almost 65 years of experience in
building cutter grinders

CUTTER sharpening as it is known today had its beginning with the development of the machine tool. Recognizing the need for a machine to accurately grind milling cutters, as well as reamers, taps, form tools and other cutters, The Cincinnati Milling Machine Co. built its first cutter grinder in 1889. The experience in using and building cutter grinders was incorporated into the design of Cincinnati's first self-contained motor driven cutter and tool grinder presented in 1904. Some eight years later the No. 1½ followed with another cutter grinder innovation...clearance setting dials on the workhead and tailstock.

Further experience in milling and cutter grinding led to a search for a still better machine for sharpening cutters, culminating in the introduction of the No. 2 Cutter and Tool Grinder in 1929.

This machine immediately won world-wide recognition for modern design and outstanding performance. It was the first to have an anti-friction table slide mounted on hardened and ground steel balls and tracks, cartridge type spindle assembly, adjustable wheelhead pile, duplicate operating controls, and spring cushioning table dogs. Recent developments were oil shot pressure lubricating system, built-in electrics, and "mist grinding" for sintered carbide cutters.

Today, the Cincinnati No. 2 Cutter and Tool Grinder brings to the skilled hands of the operator a precision tool, having maximum ease of operation, with which he can perform the exacting operations required in making and sharpening the cutting tools of today's industrial production machines.

The Cincinnati Milling Machine Co.
Cincinnati 9, Ohio, U.S.A.
When considering the purchase of a high quality cutter and tool grinder, ask the operator and toolroom foreman what conventional tools they prefer in their machines. You will find that the most desired features are those pioneered by CINCINNATI ... smooth and easy movement of the table; an accurate and sturdy spindle; convenient and comfortable working height; and a variety of attachments.

Operators and toolroom foremen know through experience that the CINCINNATI No. 2 Cutter and Tool Grinder has an unusual degree of versatility, is accurate and easy to operate, and offers many features such as: anti-friction table slide which traverses with almost zero effort; cartridge type pre-loaded anti-friction spindle mounting, lubricated for life; adjustable wheelhead pile, right where the operator wants it. Other features include—duplicate controls for safety and flexibility; centralized lubrication to reduce routine service attention ... wide selection of attachments for sharpening all types of cutters; for truing the wheel to radii and angles tangent to radii, micrometer table positioning attachment, and coolant system for "mist grinding" sintered carbide cutters.

These features and their advantages pictorially presented in the following pages make the CINCINNATI No. 2 Cutter and Tool Grinder the accepted standard the world over.
sharpening and tool grinding

CINCINNATI No. 2 Cutter and Tool Grinder
CINCINNATI No. 2 Cutter and Tool Grinders offer desirable flexibility in sharpening a wide variety of cutting tools ranging from small pencil sharpening cutters to face mills 18" in diameter and in handling occasional toolroom grinding operations, such as cylindrical, internal, face and surface grinding. These illustrations give an excellent indication of the accurate performance and unusual degree of versatility found in these precision cutter and tool grinding machines.

Grinding the side relief angle of a carbide lathe tool utilizing the Surface Grinding Attachment and the regular workhead support.

Universal workhead and universal tooth rest plate with micrometer tooth rest holder advantageously used to face grind a tapered hand reamer.

Clearance setting dial is a big timesaver when sharpening staggered tooth cutters.

Sharpening the corners of a 14" carbide face mill using the Face Mill Grinding Attachment.

Sharpening the face of the teeth of an arbor type helical mill.
Grinding the periphery of a spiral flute expansion hand reamer.

Flutes of a bottoming hand tap are being ground by means of a formed grinding wheel.

Sharpening a small end mill using the Small End Milling Grinding Attachment.

Below: Grinding the radial cutting face of a spur gear hob. Spring actuated pivot forces tooth rest blade in contact with grinding guide, at the left-hand end of the arbor, after each indexing.

Sharpening the periphery of an 8" high speed steel face mill.
Sharpening the periphery of a gang of eight metal slitting saws. Tailstock clearance setting dial and universal tooth rest plate greatly facilitate work of this type.

Salvaging a helical end mill by cutting off the damaged end with the aid of the Cylindrical Grinding Attachment.

Sharpening the periphery of an 8" diameter staggered tooth metal slitting saw.

Grinding the periphery of a plain milling cutter. The operator of a CINCINNATI No. 2 Cutter and Tool Grinder always has a clear view of the work and wheel.

Grinding the backs of the teeth of a new gear cutter using the Gear Cutter Sharpening Attachment.
Grinding the radius on the teeth of a shell end mill by means of the CINCINNATI No. 2 Radius Grinding Attachment.

Circle grinding the cutting clearance on the blades of a hand reamer utilizing the Cylindrical Grinding Attachment.

Grinding the corners of the blades of a hand reamer. Table may be swiveled to any angle; 180° if desired.

Grinding the bore in a uniform rise radial cam employing the Internal and Cylindrical Grinding Attachments.

Sharpening an arbor type concave form relieved cutter. The guide has the exact lead and the same number of teeth as the form relieved cutter.
Accurate and easy to operate, CINCINNATI No. 2 Cutter and Tool Grinders offer attractive cost-reducing possibilities for grinding and reconditioning the majority of cutters used in the average shop. In addition, a wide variety of CINCINNATI attachments extends the range of the machine for sharpening miscellaneous small tools, including those of sintered carbide. These and the advantageous features below give CINCINNATI No. 2’s an A+ investment rating in the cutter and tool grinder field.

1. **Anti-friction table slide**... traverses smoothly with a light push of one finger.
2. **Cartridge type, pre-loaded anti-friction grinding wheel spindle mounting**... lubricated for life.
3. **Adjustable wheelhead pile**... easily and accurately adjusted to the position required for the set-up.
4. **Duplicate controls**... for operating the machine at the front, right- or left-hand end of the table; or at the rear, right- or left-hand side of the column.
5. **Clearance setting dials on workhead and left-hand tailstock**... legibly graduated for convenient and accurate adjustment.
6. **Spring cushioning table dogs**... eliminate shock while reversing table traverse. May be reversed for solid stop.
7. **Universal workhead**... may be swiveled in two planes; double end spindle ready for either No. 12 B. & S. or No. 50 Series National Standard taper shank cutters.
8. **Tailstocks easily positioned along the table surface**... retractable center, adjustable for tension, saves time when setting up.
9. **Built-in electrical controls**... guarded against moisture and grit; safe for the operator.
10. **Micrometer tooth rest holder**... permits fine adjustments of blade when grinding hobs, taps and form cutters.
11. **Oil-shot pressure lubricating system**... prolongs machine life-span and reduces daily service requirements.
12. **Offset swivel table swings 180°**... for increased cross adjustment capacity and added versatility when using large attachments.
13. **Differential table traverse unit**... fine positive feed for cylindrical, internal and surface grinding.
14. **Rugged box type bed with fixed height table**... maintains accuracy of table traverse and affords comfortable operation while seated or standing. Enclosed main drive motor, accessible for maintenance.
15. **Wide selection of attachments**... provides increased versatility.
Anti-friction table slide provides unusual ease of table movement, thereby reducing operator fatigue to a minimum, a big factor in harmonious employee relations and low cost of manufacturing. With the manual controls disengaged (just pull them out to a stop), the table, with its heaviest load of attachment and cutter, can be easily pushed with the little finger. And with the manual controls engaged, it's just as easy to traverse the table with a twist of the wrist. Think what this means in eliminating fatigue throughout the day. Accuracy, smooth straight line traverse and long life are other advantages offered by this construction. The anti-friction ways are hardened, and after assembly, they're ground in position.

