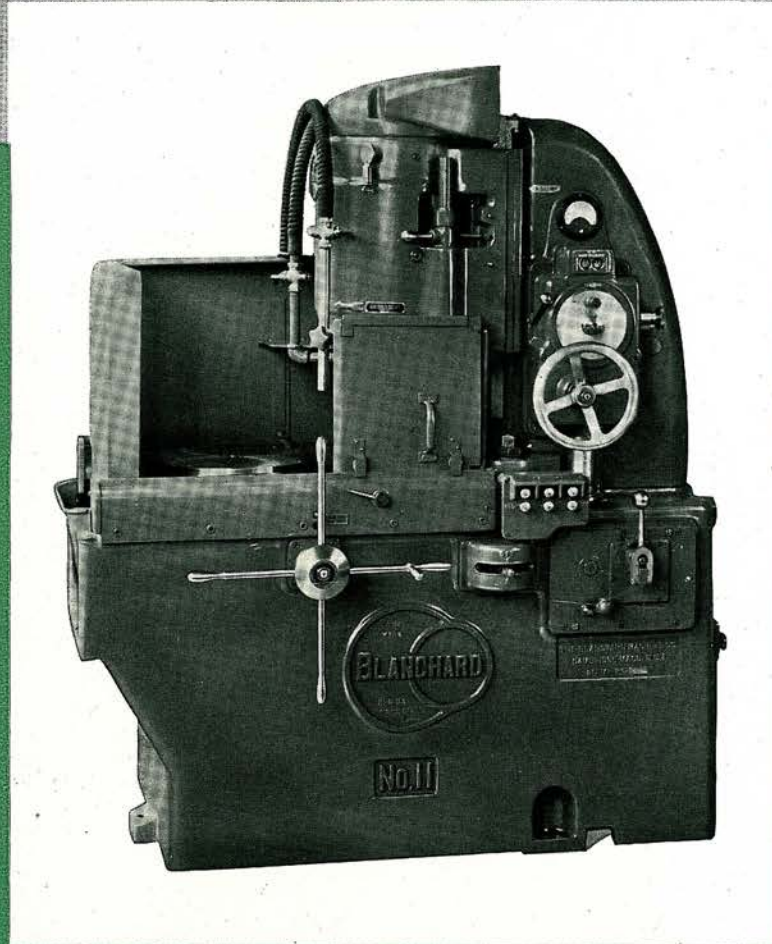


No. 11

OK



BLANCHARD Surface Grinder



THE BLANCHARD MACHINE COMPANY
64 STATE STREET, CAMBRIDGE 39, MASS.

FORM NO. 287

**THE BLANCHARD MACHINE CO.
CAMBRIDGE 39, MASS.**

THE BLANCHARD MACHINE COMPANY

64 STATE STREET, CAMBRIDGE 39, MASSACHUSETTS, U.S.A.

FREIGHT ADDRESS: BOSTON, MASS.

Cable Address: BLANCHMACH

Codes Used: WESTERN UNION, LIEBERS

BLANCHARD GRINDING

THE Blanchard method of machining and finishing flat surfaces has such broad application that Blanchard Grinding should be considered for machining any flat surface, unobstructed by projections, requiring better finish or accuracy than would result from a roughing cut.

Continuous development of the Grinders and Wheels has extended the field of Blanchard Grinding to new materials, closer limits and finer finishes. The materials ground include the usual ferrous metals; many non-ferrous metals such as aluminum, magnesium, copper, brass and bronze; also glass, carbon, plastics, and minerals such as quartz, agate and sapphire. Extremely close limits of size; flatness that is best measured with an optical flat and finishes measuring only a few micro-inches, are all obtainable by Blanchard Grinding.

There are several advantages in using a Blanchard Grinder for machining flat surfaces.

Accuracy is readily obtained because the compact and rigid construction of our Grinders gives the necessary support to the wheel and the work. The three-point column support provides for maintaining correct alignment throughout the life of the Grinder.

Production is high, both as measured by the time of grinding a chuck load of work and by the daily or

weekly output of a variety of work. Magnetic chucking is quick and reduces idle machine time when changing jobs. Most work, whether magnetic or not, is held either directly or indirectly by magnetism. Some work requires fixtures, which are usually simple and quickly operated.

Operation is easy because the Grinder is simple and has conveniently located controls that require no effort.

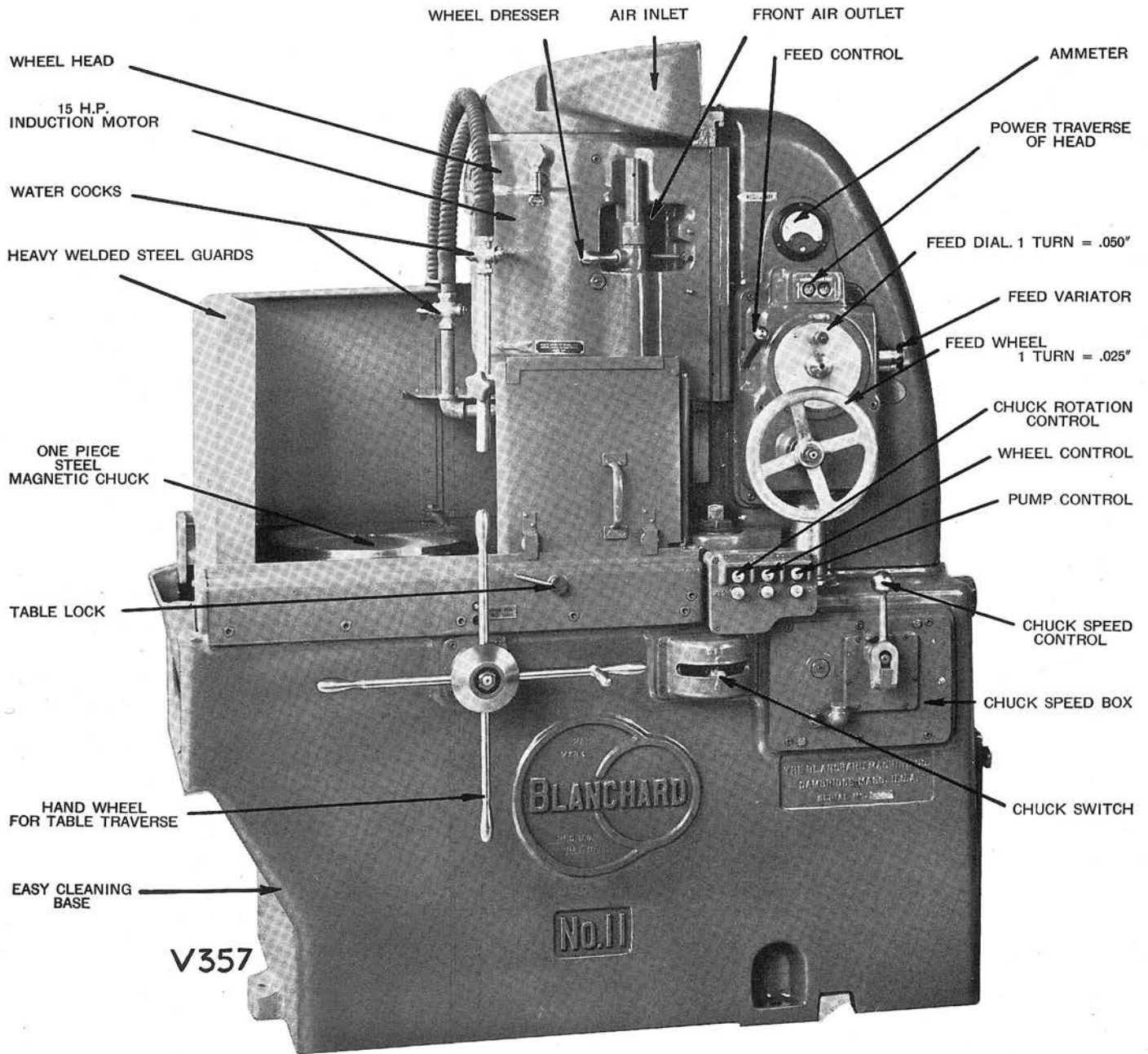
Blanchard Grinders are exceptionally durable machines, able to deliver full production for long periods of time, at a minimum maintenance cost.

