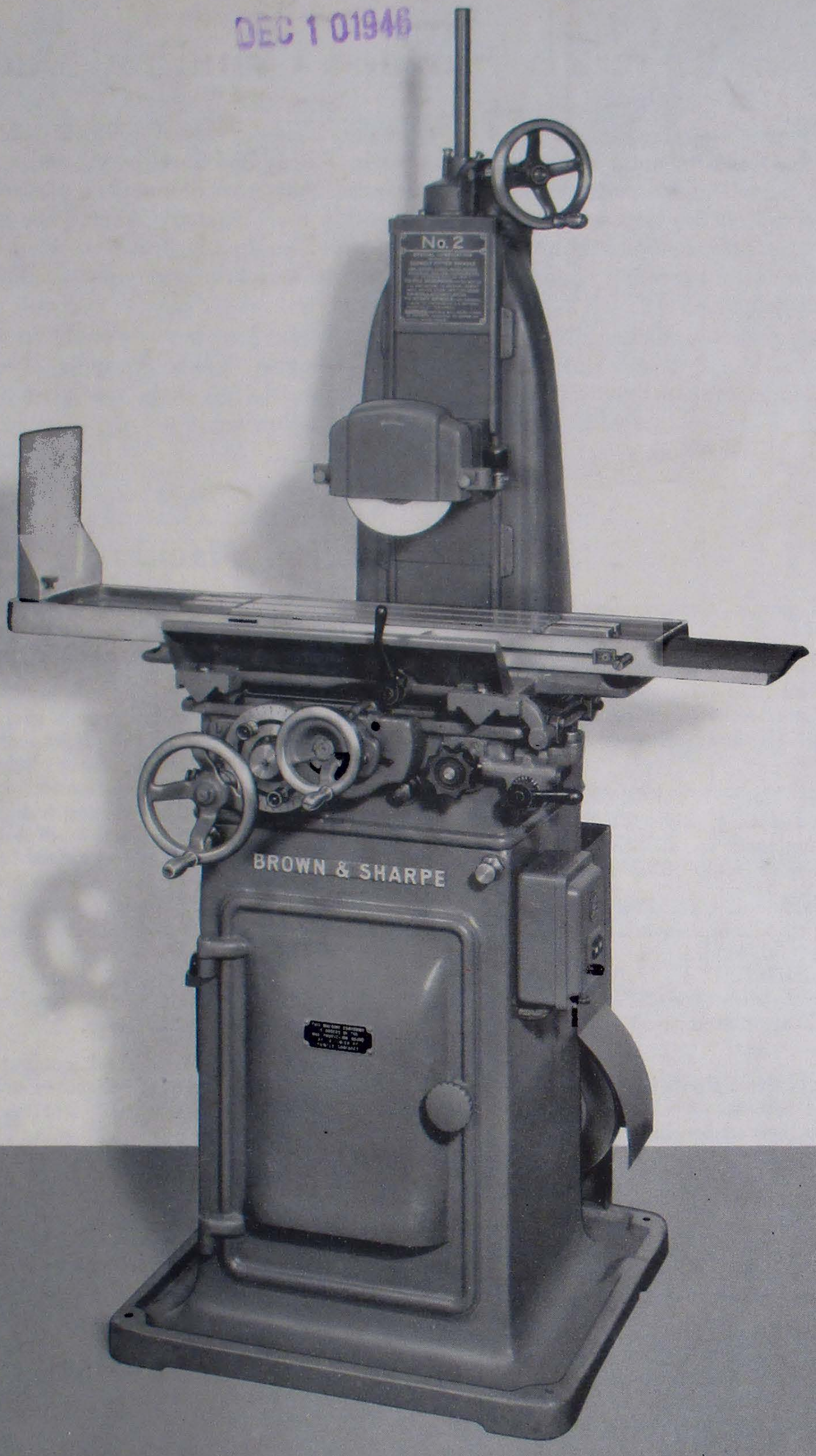


(No. 2 Machine Illustrated)

BROWN & SHARPE

No. 2 and No. 2B
Surface Grinding Machines

B·S

No. 2 and No. 2B Surface Grinding Machines

THESE machines are designed and built for the efficient removal of stock with precision and fine finish on small and medium-size work. Sturdy and durable, yet with a sensitiveness that permits easy working to close tolerances, they give economical performance on all toolroom and production surface grinding within their capacity range. The convenient location of all controls and adjustments permits rapid set-up and provides exceptional ease and efficiency of operation, enabling the operator to maintain maximum production with minimum fatigue.

High-quality materials and skilled workmanship give long-term safety to an investment in these machines. Rigid, durable construction—compact, handy grouping of controls—precision-built, smooth-running spindle—built-in motor drive—these and other features of design are described in detail below and in the pages following.

SPECIFICATIONS

No. 2 Surface Grinding Machine

TYPE Horizontal spindle. Reciprocating table. Mechanical and manual feeds.

CAPACITY Grinds work to 18″ long, 6″ wide and 9½″ high, using a wheel 7″ in diameter. Vertical adjustment of wheel spindle slide, 10″. Maximum longitudinal table travel, 20″. Maximum range of transverse movement, 6½″.

WORK TABLE 46″ long, 8″ wide. Working surface, 18″ x 6″. Three T-slots, ½″ wide. Ways proportioned to give large bearing surfaces. Oil distributed evenly by rollers. Height, floor to top of table, 40″.

SPINDLE Removable-unit type. Plain-bearing and antifriction-bearing spindle units available. Spindle speed, 3200 R. P. M. (full-load speed) when driven from motor in base; 3450 R. P. M. (full-load speed) when driven by 60-cycle direct-coupled motor on back of spindle head. Front end tapered to receive grinding wheel sleeves.

Plain-Bearing Unit: Spindle is hardened, and ground to extremely close limits of concentricity, straightness and finish. Has tapered bearings providing means of compensation for wear. Boxes are of special bronze. Automatically lubricated with extra-light spindle oil by rotating pump unit integral with spindle assembly. from reservoir in spindle unit supplied by constant-level oiler. Provision made for quickly removing end play without removing spindle unit, through spring take-up controlled by screw clamp which serves as positive lock.

Antifriction-Bearing Unit: Spindle mounted on preloaded roller bearings at front and rear. End thrust in both directions taken by two opposed preloaded ball thrust bearings. All bearings are super-precision.

NOTE—Machine is regularly furnished with plain-bearing spindle unit. Furnished with antifriction-bearing spindle unit, when specified, at extra cost.

WHEELS Takes straight wheels 7″ diameter, ½″ thick, 1¼″ hole.

SPEEDS Table speed, 33 ft. per min. (17 ft. per min. optional when specified.)

FEEDS Longitudinal: Automatic feed controlled by adjustable dogs operating against plunger in reversing lever. Plunger can be withdrawn to allow movement of table beyond reversing point without changing position of dogs. Hand lever at front permits manual reversal on short work or pieces of irregular shape. Table can be operated by hand. One turn of longitudinal handwheel moves table approximately 2″. Lock permits positive disengagement of handwheel for safety during power operation.

Transverse: Automatic cross feed mechanism actuated by table reversal. Two independent adjustable stops at front permit selection of any desired amount of feed from .01″ to .09″ at each reversal, or at alternate reversals only. Dial shows settings to .01″. Feed automatically disengaged and table stopped at any desired point in the automatic cross feed by adjustable dogs at side. Direction of feed selected by lever behind cross feed handwheel. Neutral position of lever disengages power feed. For continuous manual operation, entire feed mechanism is disengaged by knurled knob at front. Cross feed handwheel graduated to .001″ to permit rapid and accurate setting. Feed screw equipped with antifriction thrust bearings.

Vertical: By handwheel graduated to .0005″. One revolution of handwheel moves grinding wheel .050″. Working parts protected by guards.

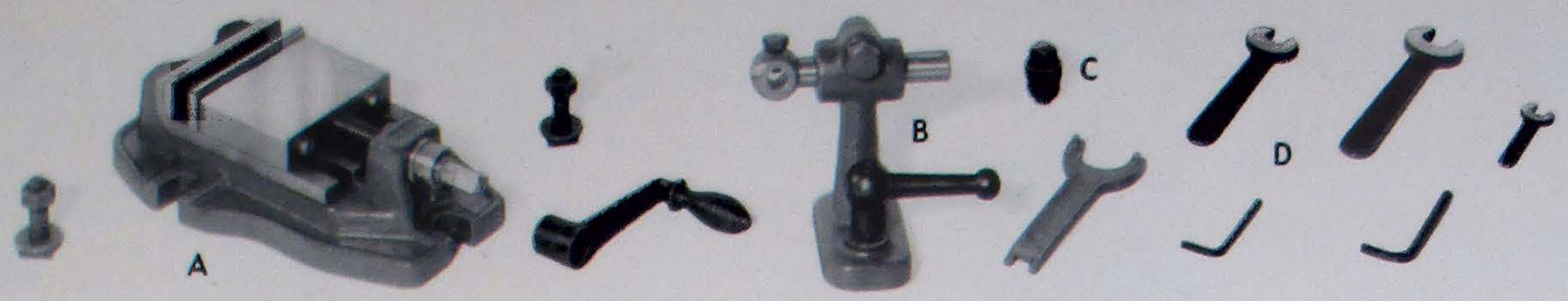
DRIVE With Motor in Base: Spindle driven by endless fabric belt, and table by leather belt, from 1½ H.P. constant-speed motor enclosed in base of machine. Ample ventilation provided for motor. Weighted idler pulley maintains proper tension in spindle belt regardless of height of wheel spindle.

With Motorized Spindle: Spindle driven by 1 H.P. constant-speed 2 or 3 phase 60 or 50 cycle A.C. motor mounted on back of wheel spindle slide and coupled directly to spindle. Sliding overlapping guards completely cover ways and mechanism. Table driven by endless fabric belt from ¼ H.P. constant-speed motor (⅙ H.P. on machine having 17 ft. per min. table speed). Motor mounted on swinging bracket in base; weight of motor maintains correct belt tension. Belt guard provided.

NOTE—Machine is regularly furnished with motor in base. Furnished with motorized spindle, when specified, at extra cost.

WET OR DRY ARRANGEMENT Machine arranged for dry grinding. Motor-driven Wet Grinding Attachment can be furnished as an extra; see page 9.

FLOOR SPACE At right angles to spindle, 65″. Parallel to spindle: machine with motor in base, 33″; machine with motorized spindle, 42″.



STANDARD EQUIPMENT

A No. 21F flanged vise
B Wheel truing fixture
C Wheel sleeve puller
D Set of wrenches

Not shown above —
Straight grinding wheel, 7″ diameter, ½″ thick, 1¼″ hole
Wheel sleeve
Wheel guard

Machine with Motor in Base includes motor for driving spindle and table, driving belts, electrical controls and wiring complete.

Machine with Motorized Spindle includes spindle driving motor, table driving motor, table driving belt, electrical controls and wiring complete.

WEIGHTS AND SHIPPING DATA	Net Weight, Lbs. (Approx.)	Domestic Shipping Weight, Lbs. (Approx.)	Foreign Shipping Weight, Lbs. (Approx.)	Dimensions for Shipment, Inches	Space Occupied, Cu. Ft.
Machine fitted with motor in base	1435	1660	1760	39 x 36 x 74	60
Machine fitted with motorized spindle	1420	1645	1745	48 x 36 x 74	74

Unless otherwise specified, machine is furnished with *plain-bearing* spindle unit and *with motor in base.*

— Additional Equipment —

The following additional equipment (described on pages 9 to 12 of this circular) is available for use on this machine at extra cost. —

Exhaust Attachment
Exhaust Nozzle
Wet Grinding Attachment
Castered Base
Magnetic Chucks
4¾ Inch Index Centers
Adjustable Swivel Vise
High Speed Surface Grinding Attachment
Radius and Angle Wheel Truing Attachment

SPECIFICATIONS

No. 2B Surface Grinding Machine

With Hand Feeds Only

The specifications for this machine are the same as those for the No. 2 machine except for the following items, and omitting the paragraph headed "Speeds":

TYPE Horizontal spindle. Reciprocating table. Manual feeds.

FEEDS **Longitudinal:** By handwheel. One turn of wheel moves table approximately 2″.
Transverse: By handwheel, graduated to .001″ to permit rapid and accurate setting. Feed screw equipped with antifriction thrust bearings.
Vertical: By handwheel graduated to .0005″. One turn of handwheel moves grinding wheel .050″. Working parts protected by guards.

DRIVE **With Motor in Base:** Spindle driven by endless fabric belt from 1½ H.P. constant-speed motor entirely enclosed in base of machine. Ample ventilation provided for motor. Weighted idler pulley maintains proper tension in spindle belt regardless of height of wheel spindle.

With Motorized Spindle: Spindle driven by 1 H.P. constant-speed 2 or 3 phase 60 or 50 cycle A.C. motor fastened to back of wheel spindle slide and coupled directly to spindle. Sliding overlapping guards completely cover ways and mechanisms.

NOTE—Machine is regularly furnished with motor in base. Furnished with motorized spindle, when specified, at extra cost.

