

MASTER *Lathe* CONVERTERS

RICHARD IVES COMPANY

FINE MACHINE TOOLS

WEST COLEFAX AT WELTON
DENVER 4, COLORADO



THE ULTIMATE-DESIGN IN UNIVERSAL MULTI-PURPOSE

MACHINE TOOL

Attachments

★ MILLING ★ BORING ★ SLOTTING ★ INTERNAL
★ GRINDING ★ DRILLING ★ INDEXING KEYSEATING



A Precision Machine Tool for Maintenance • Production • Tool Room • Experimental

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MASTER MANUFACTURING CO.

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HUTCHINSON, KANSAS



Dear Customer:

As the Originator of Multi-Purpose Motorized Lathe Attachments for milling, grinding and keyseating, we are proud to present our latest models of Master Lathe Converters.

Sixteen years of practical experience goes into the New Master Converter, which is the ultimate design of modern machine tool attachments. It is reducing costs and solving metal working problems in all types of maintenance and production plants, and this New "Shop Proven" design, after many months of actual performance tests has met the exacting requirements and approval of this Country's most technical groups of Engineers.

Now, more than ever, the three sizes of Master Lathe Converters cover the field of Motorized Lathe Attachments and for a range of lathes from 9 inch swing up to even a 72 inch swing. The wide range of Heads and Fixtures available with the Master enables you to do practically all types of metal working on a lathe.

The New Units are equally as adaptable as a production tool by applying them on Turrets, Milling Machines, Planers, Boring Mills, etc., for supplemental operations in the same set-up, eliminating the transfer of work piece, to save production time.

Present day costs of shop work, as well as, initial investment of basic machines is extremely high, therefore, the multi-purpose Master Lathe Converter is indispensable as shop equipment to reduce cost. Outstanding savings in both equipment investment and operational costs are being effected by adding a Master Converter to your present equipment, or to create a new shop or department.

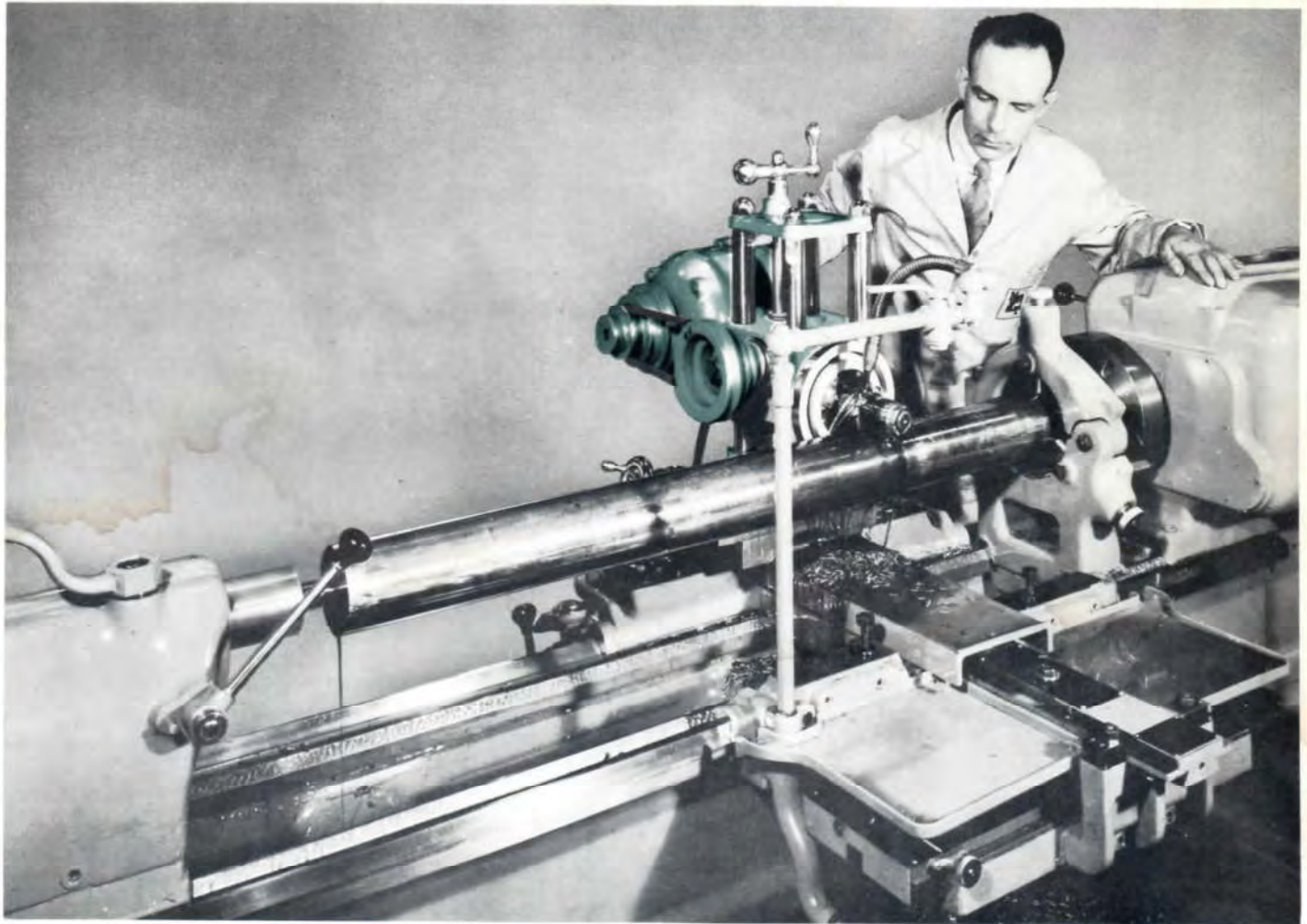
The following pages briefly illustrates these New Machines with complete equipment. Send us your work sheets, prints, or sketches for estimates of cost reduction and adaptation of this standard machine to your specialized work.

Yours very truly

MASTER MANUFACTURING COMPANY

H. Lee Hill,
General Manager

HLH:hw



WHAT IS A MASTER LATHE CONVERTER?

It is a Portable Many-Purpose Motorized Metal Working Machine, with inter-changeable heads or spindles to accomplish all types of machine shop operations.

The Basic Miller provides the Power and is of Four Post construction that gives Maximum Strength in a Minimum of Space with a Precision Feed Screw for positioning the Spindle. A heavy surface-ground Base Plate assures fast and accurate mounting on all types of Basic machine tools. This Basic Miller with 12 spindle speeds 50 to 500 rpm is utilized for heavy duty milling, boring, drilling, reaming, etc.

Seven types of inter-changeable precision heads are universal in angular adjustment, quickly inter-changed on the Basic Miller. These precision heads have speeds from 50 to 15,000 rpm; even 20,000 is available. They are the Hi-Speed End Milling and Drilling Head, 90° Universal Milling Head, Slotting and Internal Keyseating Head, Universal External Grinding Head, two types Internal Grinding Heads, and a precision geared Dividing Head, also many other fixtures and accessories are available.

BRIEFLY, WHAT IT WILL DO!

ON A LATHE – It converts any engine lathe for most all types of machining operations, both external and internal, merely by mounting it on the compound rest, cross-slide, or rear tool rest of the lathe carriage. It operates from the tool post position, therefore, the full capacity of the lathe is utilized by either hand or power feeding of the carriage, cross-slide, compound rest, taper attachment or relieving attachment. Operations can be performed full travel of the lathe carriage, giving extreme capacity for long work in one set-up.

The lathe holds the work and provides the feeds and speeds of machining and the lathe converter performs the operation. The flexibility of this universal machine which is fast and easy to set up and adjust, for either straight or angular work, makes it readily adaptable to the job. Quite often many complicated and bothersome operations can be quickly and easily performed with the Master Converter and a Lathe. Completing all operations in one set-up assures accuracy and alignment and saves time by eliminating the transfer and re-setting of work in another machine.

ON A TURRET LATHE – This Multi-Purpose Master Converter provides motorized tooling by mounting it on the front or rear of cross-slide or turret head of turret lathe to perform milling, slotting, end milling, drilling, grinding, or other operations supplemental to regular turret work. The Master unit can be mounted in either horizontal or vertical position and the ability to do a milled slot, keyway, end mill cut, off-center drilling, merely by stopping the turret and feeding the Master into the work, saves time and greatly reduces final cost. It also saves the non-productive cost of routing and transferring the work to another machine.

ON A MILLING MACHINE – The Master Converter, as a vertical head for milling machines offers the advantage of many types of spindles in one machine, with 24 speed changes from 50 to 5,500 rpm for milling, end milling, drilling, boring, etc., plus grinding heads and slotting heads which enlarge the scope of operations that the Master Converter will do on your mill. It can be attached to the over-arm or on table and is adjustable for angular positions of the tool or cutter, therefore, it is not a single purpose unit, made for any particular machine, but can be utilized on lathes and other machines in the shop.

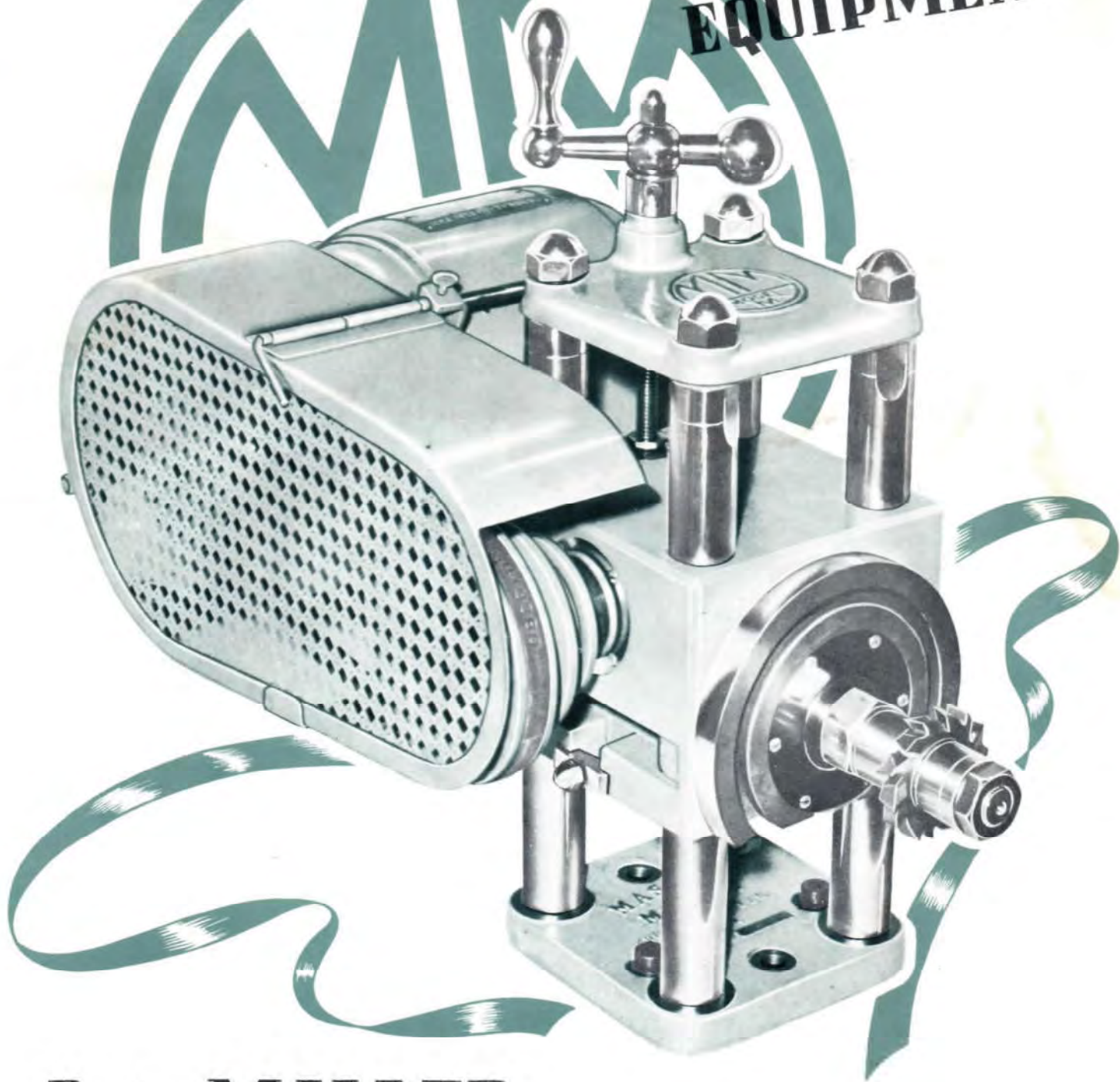
ON PLANER, BORING MILL AND OTHER MACHINES – In addition to its use on lathes, turrets and mills, it may also be mounted on the tool block of railhead of planer, boring mill, and other similar machines to do milling, drilling and grinding operations on large work pieces, which eliminates additional set-ups.