Our organization has specialized in the design, building and application of Blanchard Grinders for forty years and stands ready to help our customers obtain full value from their investment. Our accumulated experience is available to engineer the applications of Blanchard Grinding and to follow up in the field with expert service.

This catalog describes the No. 11 Grinder, a generally used size and type of Blanchard Grinder. Other Blanchard Surface Grinders are the Nos. 18; 27-48; 32-60; 36-60; 42-72; 42-72-84, and the Automatic Grinders Nos. 16-A, 16-A2, and 22-A with from one to five spindles.

THE BLANCHARD MACHINE COMPANY

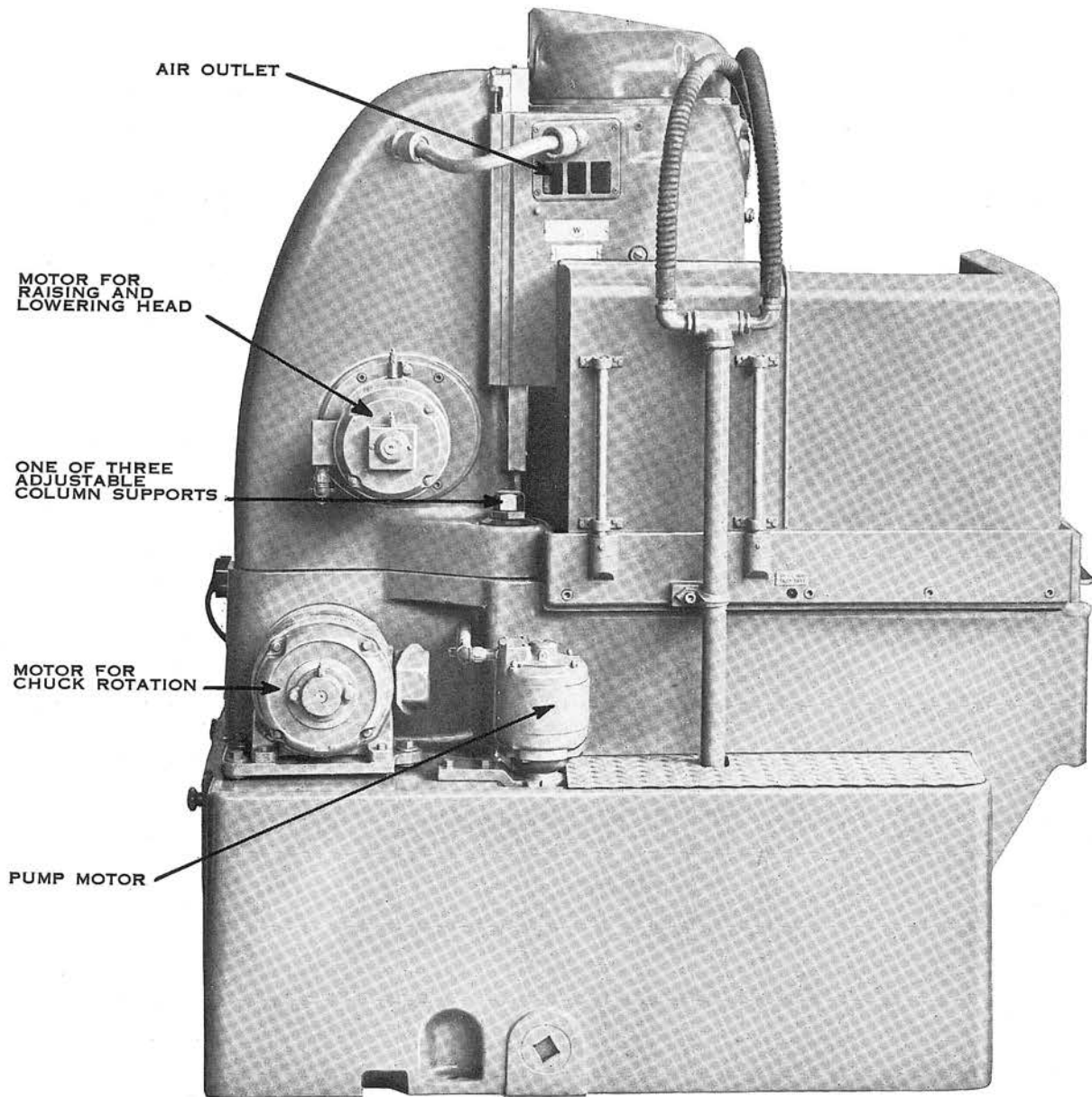
BLANCHARD NO. 11 GRINDER



Front View

THIS is the operator's side of the machine, with the guards open and the chuck in the loading position. In this view the head is near the upper end of its travel. Note the close grouping of controls, all conveniently near the operator.

BLANCHARD NO. 11 GRINDER...



Rear View

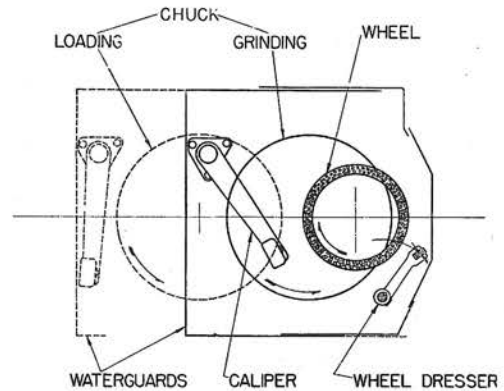
THIS is the rear side, showing the three small motors and the piping for the coolant.

BLANCHARD NO. 11 GRINDER . . .

Operation

THE piece to be ground is simply laid on the rotary magnetic chuck, and the switch closed, magnetizing the chuck, and holding the work securely in place. The operator then traverses the chuck horizontally until its center is under the face of the cylinder wheel. In this position, the chuck is rotated continuously. The water inside the wheel is turned on, and the wheel head can be fed downward, either by hand or power, until the work has been ground down to size. Size can be easily and closely controlled in any one of three ways: 1 — By setting the automatic feed stop from a previous load of work which has been correctly ground; 2 — By using the Blanchard Caliper Attachment; or 3 — By grinding down to a coppered or painted size block. When grinding is completed, the wheel head is quickly raised by power, the water turned off, and the chuck traversed back to loading position.

The horizontal traverse of the chuck is not used in grinding, but merely to move the chuck from loading to



grinding position and back. All grinding is done with rotary motion, the metal being removed by a rapid succession of shallow cuts over the entire surface of the work. This is different from Blanchard Automatic Surface Grinders used for quantities of small parts, in which the entire amount of stock is removed at a single pass.

Grinding Wheel

BLANCHARD GRINDERS use abrasive wheels which are simply hollow cylinders, cutting on one end. A plain cylinder wheel or a segment wheel can be used on the No. 11. Cylinder wheels are set with sulphur in a cast-iron ring which fastens to the face plate on the spindle with six screws. The wheel remains in the ring until it is used up, but six rings are furnished with each machine so that a variety of wheels can be kept mounted, ready for use. Only ten or twelve minutes are needed to change a wheel on the machine, and long experience with this method of mounting proves it reliable and cheap. For convenience in mounting wheels, your attention is invited to the Blanchard Wheel Mounter shown on page 11 of this catalog.

Blanchard makes wheels for use on Blanchard Grinders. All Blanchard cylinder wheels are reinforced with standardized wire banding. These bands are easily stripped off by the operator as the wheels wear down. They are described in separate circulars, supplied on request.

Diamond wheels are available for grinding extremely hard metals and minerals.

Blanchard wheel rings and quick change wheel holders for Blanchard wheels are machined all over and their balance closely checked.

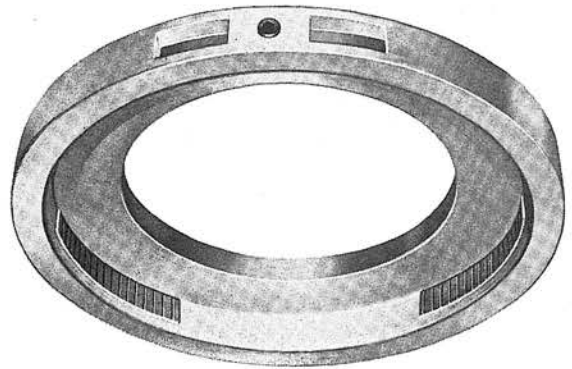


Cylinder Wheel

BLANCHARD NO. 11 GRINDER

Solid Wheel Holder

THIS solid wheel holder eliminates the use of wheel rings and sulphur to mount cylinder wheels. The wheel holder provides the advantage of rapid wheel changes, and is especially useful when the grinder is on production work, or where a variety of work requires frequent wheel changes.