STANDARD EQUIPMENT Same as that listed above for the No. 2 machine with the following exceptions:

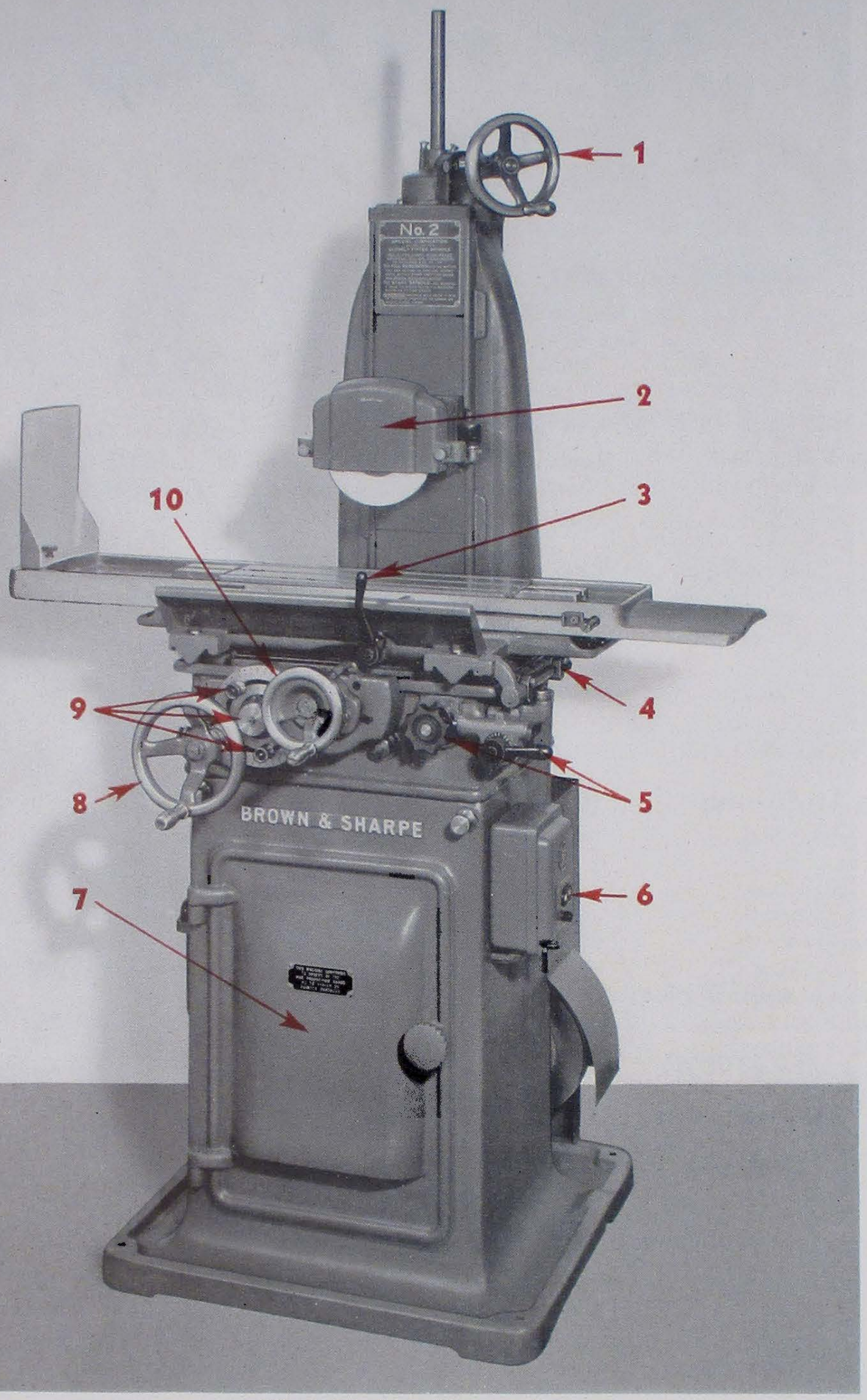
Machine with Motor in Base includes motor, spindle belt, electrical controls and wiring complete.

Machine with Motorized Spindle includes motor, electrical controls and wiring complete.

WEIGHTS AND SHIPPING DATA	Net Weight, Lbs. (Approx.)	Domestic Shipping Weight, Lbs. (Approx.)	Foreign Shipping Weight, Lbs. (Approx.)	Dimensions for Shipment, Inches	Space Occupied, Cu. Ft.
Machine fitted with motor in base	1330	1555	1655	39 x 36 x 74	60
Machine fitted with motorized spindle	1300	1525	1635	48 x 36 x 74	74

Unless otherwise specified, machine is furnished with *plain-bearing* spindle unit and *with motor in base.*

Additional equipment, available at extra cost, is the same as that listed above for the No. 2 machine.



(No. 2 Machine Illustrated)

- **Versatile**
- **Simple**
- **Efficient and Easy to Operate**

FEATURES—

1 Handwheel, graduated to half-thousandths of an inch, provides easy and accurate vertical adjustment of spindle head.

2 Removable-unit-type spindle—plain-bearing or antifriction-bearing type, readily interchangeable. Heavy wheel guard has removable cover.

3 Table reversing mechanism operated manually through lever shown, or automatically through second lever located on same shaft and tripped by adjustable table dogs.

4 Adjustable dogs permit stopping power movements automatically at any desired point in each direction of cross feed.

5 Knob and trip lever start and stop both longitudinal and transverse power movements. Turning knob to right starts power feed; depressing lever stops feed instantly.

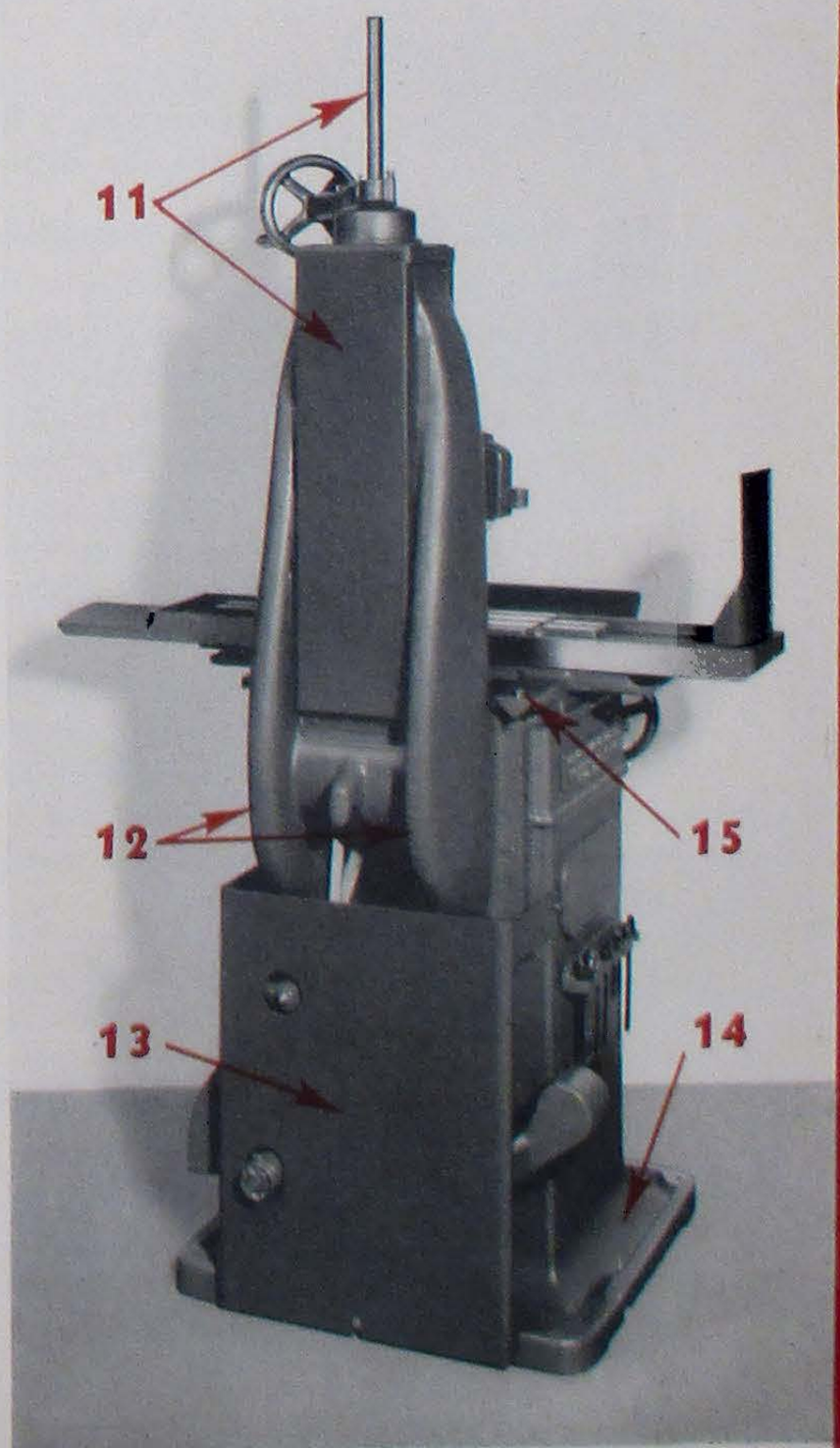
6 Start-stop push button and overload relay reset conveniently located.

7 Large base compartment has shelf for mounting driving motor for spindle and table. When machine has motorized spindle, provides handy storage space for tools and accessories.

8 Longitudinal table handwheel conveniently located and easily operated. Can be positively disengaged when power travel is used.

9 Adjustable stops provide for any cross feed from .01" to .09" (or zero feed) at either end of table travel. Knob in center disengages cross feed mechanism for manual operation.

10 Graduated handwheel permits rapid and accurate transverse adjustment.



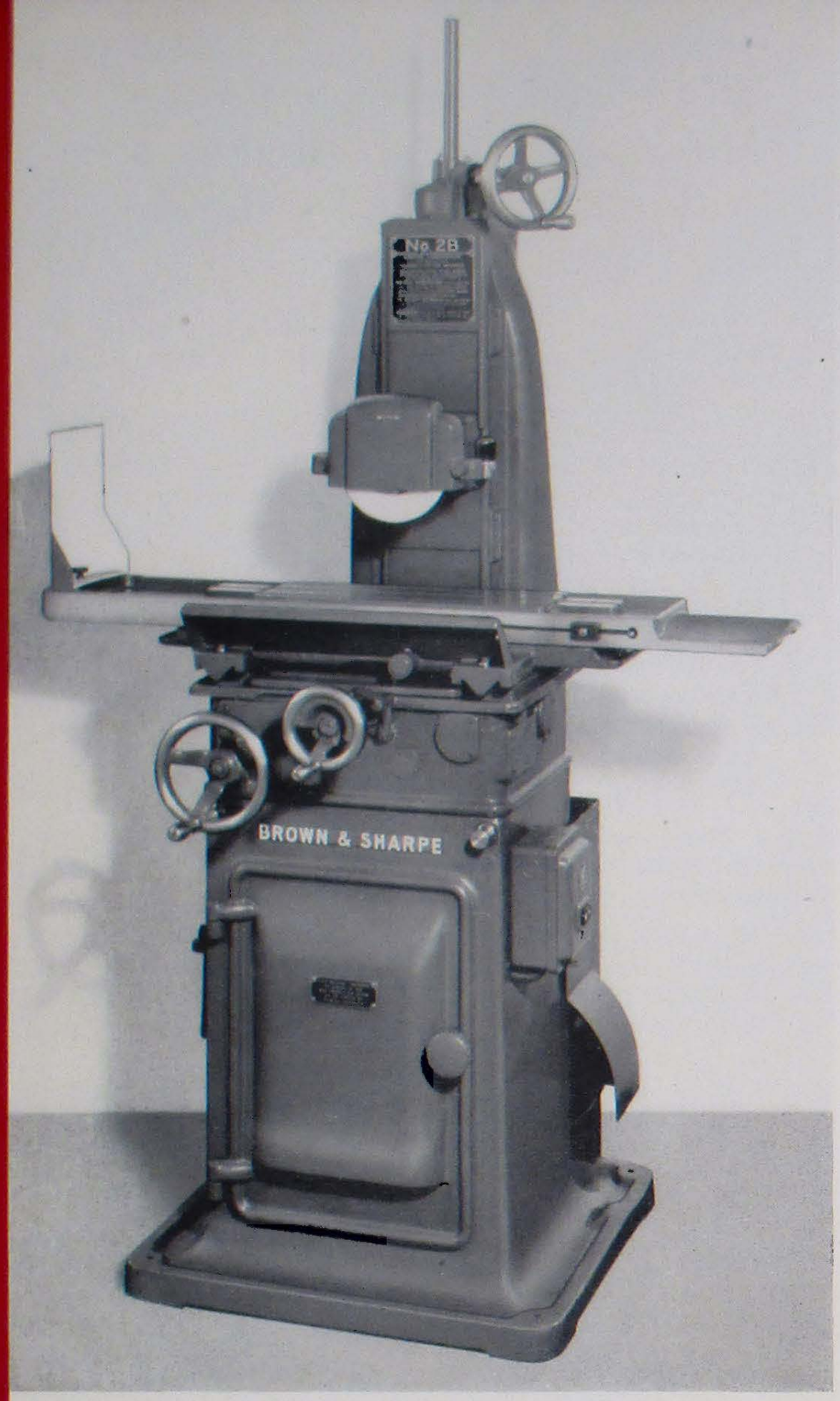
11 Elevating mechanism completely enclosed. Adequate protection of all vital parts prevents undue wear and lengthens life of machine.

12 Sturdy uprights give rigidity and accuracy of wheel alignment.

13 On machine with motor in base (as illustrated), weighted idler pulley behind guard maintains proper tension in spindle belt for all positions of wheel spindle.