USED INDEPENDENTLY – Particularly in maintenance and repair work the Master Converter can be utilized as a drive for hand reamers, hones or as bench grinder, cut-off machines, etc. When used in connection with the Master Feed Table, can be taken to work for milling, drilling, grinding or slotting operations. Internal Keyseating can also be performed on the bench if mounted by vise or holding fixture for the part.

BUILT INTO SPECIAL MACHINE – The large variety of heads and fixtures available with the Master Converter makes it ideal for building into specialized production machines and offers the further advantage, that it can be dis-mounted and used on other machines. The speed range, plus universal adjustments makes it an economical motorized unit, that often saves expense, due to its flexibility in positioning and setting for the operation.

Since the Master Lathe Converter is a complete Universal Machine there is no limit to its application since creative ingenuity by various operators are continuously finding new uses and applications.

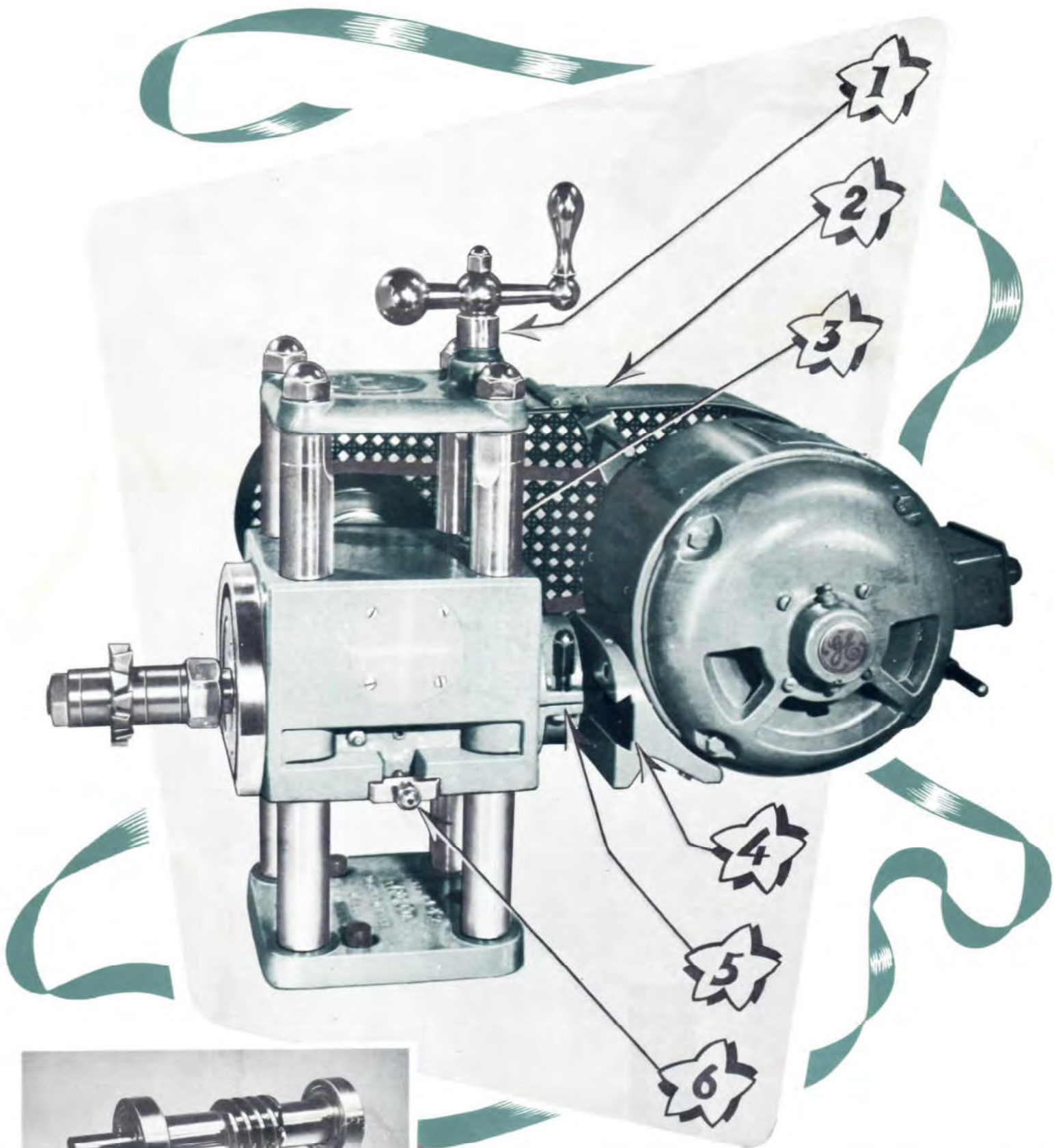
EQUIPMENT



Basic MILLER

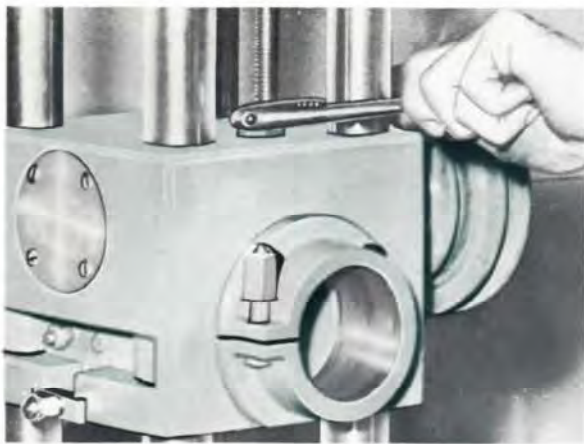
The Motorized Basic Milling Unit of the 3 New Master Lathe Converters embodies modern design and features found only in highly precision machine tools. The New "Shop Proven" design assures precision milling, boring or drilling with greater capacity and is faster set-up, due to the new simplified and conveniently located adjustments. The New Master Basic Millers are the ultimate-design in lathe milling attachments, and are equally adaptable on turret lathes, planers, boring mills, horizontal milling machines, etc. for supplemental milling, boring and drilling operations without changing work piece. 12 spindle speeds from 50 to 500 rpm handle a large variety of sizes and types of cutters and tools. These speeds are further enlarged by 12 additional speeds up to 5,500 rpm in the Hi-speed milling head.

Size	Power	Medium-Duty Lathes	Heavy-Duty Lathes
Model "M"	1, 1½ or 3 h. p.	18 to 30" swing	16 to 72" swing
Model "B"	½ or ¾ h. p.	13 to 20" swing	12 to 18" swing
Model "C"	⅓ or ½ h. p.	9 to 13" swing	10 to 12" swing



SPINDLE – The New Basic Miller is now equipped with a heavier pre-loaded spindle with precision matched, duplexed pre-loaded angular contact ball bearings for heavy duty radial and end thrust loads in both directions. The rear ball bearing is mounted with Belleville pre-load pressure springs that provides constant pre-load pressure that compensates for axial growth and wear.

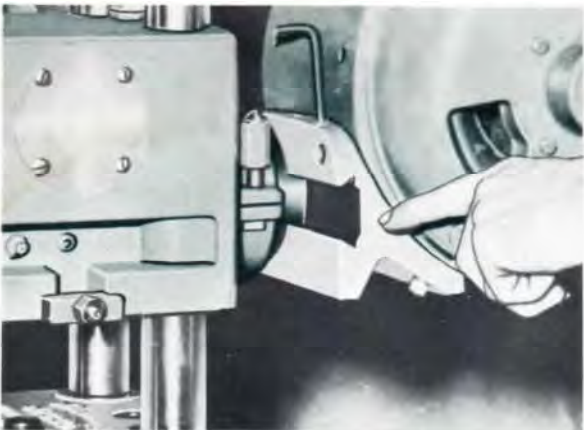
A hardened, ground worm and special aluminum bronze alloy (100,000 p. s. i.) gear with heavy tooth section gives maximum strength and long trouble-free service.



New FEATURES

No. 1. PRECISION FEED SCREW

An adjustable Graduated Dial on Lead Screw provides accurate reading of vertical feed graduated for .001 inch direct reading. An end-play adjustment is provided on the Lead Screw which is mounted on ball thrust bearings that provides ease of feeding.



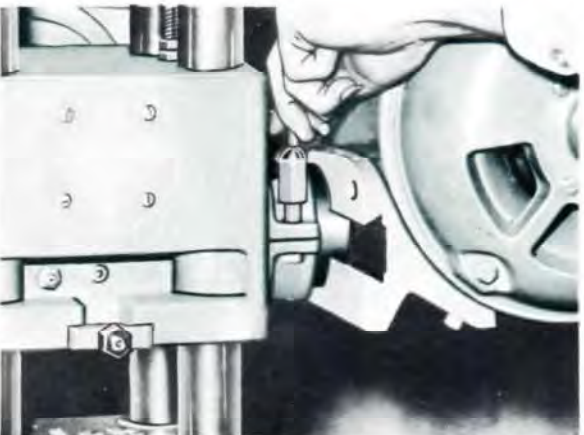
No. 2. SAFETY GUARD

A New Removable Safety Belt Guard is optional equipment, that gives complete closure of sheaves and belts on Basic Milling Unit. The Guard is two piece hinged type, designed for fast belt changing and front half removable when motor and heads are set at extreme angles.

No. 3. FEED SCREW ADJUSTMENT

Adjustable bronze nuts are provided on the Acme threads of Feed Screw to remove back-lash, which assure accurate feeding and positioning of the cutter or tool.

PRECISION **PLUS**

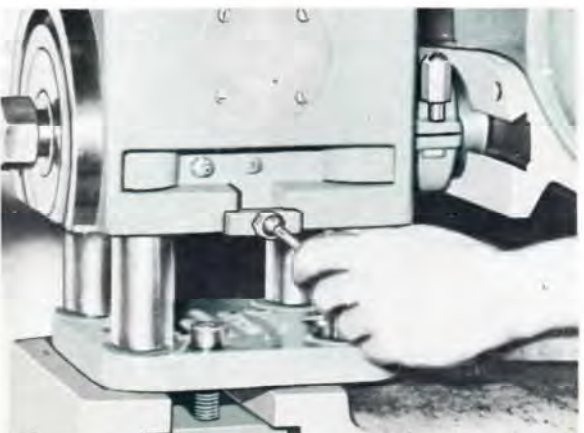


No. 4. NEW MOTOR MOUNT

A New Adjustable Motor Mount with V-Ways assures quick and accurate motor positioning for belt alignment.

No. 5. MOTOR MOUNT LOCK

Fast Belt Changes and positioning of motor is greatly simplified by a conveniently located, fast acting, single nut motor mount lock. The motor mount is a round tube, telescoping type swivels for angular setting of motor and moves in and out for belt adjustment.



No. 6. NEW VERTICAL POST LOCK

The New Basic Miller Design, incorporates an entirely New and Important Post Locking Mechanism, that assures accuracy and precision operations. All Four Post Locks are operated simultaneously by a single adjusting nut, and are self equalizing type, exerting equal pressure on all four of the hardened and ground posts. The longer bearings on the posts, together with this New Mechanism maintains accurate position of the cutter or tool. This New Post Lock speeds set-up time and accuracy of adjustments.

Interchangeable

MASTER MILLING AND SLOTTING HEADS

Universal Inter-changeable Milling, Drilling and Slotting heads, adjustable for angular positions, are quickly mounted on the compound face of basic miller by three T-slot bolts. These heads supplement the basic Miller with various type spindles and a wide range of spindle speeds, to give proper surface travel for an extreme size range of cutters and tools. The basic machine in combination with these heads provides a versatile motorized milling, boring, drilling and slotting unit with a flexibility for easy adaptation to most any job. Master Dividing Head adds precision indexing.

HI-SPEED END MILLING AND DRILLING HEAD

Adjustable 30° left or right of center for angular operations. Twelve spindle speeds from 550 to 5,500 rpm add a high speed range for small end mills, drills, and burrs. Tools and cutters are adapted in spindle by a wide variety of Master Arbors. The Hi-Speed Heads are equipped with spindle housing reversible end for end to position cutter on either side; also special heads are available for mounting vertically on machine, as well as higher speed range for carbide cutters and burrs up to 15,000 rpm.

90° UNIVERSAL MILLING HEAD

Has self contained spiral bevel gear drive with spindle mounted on Timken taper roller bearings. Spindle adapts cutters 1" bore and is adjustable for positioning cutter at any angle in 360° rotation. 12 spindle speeds 50 to 500 rpm, same as basic Miller. This head used for all types of thread milling, angle milling, gear cutting, etc.