Should they need replacement after years of service, the job can be done by your own men. Replacement ways are hardened, ground to dummy units in our shop. This means new machine accuracy may be restored inexpensively in your own shop by one man in about two hours' time.
Cartridge type grinding wheel spindle mounting with pre-loaded anti-friction bearings is a self-contained unit lubricated for life. This construction promotes smooth rotation, setting the stage for high quality surface finish on the cutting edge. Take another look at the applications shown on pages 4 to 7. Smooth chatterless action of the grinding wheel is essential to all of them. In the illustration below, note how the large spindle runs on a double mounting of special pre-loaded, precision, anti-friction bearings that are rigidly locked in a cartridge type mounting clamped in the main casting. Friction is reduced to a minimum, alignment preserved, no adjustment required, useful life span improved because emery dust is excluded. The cartridge type spindle may readily be renewed after years of service, thus restoring new spindle performance into the machine in an interval of minutes.

Grinding wheel spindle cartridge can be replaced in an interval of minutes. Spindle is mounted on pre-loaded, precision, anti-friction bearings, lubricated for life.
Adjustable wheelhead pile provides support for the motor at its lower end. The entire unit may be easily raised or lowered by duplicate vertical controls or swiveled 240° about the vertical axis. No trick at all for the operator, while comfortably seated or standing, to adjust the wheelhead to the height required for the setup. Quick clamping means for the wheelhead swivel is also provided. This facilitates the use of straight and cup grinding wheels, saves time when changing from cutter grinding to cylindrical or surface grinding. The main motor drive with two-speed pulley is enclosed within the base of the machine, eliminating an occupational hazard. An endless belt, also enclosed, transmits power from the motor directly to the grinding wheel spindle. Either of two spindle speeds can be obtained by shifting the belt on a two-step cone pulley. The belt can be replaced or adjusted in a few minutes.

Adjustable wheelhead pile may be easily raised, or lowered and swiveled 240° about the vertical axis.

Wheelhead with internal grinding attachment on a universal machine, swiveled to grind a tapered hole.
Duplicate controls give the operator a choice of four operating positions while standing or seated. They offer maximum safety and convenience for sharpening any type of cutter, either right- or left-hand, helical or straight tooth; positive or negative rake angle. Duplicate operating controls give the Cincinnati No. 2 Cutter and Tool Grinder added versatility and flexibility.

1. Most cutters are ground while the operator stands or sits at this corner.

2. Many left-hand cutters can be ground to advantage from this operating position.

3. Internal grinding operations are in full view from this operating position.

4. This operating corner will be appreciated when grinding short cylindrical sections.
Clearance setting dials on workhead and left-hand tailstock of the No. 2 Cutter and Tool Grinder enables the operator to conveniently and accurately set for predetermined clearance angles regardless of cutter diameter and type of wheel used.

An advantageous feature when you consider that the clearance angle plays a most important role in obtaining good cutter performance, high cutting efficiency and the most economical number of parts per grind.

Cutter clearance setting dial on left-hand end of workhead is legibly graduated for convenient and accurate settings.

Arbor mounted cutters are quickly adjusted to the desired clearance angle by means of the clearance setting dial on the left-hand tailstock.
feature

6 spring cushioning table dogs

Spring cushioning table dogs not only govern the length of table traverse, but they also offer an important secondary advantage. They absorb the shock at reversal of the table movement. When the table dogs are set as shown at the right, the spring behind the plunger extending from each dog cushions the shock at the end of the stroke and smoothly reverses the direction of table motion. Dogs may be reversed if positive table stop is desired.

feature

7 universal workhead

Universal workhead accommodates cutters with either the No. 12 B. & S. taper (No. 5 Morse taper optional) or the No. 50 Series National Standard taper. Its anti-friction spindle mounting insures a smooth, easy movement when rotating the spindle from one grinding position of the work to another. The base and spindle are graduated in degrees to aid in obtaining accurate swivel adjustments in the horizontal and vertical planes.
tailstocks

Tailstocks are easily positioned anywhere along the table surface. Tightening the thumb screws before clamping the tee bolts always locates the tailstocks from the same side of the table slot and assures accurate positive alignment of both centers. To enable the operator to conveniently obtain the desired clearance angle when grinding arbor-mounted cutters, the left-hand tailstock is provided with a clearance setting dial. The retractable center in right-hand tailstock is adjustable for tension; saves time when removing work for checking purposes.

electrical controls

Electrical controls are built into the bed at the front of the machine, where they are protected from moisture and abrasive grit. The current automatically shuts off when the compartment door is opened, protecting the operator against electrical hazards. In shops employing high voltages, a transformer unit reduces the voltage to 110 at the built-in push button station. These buttons are at the left-hand side of the bed where they may be easily reached.
**Feature 10: Toothrests**

Toothrests and toothrest holders offer a simple solution to one of the most perplexing elements of cutter sharpening, that of quickly positioning the toothrest when setting up. The micrometer toothrest holder, accurately graduated in thousandths of an inch, permits fine adjustment of the blade. A spring actuated pivot forces the blade into its working position after each indexing.

The universal toothrest plate is not only adjustable to a variety of positions, but can be mounted on the wheelhead pile, machine table, and top or bottom of the workhead. In addition, plain or micrometer toothrest holders are interchangeable, making it possible for the operator to use either holder with the plain or universal toothrest plate.

**Feature 11: Oil-Shot Pressure Lubricating System**

The oil shot pressure lubricating system saves the operator’s time by reducing daily service requirements, and assures longer machine life. This unit, located in the saddle, lubricates the saddle bed ways, four operating control shafts, the wheelhead pile vertical adjustment mechanism and the cross feed screw. This centralized lubrication system, along with the table slide construction, grease packed spindle bearings and sealed main drive motor add up to longer, trouble-free performance.
The off-set swivel table of the CINCINNATI No. 2 Cutter and Tool Grinder offers several noteworthy advantages. It may be swiveled 180°, and in so doing, 3½” more elbow room is gained for grinding long cutters. To facilitate the grinding of large diameter cutters and saws in a horizontal position, the table can be clamped in any angular location. Taper work up to 2” per foot may be handled quickly and conveniently, by adjusting the swivel table to desired taper per foot, as indicated by the accurately graduated scale in the sliding table.

Off-set swivel table facilitates the grinding of arbor-mounted angle cutters.

Normal cross range of the machine is increased 3 ½” when the off-set swivel table is rotated 180° (lower right).
**feature**

**13 differential table traverse**

The differential table traverse unit at the right-front of the machine, assures a fine positive feed for cylindrical, internal and surface grinding, and when truing the grinding wheel. The table moves at the slow speed of \(\frac{3}{4}\)" per revolution of the handcrank. Front and rear table controls are locked out when the handcrank is engaged—prevents damage to cutters and injury to the operator when setting up the machine.

**feature**

**14 box type construction**

The box type bed, rigid and well-proportioned, with fixed table height maintains accuracy of table traverse. Ample bearing area is provided for saddle and column.

The integral wheelhead and vertical column casting with its long bearing in the bed and accordion type dust guard also contribute their share to the accuracy and long life offered by this construction. The hinged cover on the left-hand side of the bed affords plenty of elbow room to service the enclosed motor.

Notice the recessed base for the operator's feet. It enables him to get in close and be more comfortable whether seated or standing.

