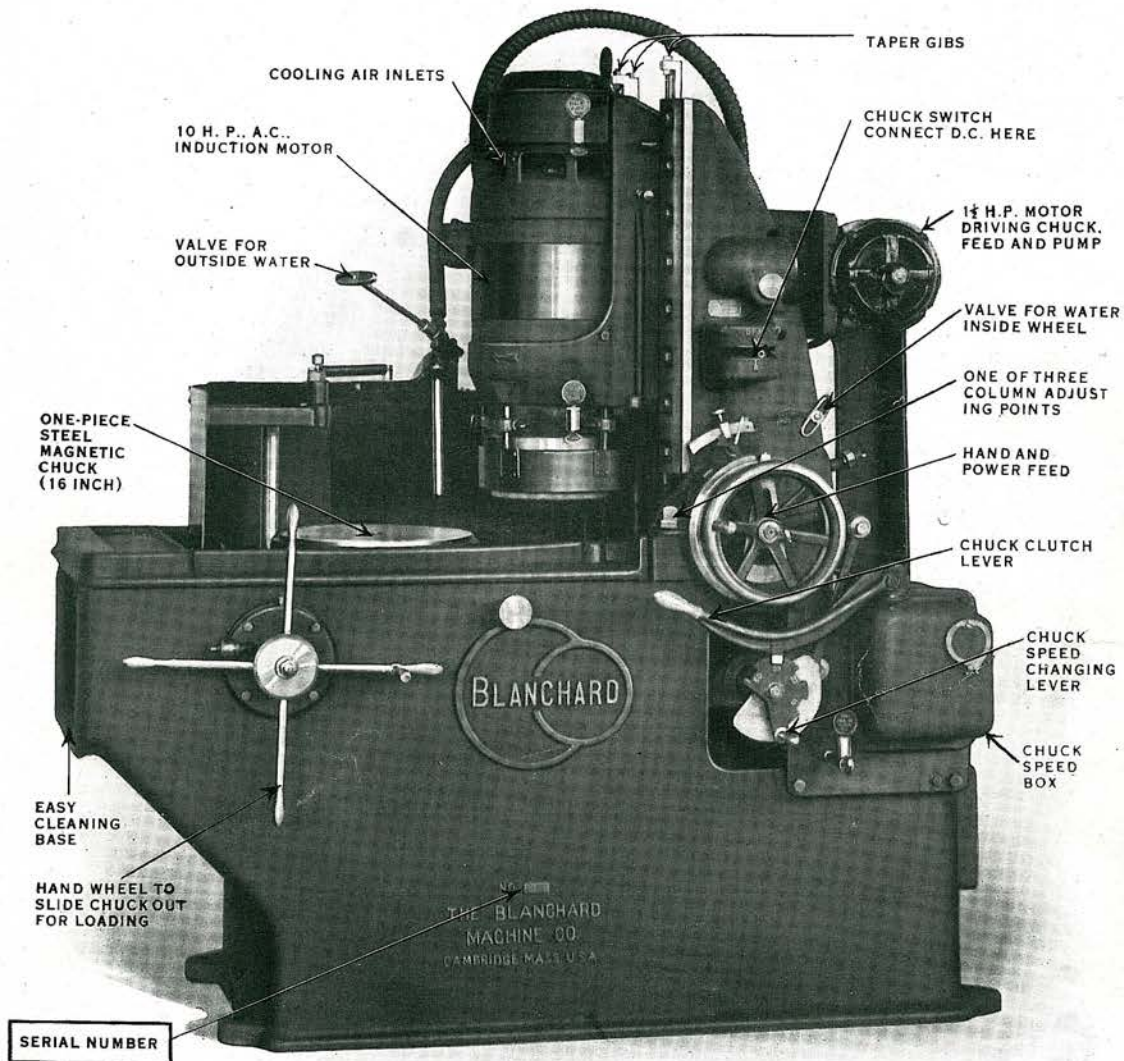


# The BLANCHARD HIGH-POWER VERTICAL SURFACE GRINDER No. 10



Direct Motor Drive Type, Front View  
With Water Guards Open for Placing Work, and Chuck in Loading Position

## THE BLANCHARD MACHINE COMPANY

64 STATE STREET,

CAMBRIDGE, MASS., U. S. A.

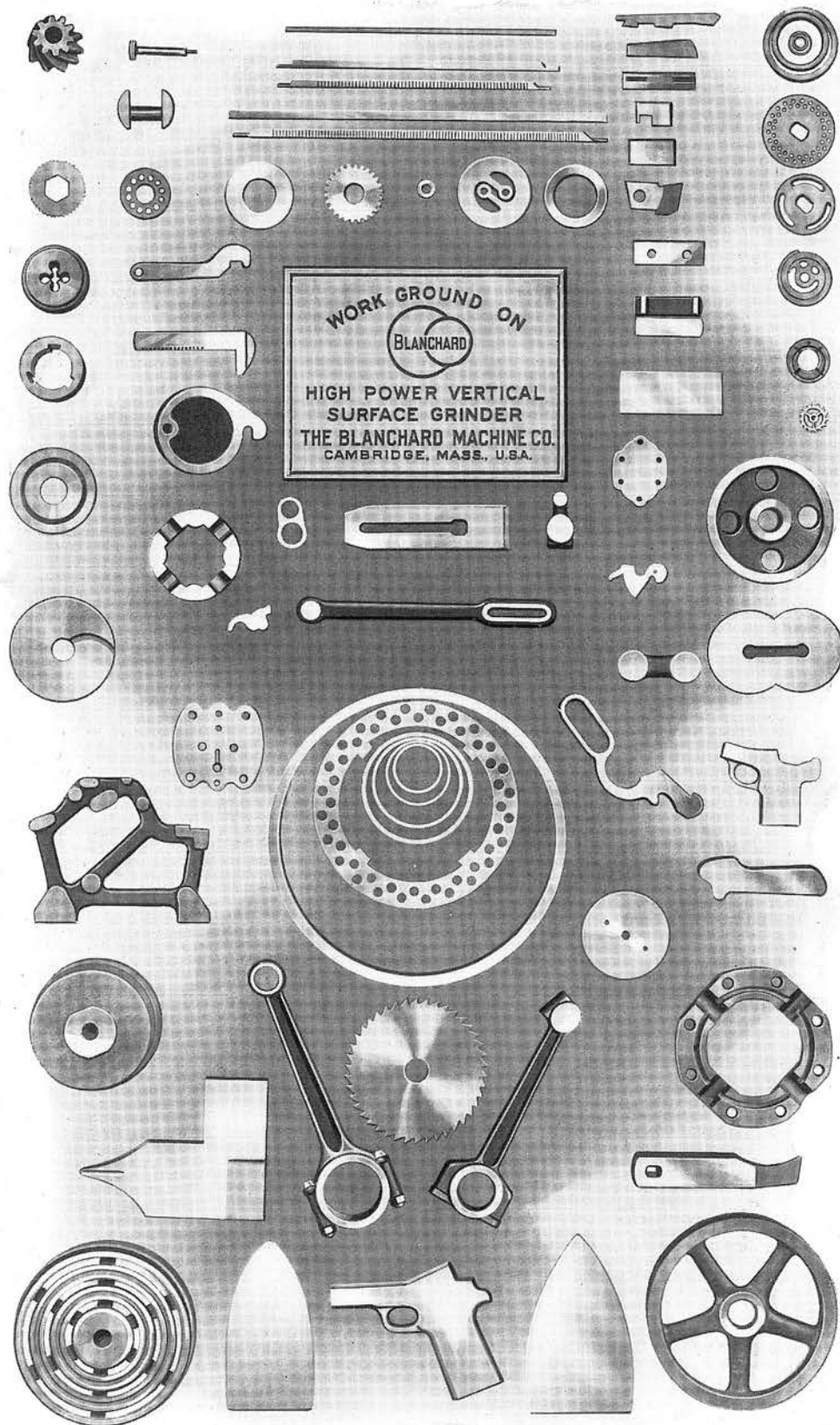
*Codes Used: Western Union, Lieber's*

Cable Address: BLANCHMACH, Boston.