UNIVERSAL SLOTTING AND KEYSEATING HEAD

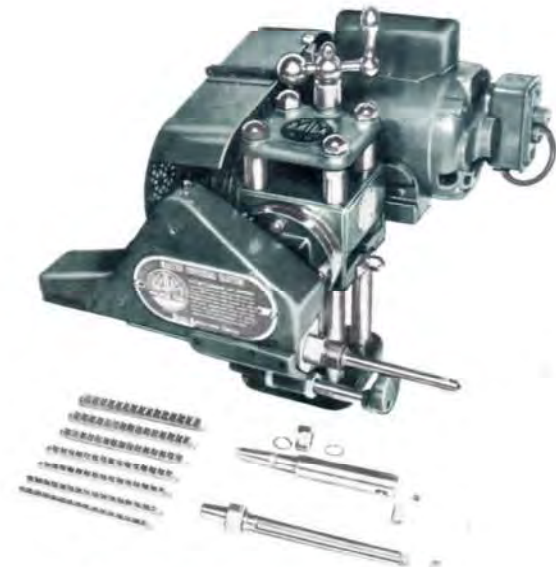
360° adjustment for setting ram at various angles. 12 speeds same as basic Miller. This head greatly broadens the scope of operations to include, slotting, shaping and internal keyseating, with precision indexed slotting by using the Master Dividing Head for rounds, flats, hexagon, splines, internal gears, dies, etc., and in straight or taper bores. It has an adjustable stroke and automatic tool relieving mechanism on back stroke. Various sizes and lengths of tool holders are available for single point tools, broaches, files, saws, etc. The head is fed vertically by feed screw of basic machine into the cut and a support sets against work piece to assure accuracy and take unnecessary strain from lathe cross-slide. Models "C" and "B", 1/2" to 4" stroke (6" keyway); model "M", 1" to 6" stroke (8" keyway).



HI-SPEED END MILLING AND DRILLING HEAD



90° UNIVERSAL MILLING HEAD



UNIVERSAL SLOTTING AND KEYSEATING HEAD



DIVIDING HEAD

Head's

MASTER GRINDING HEADS

Outstanding features of Master Grinders include: A vertical feed with .001" direct reading. Heads mount on compound face of basic Miller with three T-slot bolts. Compound is graduated in degrees for setting grinding wheel for various angles 0° to 30° left or right of center. Heavy balanced spindles mounted on super-precision ball bearings, Belleville preloaded with labyrinth type grease seals. High speed rubberized flat belt drives are used with a total of 16 grinding speeds for the three heads, since the drives are interchangeable on each model. Master Grinders are fast to set-up with a flexibility for quick adaptation to most any type of grinding job; whether it be Cylindrical, Surface, Face Plate, Flute, Internal, Cut-off, Tool and Cutter or Thread Grinding. The speed range gives proper surface travel for a wide variety of sizes and types of grinding wheels. These features are available at minimum cost through the advantage of this multi-purpose machine.

UNIVERSAL EXTERNAL GRINDER HEAD

Equipped with a double end spindle for mounting wheels on either or both ends of spindle with angular adjustments. Standard flat belt drive with eight spindle speeds (optional, V-belt drive available on models "B" and "M" external heads). Regular wheel sizes; model "C" - 4"; model "B" - 6"; model "M" - 8"; however, the speed range accommodates straight, cup, dish, flare cup, cut-off and thread grinding wheels. A diamond wheel dresser and a tooth rest grinding gauge are available, plus the geared Dividing Head for indexed grinding, makes it a universal tool grinder.

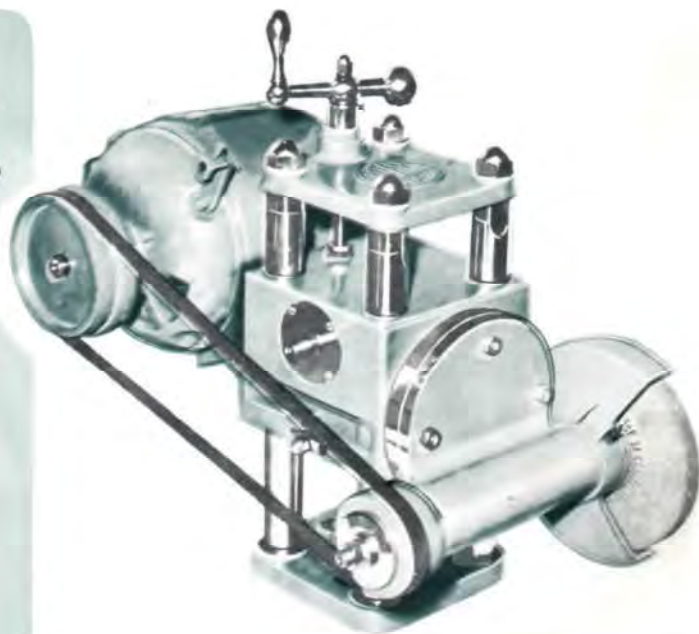
INTERNAL GRINDER HEAD - TAPER SPINDLE

High speed flat belt drive with four spindle speeds and angular adjustment. Designed for grinding small bores, bushings, dies, etc., using small wheels. Standard grinding depths; model "C" - 3"; model "B" - 4" and model "M" - 5½".

INTERNAL GRINDER HEAD, HEAVY DUTY

High speed flat belt drive with four spindle speeds and angular adjustment. Designed for grinding deep holes, sleeves, etc., with minimum investment in such grinder. Standard grinding depths; model "C" - 8"; models "B" and "M" - 10"; however, on special order, grinding depths up to 24" is available.

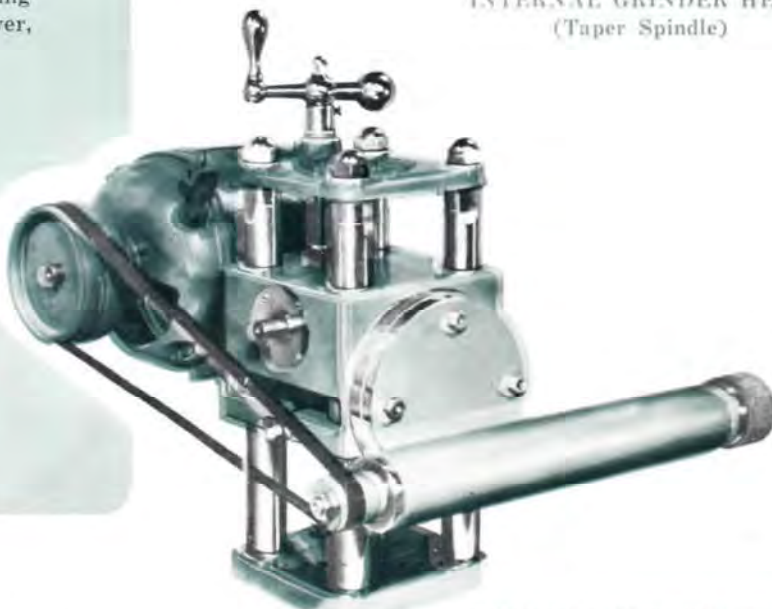
MASTER GEARED DIVIDING HEADS - 40 to 1 gear ratio - up to 720 Divisions for lathes and hollow spindles. Two sizes; Standard model for lathes 9" to 18" swing; heavy-duty model for 18" lathes and larger. Quickly mounts in the rear open end of lathe spindle by expanding collets to adapt it to various size spindle bores; standard - 3/32"; heavy duty - 1/8" expansion. (Sliding expansion type, assures concentricity with spindle.) Hardened ground worm and bronze gear with end play and back-lash adjustment assures precision indexing on any work held in lathe centers, chuck, face plate, or Master Tilting Table. Designed for fast, accurate set-ups with a new hook clamp on dividing head arm. Index work limited only by the size of your lathe.



UNIVERSAL EXTERNAL GRINDER HEAD



INTERNAL GRINDER HEAD (Taper Spindle)



INTERNAL GRINDER HEAD, HEAVY DUTY

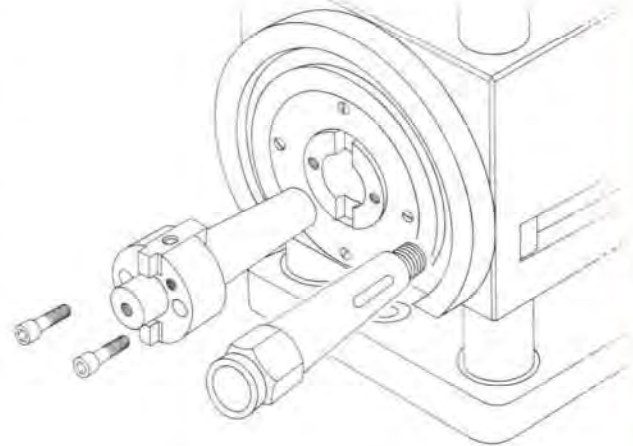
Arbors MASTER Taper

ARBORS – THREADED AND KEY DRIVE TYPES

The spindles of all three Master Basic Millers and Hi-Speed Milling Heads adapt threaded type arbors that are interchangeable in the spindles for mounting practically all types of standard milling cutters and tools. The Master taper has a greater taper than Morse or Brown & Sharpe; therefore tools having these tapers are adapted by arbors. The Model "M" Basic Miller is standard with key drive type spindle which accommodates both key drive and threaded type arbors. Key drive arbors are recommended for large cutters such as staggered tooth side mills and shell end mills or where left hand drive is required.

Master Taper No. 1 fits Models "C" and "B"

Master Taper No. 2 fits Model "M"



SIDE MILL ARBOR – KEY DRIVE

For adapting arbor type cutters; standard sizes: $\frac{7}{8}$ "–1"–1 $\frac{1}{4}$ " bore diameters with three inch mandrel for cutter adjustment; complete with spacing washers and key. Fits Model "M" basic spindle.



SIDE MILL ARBOR – THREADED TYPE

For adapting arbor type cutters; standard sizes: $\frac{3}{4}$ "– $\frac{7}{8}$ "–1"–1 $\frac{1}{4}$ " bore diameters; Master Taper No. 1, 2 $\frac{1}{2}$ " mandrel for cutter adjustment; Master Taper No. 2, 3" mandrel for cutter adjustment; complete with spacing washers and key.



TAPER ARBOR – MORSE OR BROWN & SHARPE

Have Master taper for fitting into Master spindles and a taper socket for adapting standard Morse or Brown & Sharpe taper shank tools. (tang type). Allen screw for locking tool in arbor. Sizes:

Model "M" – No. 2 or No. 3 Morse and No. 5, No. 7 or No. 9 B & S

Models "B" and "C" – No. 2 Morse and No. 5 or No. 7 B & S



BLANK ARBORS – FOR ALL MODELS

Taper finished and ground with mandrel end left blank. Arbor is centered for turning, threading or grinding as desired. Various lengths available.



FLYCUTTER ARBORS

For facing, boring and flycutting, 45° or 90° tool position for 5/16" square ground tool steel.



ANGLE MILL ARBOR - THREADED

For adapting threaded type angle mills for milling V-ways, flutes, etc.
Standard sizes; 3/8" - 24 N. F. or 1/2" - 24 N. F.



END MILL ARBOR - FOR STRAIGHT SHANKS

For adapting standard shank type Woodruff keyseat cutters and straight shank end mills and burrs in a variety of sizes:
Model "M" - 1/8" to 1" diameter.
Models "C" and "B" - 1/8" to 3/4" diameter in sixteenths.



DRIVE ARBOR - FOR 90° AND SLOTTING HEADS

Fits Spindle of Basic Miller, providing a floating key drive for above heads. Arbor included with each head.



SHELL MILL ARBORS

For adapting shell end mills for surface and large slot keyway and slot milling, standard key drive.
Model "M" - 1/2" - 3/4" - 1" - 1 1/4" mandrel size.
Models "C" and "B" - 1/2" - 3/4" - 1" mandrel size.



ARBOR FOR CHUCKS - THREADED TYPE

Arbors are available for adapting standard Universal Chucks. Threaded type 3/8" - 24 N. F. or 1/2" - 20 N. F. Can furnish arbor only or complete with chuck.

EXTENDED ARBORS

For Outboard Arbor Support. Furnished in various sizes and lengths for straddle milling, surface mill-

ing, slotting, etc. For heavy cuts arbor furnished with locking nut against spindle.

Sizes; 7/8" - 1" - 1 1/4", lengths as required.



