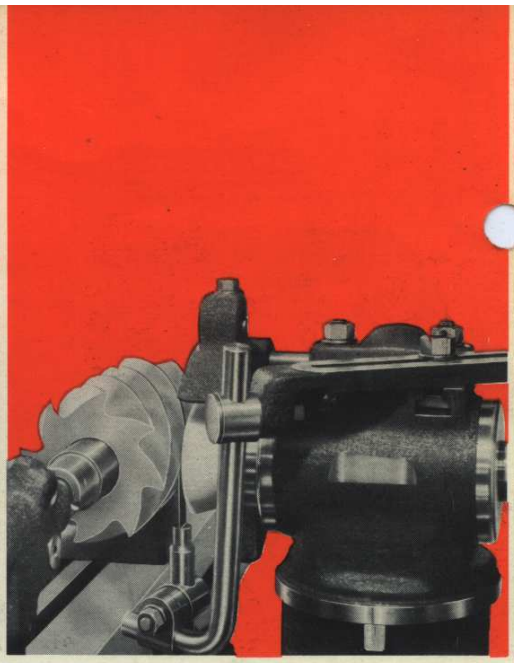
CORRECTLY POSITIONS ATTACHMENTS

The swivel table swings on the sliding table through an arc of 180° and is supported on broad bearings. Working surface is 7 9/16″ x 42″. The three milled slots—two angular, one straight—hold table attachments firmly up to a true side. Taper-per-foot graduations at one end, millimeters taper per meter graduations at other end, and micrometer dial at front center, eliminate all guesswork, aid operator in producing precision work.



A few of the numerous jobs you can grind on the LeBlond No. 2 are shown here. All are performed with standard equipment only as furnished on the plain grinder.

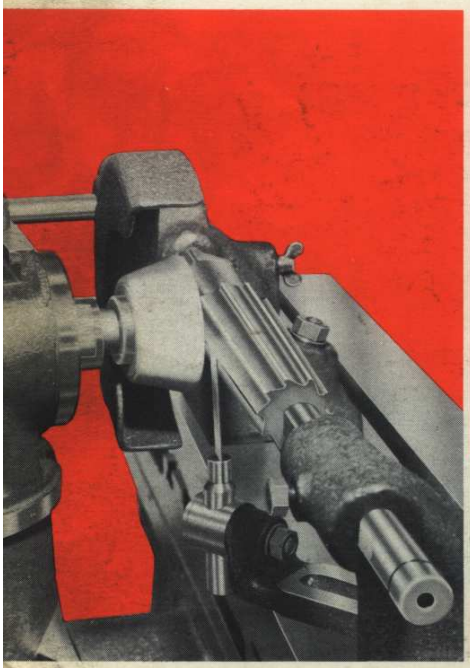
1. SHELL END MILL: Cutter mounted on tapered shank and placed in the universal work head in same manner as supported in the milling machine. Micrometer toothrest adjusted to support tooth being sharpened.



2. SPIRAL MILLING CUTTERS: Cutter mounted on its own arbor (may be mounted on mandrel) and set up between right and left-hand footstocks. Table swiveled several degrees to allow front edge of cup wheel to cut.

3. h T b p a

You can grind a broader range of

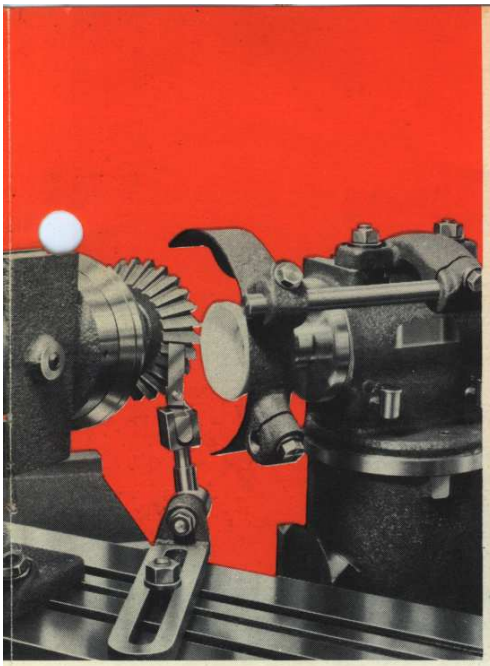


6. TAPER REAMER: Using taper-per-foot scale, swivel table to required setting. This insures correct taper and diameter. Teeth may be ground separately as shown, or cylindrically if machine is equipped with cylindrical grinding attachment.

7. STAGGERED TOOTH CUTTER—PERIPHERY: Entire periphery sharpened at one set-up by using universal tooth rest or plain rest with rounded blade, or one with double angles corresponding to those of alternate teeth of the cutter. Rounded tooth rest illustrated.