Freight Address: BOSTON, MASS.



Trade Mark, Reg.  
U. S. Pat. Office



**Some of the Smaller Work Machined by Blanchard Grinding**

Note:—These pieces are typical of smaller work machined profitably by either the number 10 or 16. The long tabulating bars near the upper margin and the automobile engine connecting rods are ground only on the number 16 grinder.

**B**LANCHARD GRINDERS are at present built in three sizes: the No. 10 described in this catalogue, a larger size of approximately twice the capacity—the No. 16, and a much larger size of several times the capacity of the No. 16—the No. 27. Descriptive matter of the two latter will be sent on request.

The first Blanchard Vertical Surface Grinder was built over eleven years ago to fill a need in our own shop. It reduced the grinding time on the job for which it was built, to one-tenth of that formerly required. We tried other work, including grinding castings from the rough, and found that on a wide variety of pieces the Blanchard Grinder made substantial savings in cost of machining. Since that time over one thousand No. 16 Grinders have been sold.

The No. 10 Blanchard Grinder is the result of constant inquiry on the part of our customers for a machine embodying Blanchard ruggedness, accuracy and production, of a smaller size than the No. 16. The machine as it stands to-day is our answer to this demand, reached after over four years' work on design, experiment and operation, both in our own shop and those of our customers.

The machine is even heavier in proportion than the No. 16 and embodies all of the outstanding Blanchard features which have made the larger machine so successful in cutting the costs of machining flat surfaces. It has been simplified where its smaller size and weight have made this possible without reduction of efficiency.

### Field of Blanchard Grinding

The name Surface Grinder is almost a misnomer in the case of the Blanchard, for it is making large savings in the machining of pieces which many shop men would never consider surface grinding jobs. It not only grinds rapidly such flat work as is ordinarily done on a surface grinder—dies, tools, gauges, small hardened parts, etc.—but it has much wider use in machining flat surfaces on all sorts of castings and forgings **directly from the rough**. The amount of stock removed per surface varies from a few thousandths up to  $\frac{3}{16}$ " , but is commonly not over  $\frac{1}{8}$ " on iron castings and  $\frac{1}{16}$ " on steel forgings and bars. The size of pieces ground economically on the Blanchard ranges from about  $\frac{1}{2}$ " diameter x  $\frac{1}{16}$ " thick up to the largest casting the machine will swing. The limits of size range from  $+.0001$ "— $.0002$ " to merely cleaning up the surface. The materials ground include not only common metals, but also fibre and fire-brick.

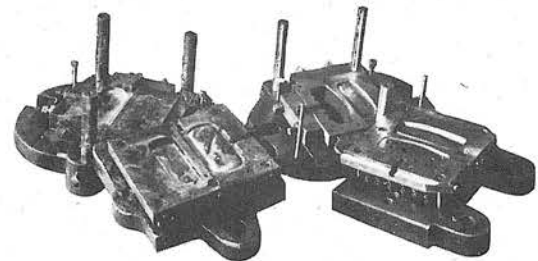
Generally speaking, Blanchard Grinding should be considered for any flat surface unobstructed by projections except where the only requirement is to remove a considerable amount of stock, with no attention to finish or accuracy. In many cases where no particular accuracy or finish is required, Blanchard Grinding is still the most economical method of machining, because of the saving of metal by allowing only enough stock to just clean up the surfaces. This saving is often a large percentage of total material on thin work.

The No. 10 Grinder is especially suited to shops in which

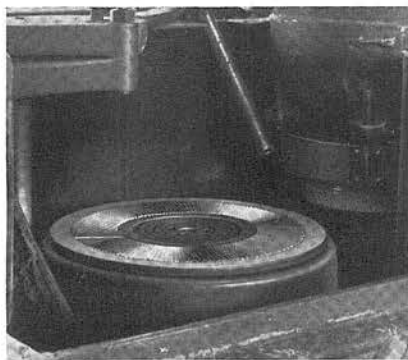
- (1) The quantity of flat work does not warrant the purchase of a larger Blanchard Grinder (either No. 16 or 27).
- (2) Work less than 18" diameter must for any reason be ground one piece at a time.
- (3) Dies, punches, and other small tools are ground in small lots, not enough pieces of the same height being ground at once to utilize a larger chuck than the 16" chuck.

### Advantages of Blanchard Grinding

Accuracy is combined with rapid production; the output per machine and per man is very high; the machine is quickly adaptable to a large variety of work; the expense for fixtures is in most cases entirely avoided; variations in hardness of material affect production but slightly if at all, and can never cause breakdowns; the stock allowed for finish can be reduced to a minimum; the operation of the machine is simple and safe.

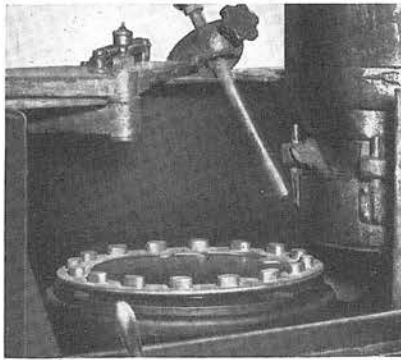


**DIES GROUND ON No. 10 BLANCHARD GRINDER**  
These dies are 6 x 8 inches, and  $\frac{3}{16}$ " hardened steel is removed from one side—the floor to floor time is five minutes apiece. The parts of dies, including cast iron and steel plates, bolsters, etc., are also ground on the Blanchard.



**REAMER BLADES**

Blades for adjustable reamers ground 139 at a time—removing  $.020$ " hardened tool steel from each of two sides to limits of  $+.000$ "— $-.0005$ " at the rate of 3000 pieces (6000 surfaces) in a nine hour day—five and one-half seconds per surface.



**MAGNETO COIL SUPPORT**

This is a typical one-piece-at-a-time job, which in any quantity can be most economically handled on the No. 10 Blanchard.  $\frac{3}{16}$ " Cast Iron is removed from one side at the rate of 45 pieces per hour.



**SIZE BLOCKS**

These blocks, each one presenting a circle  $\frac{3}{16}$ " diameter to the wheel are ground 206 at a time, at the rate of 400 pieces (800 surfaces) per hour, about  $.020$ " soft steel per side is removed by the first grinding. The piece is also ground after hardening.

On some work, Blanchard Grinding from the rough piece replaces both the planing and the scraping. This change from two operations, one of them very slow and expensive, to one quick and definite operation, shows a tremendous saving.

The economy of Blanchard Grinding extends beyond the operation itself. Accurately flat and parallel surfaces are a great help in assembling. Blanchard Ground surfaces fit without filing or scraping. They make oil-retaining joints without the use of gaskets and so ensure better alignment and more accurate center distances. Blanchard Ground surfaces give accurate location for subsequent operations.