Wheel Dresser

BECAUSE the motion of the wheel and chuck generates a true, flat surface on the work, regardless of the shape of the wheel face, the Blanchard grinding wheel needs no truing. Also, as long as the wheel wears normally, it will remain sharp. When natural wear is not sufficient, the dresser built into the machine will quickly sharpen the wheel.

The actual dressing is done by a group of toothed steel cutters on an arm at the bottom of a vertical bronze shaft mounted in the wheel head. It is operated by a handle that swings the cutters across the wheel surface. Micrometer adjustment for height is secured by a hand nut, just above the operating handle.

Spindle

THE spindle is mounted on two anti-friction bearings which are preloaded to remove all backlash from the spindle. Both bearings are oversize for the loads they carry, and the spindle is 3 inches in diameter for most of its length. The

heavy face plate is keyed on the spindle nose and secured by a large nut. Each bearing has its own oil circulation system and is thoroughly enclosed for protection from dirt and water.

Direct Motor Drive

ORIGINATED by Blanchard in 1914, direct motor drive does away with all belts or gears, delivering 100% of the motor power to the spindle. The electrical parts of the motor are built right into the wheel head, the rotor on the spindle and

the stator in a bore in the wheel head, obviously the most simple and efficient drive for a vertical grinder spindle. The motor is cooled by air drawn in at the top of the wheel head and expelled from an opening on each side of the

BLANCHARD NO. 11 GRINDER . . .

wheel head. The standard motor is a 15 HP induction motor, 1200 RPM, for 60-cycle current, either 2 phase or 3 phase. The same size motor is available for 50 cycles or 25 cycles, running 1500 RPM while oversize motors can be supplied at extra cost, up to 20 HP on 60 cycles.

Chuck rotation is driven by its own totally enclosed motor, coupled to gear box. The wheel head is raised and lowered by a torque motor, and the water pump is driven by its own direct connected motor. Without a belt of any kind, the No. 11 Blanchard is truly direct motor driven.

Wheel Head

THIS is a massive casting, bored to receive the lower bearing unit, the direct drive spindle motor and the upper bearing unit. It has air outlets both at the front and the back, with

good-sized passages to circulate air through the motor for cooling. The slides are square, with three taper gibs.

Column

THIS member is of heavy box section, rigidly supported at three widespread points on the base. It carries the wheel head on square slides, the feed screw bearing in a heavy

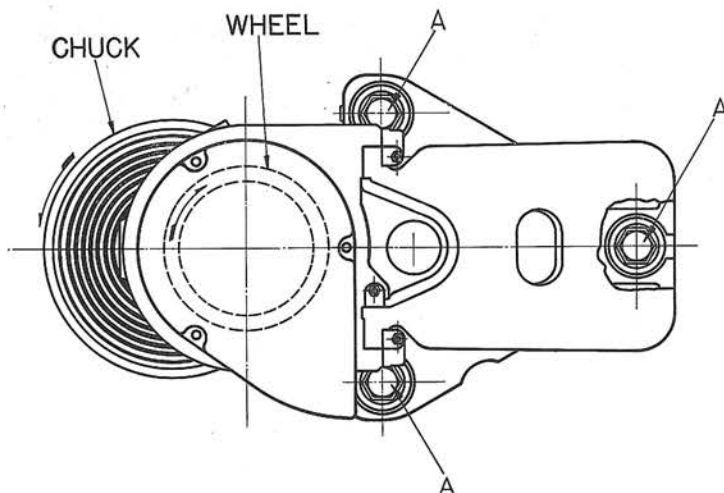
boss between the slides and the feed gear box. The torque motor that raises and lowers the head is flange mounted on the rear side of the column.

Alignment

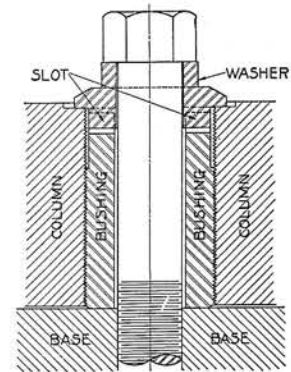
BECAUSE the heavy box-section column is rigidly *but adjustably* secured to the base at three widely separated points, it is easy to bring the spindle square with the chuck at any time — and regardless of wear in the bearings and slides. An old Blanchard Grinder can be lined up as true as a new

machine in a few minutes by adjustment with the wrenches furnished.

Close connection of head and column is desirable. Placing the adjustment at the base of the column makes it easily accessible and avoids unnecessary joints between head and column.



Plan of 3-point Column Support



Section Through One Support Point

BLANCHARD NO. 11 GRINDER....

This same three-point column support makes it easy to tilt the spindle for concave or convex work. The adjusting washer at the rear point is graduated to make it easier to

duplicate settings for grinding such work as circular saw blades or attrition mill plates.

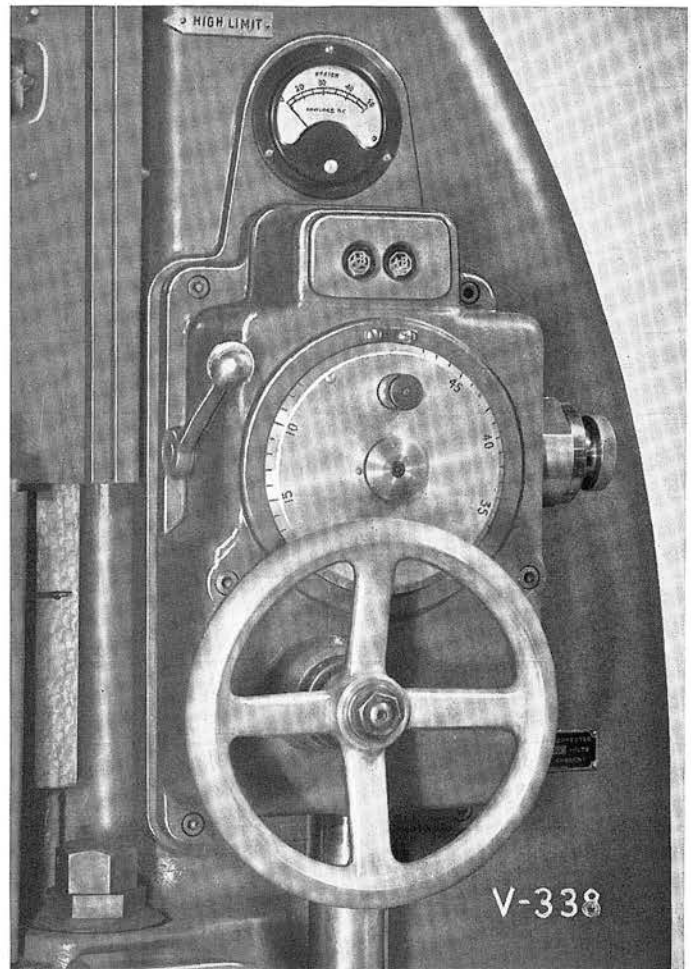
Feed

THE wheel head is supported on a heavy feed screw mounted in ball bearings in the column and geared to a large graduated dial on the feed gear box. One revolution of the dial is .050" feed of wheel head. This dial carries the feed trip and is arranged to unlock easily from its shaft for setting the zero point and trip.

The hand wheel in front of the dial makes one turn for .025" feed of wheel head.

The power feed may be varied from .003" to .070" per minute and is engaged by pulling down the lever at the left of the box into horizontal position and is disengaged either by pushing the lever upward — or automatically by the feed trip on the dial. This trip is a breaking-toggle mechanism, giving a quick and complete disengagement of the pawl from the ratchet wheel. Push buttons directly over the dial operate a totally enclosed torque motor for rapid raising or lowering of wheel head. The feed lever is interlocked so this rapid motion cannot be used with the feed engaged.