8. STAGGERED TOOTH CUTTER—SIDE: For grinding sides, cutter is mounted o arbor and held in universal work hea as illustrated. Plain tooth rest used.

9. m as to te ba

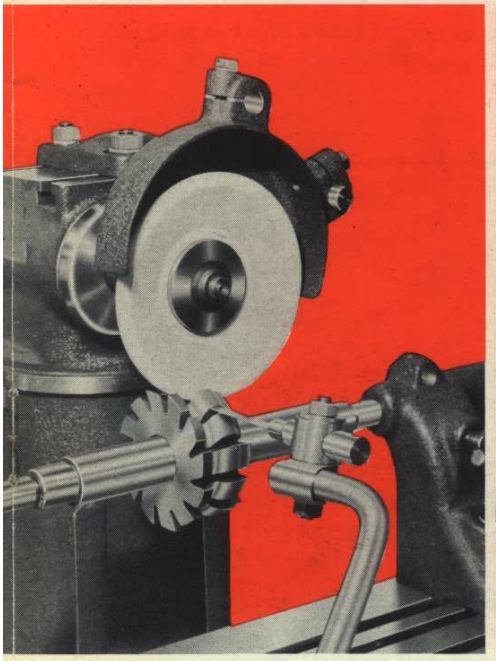


3. DOUBLE ANGLE CUTTERS: Cutter held on arbor in universal work head. Toothrest clamped on table and set to bring tooth on center in the horizontal plane. Operation is similar to grinding a shell end mill.

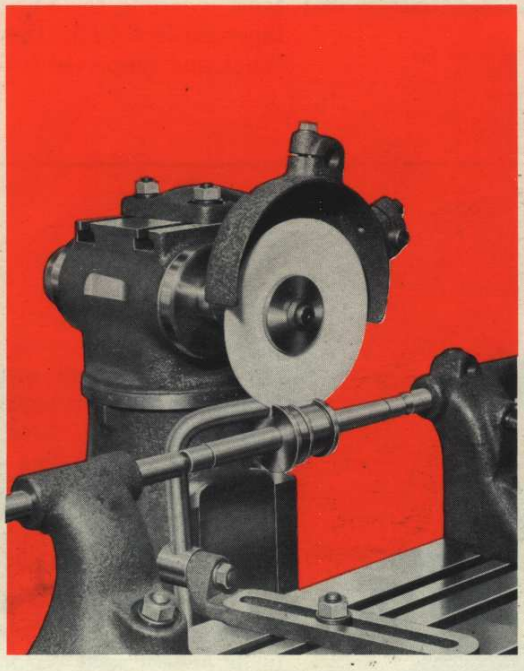
4. HAND REAMERS: Widely used reamers of the expansion type can be ground one blade at a time, as shown, or cylindrically. Wheel head is swiveled to grind with a taper on front part of blade, allowing reamer to enter hole freely.

5. FACE MILL: Cutter mounted on tapered shank and held in place in universal work head by an extension arbor same as in a milling machine. Periphery sharpening set-up shown. Easy switch-over for face grinding and beveling.

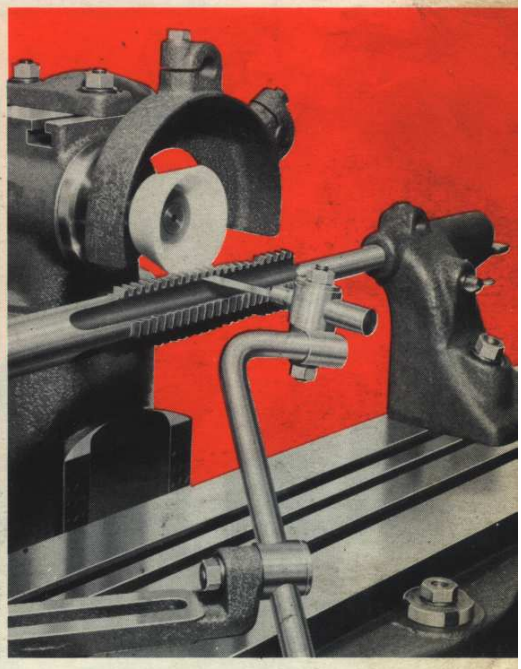
f work on the LeBlond No. 2 Cutter Grinder



9. FORMED CUTTERS: A master form mounted on the arbor with the cutter as illustrated, serves as a guide for the tooth rest to insure proper spacing of the teeth. Tooth rest has been set against back of tooth to be ground.