Box type construction enables the operator to get in close and be comfortable whether seated or standing.
cylindrical grinding attachment

The CINCINNATI Cylindrical Grinding Attachment can be used for all types of straight or taper cylindrical grinding, such as teamers, lathe centers, mandrels, reclaiming cutters, tap or drill shanks, and for facing operations such as cutter hubs, gear shaper cutters, collars, nuts, etc.

The attachment will swing 10" diameter work and is designed to rotate work in a chuck or between live or dead centers. In addition, right- or left-hand rotation may be selected as desired through a two-way switch built into the push button station at the left-hand side of the bed of universal machine.

STANDARD EQUIPMENT

Cylindrical Grinding Attachment—includes 4" universal chuck with reversible jaws, chuck adapter, chuck wrench, vee belt, plate and screws for motor base, pulley fitted with two clamps, collar and dog, universal grinding dog, 1/2 hp, totally enclosed sleeve bearing motor, 220 to 350 volts, 25, 50 or 60 cycle A.C. and 115 or 230 volts D.C., 6-foot rubber-covered extension cord and plug.

SHIPPING DATA

Net Weight—55 pounds
Case Size—13"x14"x7"
Shipping Weight—63 pounds
Cubic Contents of Case—2 cu. ft.
Code Name—CYLAT

gear cutter sharpening attachment

Since gear cutters and cutters of similar design are form relieved, the only correct way they can be sharpened is to grind the face of the teeth. Cutters of this type may be sharpened advantageously on the CINCINNATI Gear Cutter Sharpening Attachment. The attachment consists of a grinding bracket which pivots on a horizontal stud and permits the cutter support plate to be adjusted to the right or left corresponding to the angle of the tooth face. A spring pawl, which rests against the back of the teeth locates the tooth in grinding position. Capacity—cutters up to 8 3/4" outside diameter and up to 2" hole.

STANDARD EQUIPMENT

Gear Cutter Sharpening Attachment—includes gage, pawl, and five adapter bushings, 1", 1 1/4", 1 1/2", 1 3/4", and 2" O.D., each having 7/8" diameter holes, or (metric sizes 29 mm, 32 mm, 40 mm, 45 mm, and 50 mm O.D., each having 22 mm hole).

SHIPPING DATA

Net Weight—35 pounds
Case Size—13"x11"x8"
Shipping Weight—50 pounds
Cubic Contents of Case—1 cu. ft.
Code Name—GERAT
Surface Grinding Attachment

Flat forming tools, lathe tools, planer tools, flat thread chasers, drills, chisels and work of a similar nature may be accurately and quickly ground with the CINCINNATI Surface Grinding Attachment. The attachment consists of a swivel vise with an intermediate support between the vise and the base, which allows the vise to be swiveled 360° in both the horizontal and vertical planes. The regular workhead support may be removed and placed between the vise support and the base, making the vise adjustable in three planes (left). Surfaces up to 4" wide can be ground in one setting.

Internal Grinding Attachment

The CINCINNATI Internal Grinding Attachment when set up in conjunction with the cylindrical grinding attachment described on page 19, can be used for grinding holes up to 3". A "goose neck" bracket carrying the internal grinding wheel spindle is bolted securely to the finished surface on top of the grinding wheelhead. The internal grinding spindle, driven from a pulley mounted on the grinding wheel spindle, may run at either of two speeds, 13,150 rpm with the machine driving belt on the small step of the pulley, or 19,590 rpm with the belt on the large step. The spindle is made of heat-treated alloy steel and rotates on a double mounting of anti-friction bearings that take up the combined radial and thrust loads.
no. 1 radius grinding attachment

The Cincinnati No. 1 Radius Grinding Attachment fills the need existing for equipment to quickly and accurately sharpen small ball-end cutters, double-end cutters, and die-sinking cutters having straight or helical flutes.

There are two slides, each having a convenient micrometer adjustment for the purpose of setting the cutter to the desired radius. The bracket bolted to the machine table contains an anti-friction pivot upon which the attachment can be swiveled 360°. The index plate at the rear of the workhead permits sharpening straight fluted cutters, having 1, 2, 3, 4, 6, 8, 12 and 24 flutes without the necessity of a tooth rest. The capacity of the attachment is 0" to 2" radii and 4" maximum cutter diameter. The workhead spindle has No. 12 B & S or No. 5 Morse taper hole.

no. 2 radius grinding attachment

Medium to large-sized milling cutters requiring an accurate 90° radius on the corner of the teeth may be quickly ground with the Cincinnati No. 2 Radius Grinding Attachment.

In general, the attachment consists of four principal elements: a base which is bolted to the machine table; a swivel plate, on an adjustable table; and the workhead support. A micrometer gage is also included to provide a means for accurately determining the zero or starting position. The workhead itself and draw-in bolt are part of the standard machine equipment, and are not supplied with the attachment. The capacity of the attachment is 0" to 1" radii and 0" to 12" maximum cutter diameter with 3" maximum width of face.
Face mill grinding attachment

Face mills up to 18" diameter may be sharpened quickly, more easily and with a higher degree of accuracy by using the CINCINNATI Face Mill Grinding Attachment. The attachment with its anti-friction bearing spindle, coupled with the sensitive anti-friction table slide of the machine, provides an exceptionally desirable and easy method of grinding face mills. A gentle twist of the knurled table control knob at the left or right side of the saddle, or touch of the hand on the table moves the face mill past the grinding wheel.

The attachment consists of three units: workhead, swivel plate and base. The work spindle, provided with No. 50 Series National Standard taper hole of 3 1/4" per foot is mounted on anti-friction bearings at the front and rear. The latter provides the free and easy movement required when indexing from one tooth to another. A knurled handwheel at the end of the spindle aids in indexing. The base and swivel block are both graduated in degrees, permitting the cutter to be swiveled to the desired clearance angle.

Grinding the corners of the teeth on a 14" diameter face mill.

Above arbor is supplied with attachment for face mill fitting the No. 30 Series National Standard milling machine spindle nose. Other face mills can be centered on the 1 1/2" diameter end of the arbor, either direct or by adapter bushings. Adapter bushings are not furnished with attachment.

STANDARD EQUIPMENT
Face Mill Grinding Attachment—includes base, swivel plate, workhead, arbor for holding face mills (No. 50 Series National Standard taper), special pulley for motor when using disc wheel only, grinding wheel (Shape No. 27—8" diameter x 3" face x 1 1/4" hole), wheel collet assembly and guard.

SHIPPING DATA
Net Weight—150 pounds
Case Size—24"x18"x13"
Shipping Weight—170 pounds
Cubic Contents of Case—3 3/4 cu. ft.
Code Name—RIF2
long reamer grinding attachment

The CINCINNATI Long Reamer Grinding Attachment is useful in grinding long lining reamers, boring bars, taper reamers, extension taps and stay-bolt taps. When concentricity is important, special cutters and gages may be ground without removing them from their arbors.

The attachment consists of an extension bar workhead plate with an intermediate support between the workhead plate and the base. This permits swiveling the extension bar workhead plate in both the horizontal and vertical planes. The tailstock centers provide a maximum center distance of 34"; longitudinal range of machine table remains 16". Centers will swing work up to 6" in diameter over the supporting bracket and 7" diameter at any other portion of the bar section.

STANDARD EQUIPMENT

Long Reamer Grinding Attachment—consists of extension bar workhead plate, workhead support, extension center, tool rest collar and collar bolt, and tee bolts.

radius and angle tangent to radius truing attachment

The CINCINNATI Radius and Angle Tangent to Radius Truing Attachment is designed for accurately truing grinding wheels so that angles, convex and concave radii and tangents to their respective radii may be ground on lathe, shaper and screw machine form tools.