The cylinder wheel of the Blanchard Grinder, mounted in the massive head of the machine, and supplied with ample power is capable of removing large amounts of stock. The heat of grinding is distributed over a large part of the surface of the work, and an ample supply of water forced between the wheel face and the work by centrifugal force, absorbs the heat of grinding as it is generated; these two advantages make it possible to grind hardened steel (including hardened high speed steel) very rapidly without danger of overheating the piece; furthermore, castings may be placed on the chuck as they come from the foundry, roughed down to size and finished in one operation.

The wheel and chuck centers remain in fixed positions during the grinding; the strain on the machine frame is constant, and therefore it is not necessary to grind the chuck concave or in any other way allow for irregular grinding due to changing stresses.

The wheel, having its entire cutting face parallel to the work, revolving on the chuck, is always in contact with some part of the work and is therefore not able to drop down and round off the corners on work presenting an interrupted surface to the wheel.

The advantages summed up in brief are as follows:

1. Accurate and rapid work without heating. Even hardened steel is ground very rapidly.
2. Castings ground from the rough.
3. Work uniform from center to outside of chuck.
4. Efficient on rectangular, circular or irregular work; work with an interrupted surface is accurately ground.

The following pages contain description of the details of the machine and under the various headings will be found the advantages gained by the construction described.

Blanchard Grinders are built by high-grade workmen in a clean, well-lighted shop, equipped with modern tools and devoted entirely to building surface grinders. By a thorough inspection system for parts in process, running tests of the separate units, and a final test of the complete machine, we make certain that every machine shipped is up to our standard and ready for service.

When within reasonable distance of our factory an expert operator is sent to instruct customer's workmen.

The accurate and durable construction of the Blanchard Grinder can be best appreciated by visiting our shops where machines can be seen in process of construction and in operation.

All parts of the Blanchard Grinder are designed to stand continuous service under manufacturing conditions. Experience with over eleven hundred machines shows that they do "stay on the job."

## Estimates

Estimates of production will be gladly given. Send us sample pieces or blueprints and the following information:

- |  |   |
|--|---|
| 1. Material.                             | 5. Finished size and limits of variation allowed. |
| 2. Rough or machined.                    | (a) From size.                                    |
| 3. Stock to be removed in grinding.      | (b) From parallel or square.                      |
| 4. Purpose for which finish is required. | 6. Approximate daily output required.             |

## Tests

We are always willing to grind sample pieces, provided enough pieces are sent for a real test. The No. 10 Blanchard Grinder Chuck is 16" diameter and we need enough pieces to fill it at least once, and preferably 2 or 3 times.

Send samples prepaid express or freight (see address below) and mail us at the same time blueprints and the information called for in the preceding paragraph on Estimates. The samples will be ground without charge and returned to you with estimate of production, and other information to enable you to make a fair comparison with your present methods.

Send EXPRESS and MAIL to  
**THE BLANCHARD MACHINE COMPANY**  
 64 STATE STREET  
 CAMBRIDGE, MASS.

Send FREIGHT to  
**THE BLANCHARD MACHINE COMPANY**  
 BOSTON, MASS.

## Description of Operation

A brief outline of the way the Blanchard Grinder operates will help in understanding the functions of its various units.

The work to be ground is laid on the rotary magnetic chuck, and the switch closed. The entire table, comprising the chuck and the sliding carriage, in which it and its driving mechanism are mounted, is then moved by hand (by means of a pilot wheel) horizontally on the base to bring the center of the chuck just under the face of the cylinder wheel. In this position the chuck is rotated continuously, by power, the water to the inside of the wheel is turned on, and the wheel head is gradually fed downward, usually from .001" to .002" per revolution of the work, until the desired size is reached. The wheel head is then raised enough so that the wheel will clear the next load of rough pieces, the chuck rotation is stopped, the chuck is moved horizontally out from under the wheel, and the finished work removed. If the pieces are to be ground on both

sides, they are reloaded other side up and again ground in the same manner.

Notice that the horizontal sliding motion is used only for bringing the chuck clear from the wheel for convenience in cleaning and loading and is not used at all in grinding. Also notice that the metal is removed by a rapid succession of very shallow cuts over the entire surface of the work and not by setting the wheel to its final position and attempting to take all the metal off in one cut.

### Wheel

The wheel is a plain hollow cylinder or ring of abrasive. It is 10 inches O. D., 8 inches I. D., and 4 inches deep, of which all but  $\frac{3}{4}$  of an inch may be used.

The kind of abrasive, the grain and grade, must be varied to suit the work. Two wheels mounted in rings, selected for the customer's work, are included with each machine. Very complete advice on the selection of wheels, and a table showing the proper wheels for all common metals is in the Operator's Handbook, a copy of which is packed with each machine. Additional copies will be gladly furnished on request.

The wheel is mounted in a cast iron ring with sulphur. Six of these cast iron rings are furnished with each machine so that six wheels can be kept ready for use. The wheel is left in its ring until worn out, when what remains can be cracked out, and the ring used again. Changing the wheel, as is necessary in changing from grinding steel to grinding cast iron for instance, is easily and quickly done, as the rings fasten to the faceplate on the spindle with six screws.

Long experience with this method of mounting shows it to be reliable and cheap. By eliminating all clamps all danger of straining the wheel in mounting is avoided.

To reinforce these rather soft and coarse wheels a standard wire banding developed by this company, is furnished by the wheel makers on all Blanchard wheels. Experience shows that it practically eliminates wheel breakage, and this reinforcement is so efficient that a wheel, cracked entirely through in several places, can be safely used until worn out. The wire bands are easily stripped off as the wheel is worn and are so positioned that the wheel is reinforced so long as its depth requires it.

### Wheel Head

The complete wheel head for the Direct Motor Drive machine weighs 700 pounds. The massive proportions of this member are typical of Blanchard construction. Ample weight is necessary to ensure that steady vibrationless support which is essential for proper wheel action.

The Blanchard is not only much heavier compared with other grinders of equal dimensions, but has a larger part of its weight close to the wheel where weight is most effective. The square slides of this member are  $22\frac{1}{2}$ " long.