The dial is graduated to half thousandths, a distance of about $\frac{1}{16}$ " on the dial being one thousandth. The feed variator knob is graduated and numbered for feeds from .003" to .070" per minute by steps of .006". Directly over the feed gear box is an ammeter which shows the power being used by the wheel. This is a useful guide for rate of feed and dressing of wheel.



Feed Control and Built-in Ammeter

Base

IT is not necessary to provide a foundation for the No. 11 Blanchard Grinder; the machine will grind accurately on any floor that will support it as the base is heavily ribbed for stiffness and rests at three points on the floor.

The base is a one-piece casting which carries the column and the sliding table, which in turn supports the magnetic chuck. It also serves as the tank for 75 gallons of coolant.

BLANCHARD NO. 11 GRINDER

Work Table

THE work to be ground is held on a rotary magnetic chuck. This chuck is carried in a table body, sliding on the base. The work is simply laid on the chuck, and held magnetically, or in the case of a large ring, it may be merely centered by a plug or stops, and not otherwise held. By means of the pilot wheel the table body, carrying the chuck, is moved along the base to bring the center of the chuck just under the near edge of the wheel. In that position the chuck is rotated by power continuously in one direction, and the wheel head fed gradually downwards until the desired amount of metal has been removed. The chuck is then moved out again, clear of the wheel, and the work

removed. All grinding is done with the chuck rotating in a fixed position — the sliding motion is only for bringing the chuck clear of the wheel for handling work. The grinding and the loading positions are clearly shown in the diagram on page 4.

The chuck can be rotated by power in any of its positions. This permits grinding pieces with a central projection, or small pieces laid radially, with projections above the ground surface at their inner ends, as the chuck need be moved under the wheel only far enough to reach the surface to be ground.

Rotary Work Motion

THE rotary motion used for Blanchard Grinding has the following advantages:

1. The high work speed gives good wheel action and prevents overheating.
2. The continuous circular group of work, revolving constantly in one direction, has no "end pieces," keeps the

wheel working all the time, and as all pieces receive the same treatment, they are uniformly accurate.

3. Mechanism and bearings are simple, rugged and well protected.
4. No attachment is required for circular work.
5. Small floor space with no overhanging parts.

Magnetic Chuck

THE chuck body is made from a solid disc of forged steel in which are machined on one side large concentric grooves to receive the coils, and on the other side numerous small grooves which are later filled with hard brass strip. Thus a continuous layer of steel extends under the entire face of the chuck, absolutely preventing any water from leaking into the coils.

The coils are form wound, impregnated with an insulating compound and are sealed in place, making a solid chuck, with no air spaces.

The working face is composed of steel and brass in alternate rings. So close is the spacing of the steel poles that a piece of work as small as a five-cent piece will touch two or more poles, no matter where placed. This chuck will hold large or small pieces equally well. Once ground true it will remain so, much longer than chucks having cast iron and soft metal in the face. There is no soft metal in the face to charge with grit and scratch the work.

The Blanchard Chuck is very powerful and holds securely small, rough castings and forgings, making it possible to

BLANCHARD NO. 11 GRINDER

chuck magnetically much work that on other machines would require fixtures. Owing to the close spacing of poles, it is not necessary to provide perforated plates for locating any but the smallest work.

Experience with thousands of these chucks has shown that they stand up under the most severe service. The chuck for the No. 11 Blanchard Grinder is 16" in diameter. Detailed specifications appear on page 12.

The chuck is supported on a large flat bearing, and is

centered by a short hub. The flat bearing and the lower end of the hub are submerged in oil. The bearings are thoroughly protected from water and dirt, as are also the contact rings and brushes.

The chuck circuit is wired completely, so that when installing this machine it is only necessary to connect the DC circuit to the chuck switch box, which takes ½" conduit.

Chuck Speed Box

THE chuck is driven through a four speed sliding gear box by an enclosed motor coupled to the gear box. No clutch

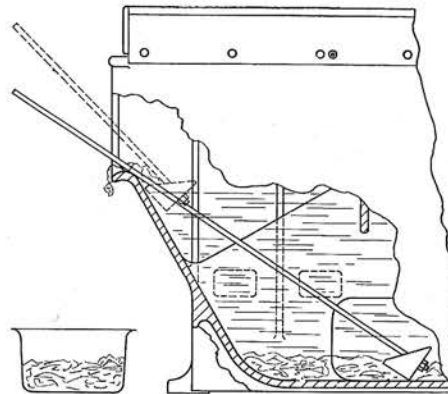
is used, the motor being started and stopped by push buttons on the front of the machine.

Water System and Guards

A MOTOR driven centrifugal pump supplies coolant to the inside of the grinding wheel and also directly to the work. All water and chips drop from the table directly into the large base tank which has a capacity of 75 gallons. This has an inclined surface at the open end, and by lifting off a small steel guard pan, the chips can be removed easily with a hoe supplied with each machine. The illustration on this page shows how easily the tank is cleaned.

The water guards open at the operator's side of the machine when the table is run out to the loading position. The table carries the end guard with it and the operator slides a small front guard a short distance to the right to provide the rest of the opening, which is over 20 inches wide. The guards confine the splash and spray very effec-

tively but allow clear view of the work and ample clearance for loading, either by hand or crane.



Electrical Controls

ALL starters and protective relays for motors are mounted in the rear of the base, completely wired to motors and push buttons. Only one connection to power circuit is necessary when installing. Each motor has overload and undervoltage protection and the motor which rotates the

work is interlocked to stop when the grinding wheel motor stops because of overload. Disconnect switch and fuses are not included with the machine. Push button circuits are 110 volts.

BLANCHARD NO. 11 GRINDER.....

Maintenance and Lubrication

ALL parts of the Blanchard Grinder are designed for continuous service under manufacturing conditions.

Throughout the design of the Blanchard Grinder special attention has been given to protection and lubrication of working parts so as to insure durability and to reduce maintenance costs.

All important bearings have oil reservoirs and while it is best to check the oil level daily, these reservoirs hold enough oil for several days' operation.

The spindle and chuck bearings are fully protected against dirt and water.

Taper gibs running the entire length of the head make it easy to adjust for wear, and the three-point support of the column provides an easy way to correct the spindle alignment. Due to this feature the initial accuracy of the machine can be maintained without rescrapping or fitting slides. This greatly increases the useful life of the machine, and saves maintenance.

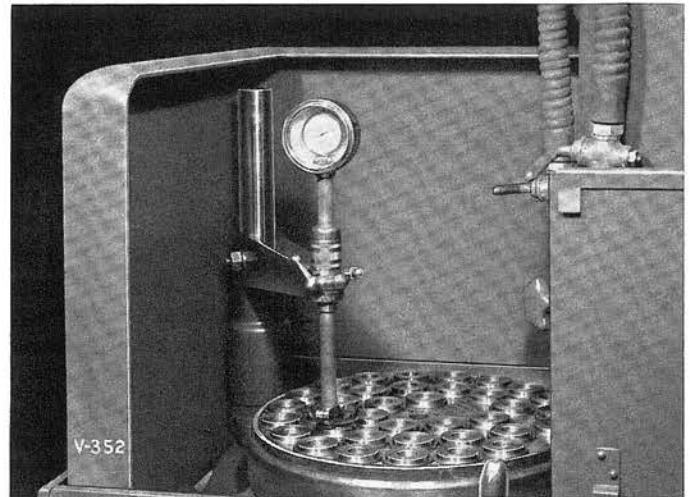
Caliper Attachment

THE Blanchard Caliper measures work accurately while on the chuck and during grinding. The dial is set to zero with contact button resting on a size block or finished piece of work. When set, the Caliper will indicate in thousandths of an inch the amount by which pieces passing under the contact button exceed finished size, and will read zero when finished size is reached. On most work, the reading can be taken without interrupting the grinding, as the contact button is shaped to ride easily over the edges of openings in the work or over the gaps between pieces.

The No. 11 Caliper measures work up to 8 inches high on the 16-inch chuck. It swings out of the way into the corner of the water guard.

