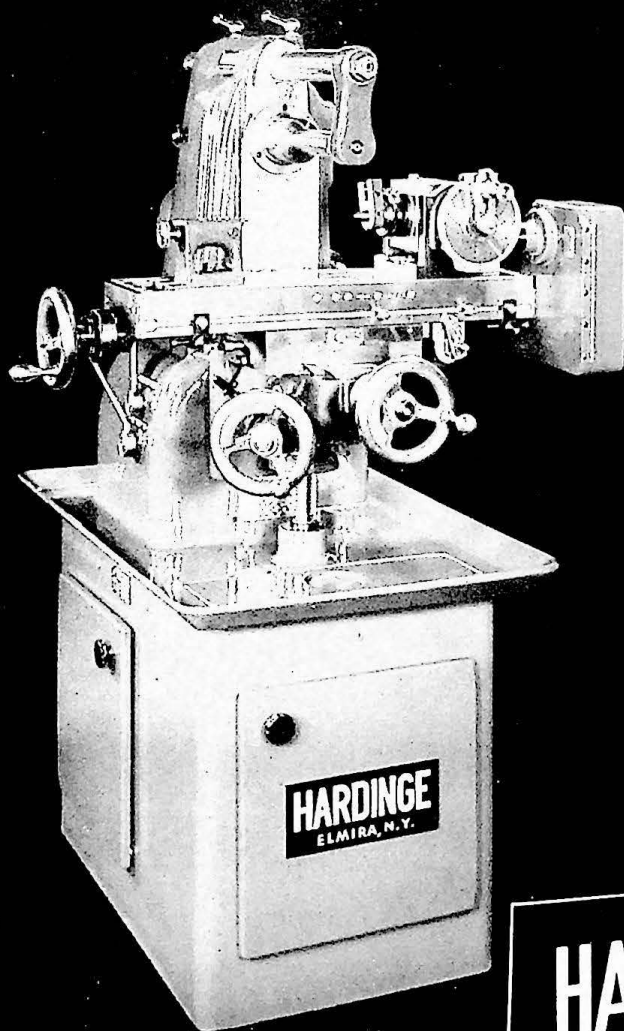


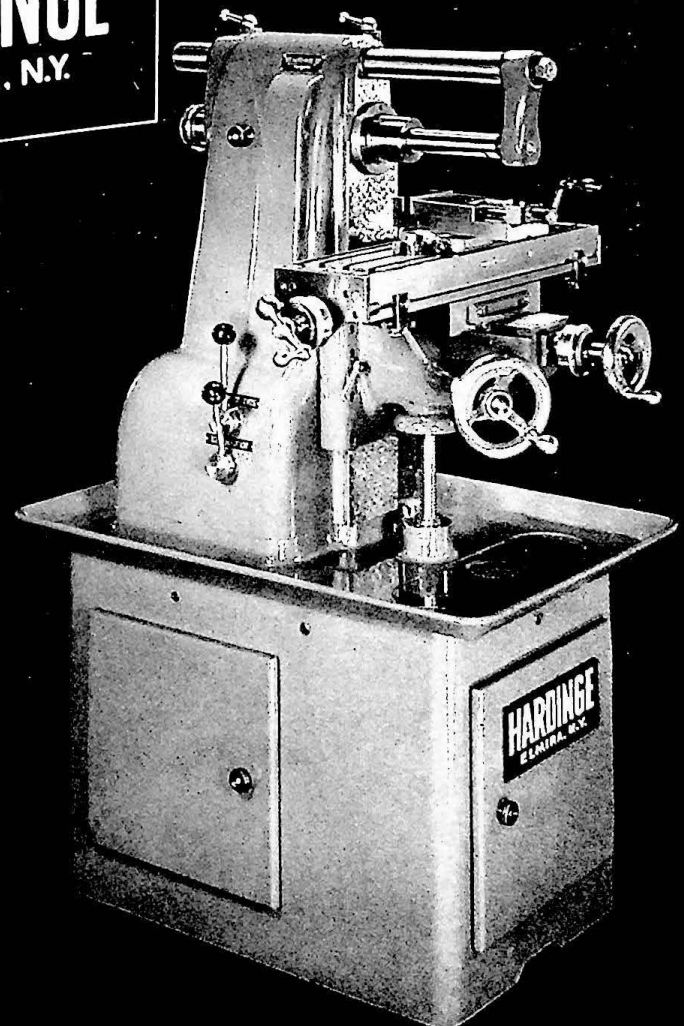


