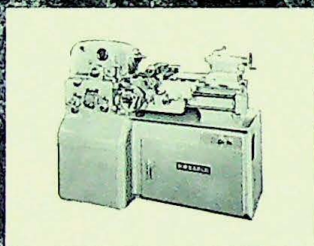


The Monarch 10" model EE precision Toolmaker's Lathe



precision by Monarch



The machine tool requirements of the atomic age have given new meaning to that frequently-abused word "precision." But, here at Monarch, there is no particular mystery about the means by which it is attained.

Needed, to be sure, are knowledge . . . experience . . . facilities. These we have in abundance, accumulated by producing nothing but fine lathes for over half a century. There's one other ingredient of basic importance—the will and determination to bring the word to life in every lathe bearing the Monarch name.

As greater precision has been demanded by industry, Monarch has met or bettered the challenge. With lathes capable of more accurate output. With practical helpfulness in applying them to the users' requirements. With an increasing understanding on the part of users that they too have a part to play in the field of ultra-precision results.

With us, then, precision is an attitude, backed by doing a huge number of things just right and without compromising time or materials. The 10" Model EE Precision Toolmaker's Lathe described in this booklet is a good example of the Monarch philosophy in action. It's typical of what can be expected of *all* lathes produced by us.

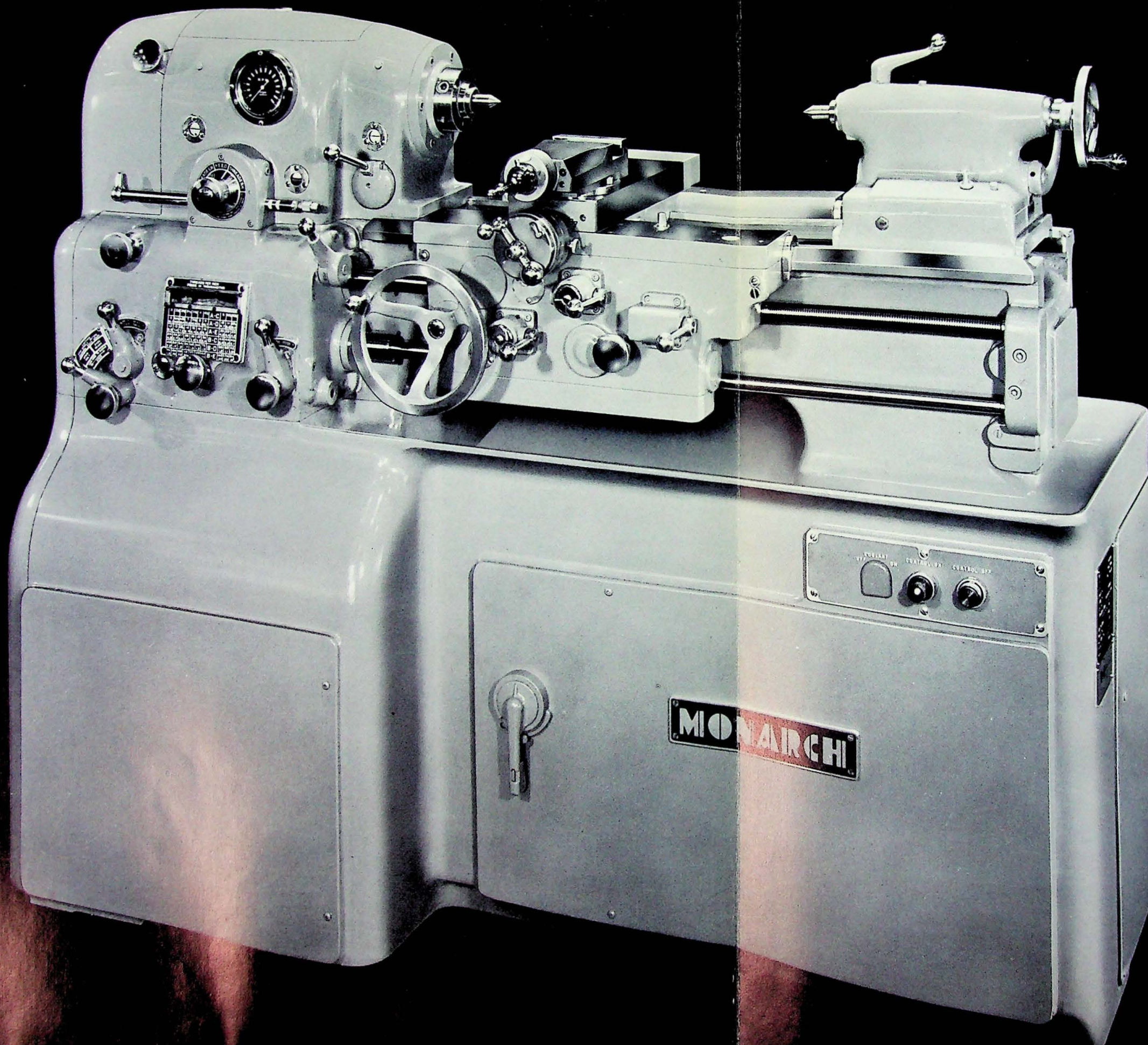
The Monarch 10" model EE precision Toolmaker's Lathe