SHIPPING DATA

| | | | |
|--------------|-----------|------------------|------------|
| Net Weight | 55 pounds | Box Size | Cubic Feet |
| Gross Weight | 70 pounds | 1'8" x 1'5" x 7" | 1½ |



Sample Grinding

You are welcome to see samples of your own work ground at our shop. There is no charge for grinding reasonable quantities of samples; we ask only that you pay transportation. Please send blueprints and full information as to

requirements with the samples, in order that we may study the job before demonstration. Samples accompanied by complete information as to dimensions, limits, finish desired and any special requirements will be promptly ground and

BLANCHARD NO. 11 GRINDER . . .

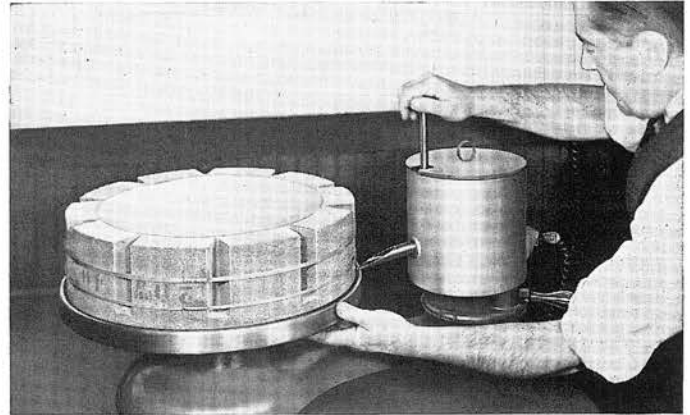
returned with our report. Enough pieces of a kind should be sent for a fair test. We should have enough small pieces to load the 16-inch chuck at least twice; of larger pieces, to be ground one at a time, at least three pieces, preferably six.

When samples cannot be sent, we make reliable estimates of production from blueprints if we have full information as to material; condition when it comes to the grinder;

amount of stock to be removed from each surface; limits of size, parallelism, flatness; and quantity to be produced hourly. In making such estimates it is helpful to have a sample of the work before grinding. An operation sheet, showing the sequence of operations on the piece, is also very helpful and may enable us to suggest a reduction in the number of operations by the use of Blanchard Grinding.

Wheel Mounter

EXPERIENCE shows that sulphur (trade names: lump brimstone; stick sulphur) is the best material for mounting Blanchard Wheels. The Blanchard Wheel Mounter consists of a sulphur pot heated by electricity, with valve and spout for running the sulphur into the wheel ring, and a turntable for supporting and rotating the ring and wheel. The turntable shown takes the 10-, 11-, 16- and 18-inch sizes of Blanchard Wheels, and by substituting a larger turntable, the same Mounter takes 27-inch and 30-inch Blanchard Wheels. A thermostat in the pot controls the temperature, which for best results should not much exceed 290°F. At higher temperature sulphur becomes very thick and is difficult to pour.



For use on AC only, 110 or 220 volts.

SHIPPING DATA

| | | | |
|--------------|------------|-------------------|-------------------------------|
| Net Weight | 104 pounds | Box Size | Cubic Feet |
| Gross Weight | 135 pounds | 3'0" x 1'6" x 10" | 3 ³ / ₄ |

Adjustable Gap Demagnetizer

THIS demagnetizer produces an intense alternating magnetic field between its poles to demagnetize articles which are placed in the gap and slowly withdrawn. Heavy high-speed tools are completely demagnetized in a few seconds.

The non-magnetic metal tray or shelf supports the work and protects the demagnetizer from water and dirt.

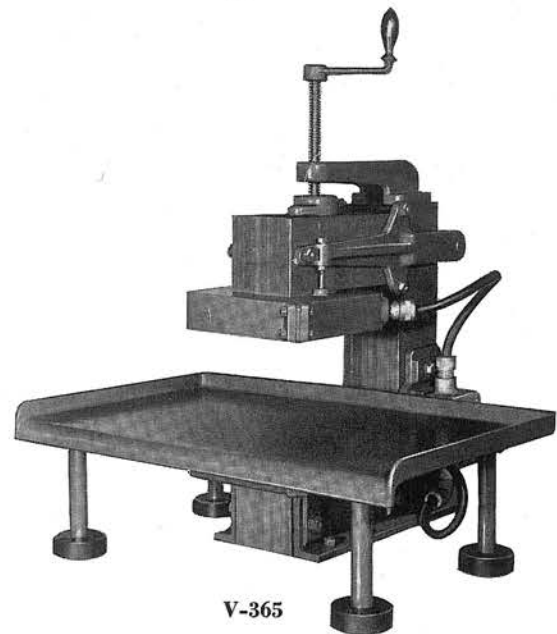
The gap is adjustable from 1" to 6". A larger gap, also heavier coils for difficult materials such as Alnico, can be supplied to order.

The current is turned on and off by a contactor controlled by a knee-operated button. This insures the current being off except when the demagnetizer is in use.

The demagnetizer is usually wound for use on 110 volts or 220 volts, 60 cycles, single-phase alternating current, but can be wound to order for other voltages.

SHIPPING DATA

| | | | |
|--------------|------------|--------------------|------------|
| Net Weight | 325 pounds | Box Size | Cubic Feet |
| Gross Weight | 435 pounds | 2'4" x 1'7" x 2'7" | 9 |



V-365

BLANCHARD NO. 11 GRINDER

No. 11 Specifications

(AC DIRECT MOTOR DRIVE ONLY; NOT MADE FOR BELT DRIVE)
 RANGE: 20" diameter x 8" high over 16" chuck with new cylinder wheel or with Blanchard Segment Wheel.

WORK TABLE: BLANCHARD ONE-PIECE STEEL MAGNETIC CHUCK, 16" diameter with 1/2" pole spacing, 3/4" center hole, four 3/8" tapped holes for securing stops or fixtures. Chuck uses DIRECT CURRENT ONLY, 110 or 220 volts, 132 watts required, 1.2 amperes on 110 volts, 0.6 ampere on 220 volts.

NOTE: Where direct current is not available, a 1/8 K.W. generator is ample for one chuck on either voltage, but if additional machines are anticipated, a 1/4 or 1/2 K.W. generator costs but little more and the capacity will be available when needed.

WHEEL: 11" diameter, 5" deep, 1" thick (11" x 5" x 9") wire banded cylinder wheel (usable depth 4 1/4").

SPEEDS: WHEEL: 1200 RPM on 60 cycle, 1500 RPM on 25 and 50 cycle (uses wheel 10" x 4" x 8"). CHUCK: Four geared speeds, 15, 24, 41, and 64 RPM on 60 cycle; 12, 20, 35, and 53 RPM on 25 and 50 cycle.

FEED: Vertical down feed by hand or power, dial graduated in .0005" (Dials can be furnished with metric graduations). Power feed variable from .003" to .070" per minute on 60 cycle current (.003" to .058" per minute on 50 cycle) with accurate automatic stop. Maximum down feed before stop operates is .048". Wheel head has rapid raise and lower by power, interlocked with feed.