Slotting.. **KEYSEATING HEAD**

The new Master Universal Slotting and Keyseating Head is quickly mounted on the Basic Milling Unit with three T-slot bolts. It provides the action of a draw cut shaper with adjustable stroke length and positive locking adjustable crank slide. An automatic tool lifting mechanism lifts the tool out of the cut on the return stroke thus eliminating back drag of tool, making it possible to use carbide tools. This portable Slotter can be mounted on lathes, turrets, milling machines, bench, and other special applications. The Slotter is fed into the cut with the vertical feed screw of the Basic Unit having graduated dial reading in .001". A heavy support arm rests against the work taking the thrust load of the cutting stroke. When used with the Geared Dividing Head, it performs all types of indexed slotting, internal keyseating, splines, as well as irregular shaping. The Slotting Head is also adaptable without the Basic Miller as an independent slotter on milling machines.

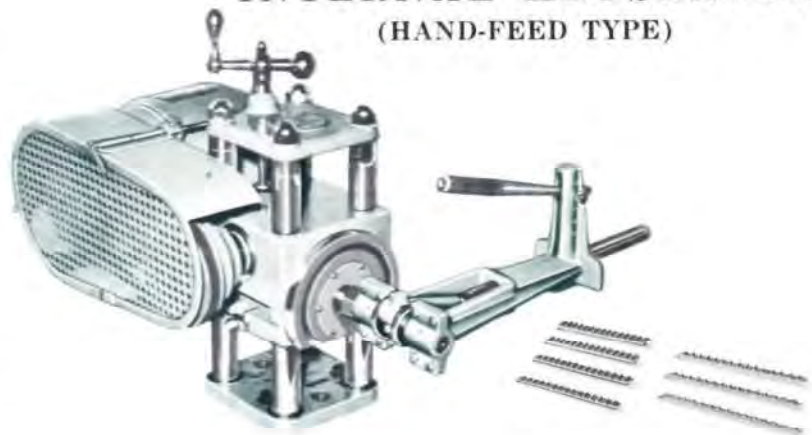
TOOL HOLDERS AND BROACH BLADES

Interchangeable Tool Holders are available in a variety of sizes for single point tools and also for Broach Blades. These tools make the Slotter adaptable for practically any slotting, shaping, or keyseating job in either open or blind holes. Formed Ground Tools are available for keyseat cutting:

Models "C" and "B" Single Point Tools up to 1/2", Broach Blades 6" long, 1/8" to 1/2" widths in sixteenths;

Model "M" Single Point Tools to 3/4", Broach Blades 8" long, above sizes plus 5/8" and 3/4" widths.

INTERNAL KEYSEATER (HAND-FEED TYPE)



An eccentric driven, broaching type Keyseater driven from Basic Miller. Cuts internal keyways in straight or taper bores, in sleeves, gears, pulleys, etc. Adjustable feed handle for various size bores applies hand pressure on cutting stroke. The attachment sets against work piece and takes thrust load off cutting stroke. A low-cost attachment for the shop desiring minimum investment for internal keyseating equipment.



GRINDER GAUGE

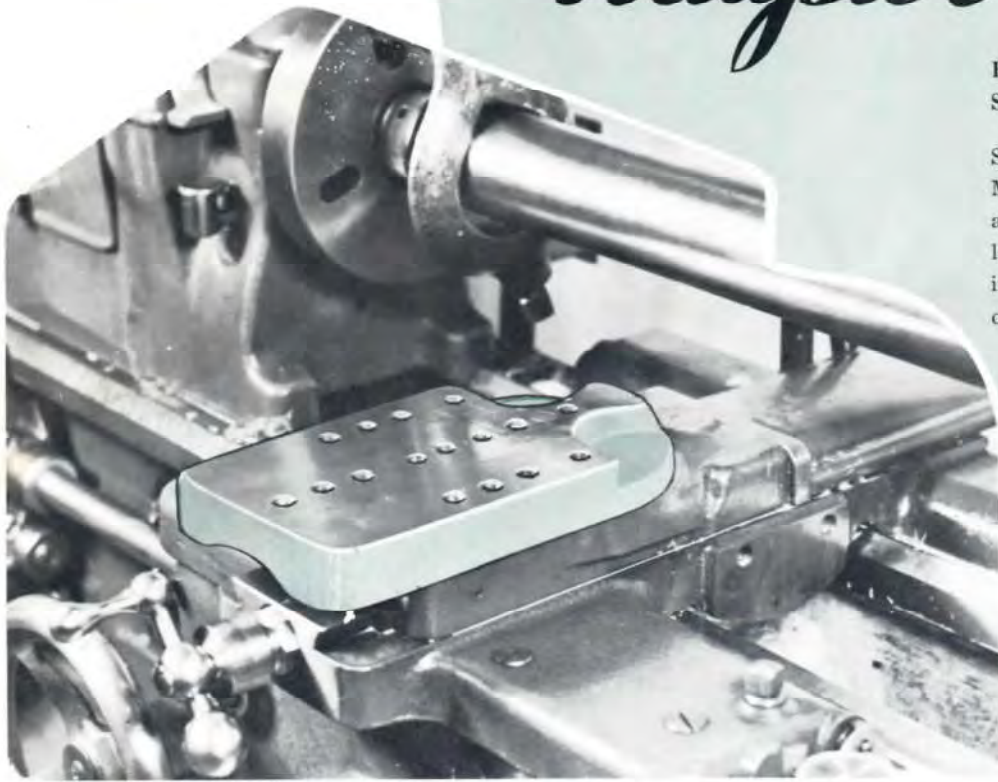
A universal tooth rest type gauge for tool and cutter grinding – attaches to face plate or lathe carriage. Available with Master Grinding Heads.

DIAMOND WHEEL DRESSER

Used with Master Grinders for dressing and shaping grinding wheels – attaches to face plate, on work piece or tail stock spindle of lathe. Designed for quick set-up with three positions for diamond.



Adapter **BASE**



FOR MOUNTING ON LATHE CROSS-SLIDE

Simple adapters are used for mounting Master Lathe Converters on lathes. An adapter base for mounting directly on lathe cross-slide provides a rigid mounting and lowers the machine for operations on or below center. This base adds to the capacity of cross-slide with various spaced mounting holes to position the machine farther out from center. If lathe dimensions from cross-slide are available it is supplied finished; otherwise, semi-finished, lathe mounting is left blank to be fitted by customer.

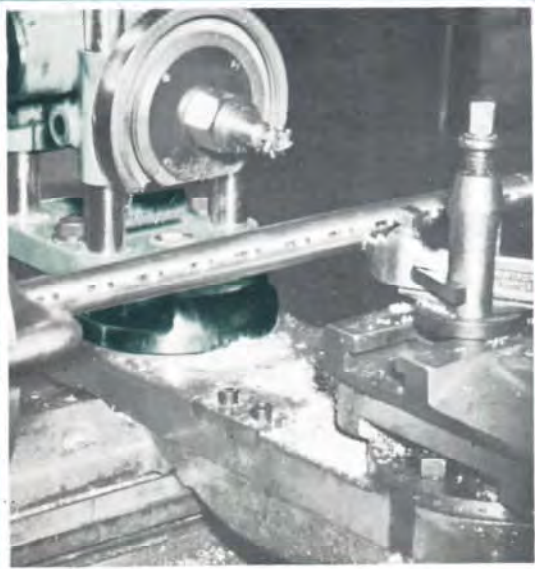


REAR TOOL REST MOUNTING

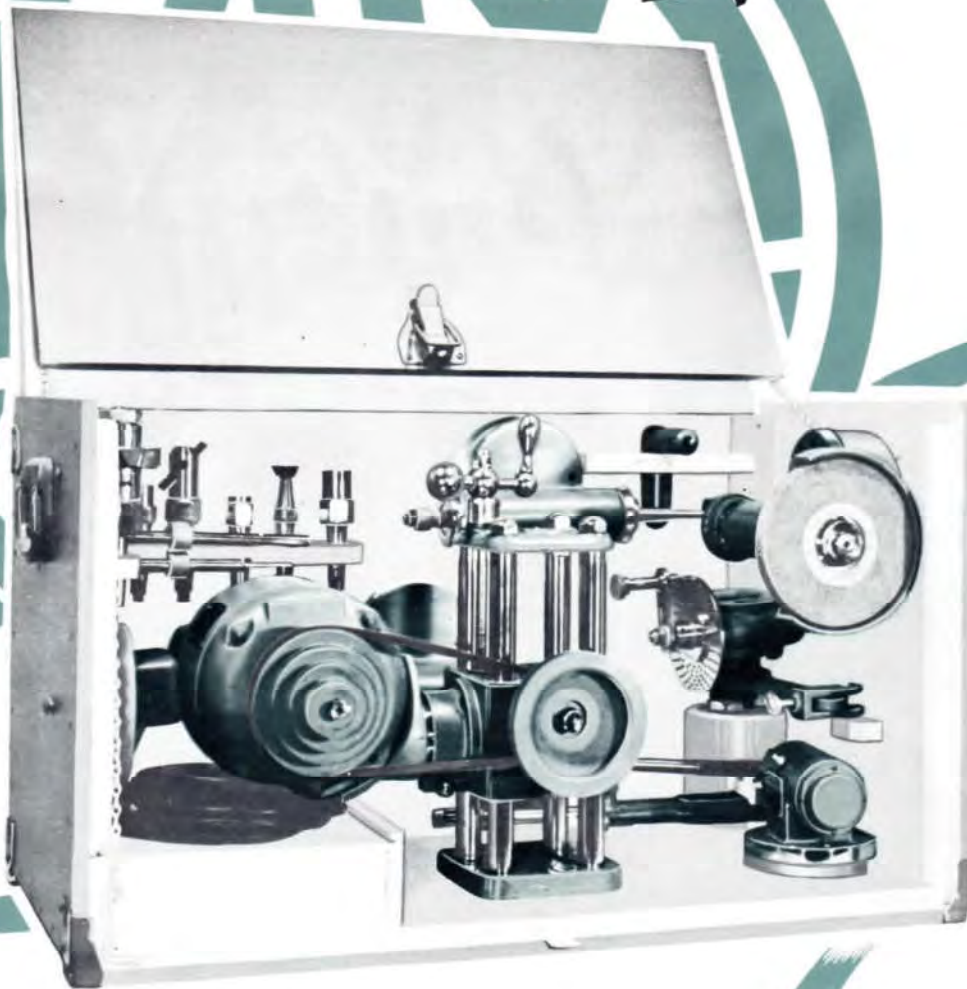
The Master Lathe Converter can be mounted on rear tool rest of lathe cross-slide to eliminate setting up and removing machine on a production job or repeat operation. This leaves the front tool post open for turning operations and saves non-productive set-up time.

T-SLOT ADAPTER MOUNTING

The most used set-up of Master Converters is mounting it on the compound rest or top slide of lathe. This adapter slides into the Tool post T-slot. Two cap screws securely hold the machine, using either pair of mounting holes in base for setting the machine in three positions on compound.



EQUIPMENT



Master **LATHE CONVERTER** *as a*

*Complete
Shop Kit*

All Three Models are now available in Master Shop Kits which includes the Basic Miller and a standard group of heads, arbors and accessories in a shop cabinet. The equipment included gives a wide range of metal working operations that can be done on lathes and other machines with minimum investment, which makes it ideal for maintenance departments, tool rooms, experimental or production departments, mobile, isolated shops or aboard ships. This packaged shop kit offers substantial savings, than if purchased individually, or a piece at a time. Many other heads, fixtures and accessories are available for Master Converters to broaden its scope of operations, but the Shop Kit includes the following:

Basic Miller, with motor
Universal External Grinder
Internal Grinder, taper spindle
Hi-speed Milling and Drilling Head

90° Universal Milling Head
Slotting and Keyseating Head
Master Geared Dividing Head
Seven (7) Arbors for cutters

Feed TABLE

The Master Lathe Converter, basic Miller, is shown mounted on the Master Independent Feed Table which permits taking the machine to the work. This Universal Table has a compound adjustment for feeding at various angles and capacity for ten inches of travel with three inches of cross-feed. It can be attached to floor, machine or on bench for such work as milling keyways, slots, surface milling, boring, drilling, grinding, shaping and slotting; as well as internal keyseating on bench by mounting near vise or holding fixture for the work. In addition to its use with the Master Converter, can be utilized on drill presses and similar machines for feeding work in both directions or at angles, holding work in vise or on table.