14 Large base area gives firm support and ample rigidity.

15 Heavy carriage provides firm support for table. Ways accurately scraped for precision alignment.



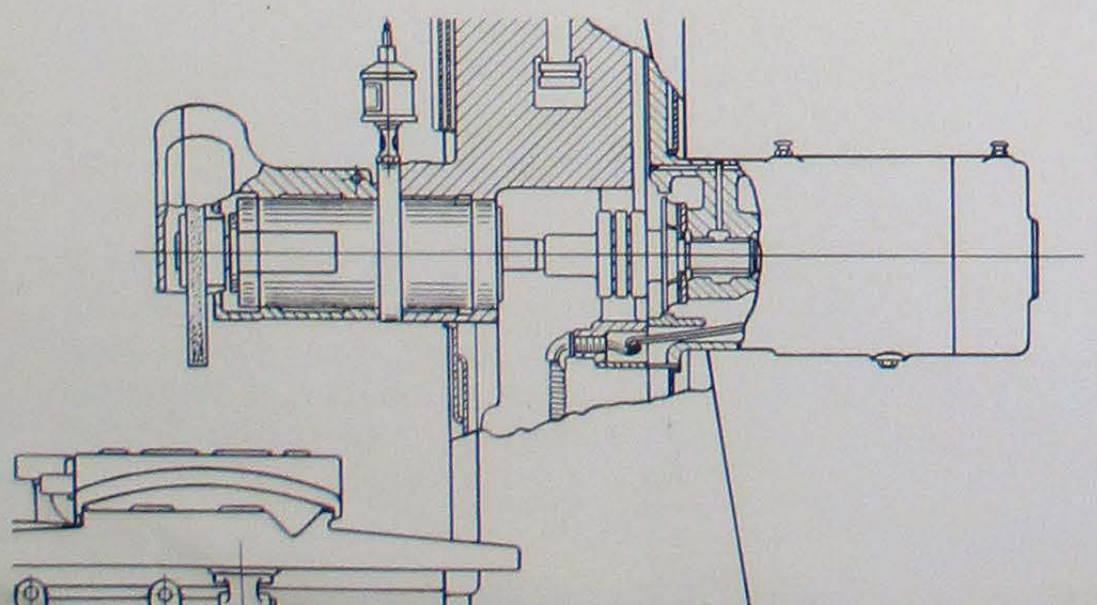
(Above—No. 2B Machine)

No. 2B
Surface Grinding Machine
With Hand Feeds Only

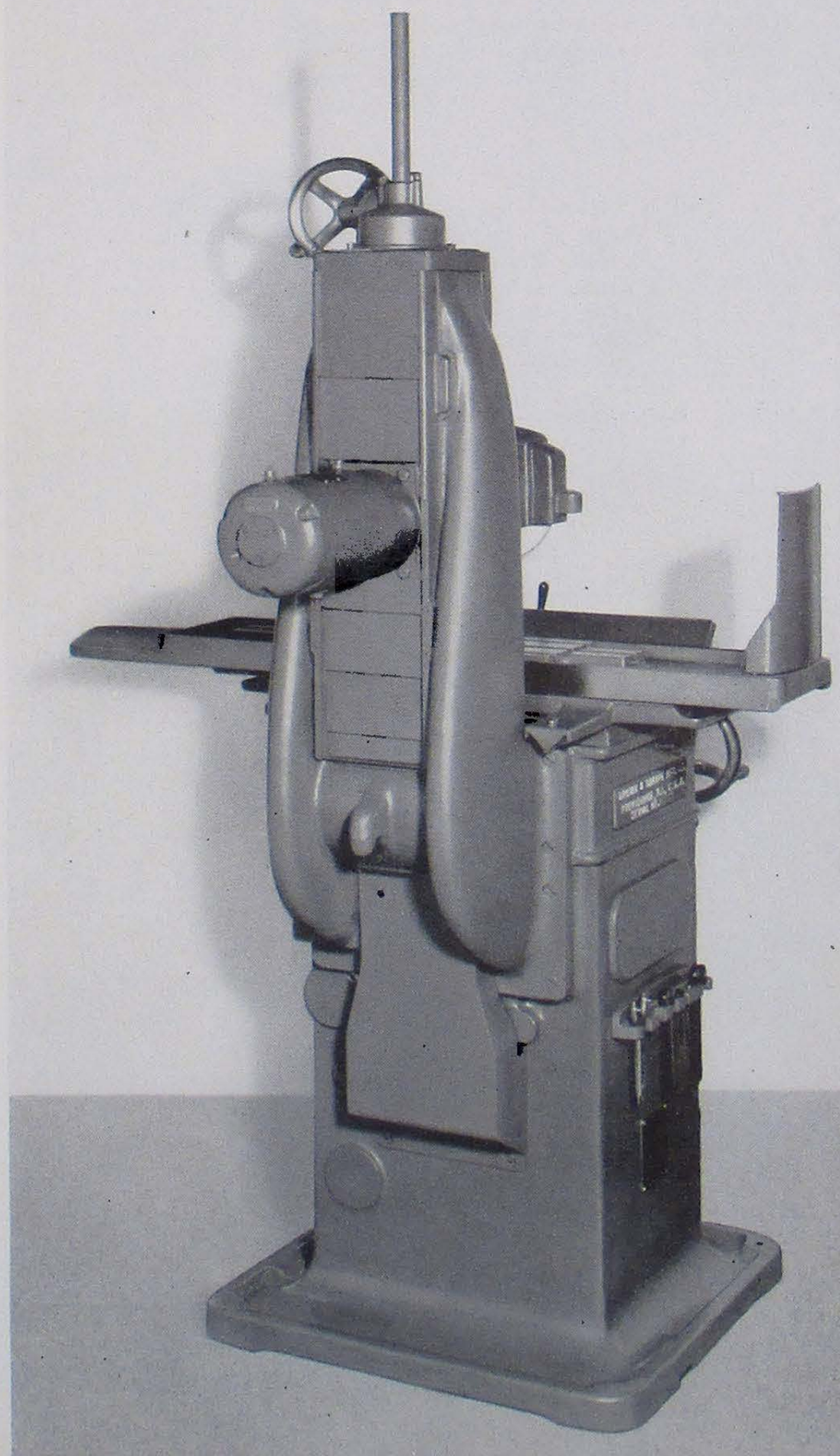
THIS machine, shown at left, is the same as the No. 2 Machine except that the power feeds are omitted. The No. 2B Machine is admirably suited for toolroom operations and a variety of production work where power feeds are not used even when available. The same in-built sturdiness and accuracy of construction permit a quality of work equal to that obtained on the No. 2. A compartment in the base provides storage space for attachments and accessories.

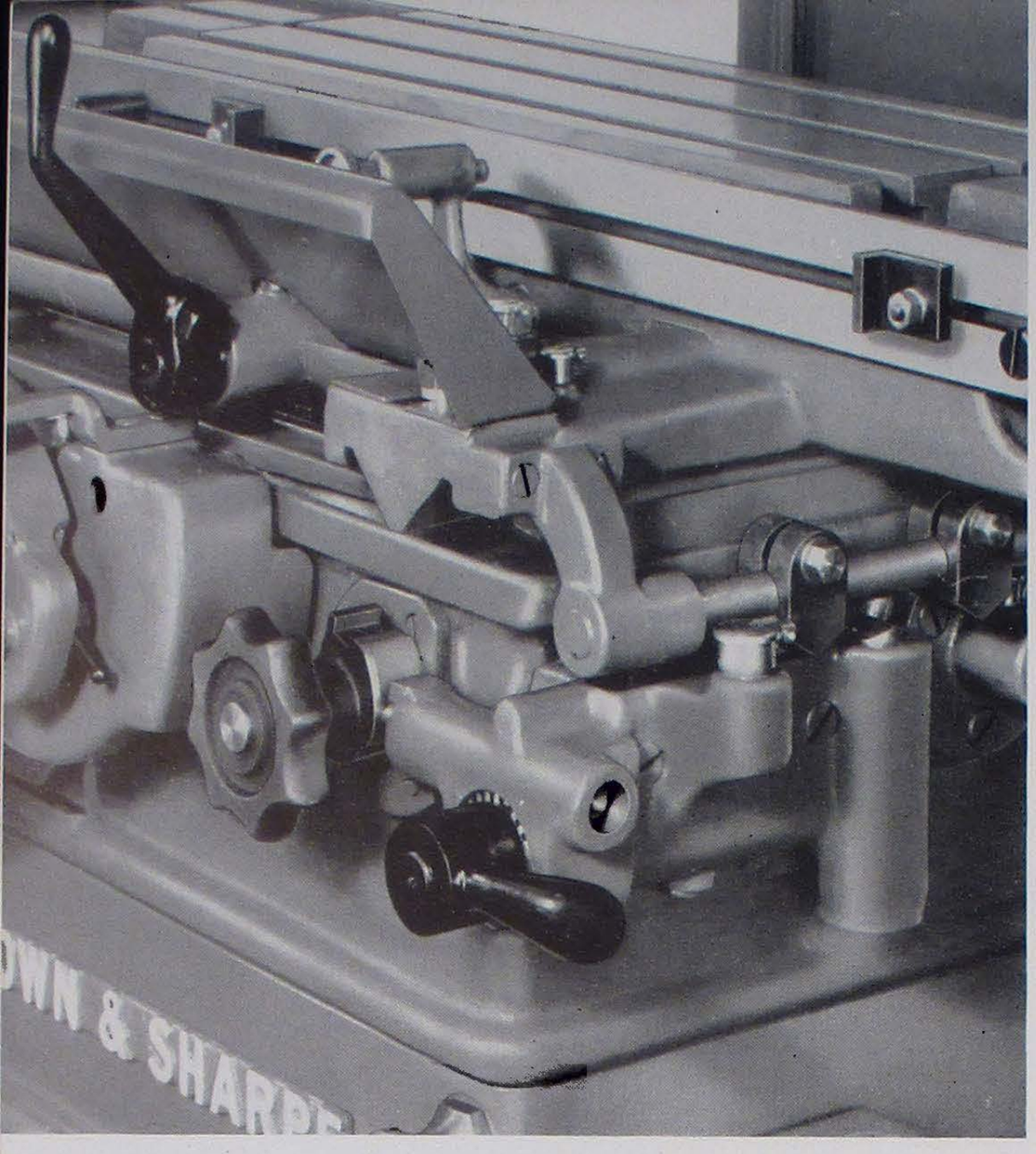
Machines with Motorized Spindle

MACHINES fitted with motorized spindle have the spindle motor mounted on the back of the wheel spindle slide and coupled directly to the spindle, as illustrated below and at right. The drawing below shows the antifriction-bearing spindle unit; the plain-bearing spindle is driven by the same arrangement. Ways and mechanisms are completely guarded. Table drive for the No. 2 Machine is by belt from a motor mounted on a swinging bracket in the base.



(*Below*—No. 2 Machine with Motorized Spindle)





Above—Power feed controls as seen from right front of machine. This view shows the table dogs and their reversing lever, and the tripping mechanism at right side of machine for automatically stopping power feeds at any point in either direction of cross feed.

Below –Table and cross feed handwheels are grouped for convenient manual operation. Plunger knob, which may be seen through the upper left sector of the table handwheel, permits positive disengagement of the handwheel for safety during power table travel.

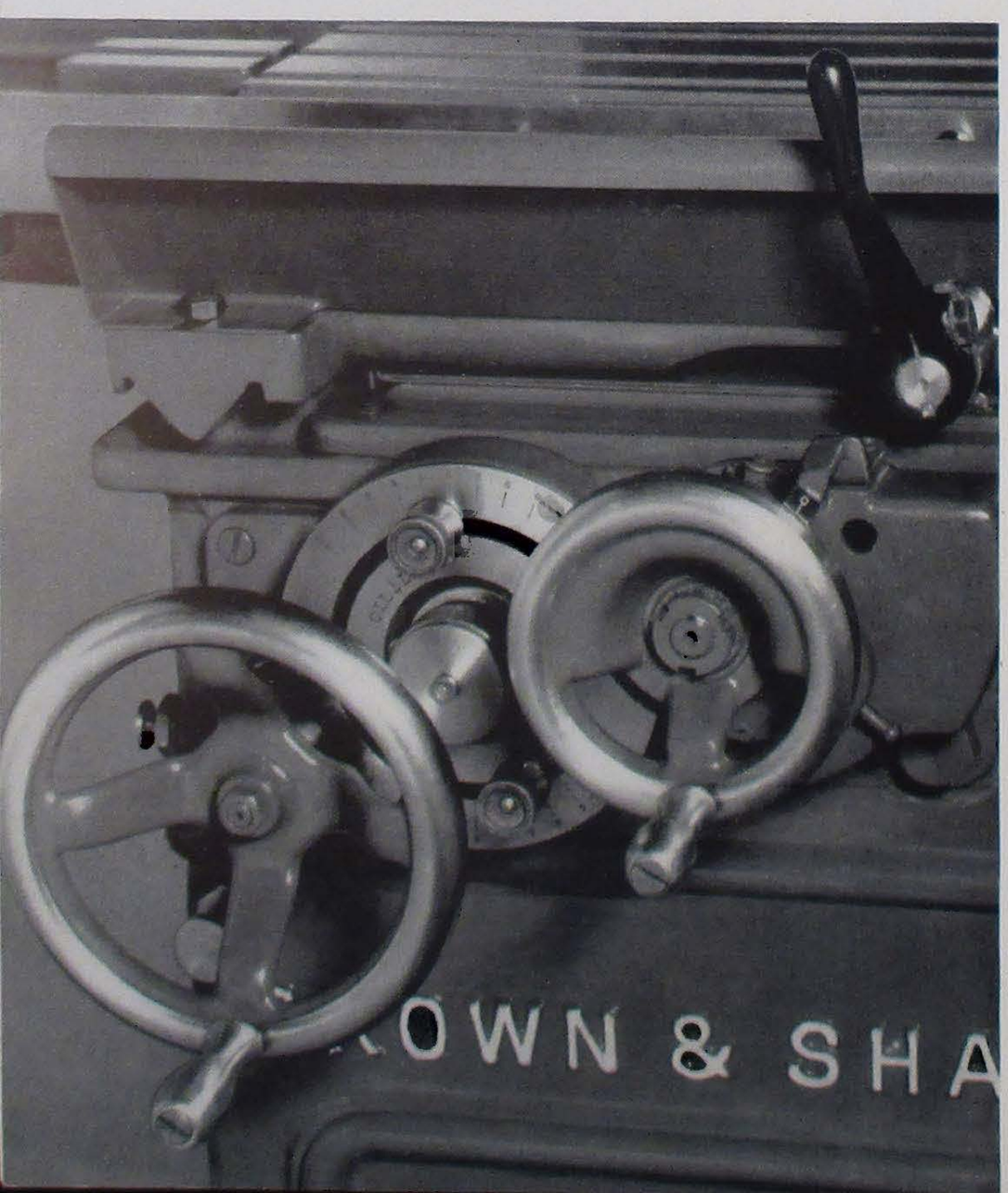


Table and Carriage Power Movements Controlled Automatically or by Hand

ALL power movements of the table and carriage are started and stopped by the starting knob and trip lever conveniently located, as shown, at the right front of the machine.

A quarter-turn of the starting knob to the right engages a reversing clutch to start the power table movement. When the cross feed mechanism is engaged, power cross feed too will operate, on reversal of the table, as described below.