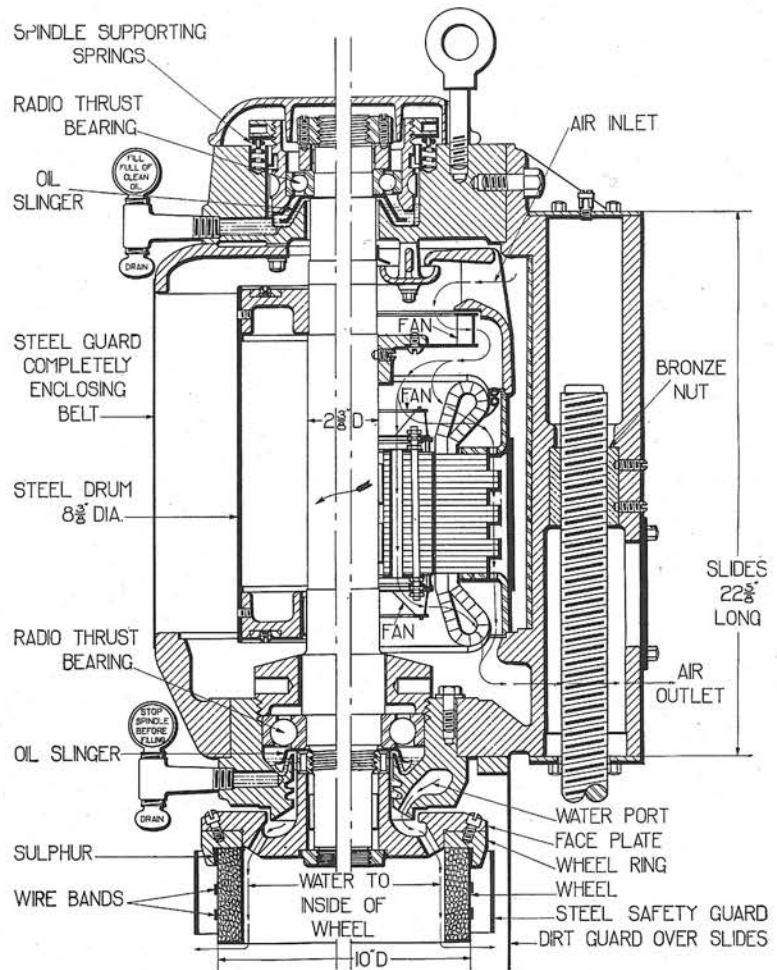
### Spindle

The spindle is made from a .40 to .50% carbon steel forging, and as will be seen in the sectional view, is of generous proportions.

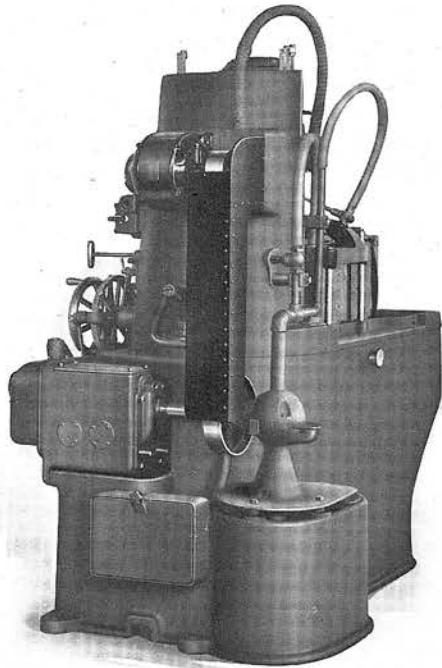
After assembling either the armature (for Direct Motor Drive type) or the drum pulley (for Belt Driven types) on the spindle it is put in a special running balance machine and carefully adjusted to perfect running balance.

### Spindle Bearings

The spindle bearings are two large ball-bearings designed to take both radial and thrust load. The main bearing, next to the wheel is of specially rugged construction (11 one-inch balls taking the load) and both bearings are mounted in the wheel head, making their alignment, relative to each other, independent of the slide. Both bearings run just above oil reservoirs from which they are supplied with continuous jets of oil by centrifugal oil slingers, see cross-section of head above.



This Side Shows Belt Driven Type      This Side Shows Direct Motor Drive Type  
CROSS SECTION HEAD

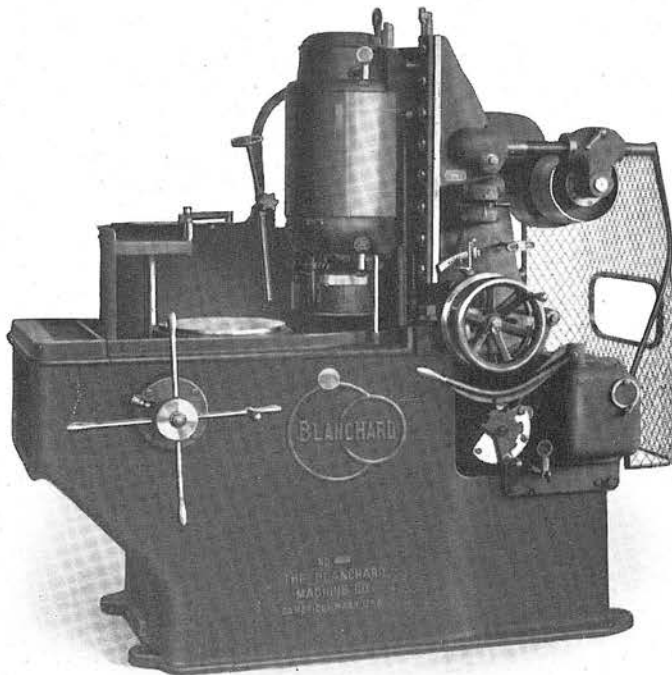


**DIRECT MOTOR DRIVE TYPE**  
Rear View

losses, delivering practically 100% of motor power to the wheel. Only the stator and rotor of a 10 H. P. induction motor are used. The motor is specially designed for this application and is made by either the General Electric Co., or the Westinghouse Electric & Mfg. Co., both of whom are regularly manufacturing these motors for us, for all standard 60 cycle currents. A reference to the right side of the sectional view on page five and to the general views on this page and page one will make the construction clear.

The motor is well ventilated by means of special fans on the spindle (see illustration, page five), which draw air in at the top and force the heated air out at the bottom.

A 1½ H. P. standard open type motor, mounted on the column, drives the chuck, pump, and feed. It starts and stops with the spindle motor.



**BELT DRIVEN TYPE**  
Front View, Water Guards Open for Placing Work, and Chuck in Loading Position

Notice that the sleeve carrying the upper spindle bearing carries a threaded collar with springs beneath, which press up against it with a force exceeding the weight of the revolving parts by at least 300 pounds. By this means, the bearing at the lower end, on which depends the accuracy of the grinding, is always kept tight. All backlash in the spindle is eliminated and variations of spindle length with temperature are automatically corrected.

### Direct Motor Drive

The illustration on the first page, and the one on this page, show the Direct Motor Drive Type of Blanchard Grinder which is built with alternating current motors only.

The drive is very economical of power; is rugged and durable; maintains efficient wheel speed on heavy cuts; avoids expense of maintaining high speed belts; takes up no space outside of machine, and the initial cost is but little more than that of a floor motor drive machine with motor and belt.

We strongly advise the purchase of the Direct Motor Drive Type, rather than the belt driven types, wherever alternating current is available.

Present sales run almost 85% direct motor drive; this in spite of the fact that this drive cannot be used by some of our customers for lack of alternating current.

The Direct Motor Drive is undoubtedly the most simple and efficient drive for a vertical surface grinder. We have not coupled a motor to a spindle, but have incorporated in the wheel head the electrical parts of an induction motor. The rotor is pressed directly on the wheel spindle; thus the spindle and its bearings replace the shaft and bearings of the ordinary motor. This applies the power directly with no belt losses and almost no bearing

### Belted Drives

For shops not having alternating current power the machine is made in three styles of belted drive. These, in the order to be preferred, are:

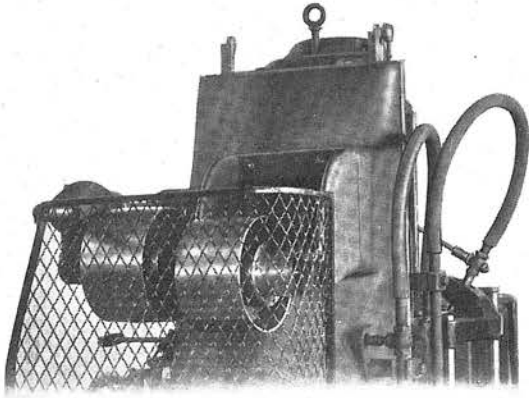
- Overhead Motor Drive
- Floor Motor Drive
- Countershaft Drive

Their wheel heads are all alike and have a steel drum pulley 8¾ inches diameter in place of the motor. This pulley takes a 4 inch double belt, running over suitable ball bearing guide pulleys, from motor or countershaft.