This attachment greatly simplifies and speeds up the truing of angles and radii on grinding wheels. Installation requires the use of an extended grinding wheel spindle which is easily and quickly interchanged with present machine spindle. The device is suitable for truing concave radii from \( \frac{1}{8} \)" to \( \frac{1}{2} \)" and convex radii from 0" to \( \frac{1}{4} \)" depending upon the diamond bracket, and may be used with 4" to 6" diameter wheels up to \( \frac{1}{2} \)" maximum width.

STANDARD EQUIPMENT

Radius and Angle Tangent to Radius Truing Attachment—includes 4" right-hand extended spindle, convex and concave diamond bracket, and diamond fitting block.
coolant system \(\text{mist type}\) for carbide grinding

The CINCINNATI Mist Type Coolant System for grinding sintered carbide cutters on the No. 2 Cutter and Tool Grinder aids in producing better finishes on the cutter teeth, reducing grinding time and offers the dual advantages of wet grinding and dry grinding.

This self-contained coolant system performs its function effectively, but leaves the machine, workpiece and the operator clean and dry.

The attachment consists primarily of a wheel guard of special design, which is connected by a flexible tube to a floor unit composed of a coolant tank, pump and suction fan. As soon as the coolant strikes the diamond wheel it is immediately transformed into a mist which thoroughly wets the wheel. Then, instead of being thrown off, as heretofore, the mist is sucked back into the wheel guard and returned to the coolant tank through the large flexible hose. The wheel guard has been designed for straight cup, flaring cup or dished diamond grinding wheels.

The coolant system takes the coolant on a round trip—practically eliminates splashing and gives the operator a clear view of the work as it makes contact with the wheel.

COOLANT SUPPLY

\[\] SUCTION RETURN

STANDARD EQUIPMENT

Coolant System (Mist Type) for Carbide Grinding—includes individually motor-driven coolant pump, motor driven exhaust system, tank, piping and wheel guard. (Diamond wheel not included.) One of the following wheel guards included with the attachment—3", 3\(\frac{1}{2}\)", 3\(\frac{1}{4}\)", 4", 5" and 6" wheel diameter (specify guard desired).

SHIPPING DATA

Net Weight—150 pounds
Case Size—40" x 24" x 18"
Shipping Weight—220 pounds
Cubic Contents of Case—10 cu. ft.
Code Name—MISTA
heavy duty tailstocks

CINCINNATI Heavy Duty Tailstocks increase the swing of the work over the table and are useful in supporting heavy boring bars, reamers, mandrels and large helical milling cutters that cannot be handled on the standard tailstocks supplied with the machine. These substantially constructed tailstocks have a 16” swing and carry the work directly over the centerline of the table, thus affording rigid support during the grinding operation.

Accurate, positive alignment is assured both tailstocks because they are located from the same side of the machine table. The illustration shows tailstocks mounted on a 36” table travel machine. The minimum diameter of work that can be ground with a 6” diameter wheel is 3”.

STANDARD EQUIPMENT

Heavy Duty Tailstocks—includes left-hand tailstock with fixed center; right-hand tailstock with retractable center; and two tee bolts.

attachment

SHIPPING DATA

Net Weight—54 pounds  Case Size—19”x10”x14”
Shipping Weight—70 pounds  Cubic Contents of Case—1 1/4 cu. ft.
Code Name—RECBA

dust exhaust system

A dust exhaust system can be connected to the CINCINNATI No. 2 Cutter and Tool Grinder. Groups of cutter grinders may be serviced with a central system, while isolated machines should be equipped with an individual self-contained unit similar to the type shown at the right. Requiring minimum floor space, this portable self-contained unit efficiently exhausts the fine granular dust particles and stores the collected material in a dust drawer for convenient disposal; outside duct connections are eliminated because the exhaust air is filtered before it is discharged into the toolroom.

STANDARD EQUIPMENT

Dust Exhaust System—includes 1/2 or 3/4 hp totally enclosed fan cooled motor driven exhaust unit containing exhauster, dust precipitator, filters, dust drawer, flexible hose and suction hood.

SHIPPING DATA

Net Weight—245 pounds  Case Size—26”x23”x41”
Shipping Weight—295 pounds  Cubic Contents of Case—14 cu. ft.
Code Name—RECBB
workhead indexing attachment

Accurate indexing when grinding straight fluted cutters or other simple indexing jobs can be accomplished quickly and easily when the standard workhead is equipped with the 
CINCINNATI Workhead Indexing Attachment.

It saves time by eliminating the tooth rest ordinarily required in the setup. Consisting of 
twenty-four accurately spaced notches, the index plate may be readily fastened to the dial on the No. 12 B. & S. end of the workhead. Cutter shanks can be inserted in either end of the 
workhead spindle, just as they can without the attachment. Rapid and accurate positioning of 
the workpiece is provided by the plunger and plate indexing mechanism.

Workhead Indexing Attachment—includes one twenty-four notched index plate, plunger type indexing mechanism, bracket, index plate clamps and screws, and one tee bolt.

draw-in collet attachment

Small straight shank end mills, key slot cutters, counterbores, spot facers, and countersinks can be conveniently ground when the No. 2 
Cutter and Tool Grinder is equipped with the 
CINCINNATI Draw-in Collet Attachment.

Additional flexibility is provided when the 
attachment is setup in conjunction with the 
Cylindrical Grinding or the Workhead Indexing Attachments.

The attachment consists of an adapter that is 
easily fitted into the No. 12 B. & S. (or No. 5 
Morse) end of the workhead spindle and a 
draw-in bolt which extends through the workhead and rigidly holds the straight cylindrical 
collets in the collet adapter. Collets (extra cost) 
available for the adapter are: 1⁄8" to 11⁄2", in 
increments of 1⁄64"; 0.125" to 1.125" in decimal 
increments (specify exact size); and metric 
sizes from 3 mm to 28 mm in increments of 1 mm.

SHIPPING DATA
Net Weight—5 pounds
Shipping Weight—8 pounds
Cubic Contents of Case—1⁄4 cu. ft.
Code Name—RECBC

STANDARD EQUIPMENT
Draw-in Collet Attachment—includes collet adapter, centering sleeve and draw-in bolt.

SHIPPING DATA
Net Weight—8 pounds
Shipping Weight—12 pounds
Cubic Contents of Case—1⁄4 cu. ft.
Code Name—RECBD
spring chuck and spring collets

Spring chucks with interchangeable spring collets (extra cost) provide a quick and accurate method for holding small size cutters having straight shanks. In general, the spring chuck consists of an adapter with a cap nut which sets the spring collet in the taper bore of the adapter and firmly clamps the tool shank in position.

Mounted directly in the No. 50 Series National Standard taper end of the workhead spindle, the spring chuck readily accommodates the various sizes of spring collets for straight shank cutters. Collets range from \( \frac{1}{8}'' \) to 1'' in diameter. A special draw-in bolt is furnished at extra cost for use with the spring collets.

**STANDARD EQUIPMENT**
Spring Chuck—includes adapter with No. 50 Series National Standard taper, cap nut, and wrench.

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extended grinding wheel spindle

Increased range when grinding broach inserts and surface grinding is provided when the No. 2 Cutter and Tool Grinder is equipped with a CINCINNATI Extended Grinding Wheel Spindle.