For super-precision and sensitivity in the toolroom, the Monarch 10" Model EE Precision Toolmaker's Lathe has long been the top choice of toolmakers everywhere.

The basic concept of the Model EE was first introduced over twenty years ago. There has been continuous refinement and improvement since then. A long and impressive list of satisfied users has resulted . . . thousands of them.

This lathe is recommended for precision turning, boring, facing and threading in the toolroom. The features which accomplish this also make the machine fully as proficient for precision manufacturing operations on such parts as small jet, missile, instrument, electronic and camera components.

Please turn page



We designed the 10" Model EE as a sensitive, super-accurate instrument for the turning of precision parts. That's what it is and within its physical capacity, will outperform any other lathe recommended for such work.

Not so long ago the following statement appeared in print:

"Profitable operation of any precision machine depends heavily upon that machine's stamina . . . the ability to stay on the job year after year, turning out work with virtually the same precision as the day it started."

We agree. Further, we submit that the 10" Model EE is the only small, floor-type, precision lathe that has the record of staying on the job year after year, still retaining its inbuilt precision.

The INSPECTION RECORD

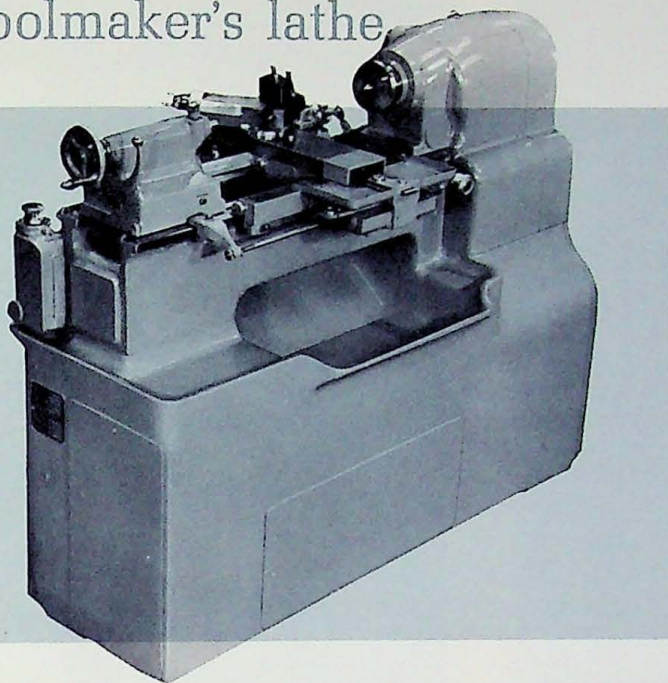
Final Proof of Precision

An inspection report accompanies every Monarch lathe. Besides the filled-in record of the final inspection checks, both A.S.A. standards and Monarch standards are shown. Following are some of the more critical of these standards as they apply to the 10" Model EE.