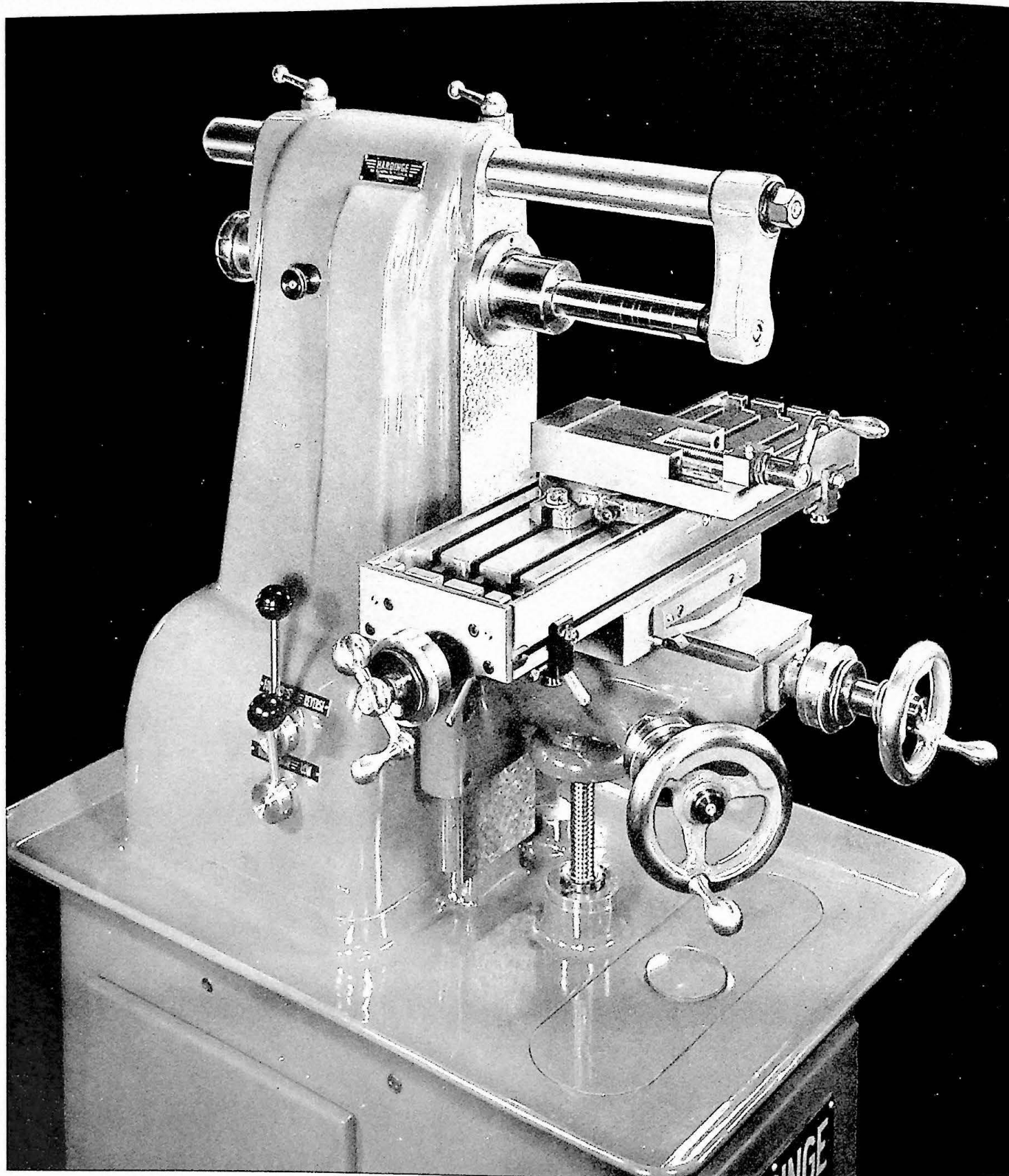
HARDINGE
UNIVERSAL
Tool Room Milling Machine

HARDINGE
ELMIRA, N.Y.