Adjustable table dogs operating against a reversing lever (shown behind table guard) regulate the length of table travel. The plunger in the top of this lever can be withdrawn to allow movement of the table beyond the limits set by the dogs. The hand lever at the front end of the same shaft permits time-saving manual reversal on work of irregular shape.

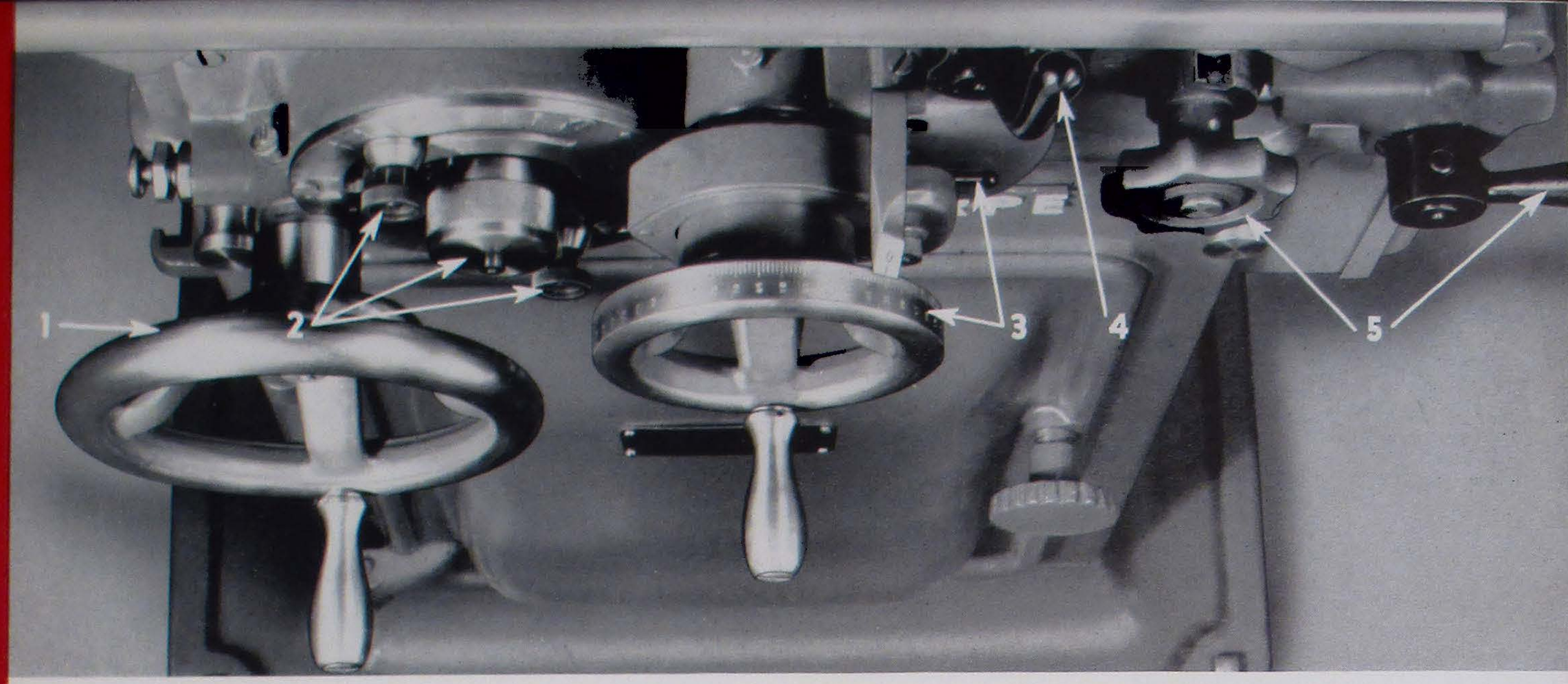
Downward movement of the trip lever releases the starting knob, which snaps back to Stop position, instantly stopping all power movements of the table and carriage. Adjustable dogs on the right side of the machine act on the trip lever shaft through a plunger to stop the machine at any desired point in the automatic cross feed.

Manual and Automatic Cross Feed Controls Conveniently Located

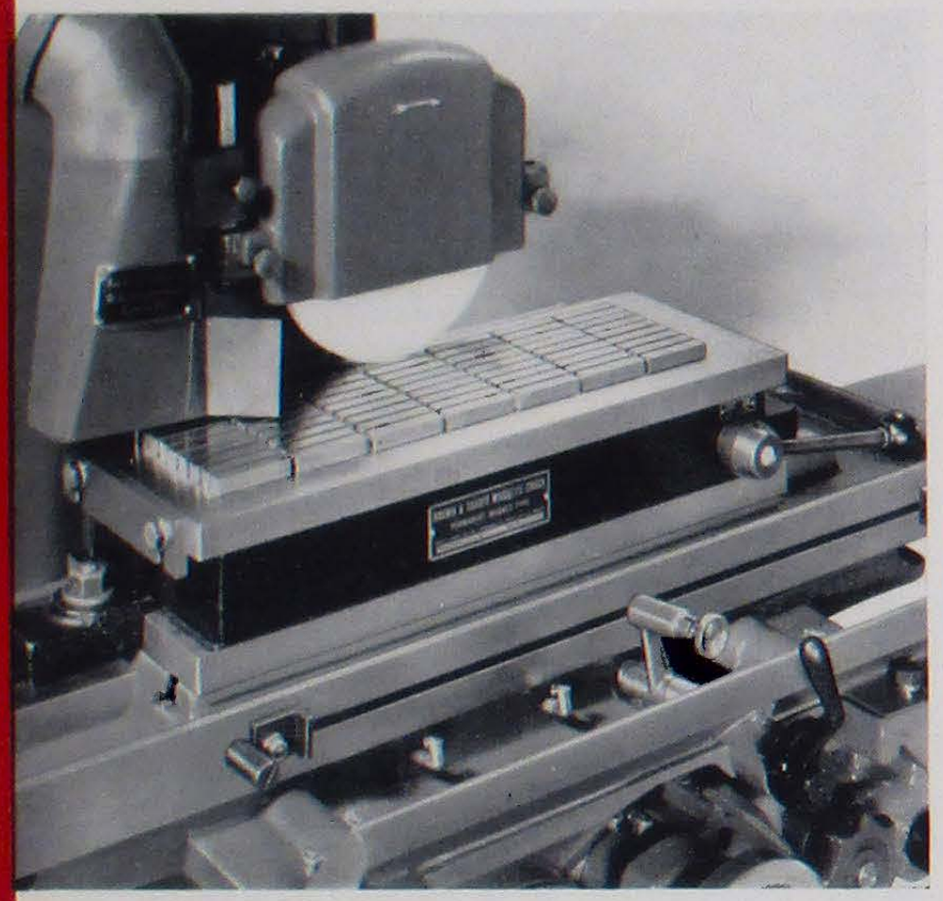
THE longitudinal table handwheel and cross feed handwheel are conveniently located respectively at the left and center of the front of the machine. The table handwheel is held positively engaged or disengaged by a spring plunger; while power cross feed is disengaged (to permit manual cross feed) by putting the cross feed directional control lever (in back of cross feed handwheel) in neutral position.

Between the two handwheels is the automatic cross feed unit, which provides for transverse feeds of .01″ to .09″ on reversal of the table. This is a friction-type mechanism which can be set to feed the full amount at both ends of the table travel or any part of it at either end; or, if desired, cross feed may take place at only one end of the table travel. The amount of feed is selected by two stops on the graduated plate or dial; while direction of feed is controlled by the lever in back of the cross feed handwheel.

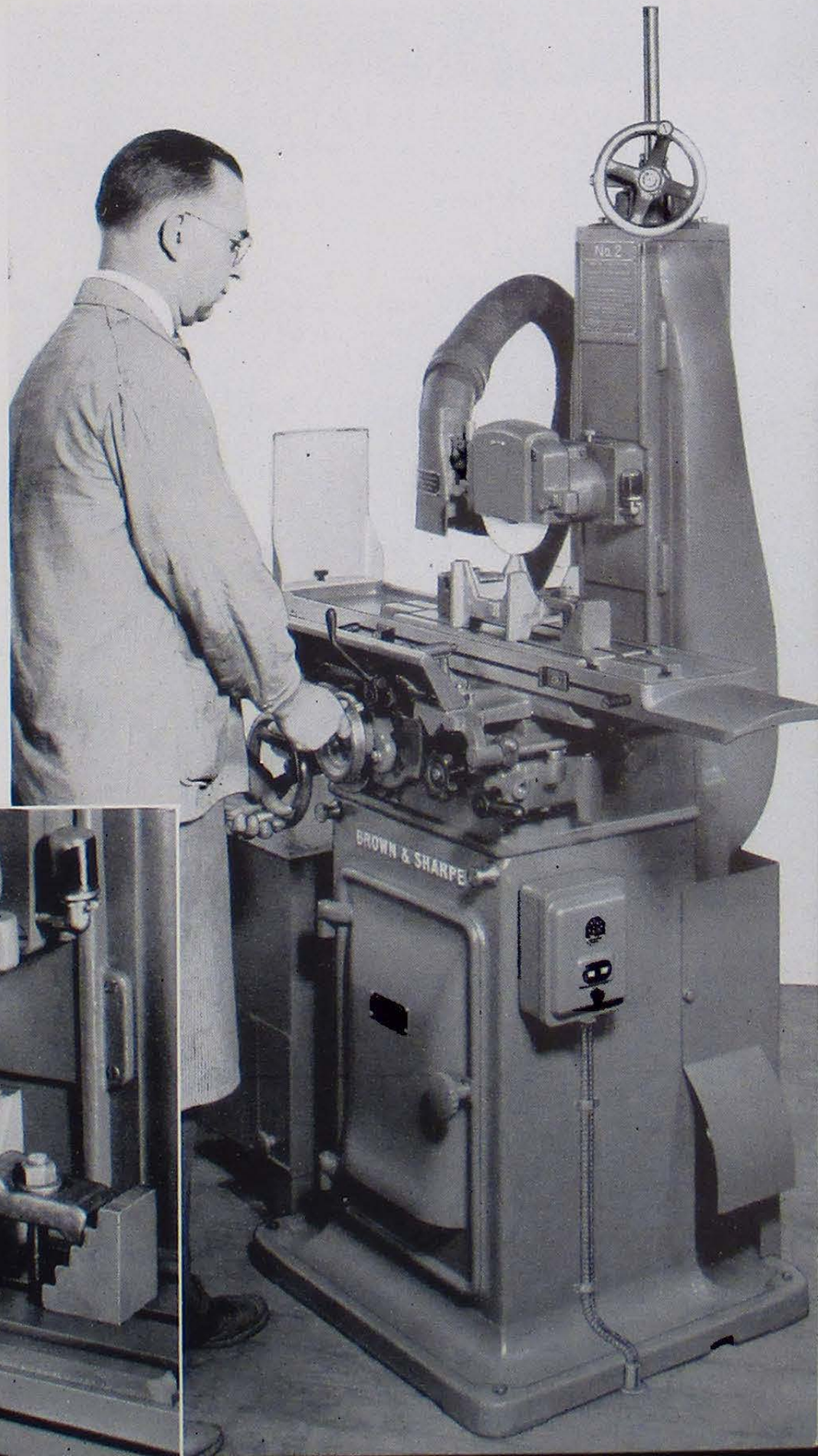
A knurled knob in the center of the dial engages or releases the cross feed mechanism; and when the mechanism is disengaged, longitudinal table movement may be used without possibility of the automatic cross feed operating.



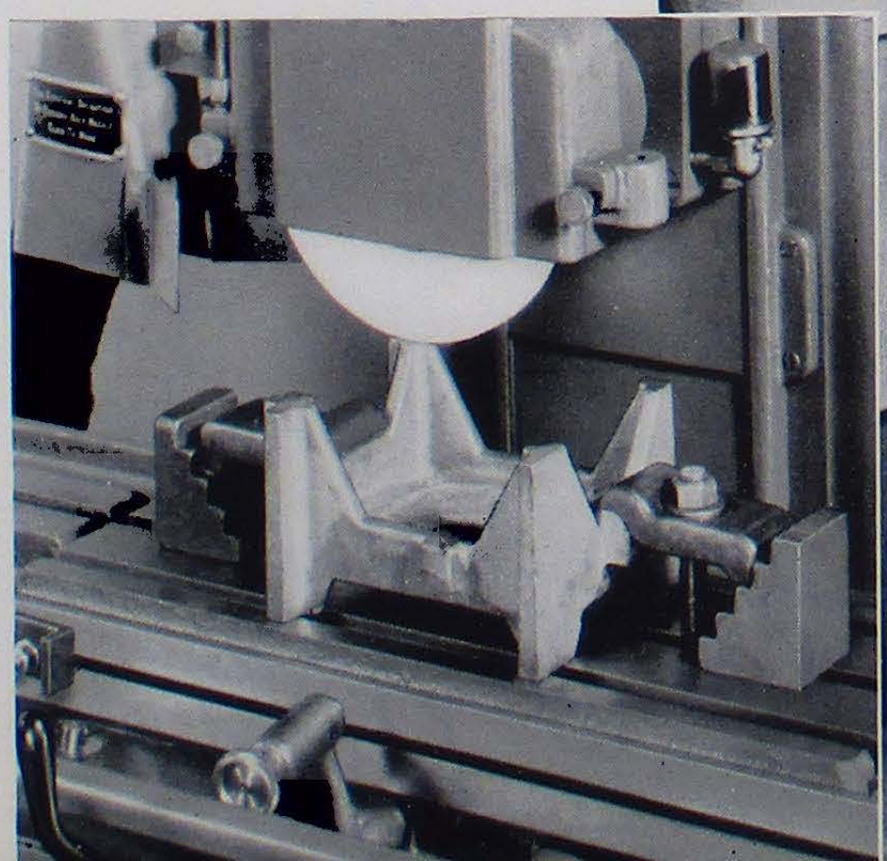
Above—View from operating position clearly shows the location and convenience of the table controls on the No. 2 Machine. From left to right they are: (1) the table handwheel, for longitudinal hand feed; (2) large knurled nut (controlling friction arrangement) for positive disengagement of power cross feed, and two adjustable stops for selecting amount of cross feed; (3) graduated cross feed handwheel, and control lever for engagement of automatic cross feed in either direction; (4) table reversing lever, for manual reversal; and (5) grooved knob and lever for respective engagement and disengagement of power table travel. All these controls, together with the table dogs and vertical adjustment handwheel, are readily reached without moving from the operating position.