MASTER UNIVERSAL FEED TABLE

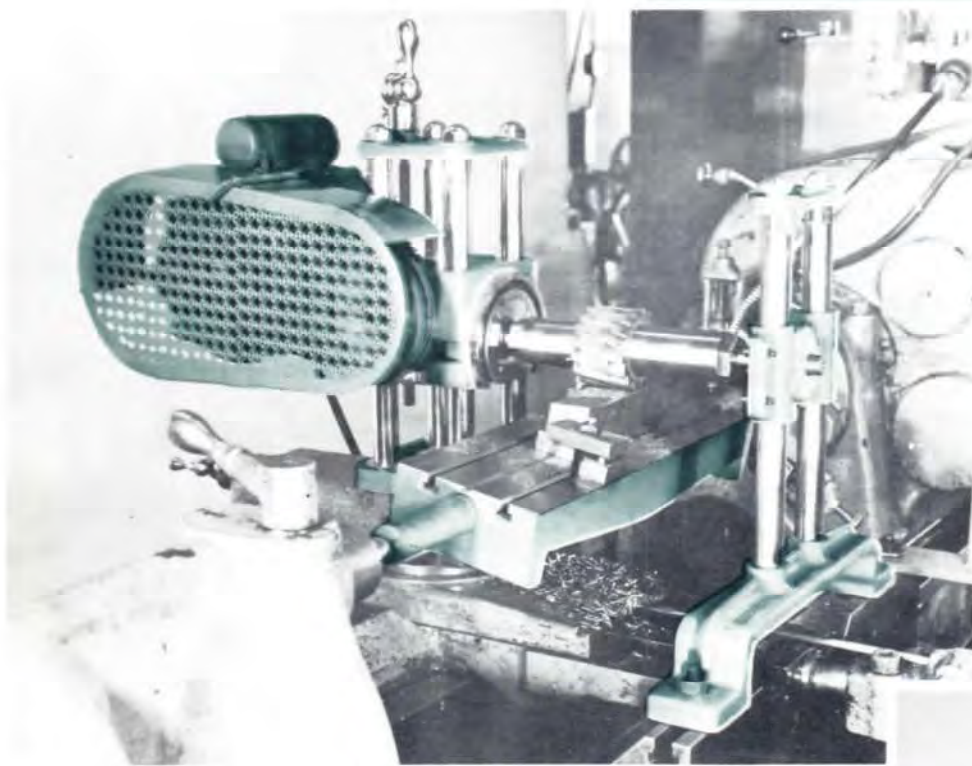
The top slide is mounted on a compound, graduated in degrees for feeding at all angles, with a precision feed screw having ten pitch Acme threads and graduated dial for .001" direct reading. Adjustable gibs in V-ways together with surface ground slides assures accuracy of feeding and positioning. Bottom slide is 8" wide by 19" long.



Outboard SUPPORT FOR MILLING ARBOR

Practically all milling operations are performed with the Master Lathe Converter using short unsupported arbors. However, for heavy duty milling, such as, straddle milling, surface and form milling on large work piece requiring the cutter to be mounted out from spindle an Outboard arbor support is available. The arbor support mounts on the rear wings of lathe carriage having twin posts with sliding ball bearing arbor pilot. Outboard Support can be locked in any vertical position. Available for each model Master Converter.

A model "B" Master Converter with Outboard Arbor Support and extended arbor, shown mounted on 16" Lathe. Also shown is Master Milling and Grinding Table, tilting type, which is quickly set-up between lathe centers being held in position by a steady rest. This Table can be tilted to any desired angle and is very useful in holding flat and irregular shaped work. Saves time and simplifies many complicated set-ups, on angle milling and grinding of long thin blades, knives, etc.



MASTER MILLING AND GRINDING TABLE FOR LATHES

A small milling and grinding table designed for fast set-up between lathe centers to hold flat and irregular work pieces and support long small shafts. The table has a ground surface $5\frac{1}{2}'' \times 16\frac{1}{2}''$ and is provided with two T-slots and a center V-groove. The Table is held and positioned by the Lathe steady rest and can be tilted to any desired angle, since it mounts between centers. In addition to its use on lathes, makes a useful bench surface table for gauging, inspecting, etc. It is also useful for positioning work, layouts, etc., on drill presses and similar machines.

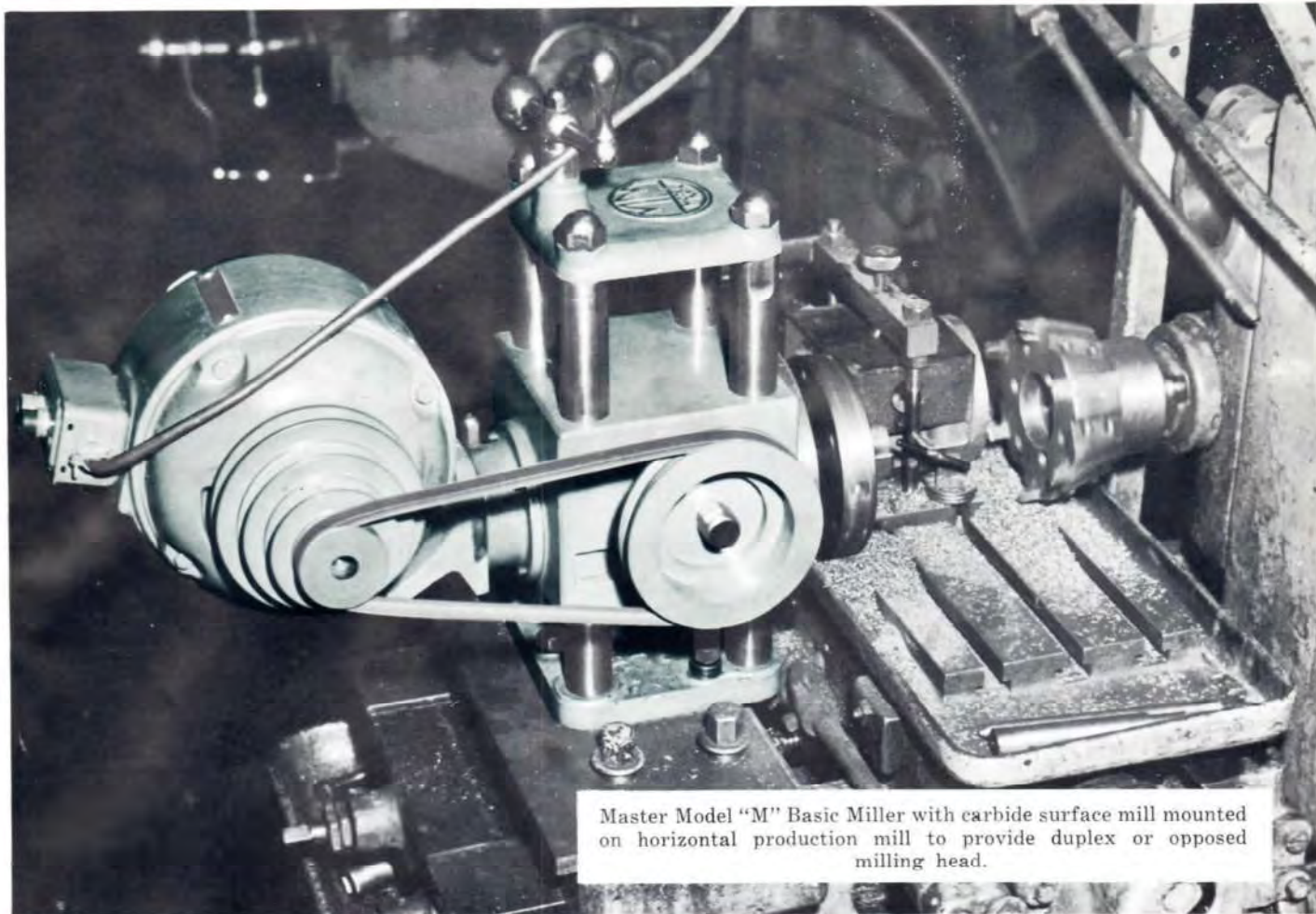


SPECIFICATIONS

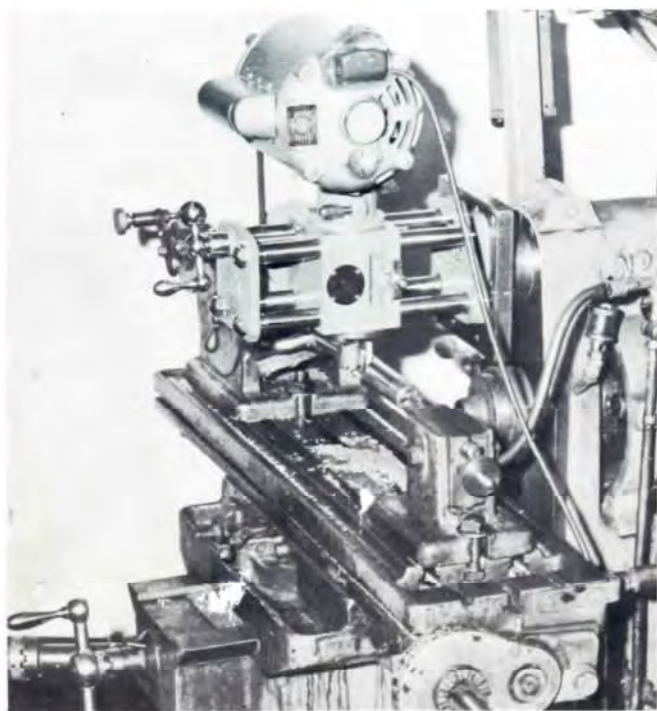
REVISED FEBRUARY, 1953

MASTER LATHE CONVERTERS	MODEL "C"	MODEL "B"	MODEL "M"
BASIC MILLER – Recommended for use on lathes	9 to 13 inch Swing	13 to 20 inch Swing	18 to 72 inch Swing
Electric Motor – includes switch, cord and plug 115/230v-60c-1ph-AC or 220/440v-60c-3ph-AC Other Motors: 220/380/440/550v – 50/60 or 25c – or DC	½ h. p. Standard ½ h. p. Optional	½ h. p. Standard ¾ h. p. Optional	1 h. p. Standard 1½ h. p. Optional 3 h. p. Optional
BASIC MILLING HEAD – Milling Spindle Taper 12 Speeds – 11 to 1 ratio – Standard 12 Speeds – 22 to 1 ratio – Optional Slow Speed Hardened Ground Worm – Alum. Bronze Gear (Hi-tensile) Spindle – Precision Ball Bearings, preloaded for radial and end thrust – Duplex on front of Spindle Center of Spindle – from bottom of Base Compound Face – Circular T-slot – Scale in degrees Bearing length on Posts Post Locks – Simultaneous locking on all four posts – Single adjusting nut with equalizing action that locks vertical position	No. 1 – Master Taper 50 to 500 rpm 25 to 250 rpm 4 pitch Acme Worm Min. 2¼" Max. 7¼" 0° to 30° left and right four inches	No. 1 – Master Taper 50 to 500 rpm 25 to 250 rpm 4 Pitch Acme Worm Min. 2¼" Max. 9" 0° to 30° left and right 4½ inches	No. 2 – Master Taper 50 to 500 rpm 25 to 250 rpm 2½ Pitch Acme Worm Min. 3¼" Max. 11¼" 0° to 30° left and right 6¾ inches
Motor Mount: Round telescopic clamp type with V-way side adjustment	1 inch belt adjustment	1 inch belt adjustment	1 inch belt adjustment
FOUR VERTICAL POSTS – Heat treated and precision ground. Threaded, shouldered and screwed-in base	¾ inch diameter	1 inch diameter	1½ inch diameter
BASE – High tensile gray iron, surface ground, with four mounting holes	4¼x4¼x11/16 thick	6x5¾x13/16 thick	7½x7½x1 inch thick
VERTICAL FEED SCREW – Mounted in post cap on Acme Threads – 10 threads per inch Graduated Dial – Marked 0-10-20-30, etc. Vertical adjustment – (end play and back lash adj.)	Ball Thrust Bearings .100" per revolution .001" direct reading 5 inches – Standard	Ball Thrust Bearings .100" per revolution .001" direct reading 6¾ inches Standard	Ball Thrust Bearings .100" per revolution .001" direct reading 8 inches Standard
HI-SPEED MILLING AND DRILLING HEAD – Direct V-belt Drive 12 Spindle Speeds – (faster speeds on special order) Spindle Bearings – Precision ball, duplex on cutter end.	No. 1 Master Taper Arbor 550 to 5,500 rpm	No. 1 Master Taper Arbor 550 to 5,500 rpm	No. 2 Master Taper Arbor 550 to 5,500 rpm
90° UNIVERSAL MILLING HEAD – Adjustable 360° 12 Spindle Speeds – Same as basic Miller Spindle – On Timken taper roller bearings Gears – Hardened Spiral Bevel – floating arbor drive	50 to 500 rpm 1 inch arbor size	50 to 500 rpm 1 inch arbor size	50 to 500 rpm 1 inch arbor size
SLOTING AND KEYSEATING HEAD – Automatic tool relieving on return stroke 12 Speeds same as basic Miller – adjustable 360° Adjustable Stroke – with various ram positions Inter-changeable tool holders – various sizes and lengths. Single point tools or broaches available. Heavy Duty Ram with large bearing area	50 to 500 rpm ½ to 4" – (6" Keyway)	50 to 500 rpm ½ to 4" – (6" Keyway)	50 to 500 rpm 1 to 6" (8" Keyway)
HAND FEED INTERNAL KEYSEATER – Adjustable feed handle Eccentric drive, adjustable for taper bores Broach Blades – interchangeable in same mandrel	⅝ inch mandrel 1½ inch stroke ⅜ to ½ inch widths	⅝ inch mandrel 1½ inch stroke ⅜ to ½ inch widths	1 inch mandrel 2 inch stroke ⅜ to ¾ inch widths
UNIVERSAL EXTERNAL GRINDER HEAD – Double end spindle. Adjustable 30° left or right of center for angular setting of wheel 8 Spindle Speeds – Rubberized flat belt or V-belt Grinding Wheel – speeds for many sizes and types Spindle Bearings – Super-precision ball, Belleville preloaded	5,175 to 8,675 rpm 4x½x½ Std.	3,750 to 5,400 rpm 6x¾x½ Std.	2,750 to 3,925 rpm 8x¾x⅝ Std.
INTERNAL GRINDER HEAD, TAPER SPINDLE – Standard length 4 Spindle Speeds – rubberized flat belt drive Grinding Wheels – regular equipment and minimum Spindle Bearings – Super-precision ball, Belleville preloaded. Adjustable 30° left or right of center for angles	3 inches 10,350 to 14,600 rpm 1¼x¼x¼ (½" min.)	4 inches 8,300 to 14,600 rpm 1¼x¾x¾ (11/16 min.)	5½ inches 8,300 to 10,800 rpm 1¼x¾x¾ (7/8" min.)
INTERNAL GRINDER HEAD, HEAVY DUTY – Standard length 4 Spindle Speeds – rubberized flat belt drive Grinding Wheels – regular equipment straight Cup Spindle Bearings – Super-precision ball, Belleville preloaded. Head adjustable 30° left or right of center for angles	8 inch grind depth 5,175 to 6,200 rpm 2½x1½x½x½	10 inch grind depth 5,175 to 6,200 rpm 2½x1½x½x½	10 inch grind depth 5,175 to 6,200 rpm 3x1½x½x⅝
GEARED DIVIDING HEAD – for lathes and hollow spindles TWO SIZES: Standard Dividing Head, for use on Heavy Duty Dividing Head, for use on Expanding Collets – interchangeable to fit spindle bore Hardened Ground Worm – Bronze Gear, Adjustable for back-lash – Standard – five pitch worm: Heavy Duty – 2½ pitch worm Steel Index Plates – three plates – Plate 1; 15-16-17-18-19-20. Plate 2; 21-23-27-29-31-33. Plate 3; 37-39-41-43-47-49.	40 to 1 ratio 9 to 18 inch lathes	40 to 1 ratio 9 to 18 inch lathes 18 inch and larger	40 to 1 ratio 18 inch and larger
SHOP CABINET – Heavy plywood metal reinforced	28x18x16½	34x20x18½	36x24x24