HARDINGE
PLAIN
Tool Room Milling Machine

BULLETIN TM-UM

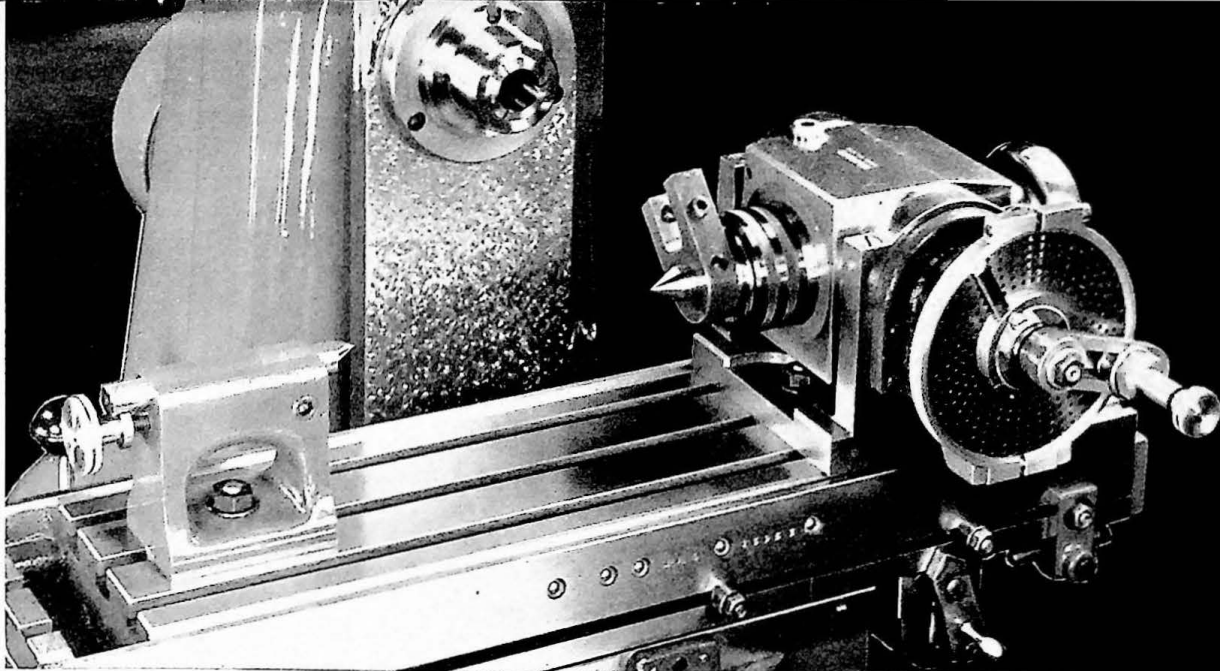




HARDINGE PRECISION TOOL ROOM MILLING MACHINES

FOR

HIGH SPEED - ACCURACY - LOW COST



Universal Plain Dividing Head and Tailstock Set Up for Between-Center Work

UNIVERSAL PLAIN DIVIDING HEAD* for TM MODEL

The HARDINGE Dividing Head is designed for extreme accuracy and maximum convenience in operation. The sturdy construction is shown by the accompanying illustrations. The dividing head and tailstock swing 7" in diameter and have a maximum between-center distance of $9\frac{3}{4}$ ". The head is graduated in degrees and the spindle can be swung from 10° below horizontal to 20° beyond vertical. The draw spindle is of two-piece construction. The draw spindle handle can be removed without loosening the collet; thus, collet work can be done with the head in the vertical position or at any other desired angle. An adjustable stop plate is provided which can be locked in any position — this speeds up work when you are doing repetitive angular milling.

The preloaded ball bearing spindle is ground for direct application of standard $1\frac{1}{2}$ " round capacity 5C HARDINGE

collets which are also used in the main cutter spindle. The spindle nose can be supplied with either the standard HARDINGE threaded nose or standard HARDINGE taper nose to provide interchangeability of spindle nose attachments between the dividing head and HARDINGE lathes, chucking machines and second operation machines. There is a 4 to 1 ratio for rapid indexing of the spindle from the crank through hardened and ground Zerol gears. Four index plates are furnished giving all divisions up to 50, all even number divisions and 75 up to 100. The table supplied shows all divisions obtainable up to 360 inclusive. The removable keys in the dividing head base and bolts fit a T-slot $\frac{7}{16}$ " wide. Standard equipment consists of: dividing head, 4 index plates, center with driver, tailstock, spanner wrench for draw spindle, and index table chart.