Lubricated for life, these large extended spindles run on a double mounting of special pre-loaded precision anti-friction bearings that are locked in a cartridge type mounting, clamped in the wheelhead.

Extended spindles are available with a 4'' extension on the right-hand or left-hand end, or both ends extended; a 6'' extension may be obtained on the right-hand or left-hand end, but not both ends.

**STANDARD EQUIPMENT**
Extended Grinding Wheel Spindle—includes pre-loaded precision anti-friction cartridge type bearings, packed in grease for lifetime lubrication.

**SHIPPING DATA**
- Net Weight—6 pounds
- Case Size—10''x6''x6''
- Shipping Weight—13 pounds
- Cubic Contents of Case—\( \frac{1}{4} \) cu. ft.

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**SHIPPING DATA**
- Net Weight—17 pounds
- Case Size—22''x6''x6''
- Shipping Weight—20 pounds
- Cubic Contents of Case—\( \frac{1}{2} \) cu. ft.
coolant system for cylindrical grinding

(Temporarily withdrawn)

Dies, punches and carbide lathe, planer and forming tools may be advantageously "wet" ground when the machine is equipped with the CINCINNATI Coolant System for Cylindrical Grinding.

The "wet" grinding method prevents overheating, improves surface finish and in most cases makes it possible to remove more stock per pass of the grinding wheel, thus reducing the time required to cylindrical, internal or surface grind. In addition, "wet" grinding eliminates checking and cracking when grinding carbide tools.

The attachment incorporates an individually motor driven coolant pump and tank unit separate from the machine. Splash guards are provided around the table, saddle, and grinding wheel. (Must be installed at factory).

centerless grinder work support blade grinding attachment

Centerless Grinder work support blades up to 1" thick and 16½" long may be accurately and quickly reground to their original accuracy on the No. 2 Cutter and Tool Grinder with a CINCINNATI Work Support Blade Grinding Attachment.

Since the angle of a centerless work support blade varies according to the diameter of the work to be ground, the type of work, and the material, the attachment is provided with a swivel range of 45°. A large, accurate, easy-to-read dial facilitates setting the attachment to the desired blade angle.

Work Support Blade Grinding Attachment — includes body, blade holder, and two tee bolts.

SHIPPING DATA

Net Weight—66 lbs.
Case Size—26"x10"x8"
Shipping Weight—87 lbs.
Cubic Contents of Case—1½ cu. ft.
Code Name—ATBLA
small end mill grinding attachment

Small end mills up to 3½" flute length with No. 7 B. & S. or No. 2 Morse taper shanks can be conveniently ground with the CINCINNATI Small End Mill Grinding Attachment.

A bar, which slides in a split sleeve or bush inserted in the No. 12 B. & S. (or No. 5 Morse) taper bore of the workhead spindle, has a No. 7 B. & S. or No. 2 Morse taper bore in the front end for holding small diameter end mills. Cutters are sharpened by moving the attachment bar instead of the machine table.

STANDARD EQUIPMENT

Small End Mill Grinding Attachment—includes one sliding bar with either a No. 7 B. & S. or No. 2 Morse taper hole; tapered sleeve; and stop collar.

SHIPPING DATA

Net Weight—6 lbs.
Case Size—21" x 5" x 5"
Shipping Weight—9 lbs.
Cubic Contents of Case—½ cu. ft.
Code Name—SMETT

micrometer table positioning attachment

The CINCINNATI Micrometer Table Positioning Attachment offers a means of obtaining accurate spacing between ground surfaces such as those encountered in grinding grooves in plungers, combination reamers and drills, countersinks, counterbores and special tools.

The attachment is, in effect, a precision lead screw with 6" of travel for the sliding table of the machine. A gentle twist of the knurled knob moves the table past the grinding wheel. Merely loosening two hexagon nuts disconnects the attachment from the sliding table of the machine. Then the machine can be used in the conventional manner.

STANDARD EQUIPMENT

Micrometer Table Positioning Attachment—includes bracket, lead screw and nut; telescopic sleeve; four adjusting bushings; and two tee bolts.

SHIPPING DATA

Net Weight—19 pounds
Case Size—22" x 3" x 6"
Shipping Weight—22 pounds
Cubic Contents of Case—½ cu. ft.
Code Name—RECBF
The success of any grinding operation depends to some degree upon the grinding wheel. Those shown below have been carefully selected as to shape, grade, grain and bond. They are typical of the wheels required for sharpening a wide variety of cutters and other small toolroom work which may be assigned to the Cincinnati No. 2 Cutter and Tool Grinder and its related attachments. Wheels are kept in stock and should be ordered by number.

The equipment supplied with the No. 2 Plain Grinder includes wheel shape Nos. 21, 23, 24, 25 and 28; while the No. 2 Universal Grinder is supplied with wheel shape Nos. 21, 23, 24, 25, 26, 28 and 29. However, shape Nos. 26 and 29 are supplied as part of the equipment of the Internal Grinding Attachment. The shape No. 27 straight grinding wheel is supplied with the Face Milling Grinding Attachment described on page 22.

<table>
<thead>
<tr>
<th>Shape Number</th>
<th>Code Name</th>
<th>Size</th>
<th>Uses</th>
</tr>
</thead>
<tbody>
<tr>
<td>21 Dished</td>
<td>WEDIS</td>
<td>6&quot; diam. x 5/8&quot; x 1/4&quot; hole</td>
<td>Gear Cutters, Formed Cutters, Hobs, Taper, Boring Cutters.</td>
</tr>
<tr>
<td>23 Flaring Cup</td>
<td>WHECU</td>
<td>3 1/2&quot; diam. x 1 5/8&quot; x 1/4&quot; hole</td>
<td>Reamers, Helical Mills, Slotting Cutters, Face Mills, Angle Mills, End Mills.</td>
</tr>
<tr>
<td>24 Straight Cup</td>
<td>WEFIV</td>
<td>5&quot; diam. x 1 1/4&quot; x 1/4&quot; hole</td>
<td>Flat Forming Tools, Lathe and Planner Tools, Screw Machine Tools, Wa&quot;n, Bore Shades, Straight Edges, Gages, Drills.</td>
</tr>
<tr>
<td>25 Straight</td>
<td>WHEIX</td>
<td>6&quot; diam. x 5/8&quot; x 1/4&quot; hole</td>
<td>Cylindrical Grinding, Surface Grinding</td>
</tr>
<tr>
<td>26 Straight</td>
<td>LASSO</td>
<td>5/8&quot; diam. x 5/16&quot; x 1/4&quot; hole</td>
<td>Internal Grinding.</td>
</tr>
<tr>
<td>27 Straight</td>
<td>ATWHE</td>
<td>5&quot; diam. x 1 1/4&quot; x 1/4&quot; hole</td>
<td>Face Mills.</td>
</tr>
<tr>
<td>28 Straight</td>
<td>WHESI</td>
<td>5&quot; diam. x 1 1/4&quot; x 1/4&quot; hole</td>
<td>Helical Mills, Reamers, End Mills, Angle Mills, Staggered Tooth Slotting Cutters.</td>
</tr>
<tr>
<td>29 Straight</td>
<td>WHENY</td>
<td>5/8&quot; diam. x 5/16&quot; x 1/4&quot; hole</td>
<td>Internal Grinding.</td>
</tr>
<tr>
<td>30 Straight</td>
<td>WHE2A</td>
<td>8&quot; diam. x 5/8&quot; x 1/4&quot; hole</td>
<td>Cutting of Stellite, High-Speed Steel, Tubing, etc.</td>
</tr>
</tbody>
</table>