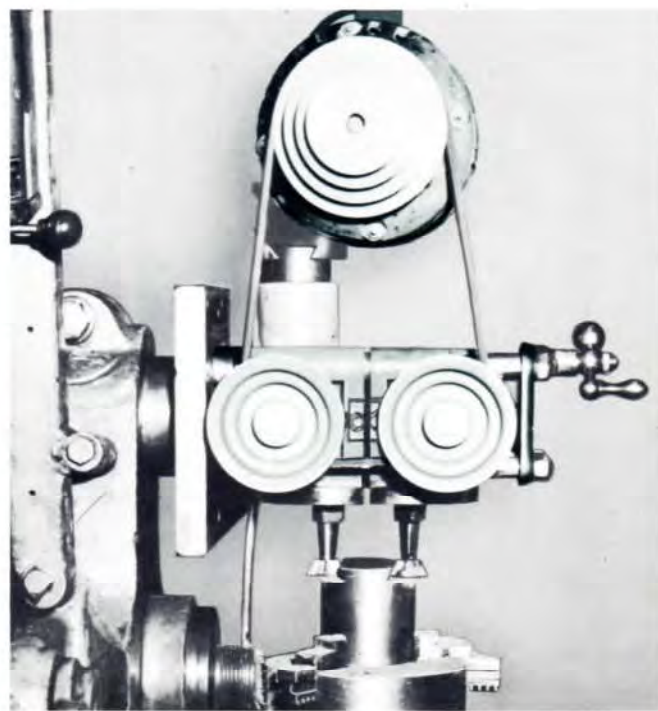
(SPECIFICATIONS SUBJECT TO CHANGE WITHOUT NOTICE)



Master Model "M" Basic Miller with carbide surface mill mounted on horizontal production mill to provide duplex or opposed milling head.

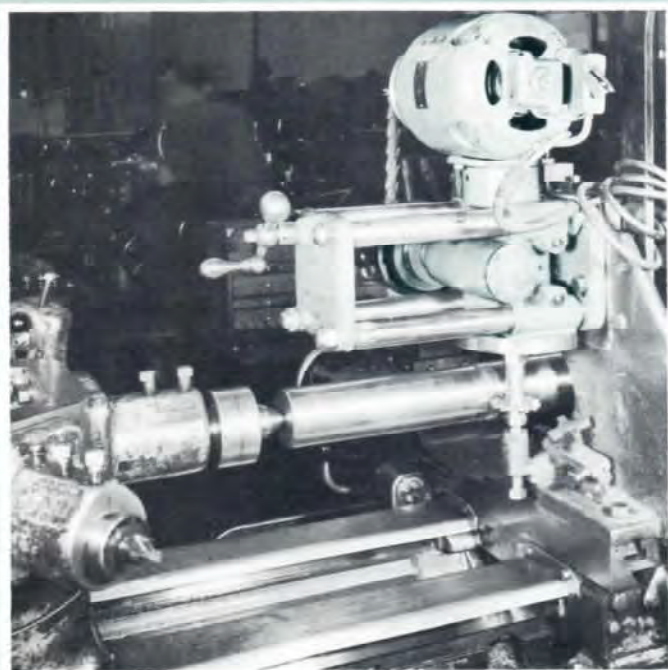
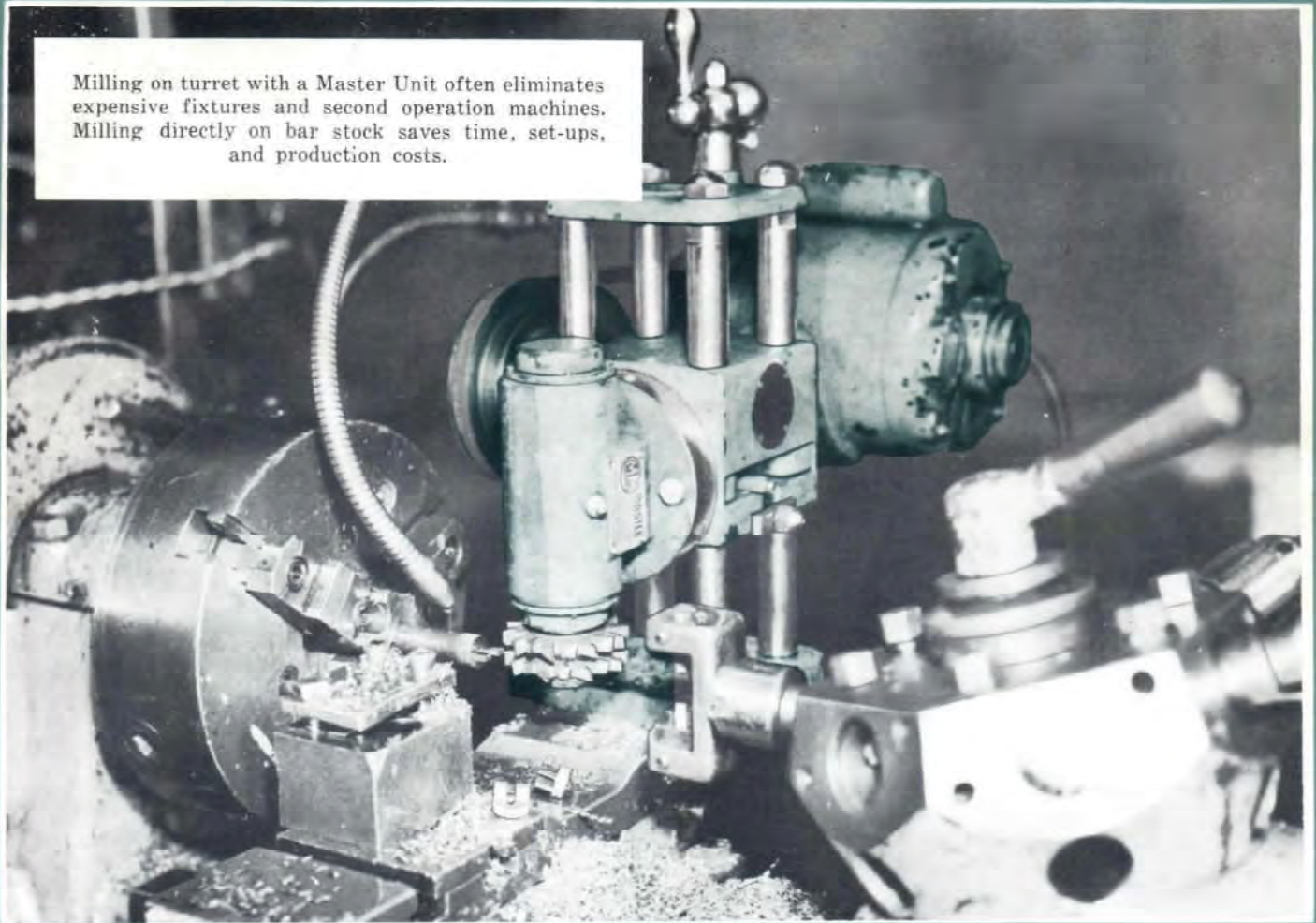


As a vertical head on milling machine provides 24 speeds 50 to 5,500 rpm; also does drilling, slotting and grinding.



Master attachment with two milling heads mounted on milling machine completing both milling operations with one pass of the work.

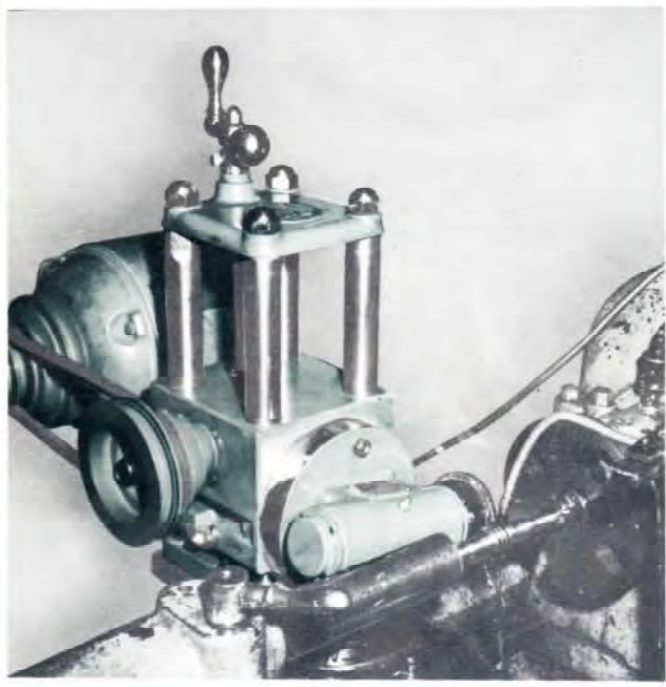
Milling on turret with a Master Unit often eliminates expensive fixtures and second operation machines. Milling directly on bar stock saves time, set-ups, and production costs.