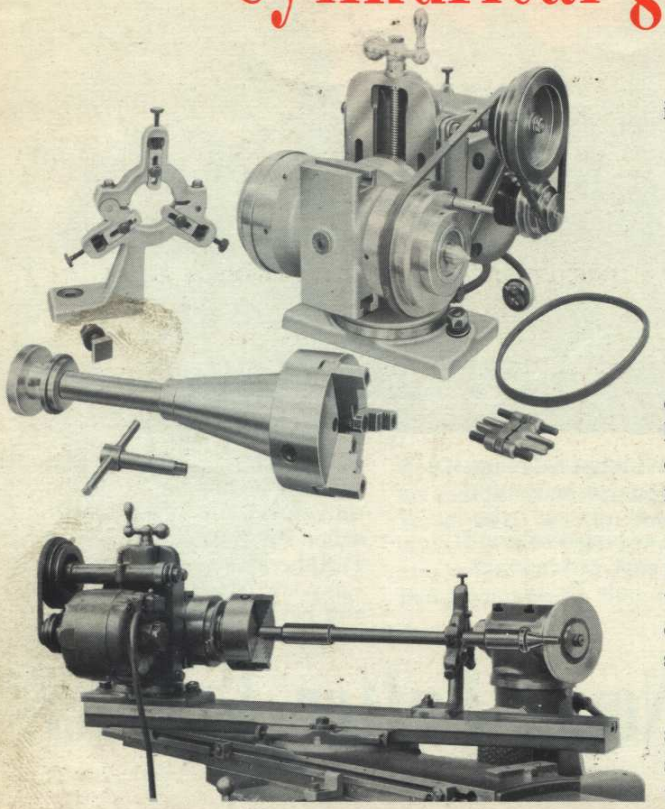


10. CIRCULAR FORM TOOLS: The tool has been pressed on a mandrel and placed between centers. The bent end of the extension bar has been adjusted over the cutter flat so that the cutting edge is in a vertical plane.



11. TAP: It is necessary to grind the teeth on the flute. The head is swiveled to 89°, the tap placed between centers and the tooth rest fastened to the table and adjusted at about the middle of and to the back of the tooth to be ground, as illustrated.

Cylindrical grinding attachment



Excellently adapted to all kinds of cylindrical grinding requiring rotation of the work such as:

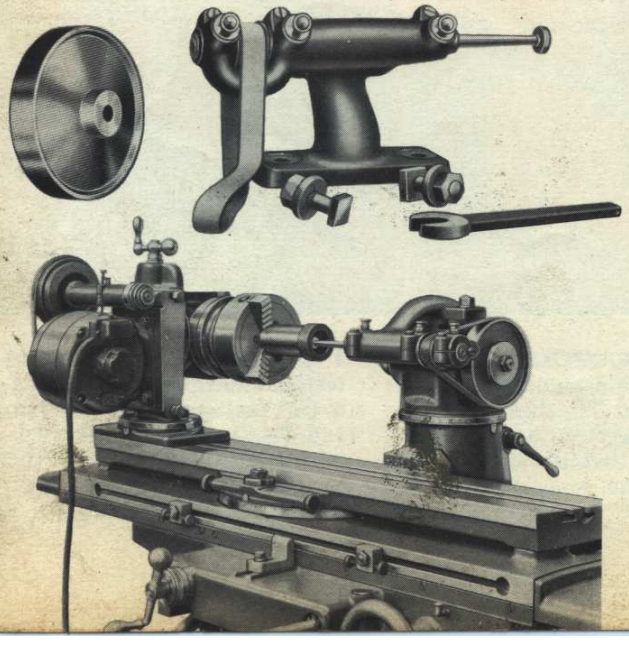
1. Mandrels, jigs, bushings, cutter shanks, tapers, gauges.
2. Grinding faces of cutters, collars, nuts true with hole.
3. And manufacturing small machine part.

The 3-step grooved pulley drives the work at speeds of 146, 204, and 294 rpm, with a supplementary drive to the larger pulley for driving work between either live or dead centers. Accommodates between centers stock 10″ maximum diameter, 20″ maximum length.

Equipment furnished with this attachment includes ⅛ hp, 1800 rpm, 110 or 220 volt, single phase motor, control, and vee belts; 4″ universal chuck with chuck adapter; one dog for diameters ½″ to 1½″; and 1¾″ capacity steady rest.

In the illustration at left all finished diameters—straight and tapered—on a long spindle are ground on one set-up. Only change required is for the taper and the swivel table is swung to the proper setting as indicated on the taper-per-foot graduations at end of table. Work is held in chuck and supported with steady rest. No. 24 wheel used.

Internal grinding attachment

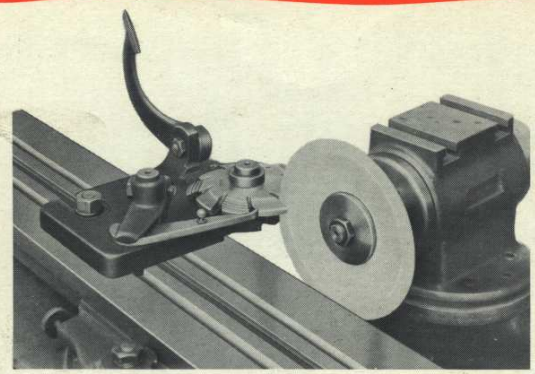


The internal grinding attachment is useful for grinding straight or tapered holes 7/16″ and larger to a maximum depth of 3″. Some of the equipment furnished with the cylindrical grinding attachment is required.