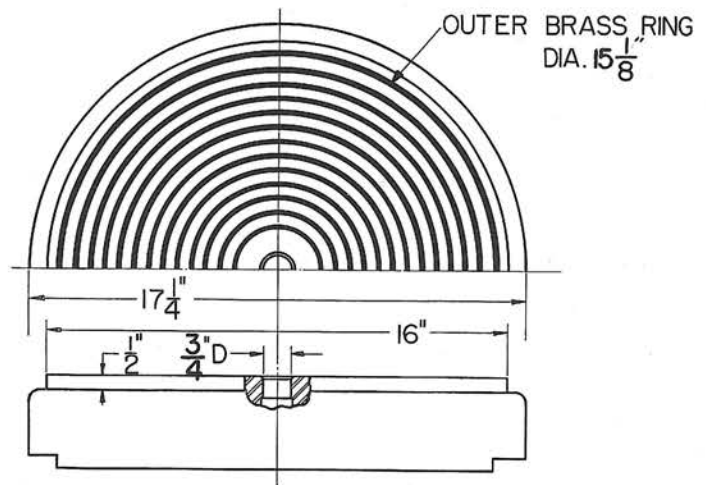
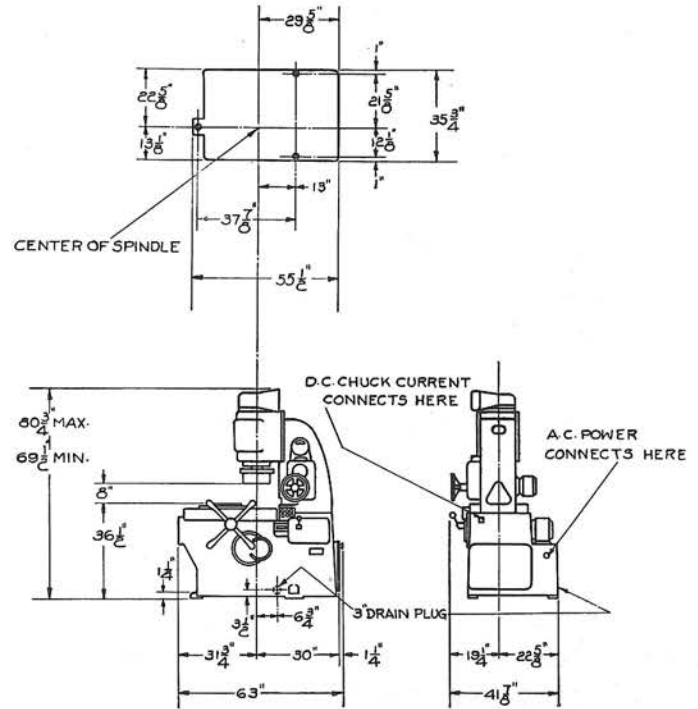
WATER SUPPLY: Easy cleaning tank in base, capacity over 75 gallons. Motor driven centrifugal pump submerged in tank, 16 gallons per minute discharge, supplying water inside the wheel and to outside nozzle through 3/4" pipes.

FLOOR SPACE and HEIGHT: Length 5' 3", width 3' 6". Maximum height 6' 8 3/4", minimum 5' 9 1/2". Height of chuck from floor 36 1/2". See line drawing for other dimensions.

WEIGHT: GRINDER WITH 16" CHUCK AND STANDARD EQUIPMENT NET 5475 lbs.
 Domestic Shipping Weight 6100 lbs.
 Export Shipping Weight 7000 lbs.
 Add for Caliper Attachment NET 45 lbs.
 Export shipment in one case approximately 6' 3" x 4' 3" x 6' 11" high; 175 cubic feet.

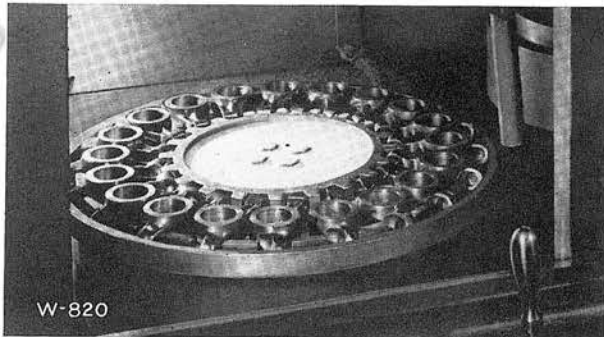
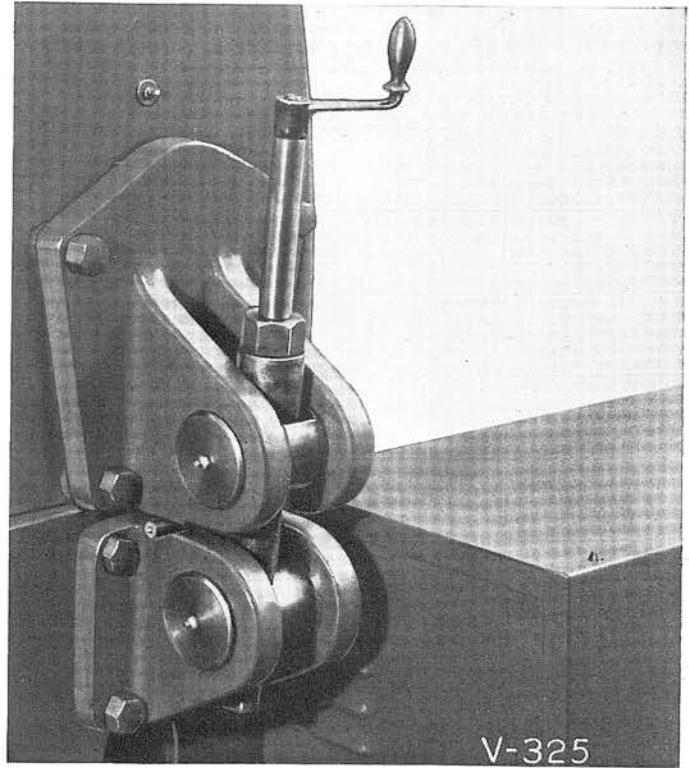
STANDARD EQUIPMENT: 16" Magnetic Chuck with demagnetizing switch, inside and outside chuck rings to hold small work from sliding, 15 HP motor built into wheel head, rotor mounted on machine spindle, ammeter in wheel motor circuit; 1 HP totally enclosed, ball bearing motor for table drive; Torque motor, totally enclosed, ball bearing, for rapid raising and lowering of the head; 1/4 HP totally enclosed, ball bearing motor driven coolant pump. All with push buttons on front of machine completely wired to control panel in base of machine containing starters and protective relays for all motors; 2 grinding wheels, 11" x 5" x 9" mounted in rings, 4 extra wheel rings; wheel dresser built into head; water-guards and piping; hoe for cleaning tank; set of wrenches; and operator's handbook.

The right is reserved to make such changes and improvements as in our opinion may be desirable.



Quick Tilting Device for Concave or Convex Grinding

THE three-point column support (described on page 6) can be modified to provide quick adjustment of one or two points with provision for duplicating the settings. With quick adjustment of rear point only (illustrated) concave or convex surfaces are ground. With adjustments at two points, other shapes of surfaces can be ground, including some truly conical surfaces. Further information regarding concave or convex grinding will be furnished on receipt of drawing, or sample, and full information as to the requirements.

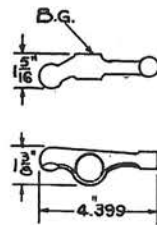


Rocker Arms on No. 11

THESE steel forgings are held directly on the chuck with one end overhanging to allow a projection to clear the chuck. A simple locating fixture consisting of a toothed center and a notched outer ring keeps the pieces in position and prevents any movement that might cause the overhanging part to ride up on the chuck.

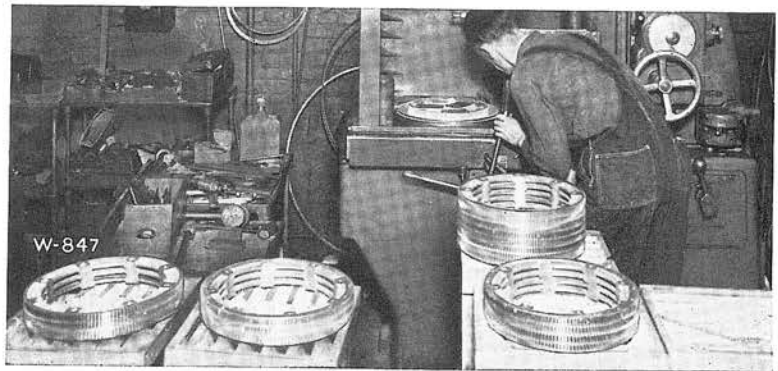
The stock is forged steel and .005" is removed from each side to limits of $\pm .001$ ", parallel .0005". Production is at the rate of 235 pieces per hour.

Brass Ring Gear on No. 11

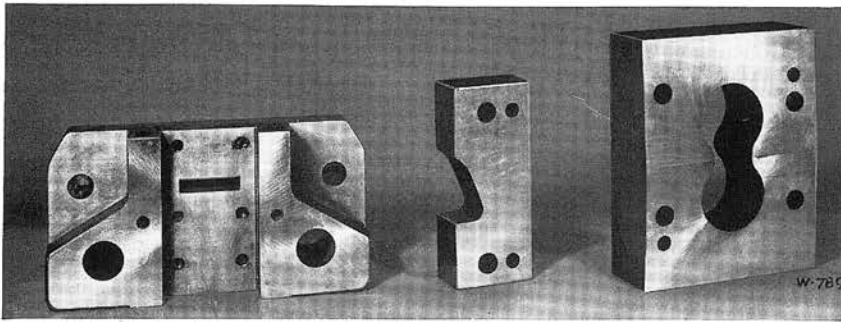


THE sides of these ring gears are ground to improve the parallelism and finish. They are held on the magnetic chuck by means of three steel blocks placed inside the gear and pushed out by hand firmly against the bore. As the wheel is continuously in contact with the work at two points while grinding, no other hold down is needed.