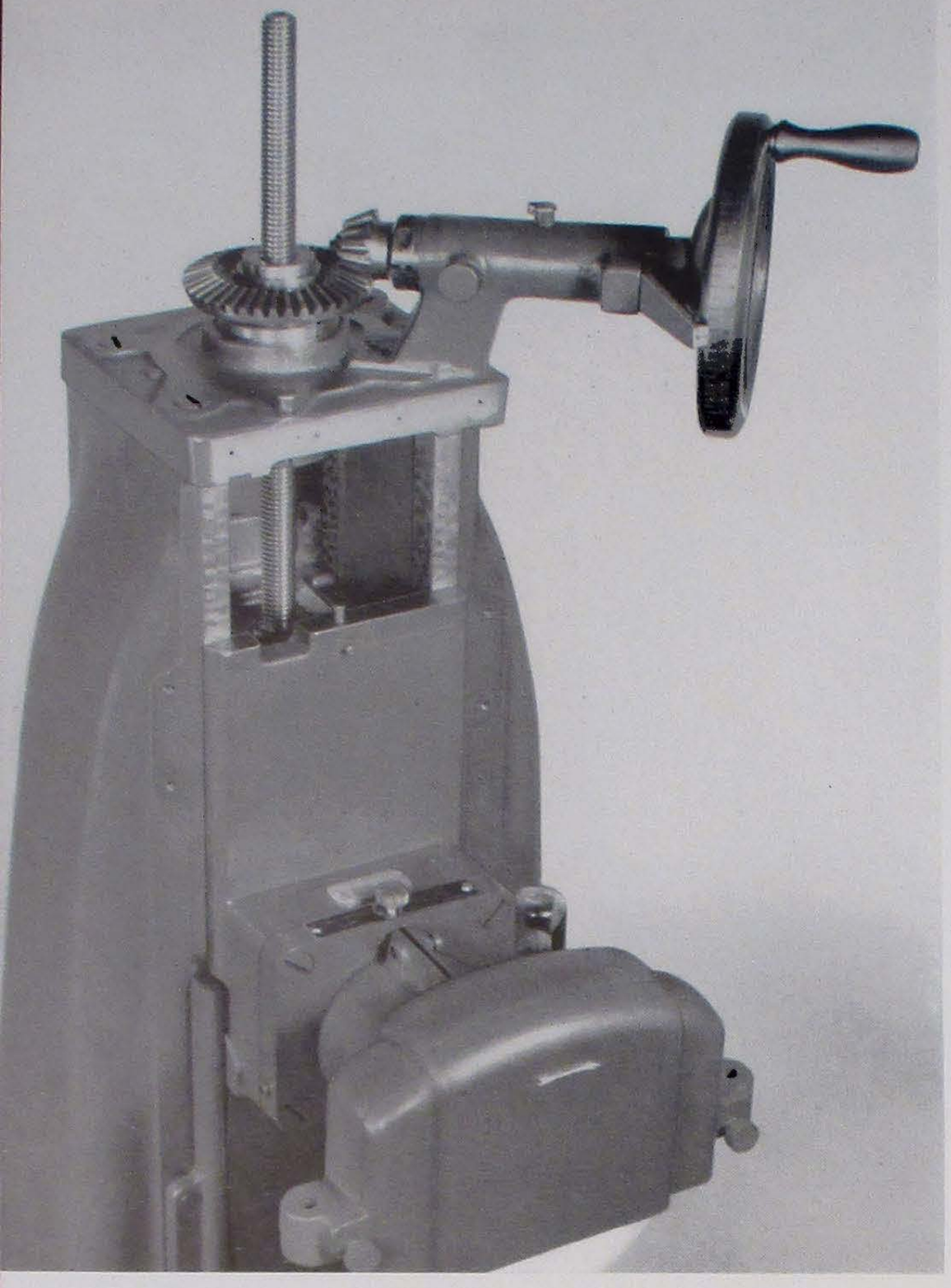


Left — A typical production job — grinding a group of parts to close limits using a Brown & Sharpe permanent magnet type chuck. Power table reciprocation and cross feed can be stopped automatically on completion of the desired amount of inward and outward cross feed.



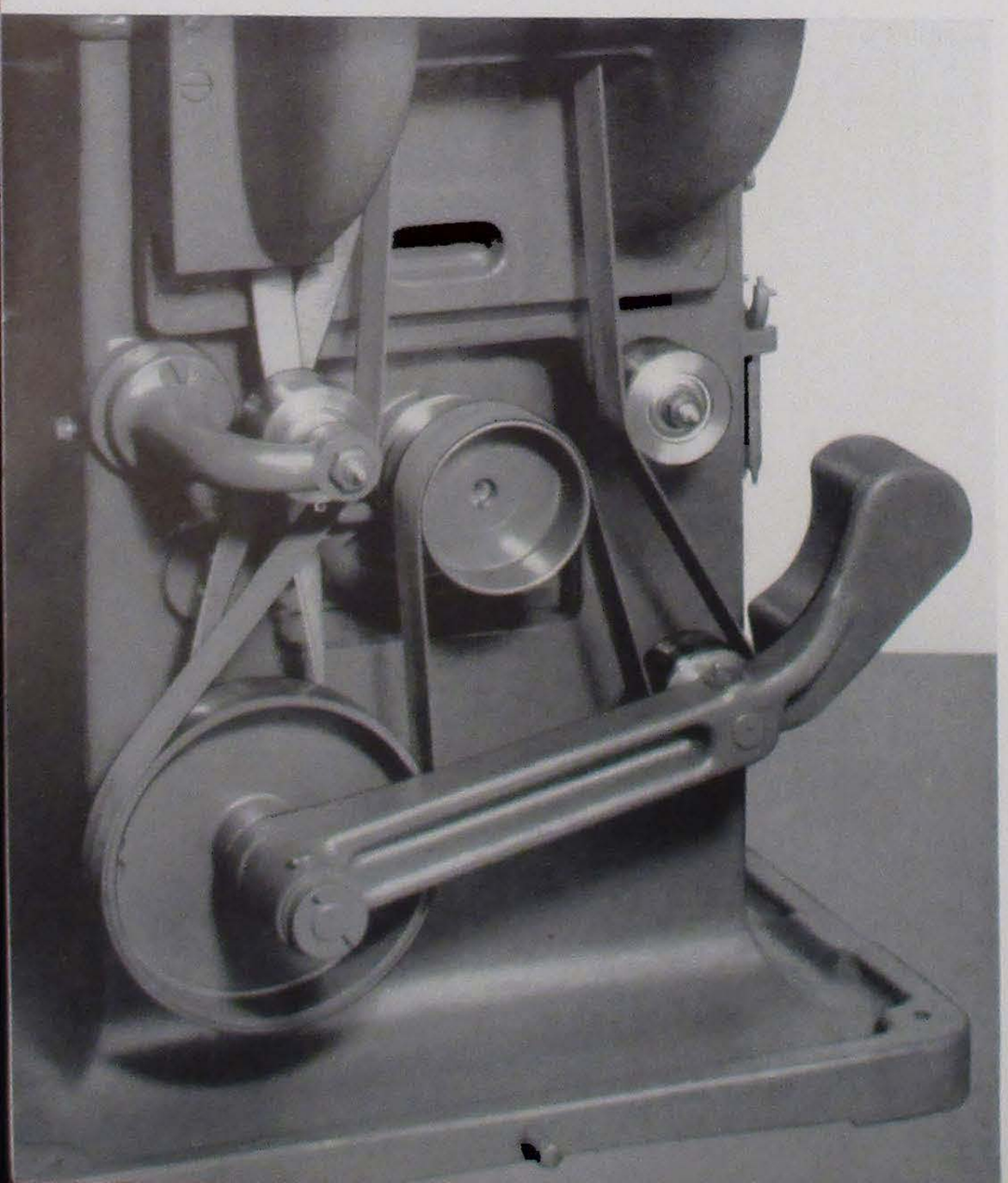
Right — Close-up shows a toolroom operation which is typical of a variety of work — both simple and complex—for which the No. 2 Surface Grinding Machine is suitable. In grinding narrow and widely-spaced surfaces such as this, economy of time is obtained by grinding one surface at a time, either by operating the reversing lever by hand when using power feed, or by using hand feed as illustrated in picture with operator.





Above — Spindle elevating mechanism with guards removed. Note the sturdy construction of the head and uprights, the finely-fitted screw (without spline), and the long bearing of the head on the precision-scraped uprights.

Below — Removal of belt guard at the rear of the machine shows the belt driving arrangement for spindle and table. Idler pulley on weighted arm maintains correct tension in spindle belt regardless of height of grinding wheel.



Removable-Unit-Type Spindle Has Rigid Alignment; Gives Fine Finish and Accuracy

AMPLE, precision-scraped bearing surfaces on the spindle head and on the sturdy upright maintain accurate and rigid alignment of the spindle throughout the vertical adjustment. Metal guards protect the bearing surfaces and adjusting mechanism from grit and dust, preventing undue wear and prolonging the life and accuracy of the machine.

Vertical adjustment of the spindle head is obtained by a handwheel at the top of the upright, which operates a pair of bevel gears as illustrated at the left. A nut keyed to the large gear moves the non-rotating, heat-treated screw vertically to adjust the position of the spindle head. The screw is precision-cut and without spline, reducing wear to a minimum and assuring continued accuracy. Graduations on the handwheel read to .0005", and are widely-spaced to facilitate estimating smaller fractions.

The spindle is of the removable-unit type, a plain-bearing unit being regularly furnished. Spark-out time is at a minimum due to the unusually small clearance between the spindle and its special bronze bearings, which practically eliminates radial play. The spindle is ground to extremely close limits of concentricity, straightness and finish, and is automatically lubricated with a cool-running, extra-light spindle oil from a reservoir supplied by a constant-level oiler. End play adjustment is obtained simply by loosening, then tightening a knurled screw.

For those who prefer an antifriction-bearing spindle, a unit of this type is also available. This spindle is mounted on preloaded roller bearings at front and rear, while end thrust in both directions is taken by two opposed preloaded ball thrust bearings. All bearings are super-precision.

Motor Drive Installation Compact and Convenient

MOTOR drive for the No. 2 and No. 2B Surface Grinding Machines is simple and compact. The 1½ H.P. constant-speed driving motor is enclosed in a compartment in the base of the machine, where it is completely out of the way and is protected against oil and dirt. The door at the front of the base gives accessibility; and a large louver in the bottom of the door and an opening at the top rear of the compartment provide an adequate, natural circulation of air for cooling the motor.

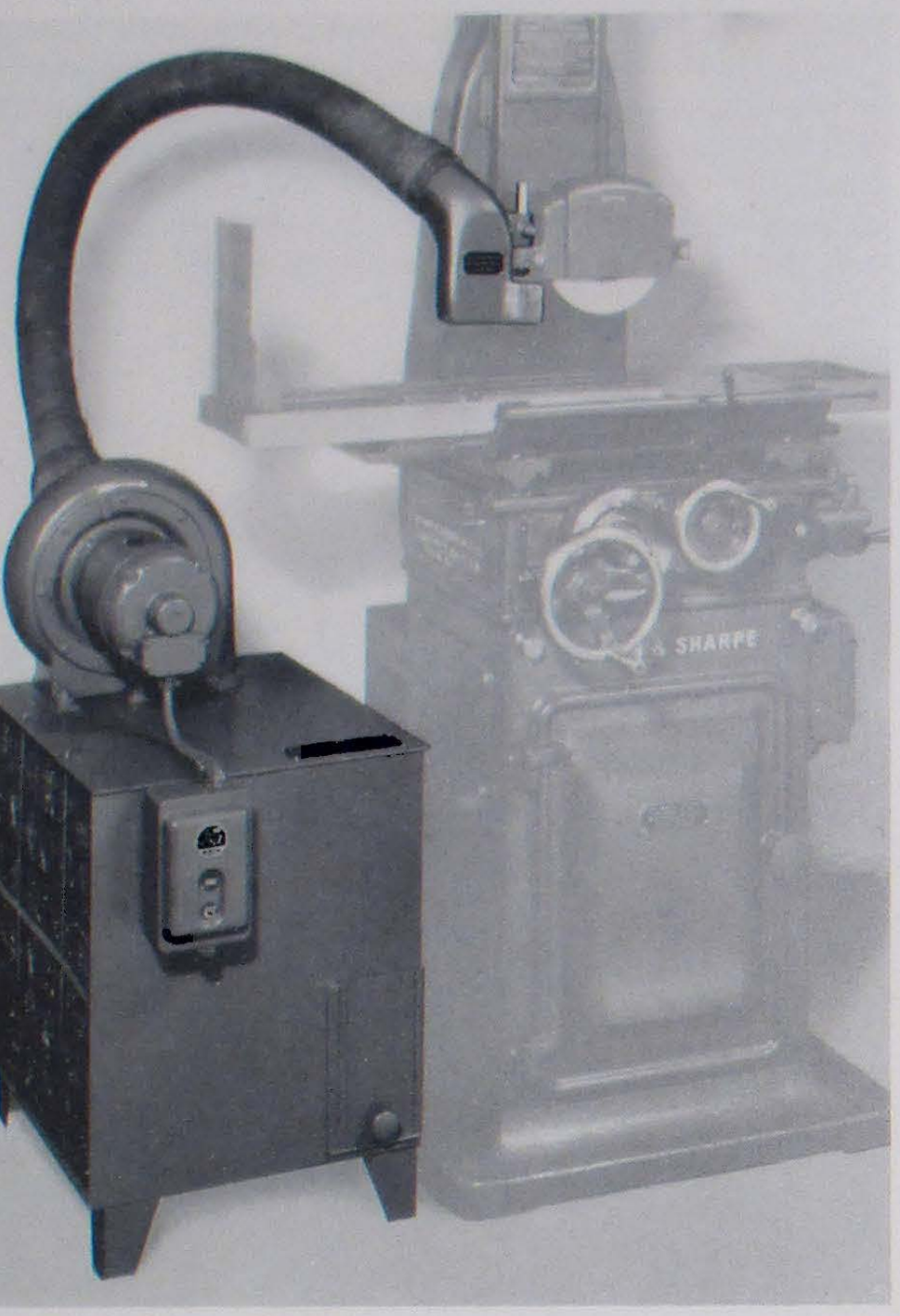
Drive from the motor to the spindle is by a flat belt running over the pulley system illustrated at the left. The pulley system includes a weighted idler pulley which maintains a constant, correct tension in the driving belt regardless of the vertical position of the spindle head. On the No. 2 Machine, the table mechanism is driven by a belt from a small pulley mounted behind the large pulley shown at the lower left of the illustration.