The internal grinding attachment is bolted to the wheel head spindle and is driven from there by an endless belt at four speeds: 10,300, 13,300, 17,000 and 21,600 rpm.

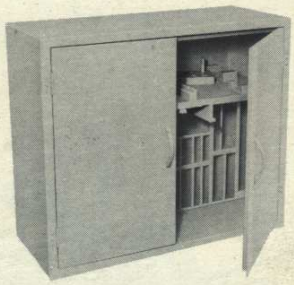
The spindle is carried in a bracket which can be adjusted to secure the proper tension in the driving belt. It is made of tool steel, hardened and ground, and runs in adjustable bronze boxes. End thrust is taken against hardened and ground thrust collars.

In the illustration at left the work is held in a universal chuck and is revolved in the direction opposite wheel rotation. Table is adjusted to grind straight hole, and stop on table is set to grind proper depth. Fine power feed is recommended for this operation. No. 7 wheel is used.

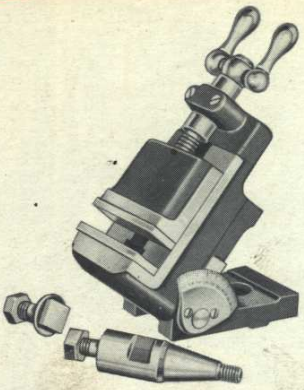


GEAR CUTTER GRINDING ATTACHMENT: The gear cutter grinding attachment is intended to sharpen radially the tooth faces of straight or staggered gear cutters; if ground otherwise, the shape of the tooth made with the cutter will be incorrect. A spring pawl, held against the back of the tooth, can be adjusted to bring the radial face of the tooth against the gauge (which swings over the cutter), where it is clamped in position, and the gauge then swung clear of the cutter. The table is provided with stops for regulating depth of cut. The attachment will take cutters 7½″ maximum diameter. Cutter with ⅞″, 1 1/16″ and 1¼″ holes can be ground.

In illustration above cutter is mounted on stud of the gear cutter grinding attachment. Cutting face of cutter is set against gauge; this insures the cutter being ground radially. Bring tooth rest to bear at heel of tooth being ground, and clamp in position. Use dished wheel No. 23. Set stop on table to limit the travel so the emery wheel will not strike bottom of tooth.

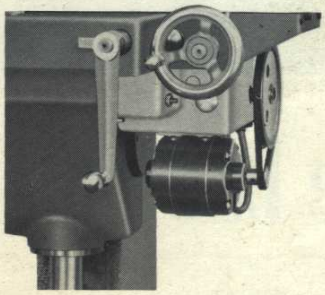


TOOL CABINET: Tool cabinet, providing convenient storage facilities for cutter grinder tools and attachments, is furnished at no additional charge when complete universal equipment is ordered. May be purchased as an extra with plain grinder.

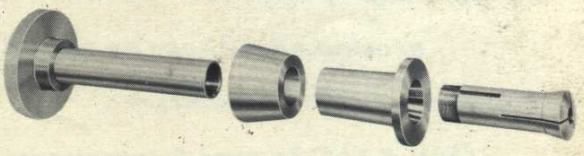


SURFACE GRINDING ATTACHMENT: Used for grinding gauges, lathe tools, dies and any parts within its range. The universal movement of the vise allows settings at any angle.