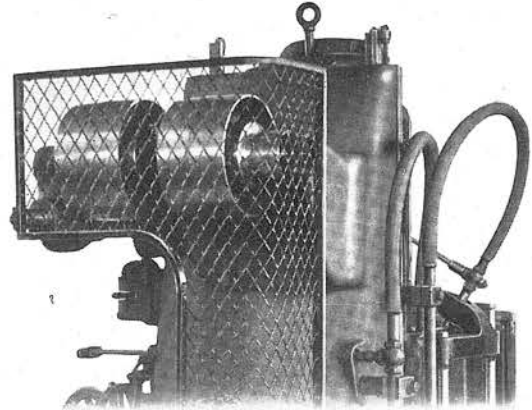
Belted drive machines are exactly alike, with the exception of the form of belt guard used. The idler pulleys, on the back of the column are so designed that they may be arranged for any type of belt drive, as shown on page seven. A substantial countershaft, fitted with Hyatt roller bearings throughout, is included with the countershaft drive machine.

Belted motor driven grinders should be driven by a 15 H. P. constant speed motor.

If it is planned to drive a countershaft grinder from a line shaft driving other machines, care should be taken to make sure that 15 to 20 H. P. will always be available for the grinder—even when all the other machines on the shaft are running under full load.



FLOOR MOTOR DRIVE TYPE



OVERHEAD MOTOR AND COUNTERSHAFT DRIVE TYPE

Showing Pulley Arrangement of Belt Driven Grinders

## Feed

The wheel is gradually fed down upon the work while the latter rotates, usually .001 to .002 inch per revolution of chuck. Both hand and power feeds are provided, the latter having a wide range of feeds, with automatic stop that can be set at any desired point. The feed is exceedingly sensitive and accurate, the wheel head immediately responding to a movement of one tooth on the ratchet wheel, which is equivalent to .0002 inch. The graduations on the wheel indicating thousandths of an inch are  $\frac{1}{2}$  inch apart.

## 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 grinding and the loading positions are clearly shown in the diagram on page nine.

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.

## Advantages of Rotary Motion for Work

### 1. High work speed.

The most used speeds, 22 and 33 R. P. M., are equivalent to 69 and 104 feet per minute; the highest speed 175 feet per minute. This makes possible the rapid removal of metal with a very small depth of cut. This gives good wheel action and no overheating of work even at very rapid rates of grinding.

### 2. Continuous circular group of work, moving constantly in one direction under wheel. There are no end pieces; every piece of work receives the same treatment, and all are uniform in thickness. The wheel is cutting all the time. The forces tending to cause deflection of machine frame are nearly constant, instead of varying from zero to a maximum as is the case with a reciprocating table. This makes possible a high degree of accuracy without sacrificing speed.

### 3. Simple, rugged and well protected mechanism and bearings.

### 4. No attachment required for circular work.

### 5. Small floor space; no overhanging parts.

## Waterproof Magnetic Chuck ; One Piece Steel

Next to the spindle the chuck is probably the most vital part of a surface grinder. The Blanchard magnetic chuck is unique in design and material. It avoids the weak points of other chucks, and has several important advantages.

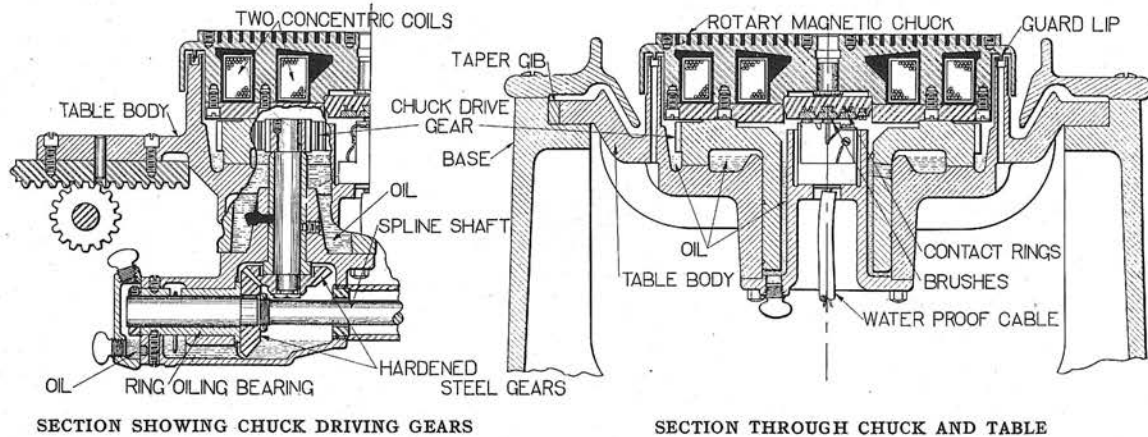
The chuck body is made from a solid disc of forged steel in which are machined on one side large concentric grooves to receive the coils, and on the other side numerous small grooves which are later filled with hard brass strip. This leaves a continuous layer of steel extending under the entire face of the chuck, making leakage of water into the coils an absolute impossibility.

The coils are form wound, vacuum impregnated, and are sealed in place with an insulating compound, making the completed chuck solid, with no air spaces. This eliminates trouble from sweating and does away with the need for ventilation of the chuck.

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 an U. S. one-cent piece will touch two or more poles, no matter where placed. This chuck will hold large or small pieces equally well and once ground true will remain so much longer than chucks having cast-iron and soft metal in the face. Also the annoyance due to grit charging the soft metal and making bad scratches on the work cannot occur.

The Blanchard Chuck is very powerful and holds securely small, rough castings and forgings, making it possible to chuck magnetically much work that on other machines would require fixtures.

Experience with over eleven hundred of these chucks has shown that they stand up under the most severe conditions.



SECTION SHOWING CHUCK DRIVING GEARS

SECTION THROUGH CHUCK AND TABLE

### Chuck Bearings and Connections

The chuck is supported on a narrow, flat bearing  $13\frac{1}{2}$  inches in diameter, and centered by a straight central spindle. The flat bearing surface in the table body is divided into eight sections by radial oil channels ensuring abundant lubrication. Both the flat bearing and the spindle run submerged in oil, the level being shown by a convenient gauge. As will be seen in the sectional view of table the protection against water or grit is very carefully worked out.

The contact rings and brushes for conveying current to the chuck are located inside the table spindle, in a chamber which is sealed by the lubricating oil against the entrance of moisture. Connection from the table to the chuck switch is made with flexible cable, which is waterproof and very durable.

Power for rotating the chuck is taken from a constant speed pulley at the back of the machine through a gear box and thence to the sliding carriage by a shaft that is splined to slide through a hollow shaft in the gear box. Hardened steel bevel gears connect from the spline shaft to a pinion which drives the large spur gear of the rotary chuck. All these gears are entirely enclosed and run in oil.