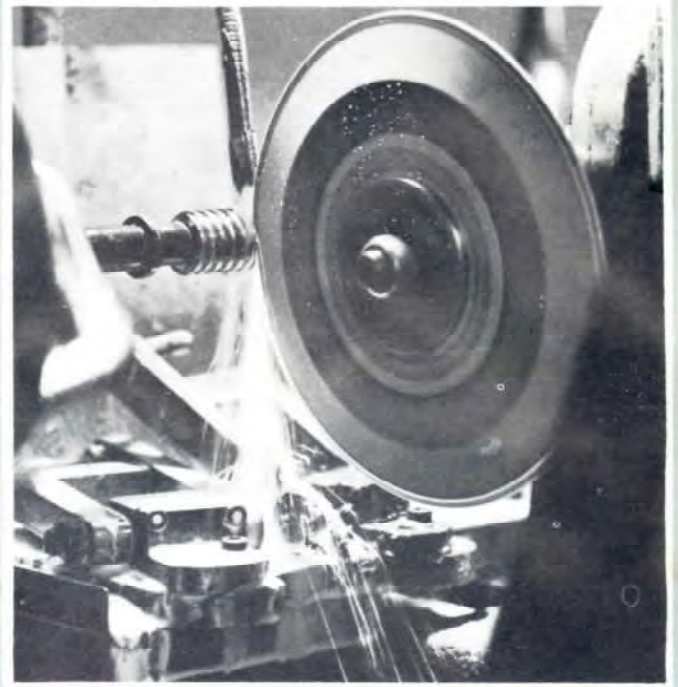
A Master vertically mounted on turret completes milling operations; also used on cross-slide or turret head.



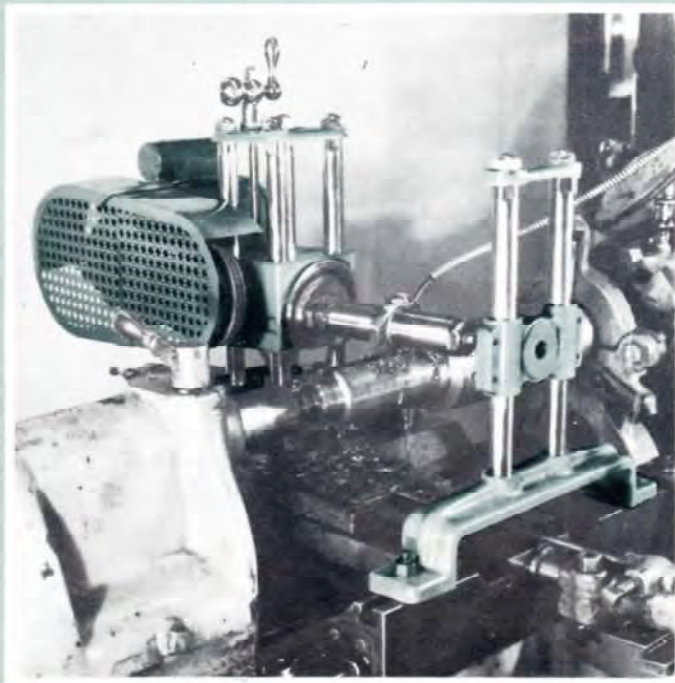
Straddle milling on a turret lathe with Master Model "B" milling attachment completing part in turret. Twelve seconds for $\frac{1}{2}$ " cut on $\frac{3}{4}$ " bar stock.



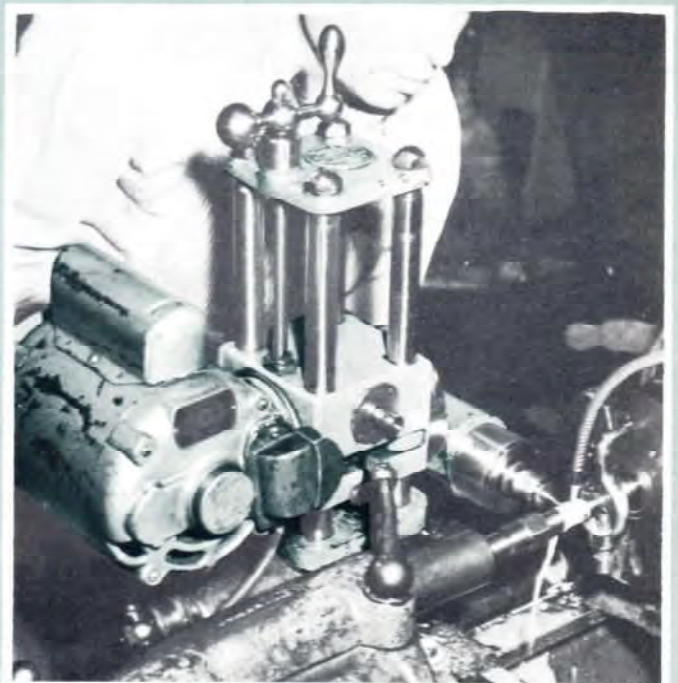
The Master Basic Unit and 90° Milling Head milling threads on double lead worm. It performs external or internal thread milling operations. Formed thread milling cutter adjusts to helix angle and is fed by the lead screw.



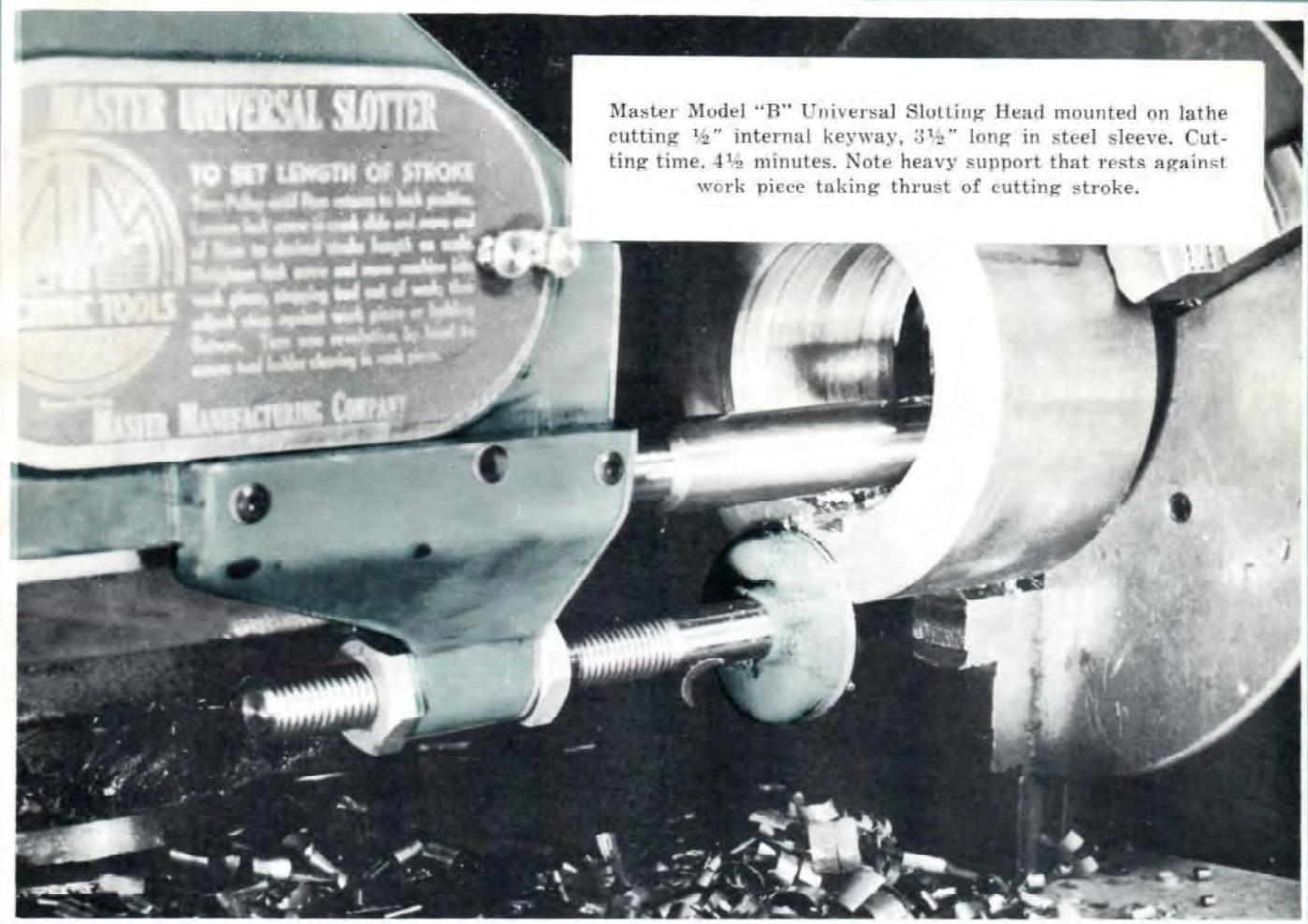
Master Unit grinding the threads on heat treated worm using thread grinding wheel on External Grinder Head. An adjustable hand-operated Wheel Dresser is available.



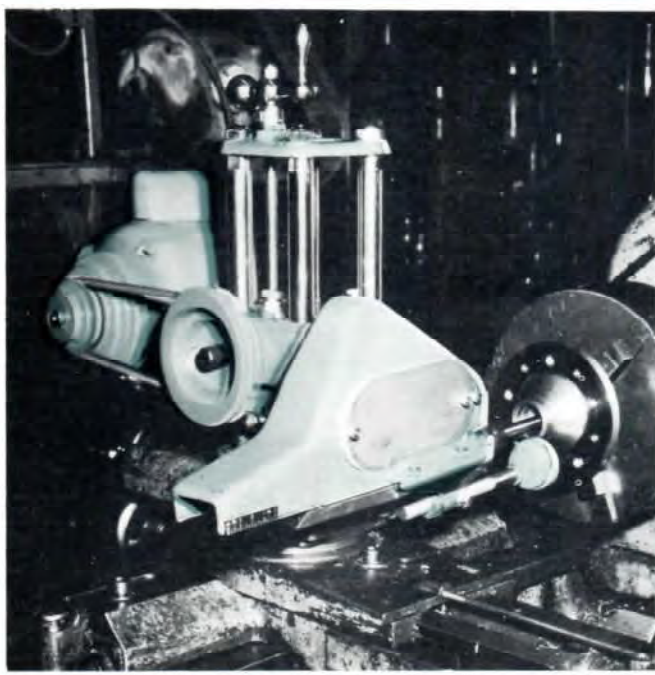
Master Basic Unit milling large keyway using Extended Arbor and Master Outboard Arbor Support. Recommended for heavy cuts, straddle milling, and where cutter is mounted out from Basic Unit.



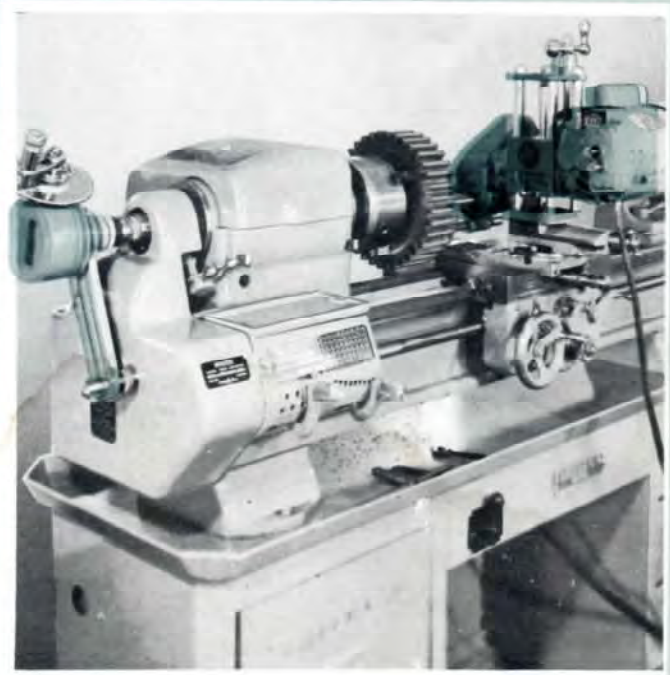
Hi-Speed Milling Head shown in reversed position end milling on a lathe. Fast movement of carriage and cross-slide speeds up many end milling jobs.