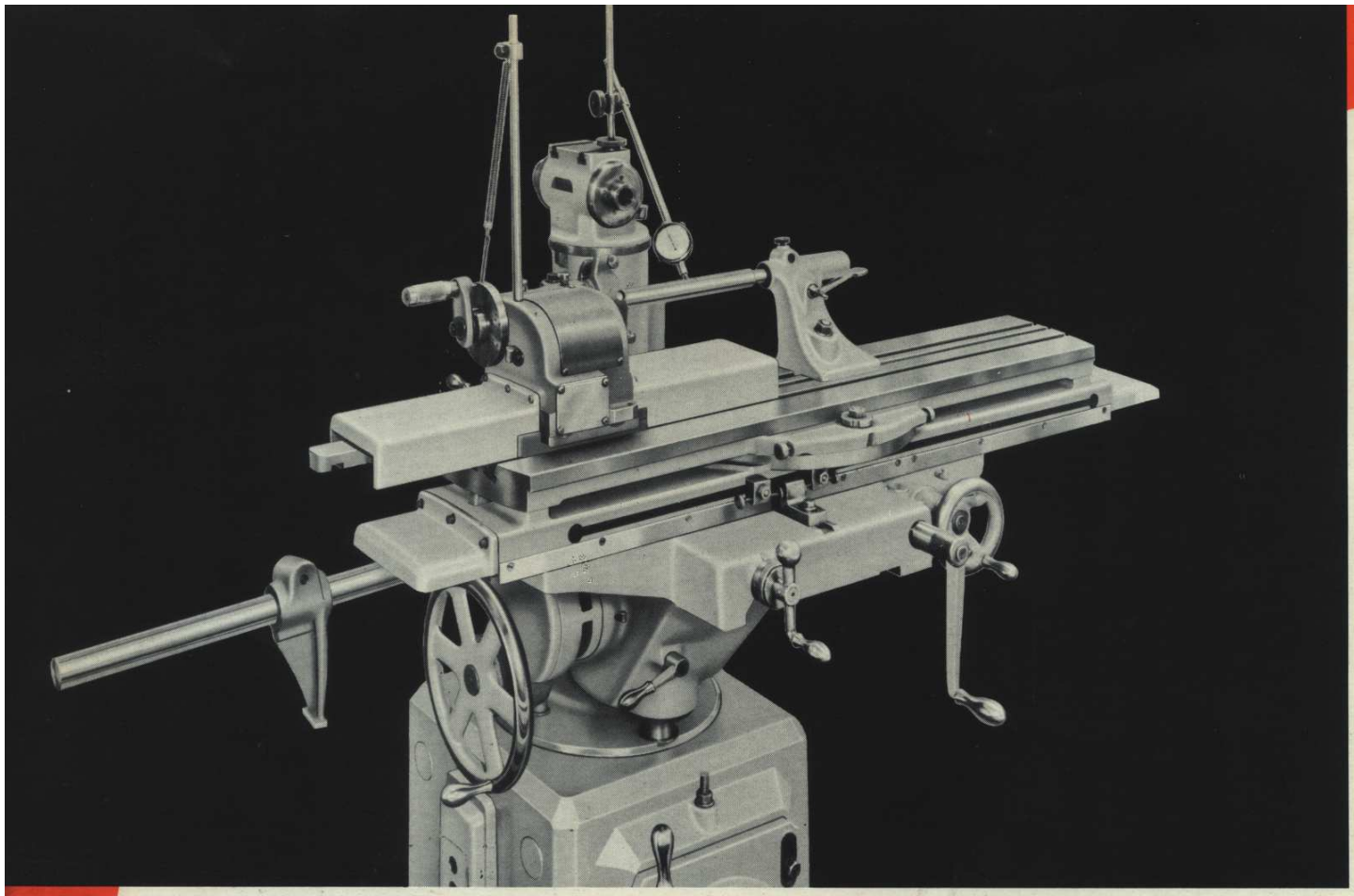
Surface grinding attachment consists of a rigid swivel vise and an extension arbor for the emery wheel. The vise can be swiveled to any angle through 90°, and clamped in position. A graduated dial indicates the angle. The vise is 3½″ wide, 1 1/16″ deep, and the jaws open to 1¾″. A 2½″ extension arbor is furnished to increase the working capacity.



POWER FEED TO SLIDING TABLE: The sliding table may be moved in either direction at a uniform rate of feed by means of power feed. An essential for production work, this attachment—consisting of a 1/20 hp, 1800 rpm, 110 or 220 volt, single phase motor—provides four changes of feed, 10″, 14″, 22″, or 31″ per minute. Table movement with power feed: 20″.



DRAW-IN ATTACHMENT: A draw-in attachment and necessary collets are available as extra equipment for use either with universal work head or cylindrical grinding attachment to broaden further the scope of work of the LeBlond No. 2.



the LeBlond Hob grinding attachment

The LeBlond hob grinding attachment is well designed and constructed for the highly specialized grinding of straight and spiral hobs. It can accommodate hobs up to and including 5 1/2" in diameter and 6 1/4" in length (maximum stroke 8").