UNIVERSAL SPIRAL DIVIDING HEAD* for UM MODEL

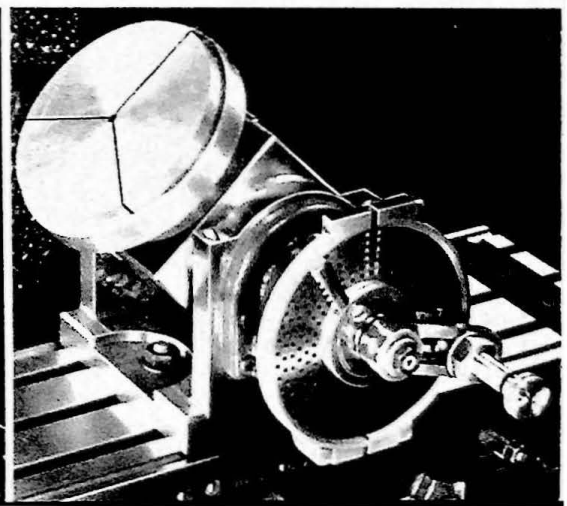
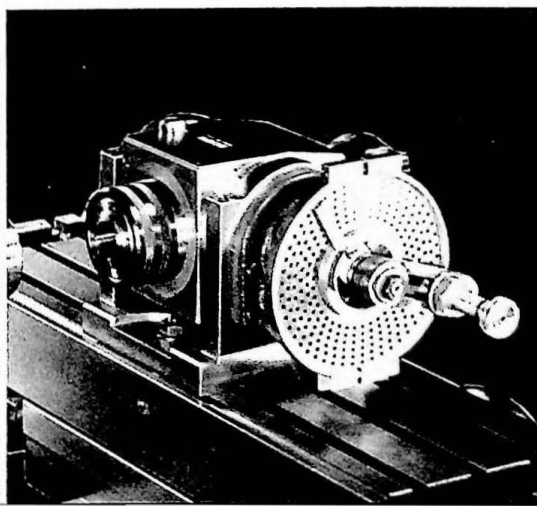
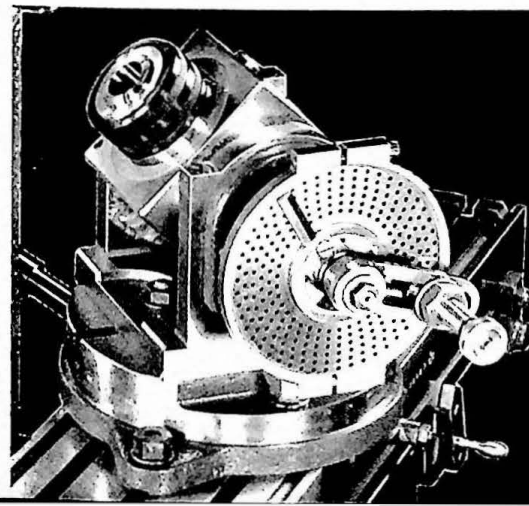
Universal Spiral Dividing Head for UM model is illustrated on the front cover of this bulletin. The universal spiral head is the same as described above with the addition of a worm wheel, worm and end gearing for driving dividing head spindle from the table feed screw for cutting spirals. By use of gears any one of 90 leads can be cut from .600" to .42,656". A chart is supplied showing gear combinations and angular setting of table for each spiral lead.

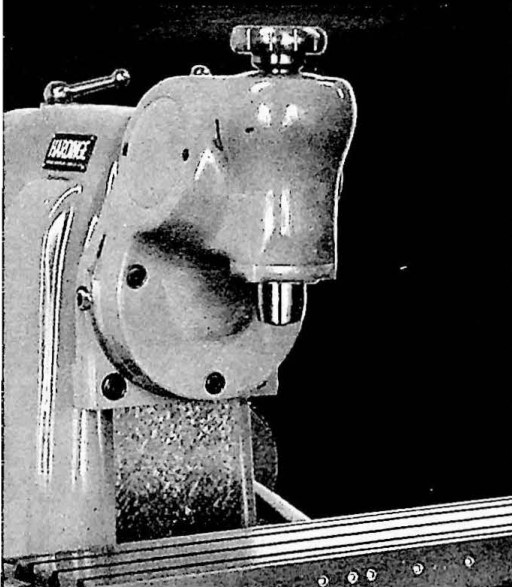
**Dividing Head Furnished with Taper Nose Spindle Unless Threaded Nose is Specified.*