NOTES 1. When supplied as standard equipment with the machine or Face Mill Grinding Attachment, wheels are mounted on collets (see pages 22 and 34). When ordered as separate items, wheels are not mounted on collets.
2. Additional wheels with a particular kind of grain, bond and grade can be supplied for special jobs at extra cost.
CAPACITY
- Swing over Table
- Length, between Right- and Left-hand Tailstocks
- Length, between Tailstock and Workhead
- Face Mills on Workhead
- Saws on Table
- Formed Cutters (using 6" Wheel)

TAPER HOLE IN WORKHEAD SPINDLE
- One End
- Other End

TABLE
- T-Slot (Number and Size)
- Working Surface

RANGE
- Longitudinal Movement of Table
- Cross Movement of Table
- Table Swivels
- Table Graduations on End, for taper of
- Table Graduations in Center, in degrees
- Vertical Movement of Grinding Wheel Spindle
- Swivel Movement of Grinding Wheel Spindle
- Maximum Distance Centerline Spindle to Top of Table

GRINDING WHEEL SPINDLE SPEEDS

ELECTRICAL EQUIPMENT

FLOOR SPACE FOR OPERATING

SHIPPING DATA
- Net Weight (approximately)
- Shipping Weight, Domestic
- Shipping Weight, Export
- Size of Case, Export
- Volume of Case, Export

CODE NAME
- Plain
- Universal

10" diam.
21 3/4"
10" diam.
48" diam.
5 3/4" diam.

No. 12 B. & S. or No. 5 Morse
No. 50 Series National Standard

0.563" x 56'
5 3/4" x 36'

See Table Page 33
See Table Below
56 3/4" x 68 3/4"

2190 pounds
2325 pounds
2910 pounds
3040 pounds
3050 pounds
3180 pounds

60" x 50" x 98"
123 cu. ft.
CUPOM
CUVOM

ELECTRICAL EQUIPMENT
Supplied With Machine:

PLAIN MACHINES:
1. Grinding wheel spindle motor: % hp, totally enclosed, ball bearing, in precision dynamic balance; 220 to 550 volts, 25, 50 or 60 cycle AC; 115 or 230 volts DC.
2. Magnetic starter for above motor provides overload and undervoltage protection.
3. Disconnect switch built-in and mechanically interlocked with the electrical compartment door.
4. Complete electrical wiring in accordance with Machine Tool Electrical Standards.

NOTE: If three-phase current is available up to 550 volts, it should be used for both the grinding wheel spindle motor and Cylindrical Grinding Attachment motor.

UNIVERSAL MACHINES:
1. Grinding wheel spindle motor: % hp, totally enclosed, ball bearing, in precision dynamic balance; 220 to 550 volts, 25, 50 or 60 cycle AC; 115 or 230 volts DC.
2. Cylindrical Grinding Attachment motor: % hp, totally enclosed sleeve bearing; 220 to 550 volts, 25, 50 or 60 cycle AC; 115 or 230 volts DC.
3. Magnetic starter for above motors provides overload and undervoltage protection. Includes a reversing drum switch for reversing the Cylindrical Grinding Attachment motor.
4. Disconnect switch built-in and mechanically interlocked with the electrical compartment door.
5. Complete electrical wiring in accordance with Machine Tool Electrical Standards.
**MAIN DRIVE MOTOR AND GRINDING WHEEL SPEED DATA**

(Small step of motor pulley is driven when 6" wheel is used, large step when 31/2" wheel is used)

<table>
<thead>
<tr>
<th>MAIN DRIVE MOTOR</th>
<th>6&quot; DIAMETER GRINDING WHEEL</th>
<th>31/2&quot; DIAMETER GRINDING WHEEL</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rating</td>
<td>Speed—rpm</td>
<td>Speed—rpm</td>
</tr>
<tr>
<td>3/4 hp A.C.</td>
<td>3425</td>
<td>3850</td>
</tr>
<tr>
<td>(A)150</td>
<td>3800</td>
<td>5965</td>
</tr>
<tr>
<td>(D)40</td>
<td>2926</td>
<td>5925</td>
</tr>
<tr>
<td>(C)25</td>
<td>1425</td>
<td>5000</td>
</tr>
</tbody>
</table>

A—Special spindle required. B—Special motor pulley and belt required. C—Special spindle, motor pulley and belt required.
### Standard Equipment

**supplied with**

**Plain and Universal Machines**

<table>
<thead>
<tr>
<th>Key No.</th>
<th>Item</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Workhead.</td>
</tr>
<tr>
<td>2</td>
<td>Right-hand Tailstock.</td>
</tr>
<tr>
<td>2A</td>
<td>T-Bolt for Tailstock.</td>
</tr>
<tr>
<td>3</td>
<td>Left-hand Tailstock.</td>
</tr>
<tr>
<td>3A</td>
<td>T-Bolt for Tailstock.</td>
</tr>
<tr>
<td>4</td>
<td>Drawer Bolt and Washer.</td>
</tr>
<tr>
<td>5</td>
<td>Wrench for Socket Head Screw.</td>
</tr>
<tr>
<td>6</td>
<td>Double End Wrench (1/4&quot; and 9/16&quot; Openings).</td>
</tr>
<tr>
<td>7</td>
<td>Two Pin Wrenches.</td>
</tr>
<tr>
<td>8</td>
<td>Diamond Holder with Diamond.</td>
</tr>
<tr>
<td>9</td>
<td>Diamond Bracket.</td>
</tr>
<tr>
<td>10</td>
<td>Wheel Guard for Wheel Shape No. 24.</td>
</tr>
<tr>
<td>10A</td>
<td>Short Holder for Wheel Guard.</td>
</tr>
<tr>
<td>11</td>
<td>Long Holder for Wheel Guard.</td>
</tr>
<tr>
<td>12</td>
<td>Wheel Guard for Wheel Shape No. 23.</td>
</tr>
<tr>
<td>13</td>
<td>Wheel Guard for Wheel Shape Nos. 21, 25 and 28.</td>
</tr>
<tr>
<td>14</td>
<td>Ejector Rod.</td>
</tr>
<tr>
<td>15</td>
<td>Clearance Angle Setting Dog.</td>
</tr>
<tr>
<td>16</td>
<td>*Reducing Collar—12 to 9 B &amp; S. or 5 to 3 Morse Taper.</td>
</tr>
<tr>
<td>17</td>
<td>*Reducing Collar—12 to 7 B &amp; S. or 5 to 2 Morse Taper.</td>
</tr>
<tr>
<td>18</td>
<td>*Reducing Collar—12 to 10 B &amp; S. or 5 to 4 Morse Taper.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Key No.</th>
<th>Item</th>
</tr>
</thead>
<tbody>
<tr>
<td>19</td>
<td>Wheel Spindle Extension, 4&quot; Long, for 1 1/4&quot; diameter hole wheels.</td>
</tr>
<tr>
<td>20</td>
<td>Center Gage.</td>
</tr>
<tr>
<td>21</td>
<td>Two T-Bolts for Workhead.</td>
</tr>
<tr>
<td>22</td>
<td>Extension Plate, Eye Bolt and Ring.</td>
</tr>
<tr>
<td>22A</td>
<td>Blade Holder Extension.</td>
</tr>
<tr>
<td>23</td>
<td>Plain Tooth Rest Holder.</td>
</tr>
<tr>
<td>24</td>
<td>Offset Blade.</td>
</tr>
<tr>
<td>24A</td>
<td>Nut for Attaching Plain Tooth Rest Plate to Universal Tooth Rest.</td>
</tr>
<tr>
<td>24B</td>
<td>Screw for Item 24.</td>
</tr>
<tr>
<td>25</td>
<td>Plain Tooth Rest Plate.</td>
</tr>
<tr>
<td>26</td>
<td>Collar Wrench.</td>
</tr>
<tr>
<td>27</td>
<td>Grinding Wheel and Collet Assembly, Shape No. 24—5&quot; x 1 1/8&quot; x 1 1/8&quot; Hole—Straight Cup.</td>
</tr>
<tr>
<td>28</td>
<td>Grinding Wheel and Collet Assembly, Shape No. 28—6&quot; x 1/2&quot; x 1 1/2&quot; Hole—Straight.</td>
</tr>
<tr>
<td>29</td>
<td>Grinding Wheel and Collet Assembly, Shape No. 29—6&quot; x 1/4&quot; x 1/2&quot; Hole—Flaring Cup.</td>
</tr>
<tr>
<td>30</td>
<td>Grinding Wheel and Collet Assembly, Shape No. 30—6&quot; x 1/4&quot; x 1/2&quot; Hole—Dished.</td>
</tr>
<tr>
<td>31</td>
<td>Grinding Wheel and Collet Assembly, Shape No. 31—8&quot; x 1/4&quot; x 1/2&quot; Hole—Straight.</td>
</tr>
</tbody>
</table>