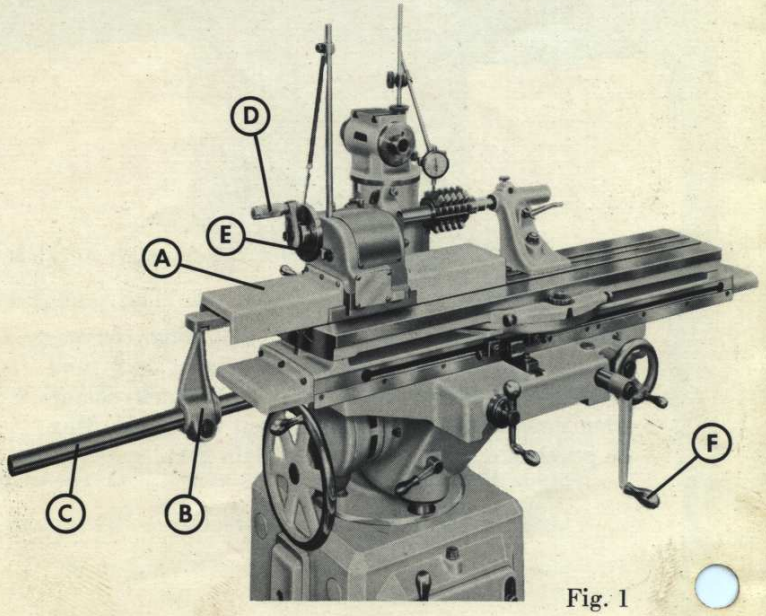


Fig. 1

INSTRUCTIONS FOR GRINDING HOBS

CLAMP hob grinding attachment in proper position on swivel table. Check the position of the grinder table and set it at zero. Remove the cover (**A**) and loosen the studs that hold the form bar in position.

With the bracket screw (**B**) disconnected, set angle bar (**C**) using following formula:

3.0105″ ÷ lead of hob = tangent of angle.

Then line up arbor with indicator as shown in photo at left. For spiral hobs, use following procedure:

Mount the hob on an arbor and place between centers as shown in Fig. 1. Set the indexing handle (**D**) so that the plunger will drop in the appropriate hole in the index plate (**E**), corresponding to the number of rows of teeth on the hob. (Note that this plate is drilled on both sides.)

Place an indicator on the wheel head as shown in Fig. 1, set so that it is just above one of the teeth.

Tighten screw on bracket (**B**). Reciprocate the table by means of coarse traverse lever (**F**). Adjust the form plate until the cutter is set approximately on the correct spiral. Place the indicator on the cutting face of the tooth and take the reading. Move the grinder table and take a reading on the other end of the cutter. Adjust the form plate until the reading is the same at both ends of the hob.

As an example, assume that the reading at left end of hob is .000″ and at right end of hob it is .030″. Move the form plate so that the indicator reads .015″ at right end. Turn the indicator dial so that it reads .000″ and check the left end. Assume that the left end is still out and reads .002″. Move the form plate until it reads .001″. Check the right end again to be sure that the reading is the same as left end.

Place a No. 3 wheel (**G**) on the spindle of the grinder, as shown in Fig. 2. Swing the column so that the face of the wheel will be set at the same angle to the table as the lead of the cutter. Then by means of the crossfeed screw (**H**), move the cutter so that the wheel will grind the whole face of the hob teeth. Set the dog (**I**) so that the hob can be fed into the wheel by loosening upper screw and tightening lower screw.

Red-lead one row of teeth and take a light cut. If all of the lead is not removed, adjust the set-up accordingly, then adjust the dog screws so that the proper cut will be taken. Index the hob after each cut and continue to feed the hob by use of the dog screws until the hob is properly sharpened.

After the hob is finished, check the work by placing an indicator on the head, and check the diameter at each end of the hob. If the readings are the same, the cutter has been ground at the proper angle, if there is a difference, in the reading, make a slight adjustment by means of the form plate and take a light cut to correct the error.

When grinding a straight hob, follow same procedure as outlined above. For slow motion of the table use handwheel (**J**).