Dividing Head and Swivel Base Set for Compound Angle Work

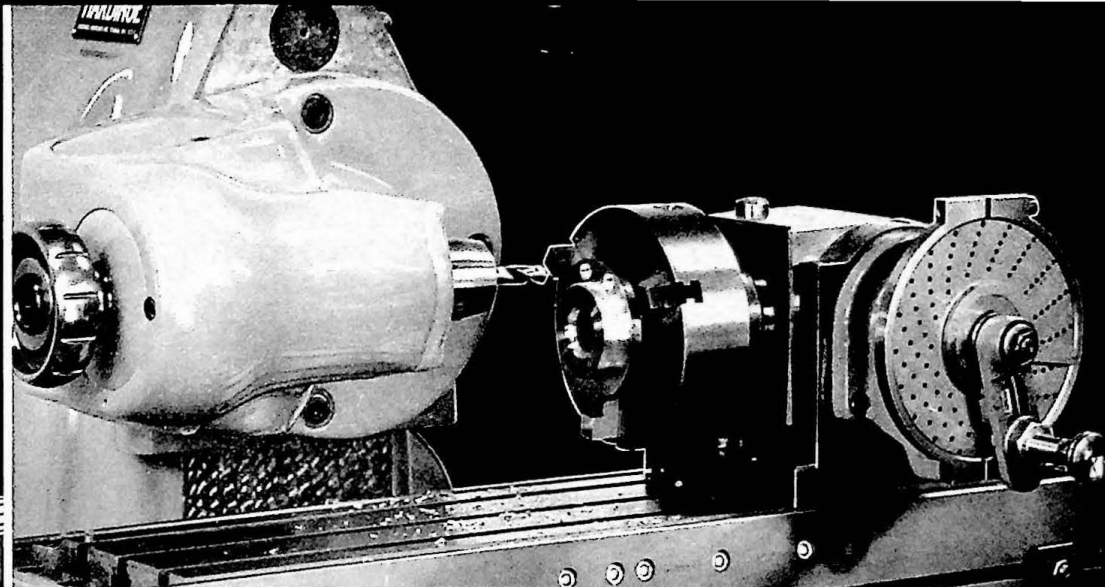
Dividing Head Spindle Set Parallel to Cutter Spindle — Note Collet Seating Directly in Spindle

Collet Like Chucking to 6" Diameters with Standard 5C Step Chucks and Closers





Head in Vertical Position



Head in Horizontal Position for Drilling and Boring with Power Feed

VERTICAL HEAD

Every shop has work which can be done more efficiently through the use of a vertical head because of the versatility which it adds to milling equipment.

The head is securely anchored to the column by mating dovetail clamps and a hardened and ground steel arbor in the overarm bore of the column. Application is an easy one-man job — a hoist or other special handling equipment is not required.

The preloaded ball bearing spindle is belt driven from the horizontal spindle at a ratio of 2:1 providing spindle speeds from 220 to 3700 r.p.m. Head can be swiveled 90° either side of vertical. Standard $\frac{3}{4}$ " capacity 4C HARDINGE collets seat directly in the head-stock spindle. Spindle center is $7\frac{1}{4}$ " from face of column. Throat clearance directly back of spindle 4". Face of spindle is $\frac{5}{8}$ " below horizontal cutter spindle.

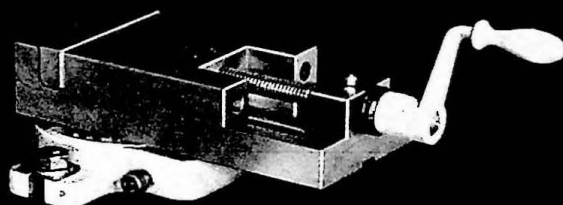
OTHER ATTACHMENTS

The stub arbors, 5C collets and taper hole collets, shown below, can be used interchangeably between the horizontal cutter spindle and index head. Jaw chucks,

face plates, step chucks and closers are for use with index head only. See page 6 for information on power feed for the table and oil coolant facilities.