**Notes:**

- Wheel Spindle Extension, 4" long, Item No. 19, page 31, listed under "Accessories and Attachments," should be used when grinding hobs.
- *Collets, Key Nos. 16, 17 and 18 cannot be used in the No. 1 Radius Grinding Attachment.
- *Your selection of taper hole in workhead spindle governs which set of reducing collars and work center are supplied.
supplied with
universal machine only

The equipment supplied with Universal Machine consists of all items shown under Plain Machine plus the standard attachments shown below.

1. Cylindrical Grinding Attachment—includes 4" universal chuck with reversible jaws, chuck adapter, chuck wrench, vee belt, plate and screws for motor base, pulley fitted with two clamps, collar and dog, universal grinding dog and complete electrical equipment (see page 31). Code Name—CYLAT.

2. Surface Grinding Attachment—includes vise, intermediate support, two tee bolts, and base plate. Code Name—SURAT.

3. Internal Grinding Attachment—includes grinding wheel spindle bracket fitted with spindle, straight grinding wheel shape No. 26 (%"x 1/3"x1/3" hole), straight grinding wheel shape No. 29 (%"x3/3"x1/3" hole), oil cup, pulley for wheel spindle, endless flat belt, brace, washer and screw. Code Name—INTAC.

4. Gear Cutter Sharpening Attachment—includes gage, pawl, two tee bolts and five cutter bushings (English or Metric). Code Name—GERAT.

<table>
<thead>
<tr>
<th>ENGLISH</th>
<th>METRIC</th>
</tr>
</thead>
<tbody>
<tr>
<td>D. x %&quot; Bore</td>
<td>D. x 22 mm Bore</td>
</tr>
<tr>
<td>1&quot;</td>
<td>27 mm</td>
</tr>
<tr>
<td>1¼&quot;</td>
<td>32 mm</td>
</tr>
<tr>
<td>1½&quot;</td>
<td>40 mm</td>
</tr>
<tr>
<td>1¼&quot;</td>
<td>45 mm</td>
</tr>
<tr>
<td>2&quot;</td>
<td>50 mm</td>
</tr>
</tbody>
</table>

NOTES—
1. No. 12 B. & S. or No. 5 Morse depending upon workhead spindle bore.
2. Requires the use of the Cylindrical Grinding Attachment.
Equipment Supplied at Extra Cost
Not Included in Price of Standard (Basic) Machine

PLAIN MACHINE ONLY

1. Cylindrical Grinding Attachment—includes 4" universal chuck with reversible jaws; chuck adapter; chuck wrench; vee belt; plate and screws for motor base; pulley fitted with two clamps, collar, and dog; universal grinding dog; and complete electrical equipment—see page 31. Specify taper in workhead spindle (12 B. & S. or No. 5 Morse). Code Name—CYLAT.

2. Surface Grinding Attachment—includes vise, intermediate support, two tee bolts, and base plate. Code Name—SURAT.

(a) For additional intermediate support for this attachment see Item 35.

3. Internal Grinding Attachment—requires use of Cylindrical Grinding Attachment—Item 1, above. Code Name—INTAC.

4. Gear Cutter Sharpening Attachment—for grinding straight or staggered tooth gear cutters. Includes five bushings; specify English or Metric (1", 1½", 1¾", 2", and 2½"; or 27, 32, 40, 45, and 50 mm O.D.). Code Name—GERAT.

PLAIN OR UNIVERSAL MACHINES

1. No. 1 Radius Grinding Attachment Capacity—0" to 2" radii and 4" maximum cutter diameter. Attachment spindle has No. 12 B. & S. or No. 5 Morse Taper. Specify which taper is desired at order time and is ordered. Code Name—RAATT.

Additional Equipment for doing straight and cylindrical grinding.

(a) Motor Drive Equipment, complete. Specify current characteristics. Code Name—MOQUS.

(b) Basic Parts required for grinding straight shank cutters when either item "c" or "d" is purchased. Code Name—BAPAR.

(c) Sleeve for Grinding Large Straight Shank Cutters—Item "b" above must also be purchased.

Capacity:

¾" and 7/8" diam. shanks. Code Name—SLESH.

1" and 1¼" diam. shanks. Code Name—SLECU.

(d) Sleeve and Draw-in Bolt for Draw-in Collets—Item "b" above must also be purchased. See item "e" below for Collets. Code Name—SLEBO.


(f) Collets for Grinding Taper Shank Cutters

mount into attachment spindle. Specify taper in attachment spindle. (No. 12 B. & S. or No. 5 Morse.)

Outside Taper  Inside Taper
No. 12 B. & S.  Nos. 4 to 11 B. & S.
No. 12 B. & S.  Nos. 1 to 4 Morse.
No. 5 Morse  Nos. 4 to 11 B. & S.
No. 5 Morse  Nos. 1 to 4 Morse.

2. No. 2 Radius Grinding Attachment. Capacity—3" to 1" radii and 0" to 12" maximum cutter diameter with 3" maximum width of face. Attachment includes swivel housing, swivel table, top plate, workhead support, micrometer locating gage, grinding wheel (Shupe No. 27, 8" diam. x ¾" face x 1¼" hole), wheel collet assembly, and guard. Code Name—RAGAT.

The following parts are included with the standard machine equipment, and therefore are not included when supplying the attachment: Workhead spindle housing, draw-in bolt, and three reducing collets. If face mills are to be ground it will be necessary to purchase a Face Mill Adapter, Item 28.

3. Long Reamer Grinding Attachment. Capacity—6" diam. 34" between centers. Code Name—TENEX.

4. (Continued)
   (a) Adapter Plate, 8" diameter with 3½" bore. Used for grinding face milling cutters. Code Name—ADPLA.

   (b) Adapter Bushing, 2" O.D. with 1½" bore, Code Name—ADTOO.

   (c) Adapter Bushing, 2½" O.D. with 1¾" bore. Code Name—ADBUS.

5. Indexing Attachment for Workhead—includes one 24-notched index plate. Extra Index Plates—specify number of notches desired. Code Name—RECBO.