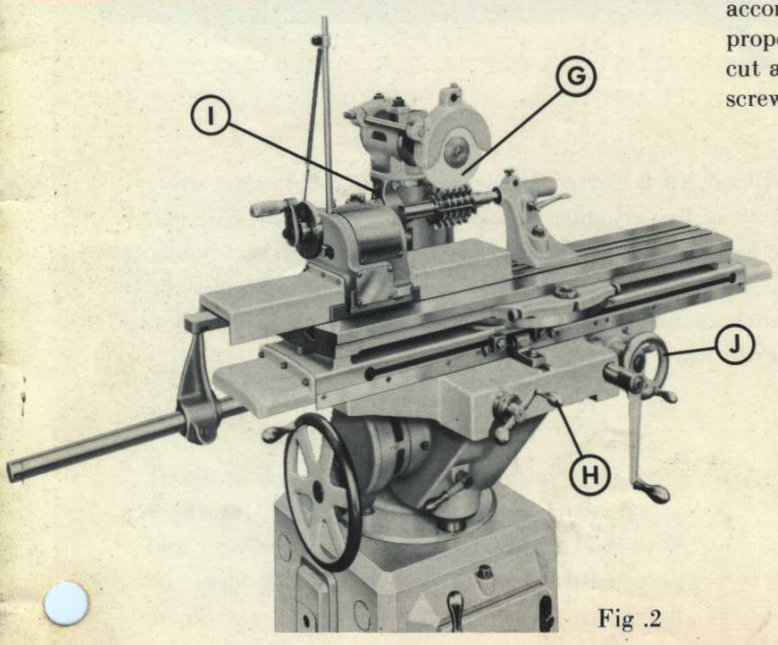
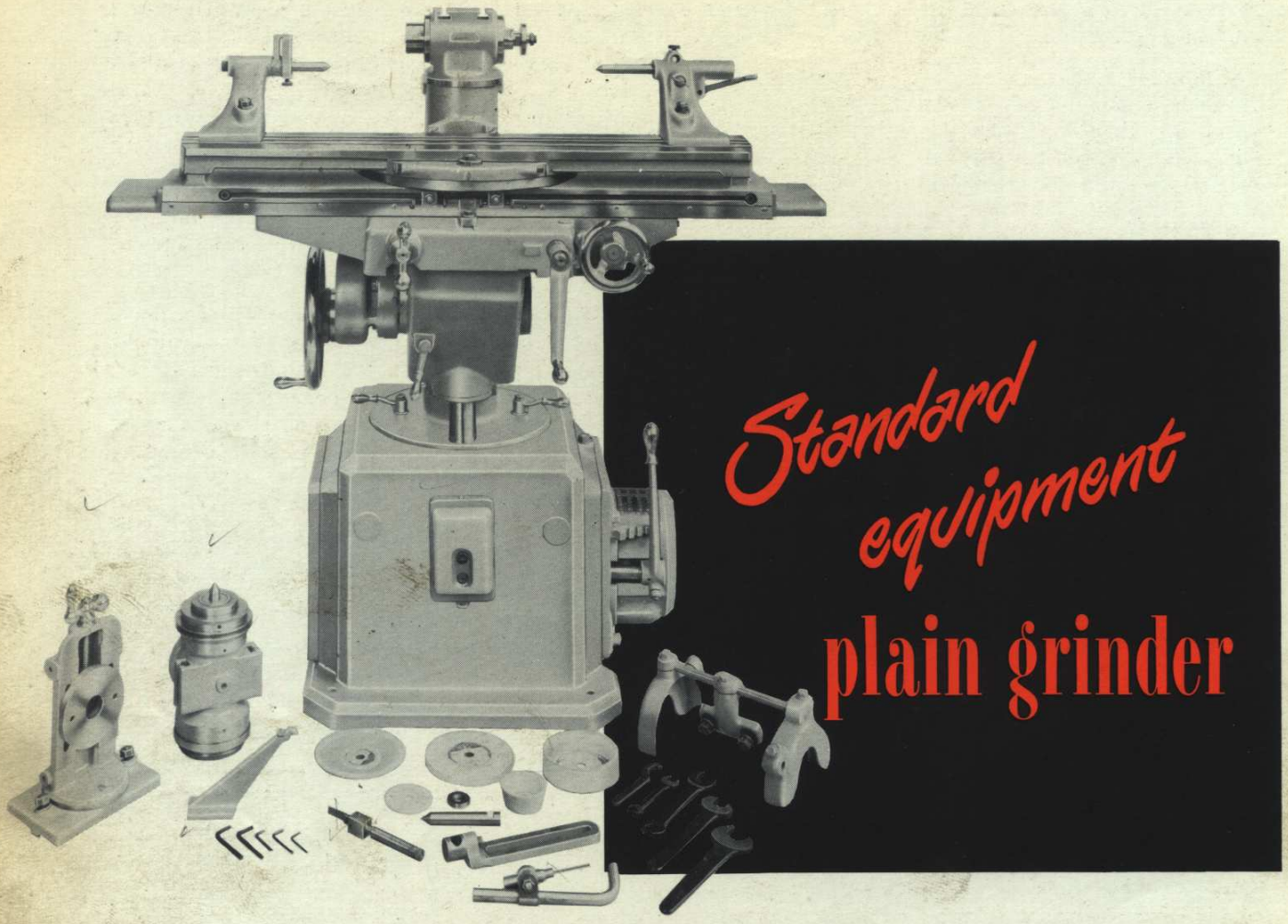


Fig .2



Standard equipment plain grinder

LeBlond No. 2 Cutter Grinder with four-speed motor drive and left-hand footstock with clearance setting dial, set of five grinding wheels (Nos. 21, 22, 23, 24, 25), center height gauge, universal work head, set of wheel guards and clamps, tooth rest holder, tooth rest holder clamp, universal tooth rest, plain tooth rest, extension bar clamp, 8″ bent extension bar and universal joint, right-hand footstock, short wheel arbor, clutch crank handle, wheel washers, necessary wrenches, and ¾ hp, 3450 rpm, 220 or 440 volt, 3 phase, 60 cycle wheelhead motor.

COMPLETE UNIVERSAL EQUIPMENT

Includes all above plus cylindrical, internal, surface, and gear cutter grinding attachments, tool cabinet, and ⅛ hp, 1800 rpm, 110 or 220 volt, single phase, 60 cycle work head motor . . . all described in detail on pages 10 and 11.