	A.S.A. Standard	Monarch Standard
Bed		
Level—longitudinal	.0005"	.0005"
Level—transverse	.0005"	.0001"
Headstock Spindle		
Face runout	.0003"	.0001"
Taper runout	.0003"	.0001"
Cam action	.0003"	.0001"
Taper hole runout	.0003"	.0001"
Cross Slide Alignment		
Concave	.0005"	.0004"
Headstock Alignment		
Back of center at end of bar	.0003"	.0003"
High at end of bar	.0005"	.0002"
Tailstock and Headstock Centers Alignment		
High at tailstock	.002"	.0005"
Leadscrew Alignment		
Vertical	.004"	.0015"
Horizontal	.004"	.0015"
Leadscrew		
Cam action	.0003"	.0002"
Lead per foot	.001"	.001"
Lead per 4" section	.0004"	.0004"

Note that, as close as the A.S.A. standards are, we set our standards higher to achieve super-precision results. Even here users receive an additional plus because many of the final inspection checks are closer than the above Monarch standards.

Major Reasons for the precision and sensitivity of the Monarch 10" Model EE toolmaker's lathe



All four bed ways flame hardened and precision ground to a tolerance of .0005" over-all. It's just as important to provide lifelong accuracy to the tail-stock ways as to the carriage ways. A user advises his Monarch Model EE performed perfectly for over one million cycles on short carriage movement work, with no measurable bed way wear taking place.

Bed and base made of special alloy cast iron. No metal absorbs vibration as well as cast iron—another reason for the smooth operation and precision performance of the 10" Model EE.

Base has three point bearing on floor. This is a simple and sure way to insure accurate alignment—a requisite for accurate results.

Drive from driving unit to spindle through one set of multiple "V" belts AT ALL SPEEDS. This smooth, practically vibrationless method is without equal for super-precision results.

Infinitely variable speed ratio of 100 to 1 when drive is direct from motor. Very low speeds secured through speed reduction elements of drive. **Total ratio: 500 to 1.** Under all operating conditions, the EXACT speed needed is obtainable.

Machine available with exclusive combination of electric leadscrew reverse and variable reverse speed control. Here is an unbeatable combination

for thread chasing. Time in some instances is reduced as much as 50%.

Drive from spindle to gear box through an endless belt. The gear train is thus preserved solely for thread chasing. Users report the chasing of precision threads after the Model EE has been in service for thousands of hours.

Drive motor power secured through an electronic conversion unit. Vibration and noise are minimized by the absence of revolving equipment in the power supply. Speed regulation is better maintained at the lower speeds. There is reserve power for normal overload operations.

Carriage held in secure alignment to non-wearing bed ways by four self-aligning ball bearing gibs, mounted on eccentric studs. The carriage never lifts regardless of the cut and the superb built-in accuracy is maintained for the life of the lathe.

All sliding movements smooth and effortless. Precise machining and assembly are responsible for that sensitive feel which makes an operator confident of superior results. Any master toolmaker who has used the Model EE will testify that this feature must be used to be appreciated fully.

Every lever, every handwheel, every adjustment performs its function with ease and sureness. Such refined sensitivity you expect on a precision instrument and you get it on this lathe.

Anti-friction bearings used throughout. Because nothing rolls like a ball, this is another reason for ease of operation and sensitivity.

Automatic lubrication. Oil where and when needed, always, is another refinement you expect and find in the 10" Model EE. Sensitivity and retained accuracy owe much to this feature.

All critical parts made of heat treated steel, accurately finished. Gears precision shaved. Leadscrew, cross feed screw and compound screw induction hardened and ground. Just additional examples are these of the Monarch concept of building a precision lathe that keeps its precision long after so-called "bargains" have lost theirs.

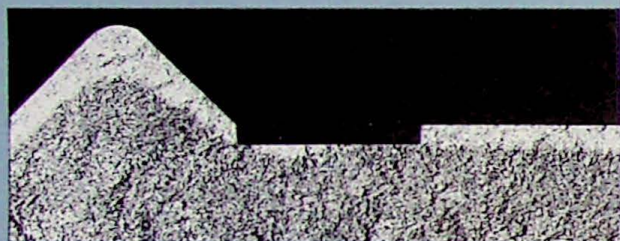
In Addition

The 10" Model EE is a successful production lathe. Hundreds are being used profitably for precision production because no other machine of comparable capacity matches it for speed and accuracy.