On machines with motorized spindle, the spindle is driven by a 1 H.P. constant-speed motor mounted on the back of the wheel spindle slide and coupled directly to the spindle. The table mechanism of the No. 2 Machine is driven by belt from a ¼ H.P. constant-speed motor mounted on a bracket in the base of the machine.

— ADDITIONAL EQUIPMENT —

Items Furnished at Extra Cost

When ordering equipment specify the size, style and serial number of machine.



Exhaust Attachment

THIS Attachment removes grit and dust-laden air from the region of the grinding operation by suction and separates out the foreign matter, leaving the air well-cleaned.

A motor-driven fan mounted on the separator tank draws the dust-laden air through a flexible pipe from an exhaust nozzle attached to the wheel guard, and then blows it into the spiral separator. As the air whirls around the spiral the heavier particles are thrown by centrifugal force against deflectors which turn them aside into the dust chamber. The air, free of heavy particles, is then spread by a baffle in the expansion chamber so that it is slowly dispersed over the whole area of the filter, where the finer particles are trapped by two viscous-coated renewable filter pads. Tests show that this Attachment has a separating efficiency of over 99%.

The fan is driven by a $\frac{1}{4}$ H.P. flange-type motor controlled by a starting switch having overload protection. The suction hose is made of a wire helix embedded in rubber and has a fabric covering. The capacity of the Attachment with a 3600 R.P.M. motor is 300 cu. ft. per minute, giving a velocity of approximately 6000 ft. per minute through the 3″ diameter hose.

The floor space required for this Attachment is no more than that necessary for the longitudinal movement of the table, although approximately 14″ should be allowed behind the machine for the loop in the flexible suction hose.

Weights (approx.): net, 200 lbs.; shipping 275 lbs. Dimensions for shipment, 24″ x 30″ x 40″.

Exhaust Nozzle

For Use with Central Plant Exhaust System

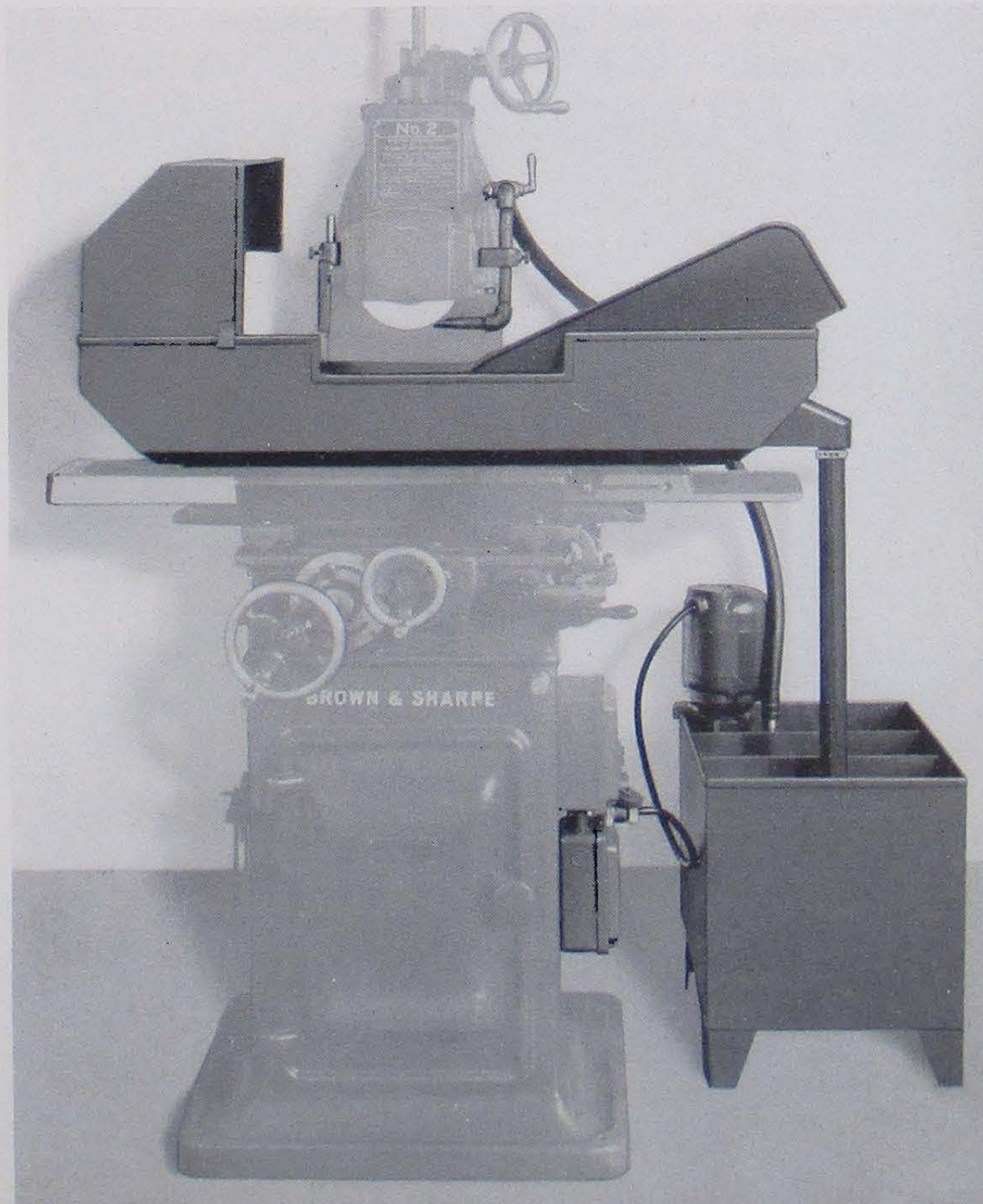
THE Exhaust Nozzle (not illustrated) is an aid in connecting the machine to a central exhaust system. A special stud is included for attaching the nozzle to the wheel guard of the machine. Weights (approx.): net, 3 lbs.; shipping, 8 lbs. Dimensions for shipment, 7″ x 8″ x 10″.

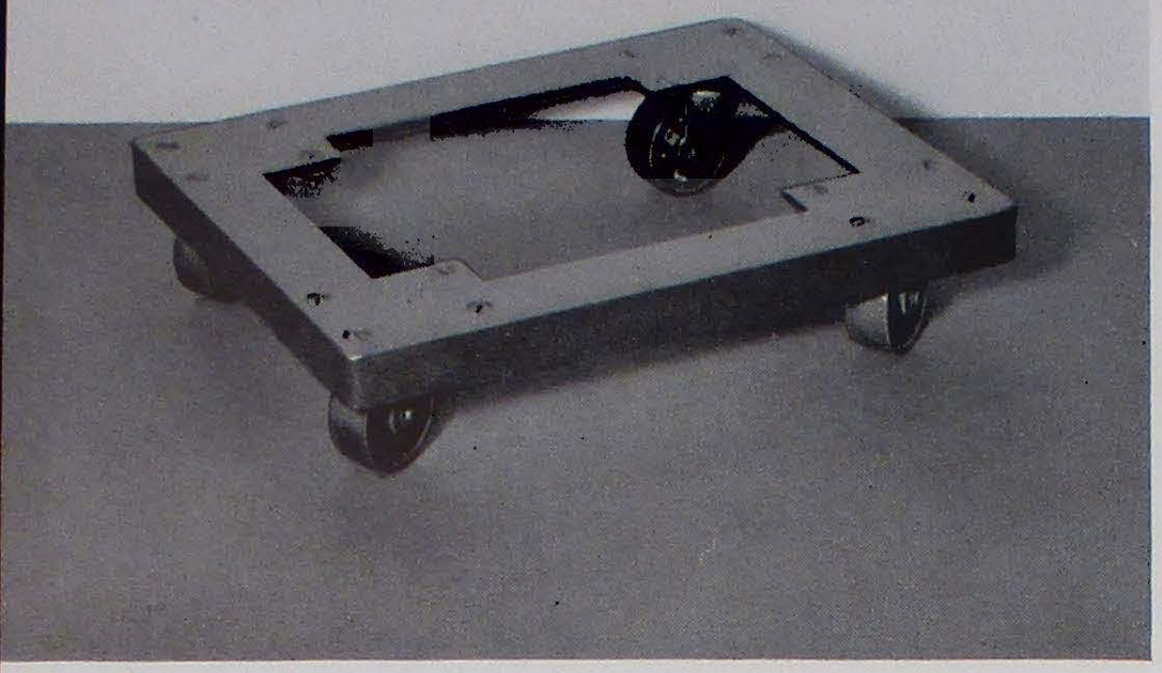
Wet Grinding Attachment

CONSTRUCTED of strong, durable material, this Attachment requires but little more floor space than is needed for the machine alone.

A splash guard is attached to the regular wheel guard, and coolant is supplied to the wheel through a nozzle and flexible piping from a $\frac{1}{4}$ H.P. motor-driven centrifugal pump mounted in the supply tank. The floor-type tank is of welded steel construction, adequately baffled for efficient settling, and has a capacity of 18 gallons. The coolant is caught in the work tank, which is provided with a hood and splash guards, and is returned to the supply tank through a flexible discharge pipe. The work or fixture is clamped to a T-slotted base plate in the work tank. Use of this Attachment reduces the vertical capacity of the machine by $1\frac{5}{8}$″.

Weights (approx.): net, 160 lbs.; shipping, 310 lbs. Dimensions for shipment, 54″ x 31″ x 22″.





Castered Base

for Use with Wet Grinding and Exhaust Attachments

STURDILY constructed of heavy steel and equipped with four 3″ ball bearing swiveled casters, this base or dolly provides a ready means of moving the coolant tank, or separator tank, to other machines or to a convenient place for emptying and cleaning. Measuring 19½″ long, 15½″ wide and 3⅞″ high, it fits well into the corners formed by the feet of the tank and raises the feet ¼″ from the floor, permitting free movement without interference.

Weights (approx.): net, 19 lbs.; shipping, 25 lbs. Dimensions for shipment, 24″ x 17″ x 5″.

Magnetic Chucks

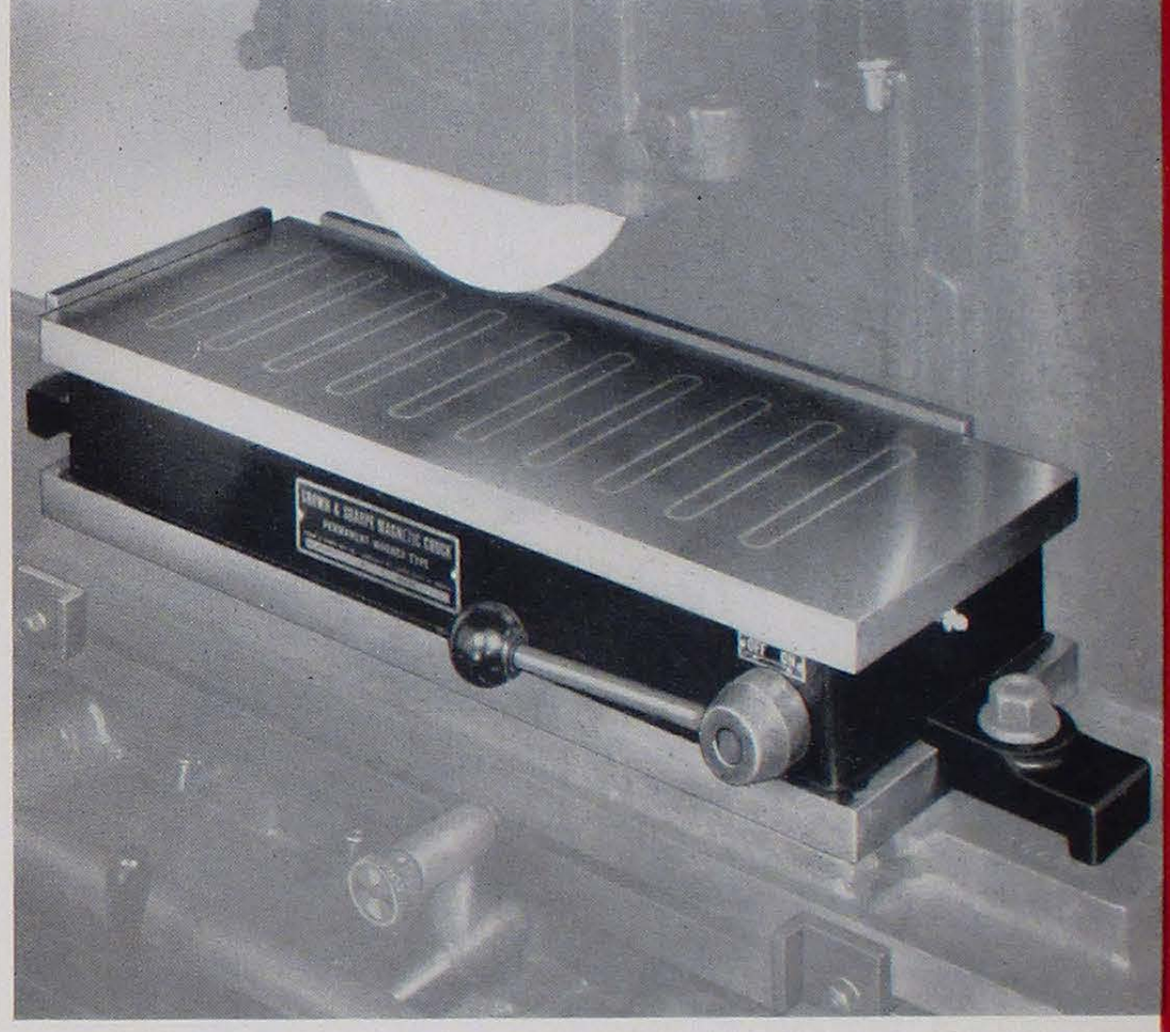
THE Nos. 510 and 618 Rectangular Model Magnetic Chucks (Permanent Magnet Type)* provide a quick, easy means of holding a variety of ferrous work for surface grinding, and for bench work and inspection purposes as well. The chuck uses no electric current; hence wiring, switches, generators etc. are not required. The special-alloy permanent magnets maintain their strong holding power indefinitely, and the chuck can be left "on" as long as desired without heating. Amount of holding power is controlled by the lever shown. Auxiliary top plates are available to permit holding smaller work than can usually be held on a magnetic chuck.