5C STUB ARBORS
 $\frac{3}{8}$ ", $\frac{1}{2}$ ", or $\frac{3}{4}$ "



SWIVEL VISE
JAWS $4\frac{1}{8}$ " WIDE, 1" DEEP, OPENS $2\frac{1}{2}$ ", OVERALL HEIGHT $3\frac{1}{4}$ "



5C ARBOR—OVERARM TYPE
 $\frac{7}{8}$ " or 1"



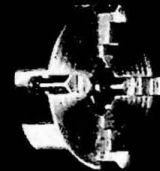
HARDINGE PRECISION COLLETS
5C for CUTTER SPINDLE
and DIVIDING HEAD
4C for VERTICAL HEAD



TAPER HOLE COLLETS



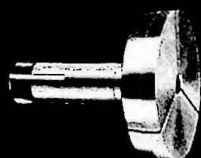
UNIVERSAL JAW CHUCK*
(INTEGRAL MOUNT)



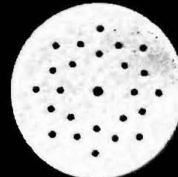
INDEPENDENT JAW CHUCK*
(INTEGRAL MOUNT)



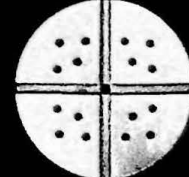
STEP CHUCK CLOSERS*
for
2", 3", 4", 5", or 6" STEP CHUCK



STEP CHUCKS
2", 3", 4", 5", or 6" CAPACITY



PLAIN FACE PLATES*
7" DIAMETER



SLOTTED and TAPPED FACE PLATE*
7" DIAMETER

*Dividing Head Tooling is Forwarded for a Taper Nose Spindle Unless Threaded Nose is Specified.

CLOSE observation in your plant will reveal the use of machines entirely out of proportion to the work. It is not uncommon to see milling machines weighing three to four thousand pounds slowly laboring away on small work.

Plants have small and large work and, for economy and proper results, there must be such a distinction among the milling machines used. When using a large milling machine for small work, you have a greater investment, loss of floor space, added power consumption, improper speeds, poor results, and most important, the loss of valuable time because of the improper relation between the machine and the work.

HARDINGE milling machines, presented in this bulletin, are primarily designed to fill a very old existent gap between the plain bench miller and the heavy duty milling machine. Extreme accuracy and high spindle speeds are coupled with power and handiness for ease of operation to rapidly obtain desired results.

The correct size of the HARDINGE TM and UM milling machines becomes apparent when slabbing, fluting, slitting, boring or when completing other milling operations; when changing collets and jaw chucks; when positioning the index head; and when making use of the many speeds and operation features.

MODELS TM and UM MILLING MACHINES

SPECIFICATIONS — STANDARD EQUIPMENT — ADDITIONAL EQUIPMENT

— SPECIFICATIONS —

Spindle

Collet round capacity (5C HARDINGE)	1-1/16"
Eight speeds { Low speed	110 r.p.m.
{ High speed	1850 r.p.m.

Range

Longitudinal	14"
With Longitudinal Power Feed for Table	11 1/2"
Transverse	5 1/2"
Vertical	13 1/4"
Top of table to center of spindle, maximum	12"

Table

Working surface	20 3/4" x 6 1/2"
Including oil pockets	25" x 6 1/2"
3 T-Slots	7/16"

Power Feed (Optional)

Number of feeds	32
Range	1/8" to 13" per minute
Drive	Belt

Overarm Arbor Support

Diameter	2"
Center of spindle to underside of overarm	3 3/4"

Arbor

Diameter	1"
Coolant Sump Capacity	2 1/2 gal.
(Coolant equipment extra — see below)	

Floor Space

Considering longitudinal travel	47" x 56"
---------------------------------	-----------

Weight	370 lbs.
--------	----------

Driving Unit: The base is of heavy, rugged construction and well ventilated. Base fully encloses a standard two-speed reversing motor, vee belt connected to a four step pulley to give eight forward and eight reverse speeds as listed above. The levers conveniently located on the column operate electric motor controls for Low-Stop-High and Forward-Stop-Reverse speeds. The levers are provided with stops for immediate location of speed positions.

— STANDARD EQUIPMENT —

TM or UM HARDINGE High Speed Precision Horizontal Milling Machines are furnished complete with:

- Fully enclosed one piece column.
- Preloaded ball bearing spindle with 1-1/16" collet capacity.
- Ball bearing draw spindle.
- Eight forward and eight reverse spindle speeds from 110 to 1850 r.p.m.
- Hardened and precision ground steel overarm.
- Ball bearing overarm arbor support.
- Plain table for TM model (swivel table for UM model) with oil pockets and three T-slots.
- Adjustable table stops with screw adjustment.
- Large 3" diameter feed screw dials graduated in .001".
- Large adjustable feed screw nuts.
- Clutch type hand-wheels for transverse and vertical feed screw.
- Locks for table, knee and saddle.
- Completely enclosed knee and saddle.
- Large chip pan with integral coolant sump.
- Conveniently located speed control levers.
- Welded steel pedestal completely enclosing motor, driveshaft and tool storage compartment.
- Smooth, powerful endless V-belt drive.
- Ball bearing driveshaft.
- Eight speed driving unit complete with 2-speed, reversing motor and lever operated controls for operation on 220 or 440 or 550 volt. 60 cycle, 3 phase line, completely wired and assembled.