EXTRA EQUIPMENT

Draw-in attachment, collets, hob grinding attachment, power feed (pages 11, 12, 13), taper sleeves. The cylindrical, internal, surface, and gear cutting grinding attachments may be purchased separately or as a group.

SPECIFICATIONS

RANGE—Table longitudinal movement 28″ (hand feed), 20″ (power feed), vertical movement 9″, cross movement 8″.

CAPACITY—Centers swing 10″, will take 28″ between head and footstock. Work head adjusted to its top elevation takes cutters 17″ in diameter. Machine will grind saws and cutters on radial faces 36″ diameter.

WHEEL HEAD—Remains stationary, delivers four speeds. Accommodates two grinding wheels and is fitted with wheel guards. Wheel head spindle rolls on single row, preloaded ball bearings held under 100-lb. tension by a heavy flat spring, automatically compensating for wear.

UNIVERSAL WORK HEAD—Now furnished at no additional charge. As the work head on both the plain and complete universal grinders is in itself a universal attachment, no additional equipment is needed.

TWO TYPES OF DRIVE—The standard drive is the variable speed transmission coupled direct to the motor. It is housed in a compact self-contained dust-proof housing that can be taken out of the base conveniently and quickly. Four speeds are available, 3100, 4000, 5100 and 6500 rpm and all are shifted by a single lever.

A simplified drive is available with three interchangeable pulleys giving 4100, 5200 and 6300 rpm respectively. The motor is in a dust-proof housing. A flat belt 1½″ wide from the motor to wheel head is used with both drives.

KNEE—Is of box section. It is dovetailed to and slides on the column which swivels on the stump through an arc of 360°. It has a vertical adjustment of 9″. Movement by handwheel graduated to read in thousandths of an inch.

SADDLE—Is an improved design more rigid in construction and providing generous bearing surface. Special alloy iron in the saddle and table provides an exceptionally hard, close-grained bearing surface to maintain adjustment and increase the life of alignment. The crossfeed screw is completely enclosed at all times. The saddle has cross movement of 8″.

SLIDING TABLE—Traversed by handwheel for slow motion (9/16″ per revolution of wheel) and by lever in front and rear for rapid motion (11″ per revolution of lever), also traversed by 1/20 hp motor when Power Feed is ordered. Table movements controlled by adjustable table dogs.

SWIVEL TABLE—Swivels through an arc of 180°. Has fine micrometer adjustment throughout this range for accurately setting the table. It has a working surface of 7 9/16″ x 42″. Tee slots ½″ wide.

RIGHT AND LEFT FOOTSTOCK CENTERS—Work on centers, not requiring movement of power driven work head, can be held between right and left-hand footstocks. They swing 10″ and take 28″ between centers. Right-hand footstock has a clearance setting dial to secure predetermined correct clearance angle. Left-hand footstock has quick-acting spring center.

ATTACHMENTS—Attachments for cylindrical, internal, surface, and gear cutter grinding are furnished with cabinet in addition to above when complete universal grinder is ordered. See pages 10-13.

CYLINDRICAL GRINDING ATTACHMENT—The 3-step grooved pulley is driven by a vee belt from the motor at speeds of 146, 204, 294 rpm, with a supplementary drive to the large pulley for driving the work both on live and dead centers. Chuck, steady rest, adaptor, universal dog, and motor driven work head furnished with complete attachment.

POWER FEED—Automatic power feed to table for production work is supplied as an extra and can be attached at any time. Four changes of feed are available—10,14, 22, 31 inches per minute. Movement to the table with power, 20″.

MOTOR DATA—Motor drive is simplified and the driving motors are integral with the machine. Specify characteristics of current when ordering:

Wheel head—¾ hp, 3450 rpm, 220 or 440 volt, 3-phase motor, 60 cycle	A 50 cycle motor reduces all speeds 1/6th.
Work head—⅛ hp, 1800 rpm, 110 or 220 volt, single phase motor, 60 cycle	
Power feed—1/20 hp, 1800 rpm, 110 or 220 volt, single phase motor, 60 cycle	

Transformer furnished as an extra for ⅛ and 1/20 hp motors where AC voltage is over 220.

The single phase motors can be connected to multi-phase lines by hooking up any 2 leads of two or three-phase lines.

No. 2 Cutter Grinder can also be furnished with single speed drive for 25 cycle service. Details on request.

Floor space for operating, 61″ x 61″.
Net weight, plain machine, 1270 lbs.
Domestic weight, plain machine, 1640 lbs.
Export weight, plain machine, 1740 lbs.
Net weight, complete machine, 1520 lbs.
Domestic weight, complete machine, 1900 lbs.
Export weight, complete machine, 1990 lbs.
For POWER FEED, add 31 lbs. to above weights.
Size of case, export 39″W x 58″H x 57″L.
Contents of case, export, 66 cubic feet.

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