No.	Working Surface, Inches	Magnetic Surface, Inches (Approx.)	Net Weight, Lbs. (Approx.)	Height of Chuck, Inches	Shipping Weight, Lbs. (Approx.)
510	5⅝ x 10⅜	3⅜ x 7½	41	3⅜	50
618	6⅜ x 18⅛	4½ x 14 1/16	87	3⅝	104

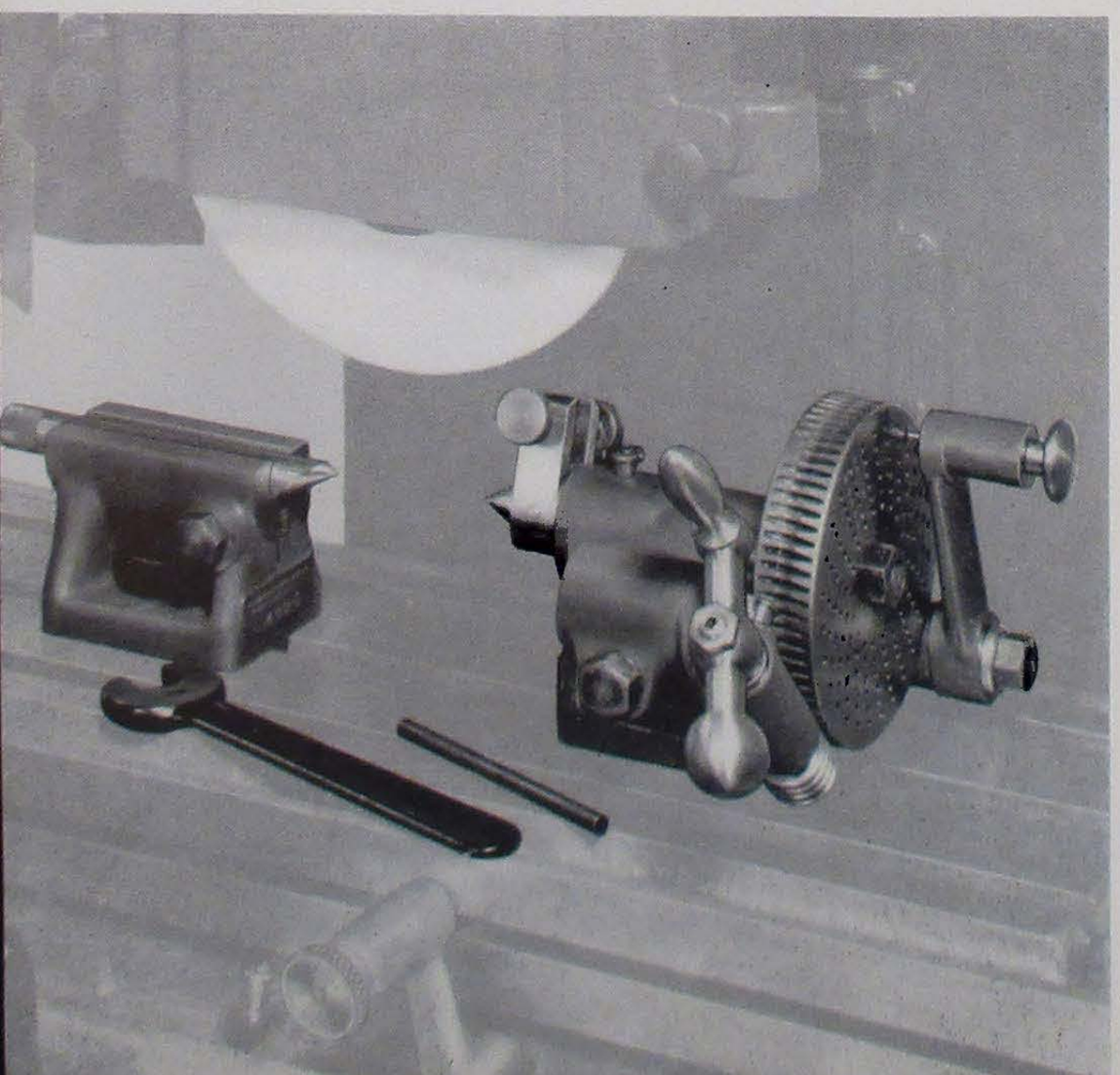
Electromagnetic Chucks and controlling equipment are also available. Information on application.

Magnetic Chuck Generator, for use with electromagnetic chuck, is also available except on machines fitted with motorized spindle. Information on application.

****Brown & Sharpe Magnetic Chucks of the Permanent Magnet Type are for sale only in the United States of America and its Territories.***



Above — A Brown & Sharpe No. 618 Magnetic Chuck (Permanent Magnet Type). Note absence of wiring and switches. Holding power is controlled by the lever.



4¾ Inch Index Centers

PERMITTING exact indexing of the more common circumferential spacings, the Index Centers greatly facilitate the grinding of taps, reamers, formed cutters and similar work. The centers are quickly clamped in position by T-bolts, and are accurately aligned by tongues which fit the table T-slots.

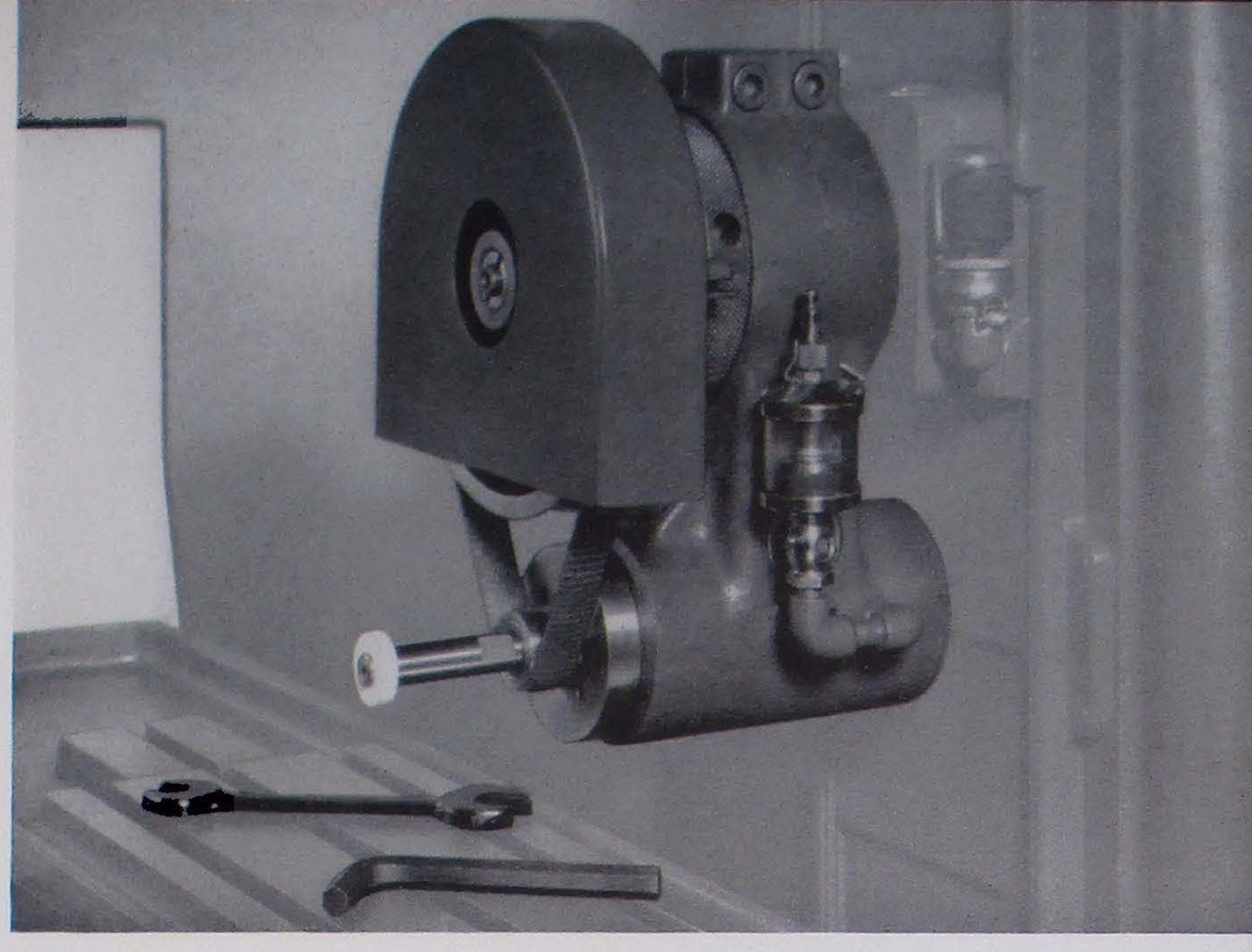
Indexing is rapid and accurate. A spring-loaded locking pin (see illustration) and six rows of holes in the face of the combined index plate and worm wheel provide for indexing all divisions from 2 to 14, and all even numbers from 18 to 28. The worm wheel can either be turned by worm, or the worm can be thrown out of mesh and the wheel turned by hand. Ratio of worm to worm wheel, 75:1.

Centers swing 4¾″ diameter.* Combined base length with centers together, 8½″. Centers have reversible tongues for T-slots ½″ or 5/16″ wide.

Weights (approx.): net, 12 lbs.; shipping, 18 lbs. Dimensions for shipment, 13″ x 9″ x 7″.

***Raising Blocks,** available at extra cost, increase the swing to 8¼″.

The High Speed Surface Grinding Attachment installed on the machine. Tension in the driving belt is adjusted by turning the knurled shoulder of the eccentric sleeve in the Attachment body, and the adjustment is clamped by the rear hollow-head screw at the top. This screw also clamps the Attachment to the spindle housing of the machine.



High Speed Surface Grinding Attachment

SLOTS and other surfaces which do not permit the use of a wheel of large diameter can be rapidly and economically ground with this Attachment. The Attachment is readily applied to the machine, and drives small grinding wheels at the necessary high surface speeds.

Fitting on the machine spindle housing in place of the wheel guard, the Attachment can be used in practically any angular position around the machine spindle. With the Attachment spindle in the lowest position, maximum vertical distance between center of Attachment spindle and top of machine table is 7". The spindle is mounted on two pairs of super-precision ball bearings and is driven at 18,000 R.P.M. by an endless fabric belt from a pulley mounted on the machine spindle. Belt tension adjustment is by means of an eccentric sleeve in the Attachment body. A hand-engaged plunger for locking the spindle facilitates the changing of wheel arbors.

Wheel arbors and grinding wheels are furnished at extra cost, stock sizes being listed at right. The exacting limits and fine finish demanded of this equipment require extreme accuracy in the taper fit between spindle and wheel arbor; therefore we strongly recommend that all wheel arbors be furnished by us to assure the utmost in precision and finish.

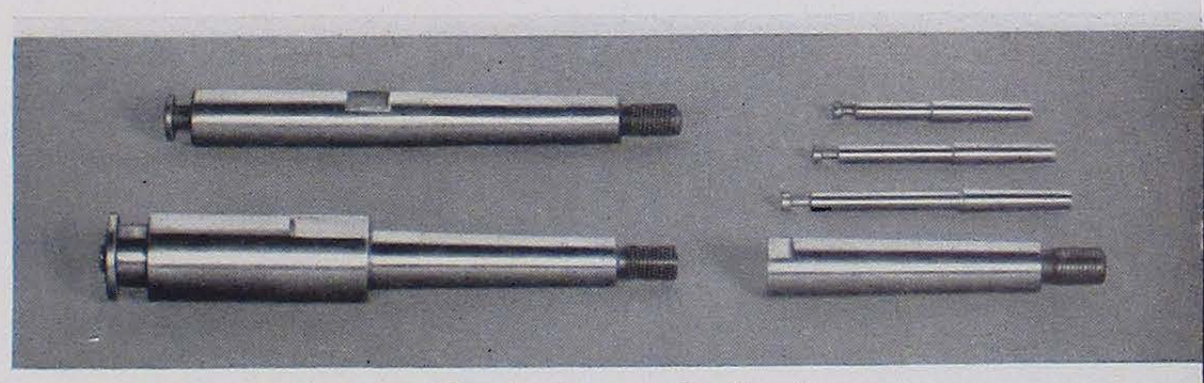
Wheel Arbors and Grinding Wheels

Furnished at extra cost

One Grinding Wheel furnished with each Wheel Arbor

Arbor Number	Grinding Wheels — Size, Inches Diam. x Thick. x Hole	Distance, Rear Face of Grinding Wheel to End of Machine Spindle, Inches
2103*	$\frac{1}{2}$ x $\frac{1}{4}$ x $\frac{3}{32}$	$\frac{13}{16}$
2105*	$\frac{1}{2}$ x $\frac{1}{4}$ x $\frac{3}{32}$	$1\frac{3}{16}$
2107*	$\frac{1}{2}$ x $\frac{1}{4}$ x $\frac{3}{32}$	$1\frac{9}{16}$
2109	$\frac{7}{8}$ x $\frac{1}{4}$ x $\frac{1}{4}$	$1\frac{3}{4}$
2111	$1\frac{1}{4}$ x $\frac{3}{8}$ x $\frac{5}{8}$	$1\frac{3}{4}$

*Used with No. 2125 Collet (furnished at extra cost).