— ADDITIONAL EQUIPMENT AVAILABLE —

In addition to the attachments shown on pages 3 and 4 the following equipment is available:

POWER FEED: A belt-driven power feed is available for longitudinal travel of the table. The feed range is 1/8" to 13" per minute. Power feed box has automatic disengagement by adjustable stops. *If power feed is required, it must be ordered when machine is purchased.*

COOLANT SYSTEM: When specified, a pump and piping can be supplied for cutting oils. The machine has a built-in sump and while the coolant system can be added at a later date, it is best to order when the machine is purchased.

QUOTATION

HARDINGE MILLING MACHINES

manufactured by

HARDINGE BROTHERS, Inc.

Elmira, N. Y.

	DESCRIPTION									
	HARDINGE High Speed Precision Milling Machine(s) — Consisting of: • Fully Enclosed One Piece Column • Preloaded Ball Bearing Spindle with 1-1/16" collet capacity • Ball Bearing Draw Spindle • Hardened and Precision Ground Steel Overarm • Ball Bearing Overarm Arbor Support • Power feed for longitudinal travel of table • Adjustable Table Stops with screw adjustment • Large 3" Diameter Easy Reading HARDINGE Black and White Feed Screw Dials graduated in .001" • Large Adjustable Feed Screw Nuts • Clutch type handwheels for Transverse and Vertical Feed Screw • Locks for table, knee and saddle • Completely Enclosed Knee and Saddle • Conveniently Located Speed Control Levers • Welded Steel Pedestal completely enclosing motor, driveshaft and tool storage compartment • Tool Storage Compartment with collet tray • Smooth, Powerful Endless V-Belt Drive • Ball Bearing Driveshaft • Complete coolant facilities, pump and sump • Magnetic Electric Control Panel(s) with transformer providing 110 volts for push button control circuit; time lag thermal overload relays provide overload protection; low voltage protection is also provided; cam operated, quick make and quick break forward and reverse switches; pilot light; fused disconnect switch interlocked with cover of panel — entire panel is one self-contained unit. • Machine painted 7B Gray — For other colors price upon application.									
QUANTITY		PRICE PER UNIT								
	TM Horizontal Plain Milling Machine(s) — consisting of above with: • Plain Table with oil pockets and three T-Slots. Eight Speed Driving Unit Complete with single voltage, 2 speed, reversing motor and lever operated controls for eight forward and eight reverse spindle speeds from 110 to 1850 r.p.m. Completely wired and assembled when delivered. For operation on (Specify electrical current): <table><tr><td>208 Volt 60 cycle 3 phase</td><td>\$ 3,625.00</td></tr><tr><td>220 Volt 60 cycle 3 phase</td><td>3,625.00</td></tr><tr><td>440 Volt 60 cycle 3 phase</td><td>3,625.00</td></tr><tr><td>550 Volt 60 cycle 3 phase</td><td>3,625.00</td></tr></table>	208 Volt 60 cycle 3 phase	\$ 3,625.00	220 Volt 60 cycle 3 phase	3,625.00	440 Volt 60 cycle 3 phase	3,625.00	550 Volt 60 cycle 3 phase	3,625.00	
208 Volt 60 cycle 3 phase	\$ 3,625.00									
220 Volt 60 cycle 3 phase	3,625.00									
440 Volt 60 cycle 3 phase	3,625.00									
550 Volt 60 cycle 3 phase	3,625.00									
	UM Horizontal Universal Milling Machine(s) — consisting of above with: • Swivel Table with oil pockets and three T-Slots. Eight Speed Driving Unit Complete with single voltage, 2 speed, reversing motor and lever operated controls for eight forward and eight reverse spindle speeds from 110 to 1850 r.p.m. Completely wired and assembled when delivered. For operation on (Specify electrical current): <table><tr><td>208 Volt 60 cycle 3 phase</td><td>\$ 3,825.00</td></tr><tr><td>220 Volt 60 cycle 3 phase</td><td>3,825.00</td></tr><tr><td>440 Volt 60 cycle 3 phase</td><td>3,825.00</td></tr><tr><td>550 Volt 60 cycle 3 phase</td><td>3,825.00</td></tr></table>	208 Volt 60 cycle 3 phase	\$ 3,825.00	220 Volt 60 cycle 3 phase	3,825.00	440 Volt 60 cycle 3 phase	3,825.00	550 Volt 60 cycle 3 phase	3,825.00	
208 Volt 60 cycle 3 phase	\$ 3,825.00									
220 Volt 60 cycle 3 phase	3,825.00									
440 Volt 60 cycle 3 phase	3,825.00									
550 Volt 60 cycle 3 phase	3,825.00									