The chuck drive gear box, which has forced lubrication, provides four speeds for the chuck, any one of which may be instantly engaged. A friction clutch is provided for starting and stopping the chuck.

### Base

This is made in one casting and is of box form, heavily webbed inside, forming an exceptionally rigid support for the parts of the machine. No foundation is required.

The base serves as a tank for the cutting lubricant, and can be easily cleaned, from the end, with the hoe provided for that purpose.

### Column

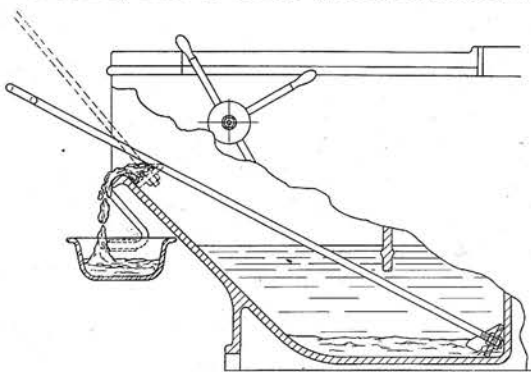
The column is of box form, with internal stiffening webs. Its careful design and generous proportions are typical of Blanchard construction. A good idea of its proportions may be gained from the views on pages one, six and seven.

The square slides for the wheel head have three accurately fitted taper gibs, extending the entire length, so that wear in any direction may be taken up. A metal guard attached to the wheel head completely protects the slide from dirt and water.

### Alignment

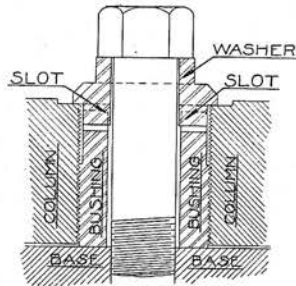
To produce flat work of uniform thickness the wheel spindle must be exactly square with the chuck. This alignment, of course, must be correct when the machine is new, but the inevitable wear which occurs in the bearings and slides of any machine will in time destroy this alignment and means for correcting it must be provided. The adjustment for this purpose must be in all directions, must not impair the rigidity of the wheel or work support, and should preferably be easy to make, without dismantling the machine.

All these conditions are successfully met in the Blanchard by the three-point column support. The column is fastened to the base at three points spread far apart. Bushings threaded into the column and bearing on the base provide vertical adjustment at these three points. The base and column are separated by a clearance of about  $\frac{1}{8}$  inch, so that the bearing comes entirely on the three bushings. Holding-down bolts of large diameter pass through the bushings and are threaded into the base. The heads of these bolts bear on large washers which rest in finished seats on the column and not on the bushings. These washers have a hexagonal portion and serve to turn the bushings by means of projections entering slots in the tops of the bushings. This construction is clearly shown in the sectional



SECTION THROUGH EASY CLEANING BASE

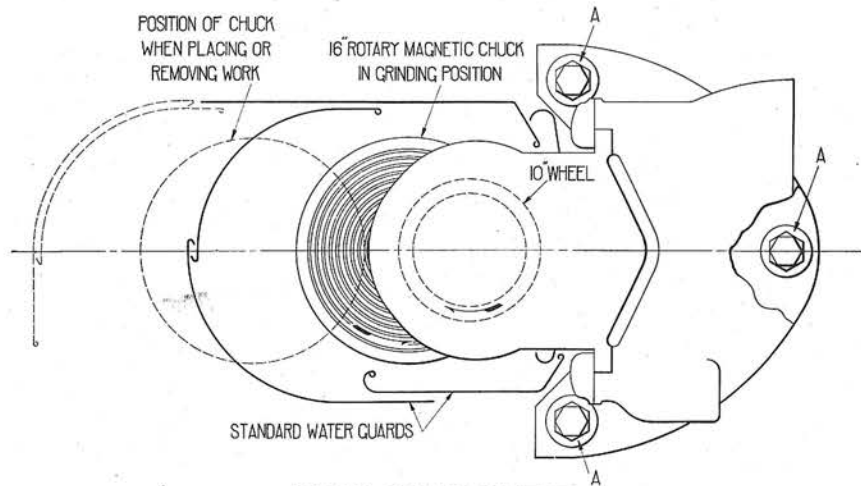




SECTION THROUGH ONE OF THE THREE ADJUSTABLE COLUMN SUPPORTS

view, on page nine taken through one of the three points. The plan view shows the position of the three points in the machine.

By slightly raising or lowering these points the column, and consequently the spindle, can be tipped in any direction an amount sufficient to restore the spindle to its correct position. The Blanchard is the only vertical surface grinder having this adjustment.



PARTIAL PLAN OF MACHINE  
Showing Chuck Positions, also Three Point Column Support, A-A-A

### Concave and Convex Grinding

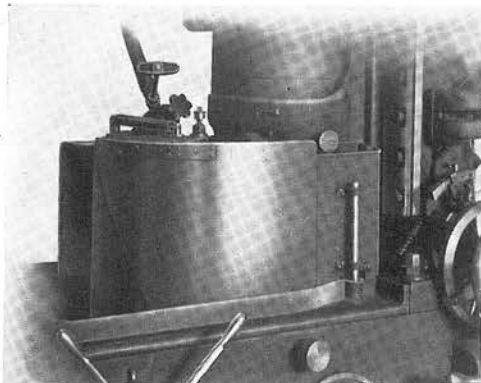
The three-point column support described above furnishes a convenient means for inclining the spindle to grind concave or convex work. In setting for such work it is only necessary to change the adjustment of the rear supporting point. The adjusting washer at this point is graduated so that settings can be readily duplicated. This adapts the machine to the finishing of circular saws and cutters and on this class of work it is an extremely rapid producer.

### Pump and Water System

For accuracy on any work, and to permit rapid grinding of hardened material, the work must be kept cool all the time. Therefore on the Blanchard all grinding of metal pieces is done wet. This means more than flooding the work with water after it comes out from under the wheel, for to heat the work and then suddenly cool it, is perhaps worse than to let it remain hot. The water system of the Blanchard applies the water at the point where heat is generated and absorbs the heat before the temperature rises.

The base of the machine serves as the tank for the water and holds 65 gallons. The water passes from this main tank through a removable gate, which holds back both the mud at the bottom and any floating dirt, into the pump tank at the rear. There a submerged centrifugal pump forces the water to the wheel head and to the outside nozzle. A 3/4 inch pipe leads to each. The water supplied to the inside of the wheel issues from under the cutting face with considerable force. This not only keeps the wheel cool but owing to the coarse grain of the wheels used, the water penetrates between the wheel and work, in direct contact with the grains that are cutting. All doubt as to this action is removed by watching the machine at work with outside nozzle shut off, when a rapidly moving and continuous sheet of water will be noticed issuing from under the wheel and passing over the work.

All the water discharged onto wheel and work runs down over the chuck and table body and drops into the main tank in the base. Here the large volume gives a good chance for the chips and dirt to settle out. The end of the base is inclined and so arranged that all the chips that accumulate can be easily hoed out with the hoe furnished with each machine. This makes cleaning very easy, and so encourages the frequent cleaning out of the tank.