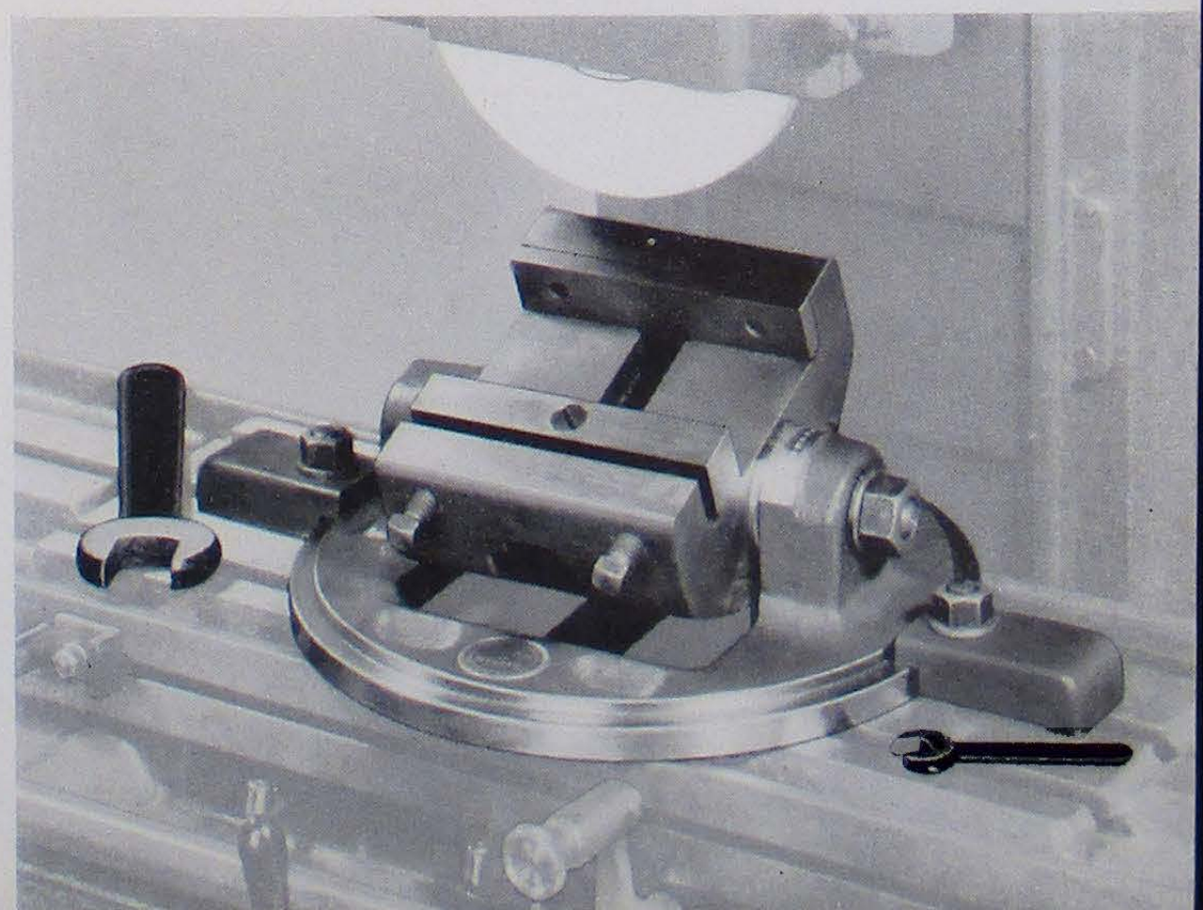
Above — Wheel arbors and collet for use on High Speed Surface Grinding Attachment.

Adjustable Swivel Vise

THIS vise can be clamped to the table with the jaws at any angle to the table T-slots. Its pivoted construction allows the jaws to be tilted at any angle to 45° either side of horizontal, a graduated arc indicating the setting to degrees.

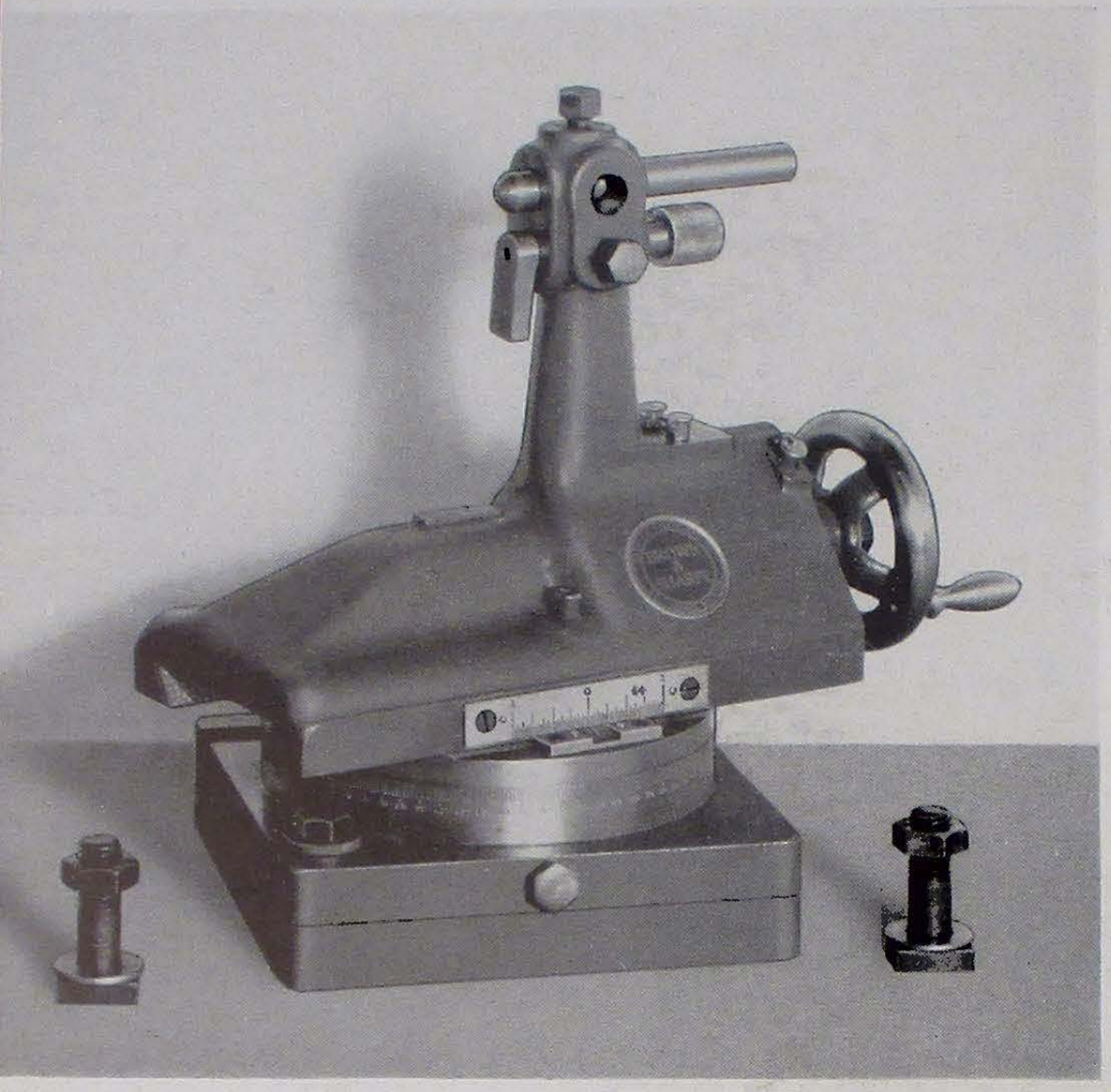
The jaws are of tool steel, hardened, 5" wide, 1" deep and open $2\frac{3}{4}$". Distance from bottom of base to top of jaws with jaws horizontal, 4".

Weights (approx.): net, 30 lbs.; shipping, 36 lbs. Dimensions for shipment, 13" x 12" x 5".



Radius and Angle Wheel Truing Attachment

THIS Attachment provides an accurate and efficient means of shaping abrasive wheels, and is particularly valuable when grinding such work as lamination dies, flat forming tools and other pieces requiring wheels having radial or angular faces. By its use, convex or concave outlines having radii up to 1″, and face angles up to 90° either side of zero, can be formed; and numerous combinations of radial and angular shapes otherwise difficult to obtain can easily be developed.



Below—Shaping a radial contour. The slide is set by the scale to the required radius and clamped in position by a screw on the opposite side of the slide. The diamond point is set by the diamond tool setting gage, shown directly below the diamond tool, and the slide is then swiveled to form the wheel.

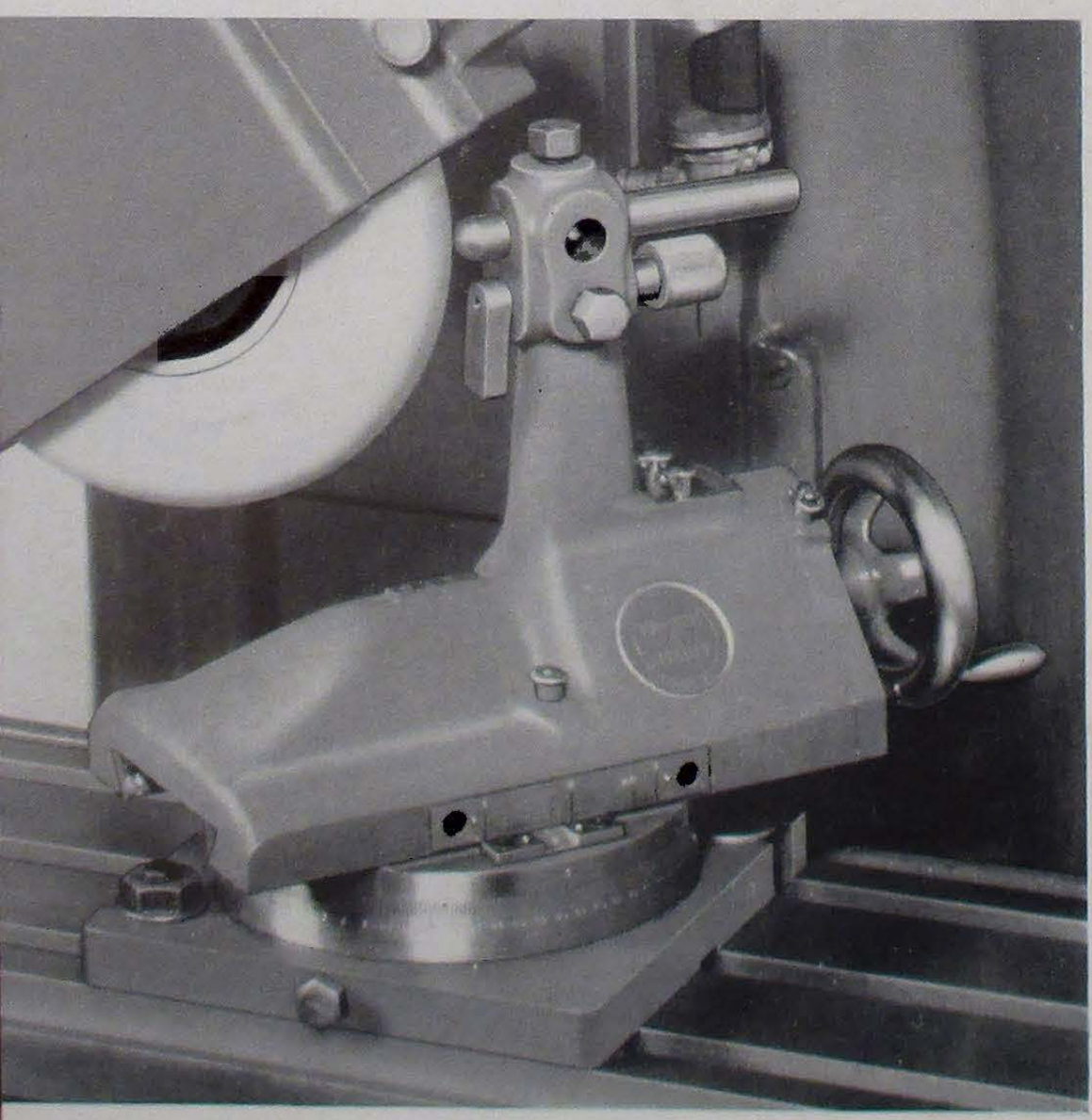
The base of the Attachment carries a swivel platen upon which is mounted a slide which can be moved longitudinally by handwheel. An upright, integral with the slide, holds the diamond tool and diamond tool setting gage; and the diamond tool (diamond not furnished) may be set either parallel to the slide (for forming radii) or at right angles (for forming angular surfaces) and clamped in position by a locking screw.

For truing the wheel to the desired angle, the base of the Attachment is graduated in degrees to 90° each side of two opposed zero marks, a clamp screw permitting the swivel to be locked in the desired angular position. The diamond is passed across the face of the wheel by running the slide back and forth by handwheel. For forming concave or convex outlines, the diamond point is located by means of the diamond tool setting gage (turned upward 180° from position shown), and the slide is adjusted longitudinally to the desired radius as indicated by a scale on the slide reading to 1″ each side of zero by 64ths. The slide is locked in position by a clamping screw, and the diamond is passed across the wheel by swiveling the Attachment on its base to produce the desired form. A gib and adjusting screws provide means of compensating for wear in the slide.

An auxiliary base, for use with the Attachment when a magnetic chuck is used, is furnished as regular equipment.

Weights (approx.): net, 33 lbs.; shipping, 42 lbs. Dimensions for shipment, 14″ x 9″ x 11″.

Diamond (mounted) can be furnished at extra cost.



Below—Forming an angle. The swivel platen is clamped at the required angle by the screw at the front of the base and the slide is operated by means of the handwheel to true the wheel. The diamond tool is held in the upright at right angles to the slide, and is advanced by hand feed of the machine table.

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