QUOTATION CONTINUED

QUANTITY	DESCRIPTION	PRICE PER UNIT
	OPTIONAL TOOLS	
	5C HARDINGE Collets — (Collets are interchangeable between the horizontal milling machine spindle and the dividing head spindle) — round fractional sizes, 1/16" to 1-1/16" inclusive by increments of 1/16" (seventeen collets)	6.60 ea.
	5C HARDINGE Taper Hole Collet(s) — No. 4, 5, 6 or 7 B&S, No. 1 or 2 Morse Taper	18.00 ea.
	3/8" 5C HARDINGE Arbors(s)	98.50
	1" 5C HARDINGE Arbor(s)	98.50
	5C HARDINGE Stub Arbor(s) — 3/8", 1/2" or 5/8" Stud	49.50 ea.
	5C HARDINGE Arbor(s) for Shell End Mills (Specify Tool Number when Ordering)	
	1/2" Diameter No. MA 1/2	22.50
	3/4" Diameter No. MA 3/4	24.00
	1" Diameter No. MA 1	26.00
	1-1/4" Diameter No. MA 1-1/4	29.00
	Precision Vise(s) — swivel type with graduated base	180.00
	Dividing Head(s) with Tailstock(s) — taper nose spindle, preloaded ball bearing, universal plain type — takes 5C Hardinge collets in the spindle (For use with TM Plain Milling Machine)	850.00
	Dividing Head(s) with taper nose spindle and tailstock(s) — preloaded ball bearing, universal spiral type with bracket and gears — takes 5C Hardinge collets in the spindle (For use with UM Universal Milling Machine)	1050.00
	5" 3 Jaw Universal Chuck(s) , integral mount, for dividing head with taper nose spindle	95.00
	5" 4 Jaw Independent Chuck(s) , integral mount, for dividing head with taper nose spindle	85.00
	7" Diameter Slotted and Tapped Face Plate(s) for dividing head with taper nose spindle	49.50
	2" 5C Step Chuck(s) , split only for dividing head	13.00
	2" 5C Step Chuck Closer(s) for dividing head with taper nose spindle	18.00
	3" 5C Step Chuck(s) , split only for dividing head	17.00
	3" 5C Step Chuck Closer(s) for dividing head with taper nose spindle	22.25
	Swivel Base(s) for dividing head	150.00
	Vertical Headstock Attachment(s) — takes 4C Hardinge collets in the spindle	450.00
	4C HARDINGE Collets — round fractional sizes, 1/16" to 3/4" inclusive by increments of 1/16" (twelve collets)	6.50 ea.

DATE:

QUOTATION TO:

DELIVERY:

Subject to prior sale, government priorities and regulations.

By _____

TERMS:

See reverse side of this page.

ALL PRICES AND QUOTATIONS ARE FOR IMMEDIATE ACCEPTANCE

TERMS

CANCELLATION: A request from purchaser to cancel all or part of an order will be accepted by Hardinge, all work stopped as promptly as reasonably possible and the resulting cancellation charge, rendered in lieu of liquidated damages, will be computed on the basis of Hardinge full cost plus 15% for all engineering work, all work in process, all raw materials, all supplies and all commitments made by Hardinge in connection with the order, less such allowances as Hardinge may be in position to make for any standard components and for the balance of the material as scrap.

ACCEPTANCE: All contracts and orders are subject to final acceptance at the main office of Hardinge in Elmira, New York.

TERMS: All items net 30 days except collets, step chucks, step chuck closers, collet stop sets and plug chucks are 2% 10th Prox., 30 days net, f.o.b. Elmira, New York, subject to approval of Hardinge Credit Department. Packed for domestic shipment.

TAXES: Prices quoted do not include any Federal, State, City or Local Sales, Use or Occupational Tax. Any taxes we are legally required to collect will be added to the invoice or billed separately.