WATER GUARDS CLOSED, CHUCK IN GRINDING POSITION

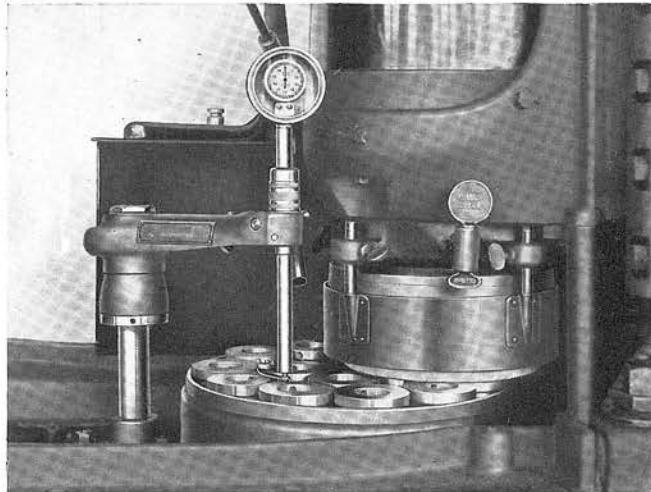
### Water Guards

Suitable guards are provided to enclose the wheel and work when grinding. These automatically open when the chuck is moved out for loading, and close when the chuck is moved into the grinding position.

### Lubrication

All important bearings and gears are lubricated by oil baths. The reservoirs contain sufficient oil to lubricate properly for a week or longer without replenishing, and are fitted with gauges which show the oil levels and indicate when refilling is needed. The generous supply of oil contained in these bearings is good insurance against careless oiling.

The Table Gear Box which actuates the feed mechanism and rotates the chuck has forced lubrication by a gear pump.



CONTINUOUS READING CALIPER IN USE ON STEEL COLLARS, MOVING WATER GUARDS REMOVED

### CONTINUOUS READING CALIPER ATTACHMENT

This attachment measures the work while it is in place on the chuck and being ground. The dial is set to zero with contact button resting on a size block or finished piece of work. When set in this way 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 stopping the chuck and without in any way interrupting the grinding. The lower face of the contact button has the form of a very flat cone, and easily rides over the edges of openings in the work or the gaps between pieces.

The caliper saves time and prevents errors and spoiled work. It gives the operator increased confidence since he knows the thickness of the work all the time and can grind rapidly right down to finished size. Unlike micrometers it is direct reading, telling at a glance just what the operator needs to know, namely how much the work exceeds finished size.

The caliper will measure work up to 6" high, and is quickly adjustable for different heights. For measuring work less than nine inches in diameter, centrally placed on the chuck, a special offset caliper foot is obtainable. All Blanchard Grinders are made to receive the caliper.

#### Shipping Data

Net Weight—35 pounds  
Gross " —50 "

Box Size  
1' 3" x 1' 3" x 0' 7"

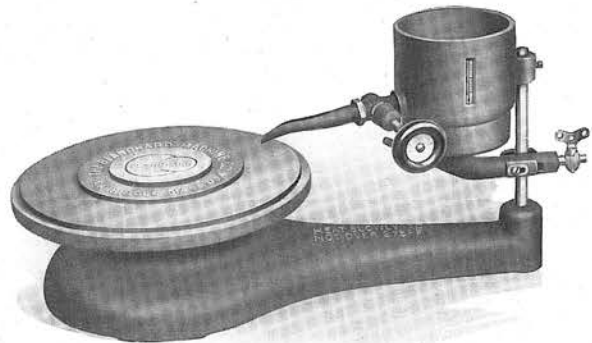
Cubic Ft.  
1

(When shipped with machine Caliper goes in place on machine)

### BLANCHARD WHEEL MOUNTER

Experience shows that sulphur is the best material for mounting Blanchard Wheels. To facilitate the proper melting and pouring of the sulphur the Blanchard Wheel Mounter has been developed. It consists of a gas or electrically heated sulphur pot, with cock and spout for running the sulphur into the wheel ring; and a turntable for supporting and rotating the ring and wheel. The turntable takes all three sizes of Blanchard Wheels (10", 16" and 18") and the sulphur pot, with its heater, is mounted on a post that swivels in the base, to bring the spout close to the wheel. A thermometer in the wall of the pot indicates the temperature, which for best results should not exceed 275° F. At higher temperature sulphur becomes very thick, and so difficult to pour, that there is danger of not properly filling the space in the wheel ring.

If care is taken not to overheat the sulphur this apparatus can be used anywhere, but if many wheels are mounted it may be found best to place over the apparatus a hood with ventilation to outside the building.

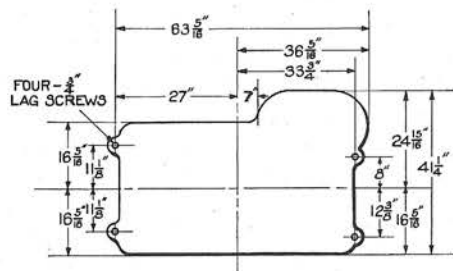


#### Shipping Data

Net Weight—78 pounds  
Gross " —95 "

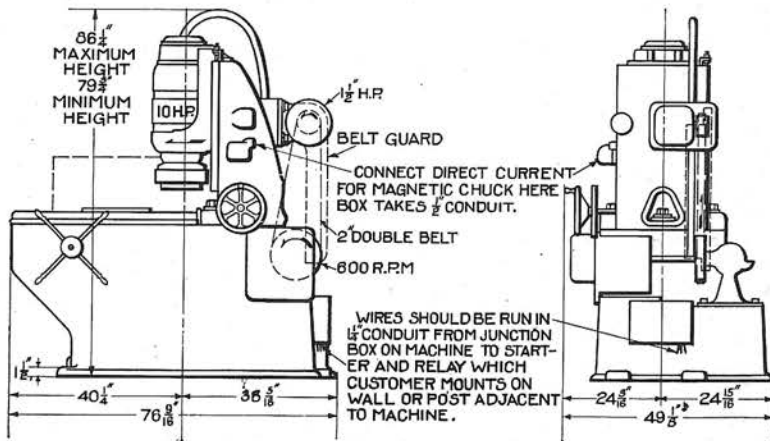
Box Size  
2' 5" x 1' 6" x 0' 9"

Cubic Ft.  
3



#### Base Outline for All Types of No. 10 Grinders

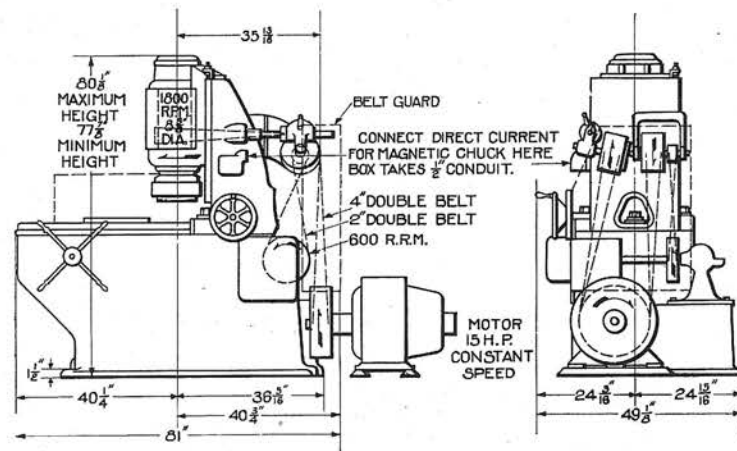
This outline does not give floor space required; overall dimensions are given on the drawings following.