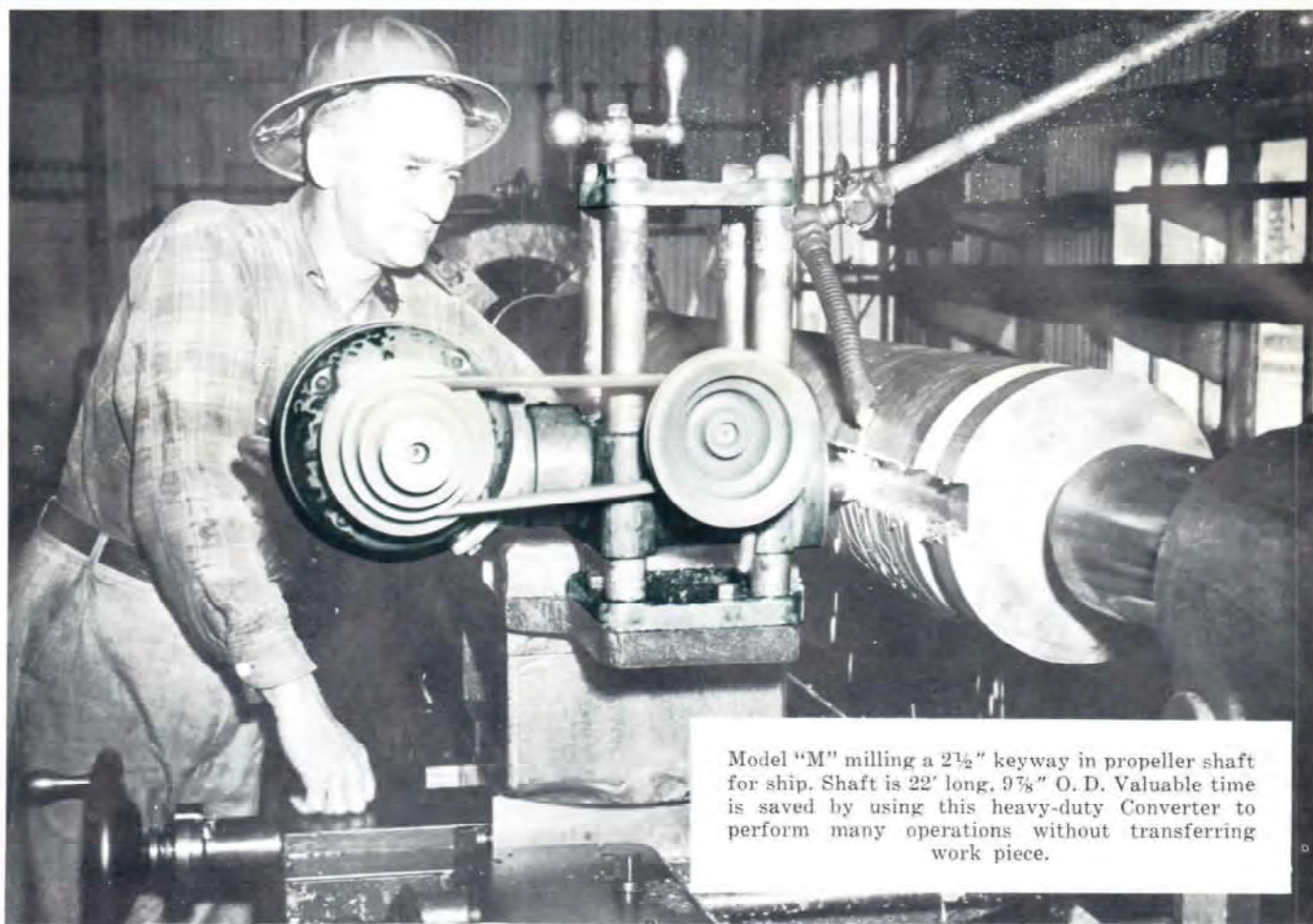
Master Model "B" Universal Slotting Head mounted on lathe cutting $\frac{1}{2}$ " internal keyway, $3\frac{1}{2}$ " long in steel sleeve. Cutting time, $4\frac{1}{2}$ minutes. Note heavy support that rests against work piece taking thrust of cutting stroke.



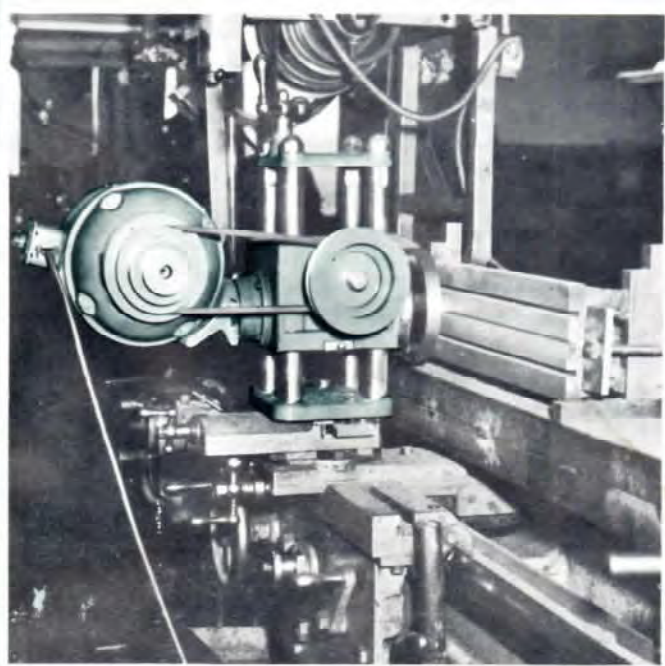
Master Universal Slotter on Model "B" machine cutting keyway in taper hub of automobile. Slotting Head adjusted to angle of taper, fed to depth of cut by vertical screw having .001" direct reading.



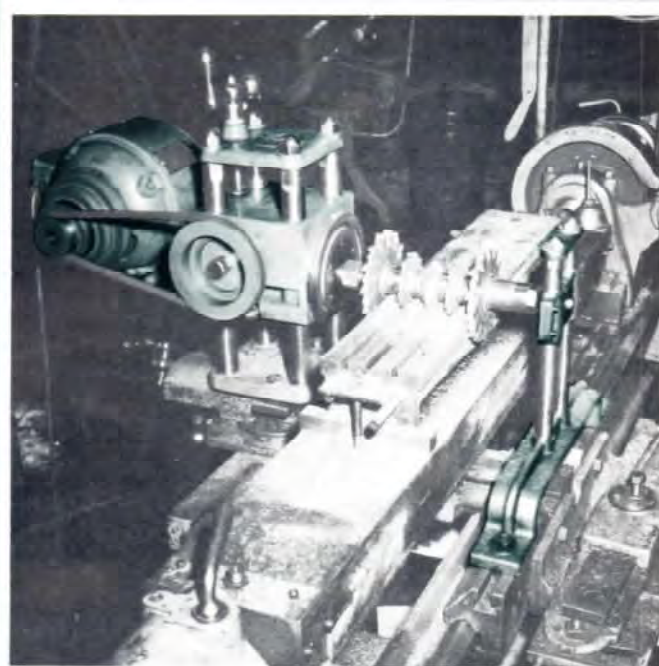
Master Model "C" with Slotting Head cutting indexed keyways in spur gear. Note Geared Dividing Head in lathe spindle for indexing. Similar set-up for internal splines, keyways, irregular shaping.



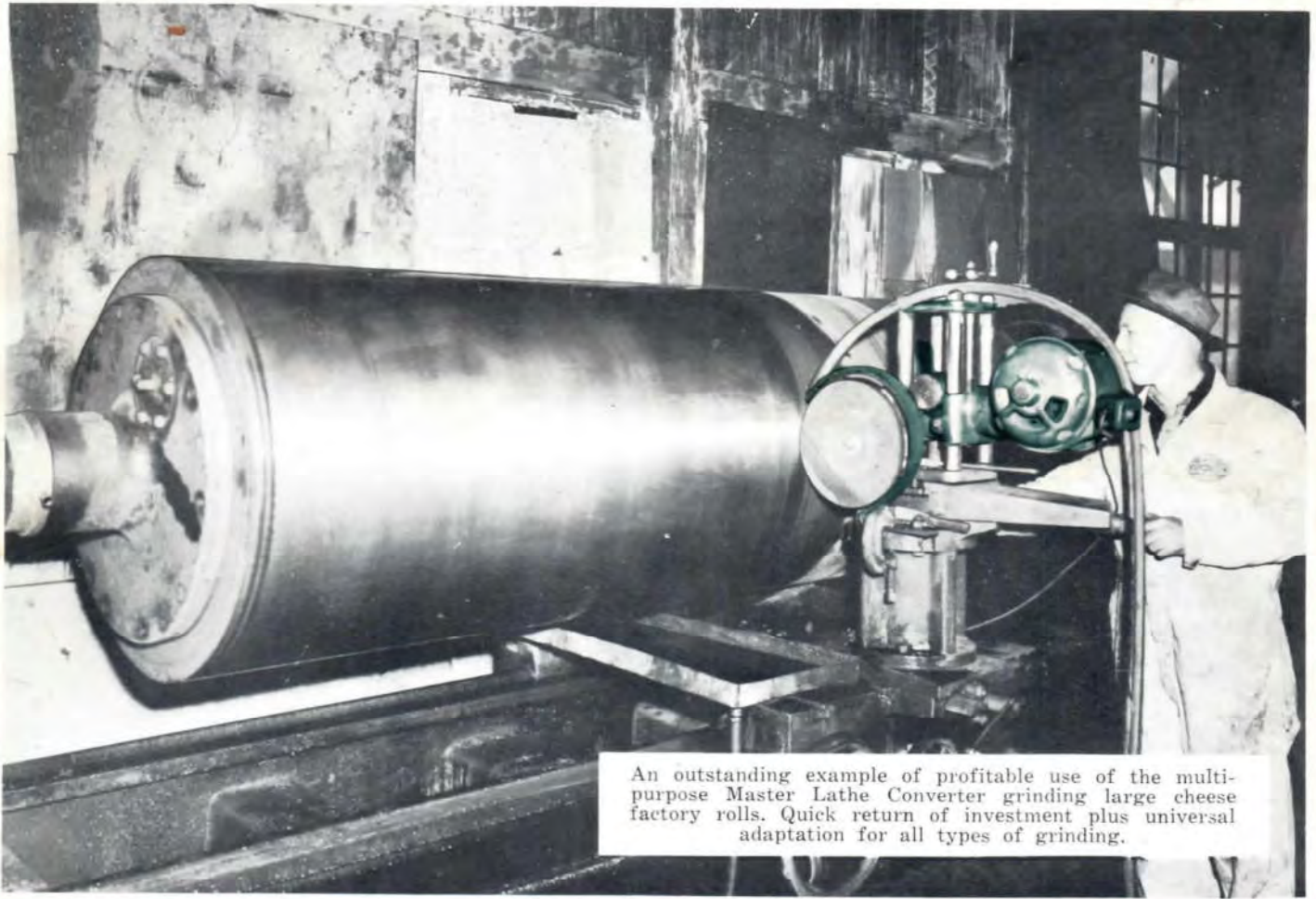
Model "M" milling a 2½" keyway in propeller shaft for ship. Shaft is 22' long, 9⅞" O. D. Valuable time is saved by using this heavy-duty Converter to perform many operations without transferring work piece.



Master Milling Unit surface milling long surface with Milling Table fixture mounted on interways of lathe bed. Often little used old lathes can be utilized for special work.



Master Unit with Outboard Support shown with several cutters straddle milling on a lathe. Illustrates versatile use for special jobs.



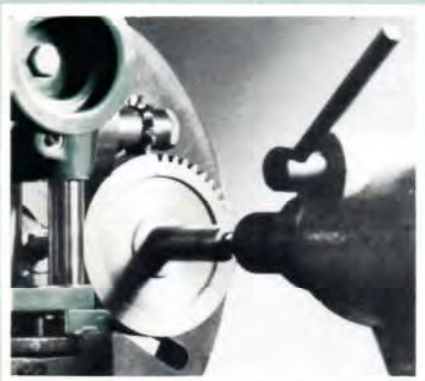
An outstanding example of profitable use of the multi-purpose Master Lathe Converter grinding large cheese factory rolls. Quick return of investment plus universal adaptation for all types of grinding.



Large keyways can be milled with the Master Unit using end mills or shell end mills working into the side of shaft on center line. Same set-up for milling Pratt & Whitney round end keyways.



Milling splines, either rebuilding or making new, is profitable with a Master and Dividing head assures accurate indexing. A Master Slotting head does internal splines.



Woodruff keyseat cutting is fast and easy with a Master. A single or a series of Woodruff keyways can be cut in accurate alignment by positioning lathe carriage.



Milling spur gear with a Master Converter in lathe using Master geared Dividing Head in lathe spindle for precision indexing.

RICHARD IVES COMPANY
FINE MACHINE TOOLS
WEST COLFAX AT WELTON
DENVER 4, COLORADO



MILL $\frac{1}{2}$ INCH KEYWAYS — ONE FOOT PER MINUTE
Full Travel of Lathe Carriage

The New $1\frac{1}{2}$ h. p. Model "M" Master Lathe Converter shown milling keyway on long shaft moving $1\frac{1}{2}$ cubic inches of metal per minute. Keyways as large as $2\frac{1}{2}$ " width are being milled with the heavy duty Model "M" using end mills and shell mills. All three models of the new "Shop Proven" Master have greater capacity, stamina, rigidity and strength for continuous heavy duty use.



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