These brass ring gears measure $12\frac{5}{8}$ " O.D. $9\frac{7}{8}$ " I.D. x $\frac{5}{8}$ " thick and .012" of stock is removed from each side to limits of .001" flat and parallel. Two sides are ground at the rate of 7 pieces (14 surfaces, 2 operations on each) per hour.



BLANCHARD NO. 11 GRINDER...



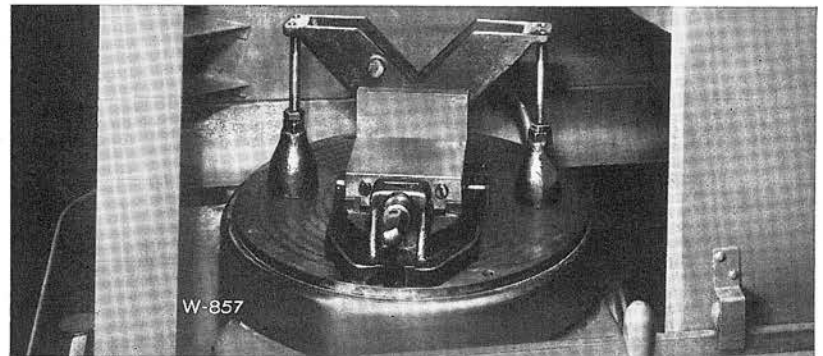
Tool Makers - Die Makers Use No. 11

"EXCELLENT - Fast - Accurate," says this customer after more than a year of tool room service. Jobs like these require only a few minutes each on the No. 11. The cylinder wheel covers the entire surface at every revolution of the work. High work speed and ample supply of coolant eliminate any danger of heating the work. The Blanchard is

a heavy and rigid machine, permitting the economical use of free, soft cutting wheels.

Savings in time and money, and opportunities to release men from grinding to other work, make it logical to install Blanchard Grinders in every tool and die shop.

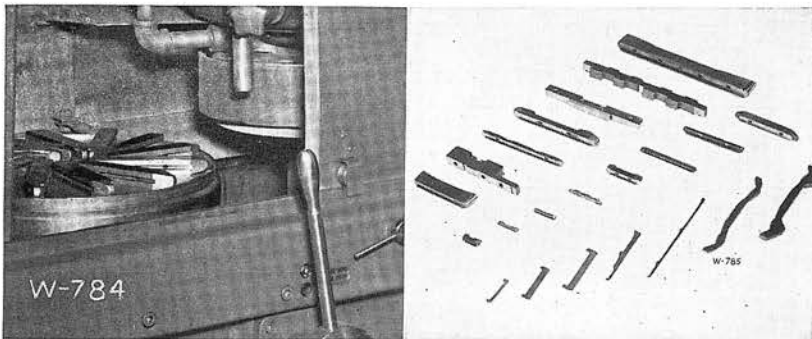
Half Coil Case on No. 11



THIS job illustrates how an awkward shape can be chucked if the quantity does not justify a fixture. The vise and the jacks are magnetically held. If a vise is not available, heavy steel or cast-iron blocks can be used in place of the vise jaws.

Many irregular shapes can be held magnetically by the use of blocks of steel to support and block the work.

These Nomag Cast-Iron Half Coil Cases are $12\frac{1}{4}'' \times 5\frac{3}{4}'' \times 2''$ and $\frac{1}{16}''$ to $\frac{1}{8}''$ of stock is removed per side to limits of $\pm .010''$. Ten pieces are ground per hour.



Variety with Consistent Profits on the No. 11

THE photographs above were taken in the plant of a leading hone manufacturer—here the lots are small, yet tolerances of $+.0000''$ and $-.0005''$ are held with ease. Parts range from 3'' to 8'' in length; $.015''$ to $.020''$ of stock is ground off

each surface; materials are mild steel, Vulcan tool steel and machine steel. This is a typical installation where the No. 11 Blanchard Grinder is earning profits on parts which vary in quantity, length, thickness and material.

BLANCHARD NO. 11 GRINDER

Glass and Quartz Grinding

BLANCHARD SURFACE GRINDERS have made remarkable records of production and accuracy in the optical industry. It is no exaggeration to say that Blanchard Grinding has revolutionized the grinding of flat surfaces on prisms, lenses, reticles and filters.

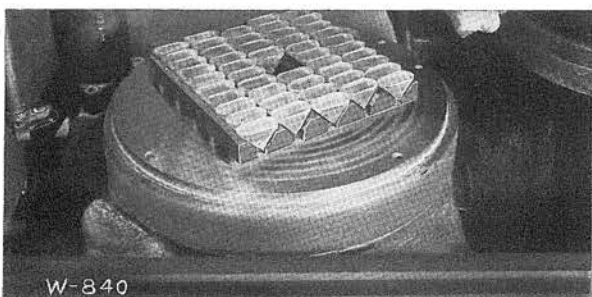
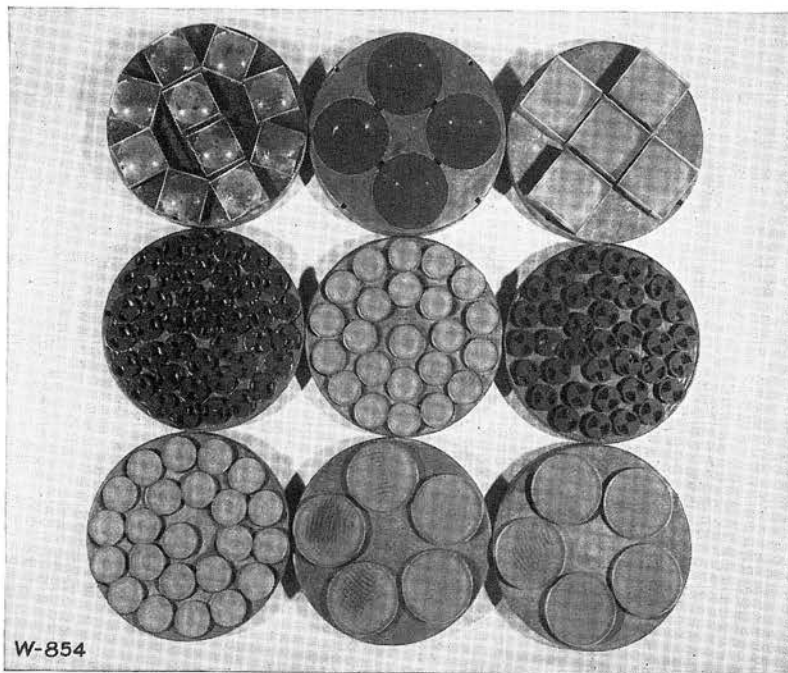
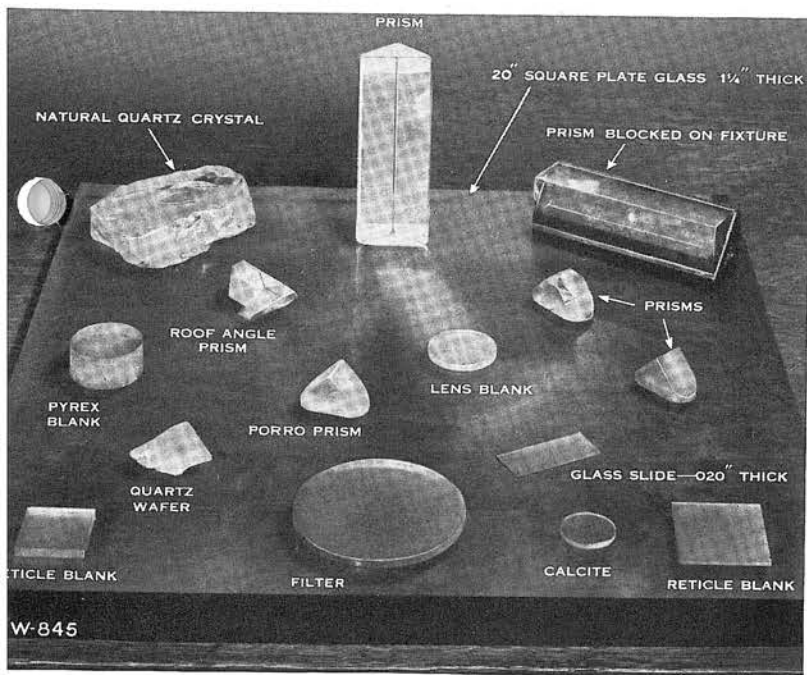
A further Blanchard development is the grinding of quartz wafers, used in radio frequency control, to a finish and accuracy that prepares them for the final lapping, tumbling or etching operation. One machine is said by its owner to have paid for itself in one month, so great was the labor saving.