### Direct Motor Drive Type

This type of drive, built for alternating current only, is the most efficient drive, and should be used wherever alternating current is available.

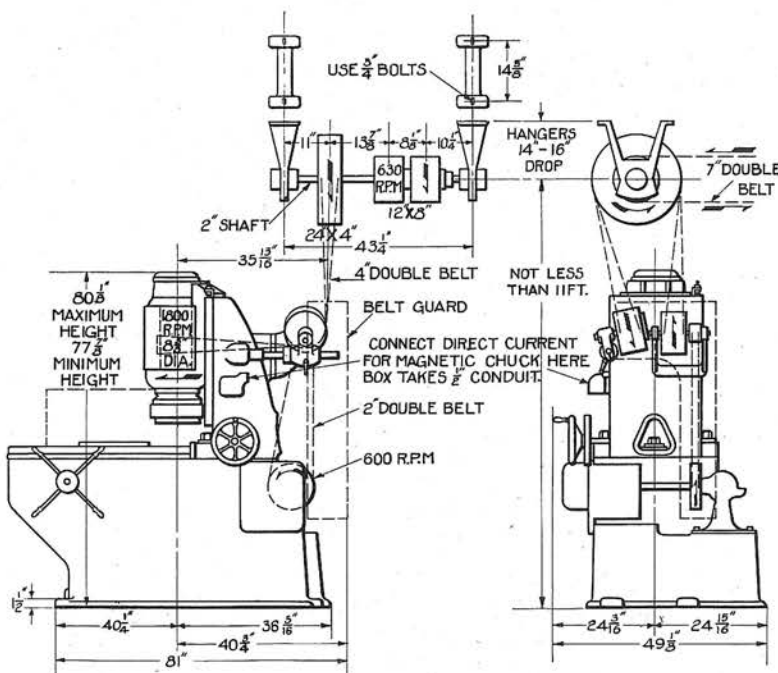
For Description, see page 6.



### Floor Motor Drive Type

Where no alternating current is available either this type or the Overhead Motor Drive Type should be used. It is more efficient than the Countershaft Drive Type. Any constant speed, 15 H. P. motor may be used.

For Description, see pages 6 and 7.



### Overhead Motor Drive Type

For this type of drive any constant speed, 15 H. P. Motor is placed so that pulley comes in position of 24" x 4" pulley shown on countershaft with tight side of belt vertical.

### Countershaft Drive Type

This drive is usually recommended only when the motor driven types are impractical.

## SPECIFICATIONS

## OF NUMBER 10 BLANCHARD SURFACE GRINDER

(Covering both Direct Motor Drive and Belted Grinders)

## RANGE

18" diameter by 6" high under new wheel.

## WORK TABLE

Blanchard One-Piece Steel Magnetic Chuck 16" diameter with fine divided face suitable for all sizes of work. 1" center hole and 8— $\frac{1}{2}$ " tapped holes for securing stops. Direct current only, either 110 or 220 volts; 125 watts.

## WHEEL

10" diameter, 4" deep. Rim 1" thick. (10" x 8" x 4".) Of 4" total depth 3 $\frac{1}{4}$ " (81%) can be used.

## SPEEDS

Belted Machine	Direct Motor Drive Machine
Wheel 1800 R. P. M.	Wheel 1740 R. P. M.
4720 F. P. M.	(at full load)
Countershaft 630 R. P. M.	4560 F. P. M.
	(60 cycle only)
Chuck, 4 speeds, all geared, 15, 22, 33, 50 R. P. M.	

## FEED

Vertical down feed of wheel head by hand or power. Power feed can be varied from .0002" to .004" per revolution of chuck, by steps of .0002".

## PULLEYS AND BELTS (For Belted Machines only)

Lineshaft to Countershaft 7" double belt.  
Countershaft tight and loose pulleys 12" x 8".  
Countershaft drive pulley 24" x 5".  
Countershaft (or motor) to spindle 4" double belt.  
Spindle drum pulley 8 $\frac{3}{8}$ " diameter.  
The guide pulleys for spindle belt are ball bearing 10" diameter.

## WATER SUPPLY

Tank in base, capacity 52 gallons. Pump, submerged centrifugal, 8" runner,  $\frac{3}{4}$ " pipe to wheel and outside nozzle.

## FLOOR SPACE

Direct Motor Drive Machine . . . . .	6' 5" x 4' 2"
*Floor Motor Drive Machine . . . . .	9' 1" x 4' 2"
Countershaft Drive Machine . . . . .	6' 10" x 4' 2"
*Overhead Motor Drive Machine . . . . .	6' 10" x 4' 2"

\*Space given includes that required for 15 H. P. constant speed motor.

## WEIGHTS

Direct Drive Grinder and Equipment net . . . . .	6000 pounds
Floor Motor Drive Grinder and Equipment, without motor, net . . . . .	5800 pounds
Countershaft Drive Grinder and equipment except Countershaft, net . . . . .	5800 pounds
Countershaft . . . . .	300 pounds
Overhead Motor Drive Grinder and Equipment, without motor, net . . . . .	5800 pounds
Caliper Attachment . . . . .	27 pounds
Crating material for Domestic Shipment . . . . .	475 pounds
Boxing material for Foreign Shipment . . . . .	950 pounds
Crate or Box, outside dimensions, 7' 4" x 4' 5" x 7' high. Countershaft is packed in case with machine.	

## STANDARD EQUIPMENT

16" Blanchard One-Piece Steel Magnetic Chuck, water guards, pump, and piping.  
2 Grinding wheels 10" x 4" x 8" mounted in rings.  
4 Extra rings for mounting wheels.  
2 Chuck rings, 1 outside, 1 inside, to hold small work from sliding.  
Set of Wrenches. Wheel Truing Device. Hoe for cleaning Tank. Instruction Book.  
Countershaft, fitted with Hyatt Roller Bearings throughout. Note: Motor Drive Machines omit Countershaft.  
Direct Motor Drive Machines include 1-10 H. P. and 1-1 $\frac{1}{2}$  H. P. alternating current motors, wiring, junction box and fuses for small motor, mounted on machine; 1 hand auto-starter with no-voltage release and overload relays separate, to be mounted by customer.

## CODE WORDS

	With 110 Volt Chuck	With 220 Volt Chuck
No. 10 Grinder, Direct Motor Drive Type,	TENECTONE	TENECTWO
No. 10 Grinder, Floor Motor Drive Type, without motor,	TENFLOTONE	TENFLOTWO
No. 10 Grinder, Overhead Motor Drive Type, without motor	TENOTONE	TENOTWO
No. 10 Grinder, with Countershaft,	TENSHATONE	TENSHATWO
Blanchard Wheel Mounter Gas heated type		MOUNTGAS
Electric type (110 volts, A. C. or D. C.)		MOUNTELEC

No. 10 Continuous Reading Caliper Attachment: English Graduations (.001 inch),	TENCALENG
Metric Graduations (.01 millimeter),	TENCALMET

Code word for Direct Motor Drive Machine should be accompanied by words indicating phase, cycles, and voltage of alternating current available for motors. Example:—"TENECTONE THREE SIXTY TWO-TWENTY" for "1 No. 10 Direct Drive Grinder, 110 volt chuck, with motors for 3 phase, 60 cycle, 220 volts."

Codes used—Western Union, Liebers.

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

THE BLANCHARD MACHINE CO., Cambridge, Mass.