6. Micrometer Table Positioning Attachment—operated by an accurate lead screw. Code Name—RECBF.

7. Coolant System for Cylindrical Grinding—includes individually motor driven coolant pump, tank, piping, and splash guard. Nos. 1 and 2 Radius Grinding Attachment cannot be used with this attachment. Code Name—RECBOG. (Temporarily withdrawn.)

8. Coolant System (Mist Type) for Carbide Grinding (See item "a" below)—includes individually motor driven coolant pump, motor driven exhaust system, tank, piping and wheel guard. (Diamond wheel not included.) This attachment is designed for use with one of the wheels listed below under item "a". Specify wheel diameter when ordering. If the attachment is to be used with wheels other than those specified, consult factory. Code Name—MISTA.

   (a) One of the following diamond wheels may be used: 3", 3½", 3¾", 4", 5" and 6" diameter.

9. Heavy Duty Tailstocks—16" swing. Minimum diameter ground with 6" diameter wheel is 3". Code Name—RECBAA.

10. Attachment for Truing Radii and Angles Tangent to Radii—Diamond Truing Type. Range ½" to ½" concave, 0" to ½" convex. 4" RH extended spindle included. Code Name—RECBE.

11. Extended Grinding Wheel Spindles.

   (a) 4" Extended spindle on left-hand end (RH threads).

   (b) 4" Extended spindle on right-hand end (LH threads).

   (c) 4" Extended spindle on both ends.

   (d) 6" Extended spindle on left-hand end (RH threads).

   (e) 6" Extended spindle on right-hand end (LH threads).

12. Spindle Extension, screw-on type. 2" and 4" length (RH or LH threads), ½" and 1¾" diameter at wheel section.


   (a) Shape No. 21 dished—6" diam. x ¾" x 1½" hole. Code Name—WEDS.

   (b) Shape No. 23 flaring cup—3½" diam. x 1½" x 1¼" hole. Code Name—WHECU.

   (c) Shape No. 24 straight cup—5" diam. x 1½" x 1¼" hole. Code Name—WEFIV.

   (d) Shape No. 25 straight—6" diam. x ½" x 1¾" hole. Code Name—WHEIX.

   (e) Shape No. 26 straight—7½" diam. x ½" x ¼" hole. Code Name—LASSO.

   (f) Shape No. 27 straight—8" diam. x ¾" x 1¼" hole. Code Name—ATWHE.

   (g) Shape No. 28 straight—6" diam. x ½" x 1¾" hole. Code Name—WHESL.

   (h) Shape No. 29 straight—½" diam. x ½" x ¼" hole. Code Name—WHENV.
14. (Continued)
   (i) Shape No. 30 straight—8" diam. x 3/8" x 1 3/4" hole (used for cutting off tubing, etc.). Code Name—WHEZA.

15. Reducing Collets:
   12 B. & S. to: 7 B. & S., 9 B. & S., 10 B. & S. or 11 B. & S.

   12 B. & S. to: 1 Morse, 2 Morse, 3 Morse or 4 Morse.

   5 Morse to: 2 Morse, 3 Morse or 4 Morse.

   50 Series to 40 Series (National Standard taper).

   Draw-in Bolt for 50 Series to 40 Series National Standard taper reducing collet.

16. Dust Exhaust System. Code Name—RECBD.

17. Draw-in Collet Attachment—Specify 12 B. & S. or No. 5 Morse (See Item 18 for collets). Code Name—RECBD.

   (a) Inch sizes from 3/8" to 1 3/4" in increments of 3/4".

   (b) Decimal sizes from .125 to 1.125. Specify exact size.

   (c) Metric sizes from 3 mm to 28 mm in increments of 1 mm.

19. Centerless Grinder Work Support Blade Grinding Attachment—for blades up to 1" thick and 16¼" long. Code Name—ATBLA.


21. Small End Mill Grinding Attachment—complete, including three of the following items: "a" or "b" (not both), "c", and "d" or "e" (not both). Code Name—SMEIT.

22. Saw Grinding Attachment (Face Chuck), complete. Code Name—FACHU.

   Note—Item No. 22 consists of the following parts. They may be purchased separately as replacements.

   (a) Stem for Saw Grinding Attachment. Code Name—SAWAT.

   (b) Plate for Saw Grinding Attachment. Code Name—PLATA.

   (c) Bushing for Saw Grinding Attachment. Code Name—BUSGA.


   Capacity: Side Milling Cutters—½" maximum width with 3/8" hole.

   Saws—7/16" maximum width with 3/8" or 1" hole.

   Note—Item 23 consists of the following parts. They may be purchased separately as replacements.
23. (Continued)

(a) Stud for Side Milling Cutters. Code Name—STUSC.

(b) Washer for Side Milling Cutters. Code Name—WAMCIII.

(c) Collar for Saws. Code Name—COMCUn.

24. Diamond Truing Rod—with diamond. Code Name—RECBH.

25. Tooth Rests:

(a) Universal Tooth Rest—complete assembly including plate and item "b" below.

(b) Micrometer Adjustable Blade Holder with two blades—for Universal Tooth Rest.

(c) Plain Tooth Rest—complete assembly including plate and item "d" below.

(d) Plain Blade Holder with offset blade for Plain Tooth Rest.

26. Tooth Rest Blades:

(a) Flat Top.

(b) Round Top.

(c) Off-Set (For Plain Tooth Rest only).

27. Hand Rest. Code Name—HANRE.

28. Face Mill Adapter. For grinding face mills on either the standard Workhead or No. 2 Radius Grinding Attachment. Code Name—MILAD.

29. 4" 2-Jaw Universal Chuck. Mounts in standard workhead spindle. Includes one set of reversible jaws. Chuck is fitted with No. 5 Morse or No. 12 B & S. taper shank only. Specify which taper desired. Code Name—CHUOG.

30. 4" 4-Jaw Independent Chuck Mounts in standard workhead spindle. Includes one set of jaws. Specify taper hole in spindle (12 R & S. or 5 Morse). Code Name—RECBL.

31. Raising Block. 2" used with Workhead, Surface Grinding Attachment and Face Mill Grinding Attachment—includes long tee bolts. Code Name—RABLO.

32. Relt—Main Drive. Code Name—RECBL.

33. Wrenches:

(a) Double end—7/16" and 7/8" opening.

(b) Collet nut wrench.

34. Cutter Sharpening Arbor—includes set of collars and nut:

(a) 7/8" diam. x 8¼" usable cutter length.

(b) 1" diam. x 8¾" usable cutter length.

(c) 1½" diam. x 8¾" usable cutter length.

(d) 1½" diam. x 8¾" usable cutter length.

(e) 2" diam. x 8¾" usable cutter length.

35. Intermediate Support for Vise Body—includes bolt and washer. Code Name—REC8K.
To fulfill your cutter and tool grinding requirements, CINCINNATI offers a complete line of cutter and tool grinding machines. These machines offer desirable flexibility in grinding and reconditioning a wide variety of cutting tools, and in handling diversified toolroom grinding operations.

MONOSET CUTTER AND TOOL GRINDER
The Monoset Cutter and Tool Grinder is particularly adapted to reconditioning, sharpening and grinding from the solid, small, intricate cutters.

CONTOUR CUTTER SHARPENING MACHINE
Cutters of the formed profile or contour ground type of tools can be handled by the Contour Cutter Sharpening Machine.

PROJECTO-FORM GRINDING MACHINE
Accurate profile shapes of small cutter tips and lamination die parts can be effectively ground on Projecto-Form Grinding Machines.