Other new developments are the grinding of sapphire jewels for bearings, small porcelain parts for electrical apparatus, wafers of silicon and pieces of agate.

These materials are held on magnetic plates for grinding by means of suitable adhesive such as rosin, wax or shellac.

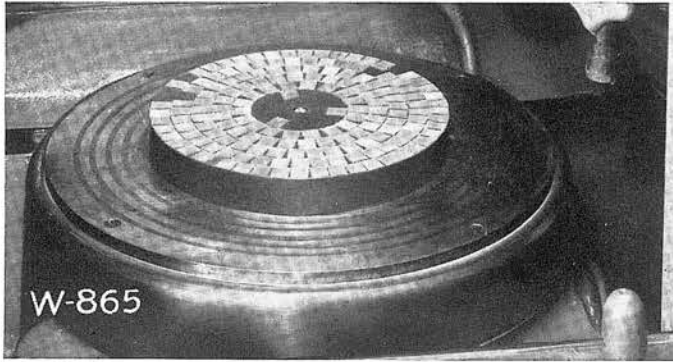
The methods developed for glass are applicable to many other pieces which cannot be held either magnetically or by usual mechanical methods because of their material or their small size.

We invite inquiries regarding the grinding of unusual materials, either metallic or non-metallic.



This photograph shows a fixture load of 48 prisms ready for grinding the hypotenuse. The "V" block fixture is held magnetically on the Blanchard chuck. The grinding time is less than 3 minutes; stock removal .085". A 120 grit diamond wheel is used.

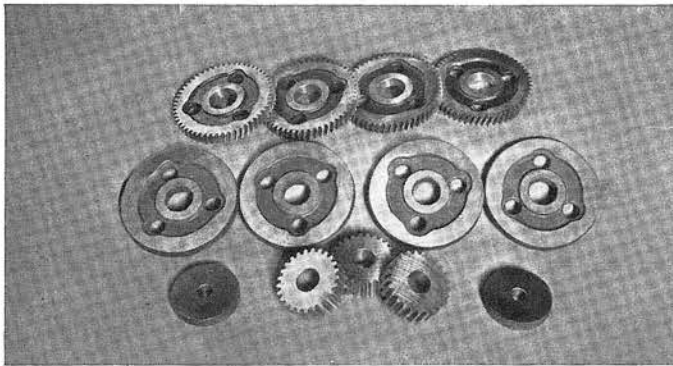
BLANCHARD NO. 11 GRINDER . . .



Quartz Crystals on No. 11

IN the manufacture of quartz crystals used for radio frequency control, the grinding of the parallel sides from the rough sawed surfaces ready for the final lapping, etching or tumbling is best done by Blanchard Grinding. The surfaces produced are extremely flat and any degree of surface finish desirable in this operation is readily obtained.

These quartz crystals are $\frac{9}{16}$ " x $\frac{9}{16}$ " x $.015$ " to $.020$ " finished thickness. The stock removal per side is $.015$ " to limits of $\pm .0005$ ". 800 to 1000 pieces (1600 to 2000 surfaces) are ground per hour.



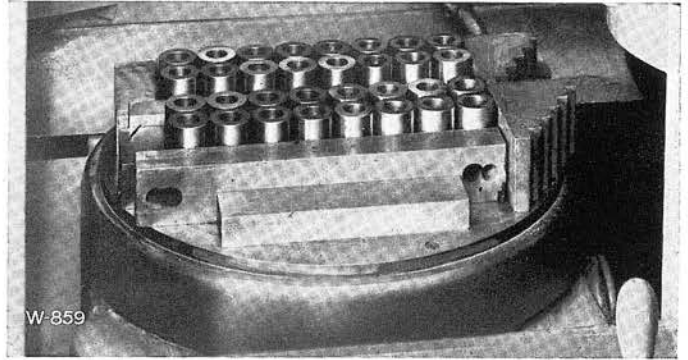
Timing Gears Ground on No. 11

BLANCHARD Grinding of gear blanks insures parallel sides that allow stacking for cutting. The pieces shown are ground

THESE pieces are typical of the work which can be ground to advantage on the No. 11 Blanchard Surface Grinder. If you are anxious to make worth while savings on operations of this character, Blanchard engineers will welcome an opportunity to study your problems and submit practical suggestions for increasing your profits by Blanchard Grinding.

from the rough forgings on both sides, the holes are then bored, blanks are stacked on arbor, turned on O.D. and then cut. If preferred, hole and one side can be machined, then second side Blanchard ground.

The largest pieces shown are 3140 steel and $.012$ " of stock is removed to limits $\pm .001$ ". Forty pieces (80 surfaces) are ground per hour.

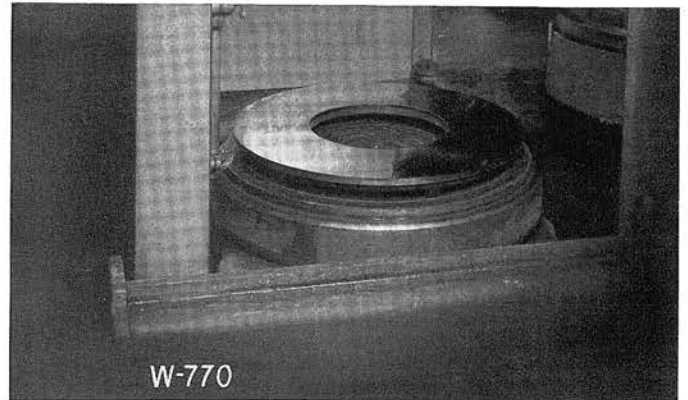


Bushings on No. 11

THESE bushings are held on the magnetic chuck and because of their height, almost twice their diameter, they need to be securely blocked by steel parallels and blocks.

Note that in this, as in so many other setups on the Blanchard, all holding is magnetic and the machine can be cleared for other work in a minute.

Bushings are cast-iron, $1\frac{3}{8}$ " O.D. $\frac{3}{4}$ " I.D. x $2\frac{1}{2}$ " long. Stock removal from two sides is $.010$ " per side to limits of $\pm .005$ ". Production is at the rate of 60 pieces (120 surfaces) per hour.



High Finish on Clutch Pressure Plate



BLANCHARD PRODUCTS

No. 11 HIGH POWER SURFACE GRINDER

No. 18 HIGH POWER SURFACE GRINDER

No. 27-48 HIGH POWER SURFACE GRINDER

No. 32-60 HIGH POWER SURFACE GRINDER

No. 36-60 HIGH POWER SURFACE GRINDER

No. 42-72 HIGH POWER SURFACE GRINDER

No. 42-72-84 HIGH POWER SURFACE GRINDER

No. 16-A AUTOMATIC SURFACE GRINDER

No. 16-A2 AUTOMATIC SURFACE GRINDER

No. 16-A DUAL AUTOMATIC SURFACE GRINDER

No. 22-A SERIES AUTOMATIC SURFACE GRINDERS

**CYLINDER, SECTORED AND SEGMENT WHEELS FOR
BLANCHARD SURFACE GRINDERS**

DEMAGNETIZERS

WHEEL MOUNTER

WASHING ATTACHMENT

CALIPER ATTACHMENT

**MECHANICAL OR MAGNETIC FIXTURES FOR
BLANCHARD GRINDERS**



THE BLANCHARD MACHINE COMPANY
64 STATE STREET, CAMBRIDGE 39, MASS. U.S.A.

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