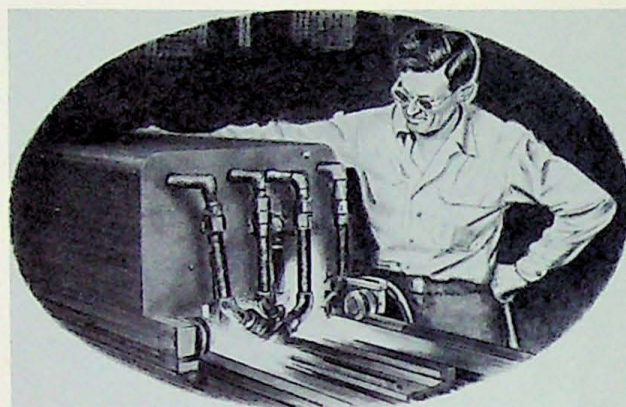
A vast assortment of accessory equipment is available. Check pages 10 to 16 for a complete review of the manner in which these items can increase versatility and usefulness.

Machine operatable from a standing or sitting position. Design of base and placement of controls permit operation standing or sitting, whichever provides the greater convenience.

features of design

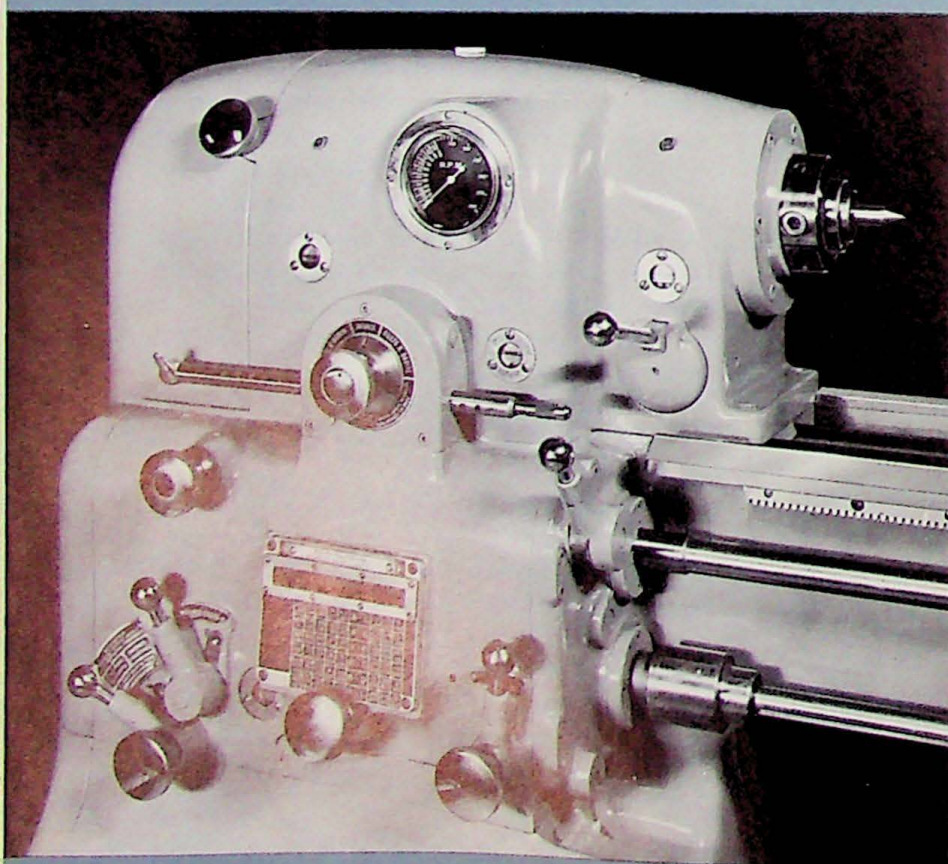


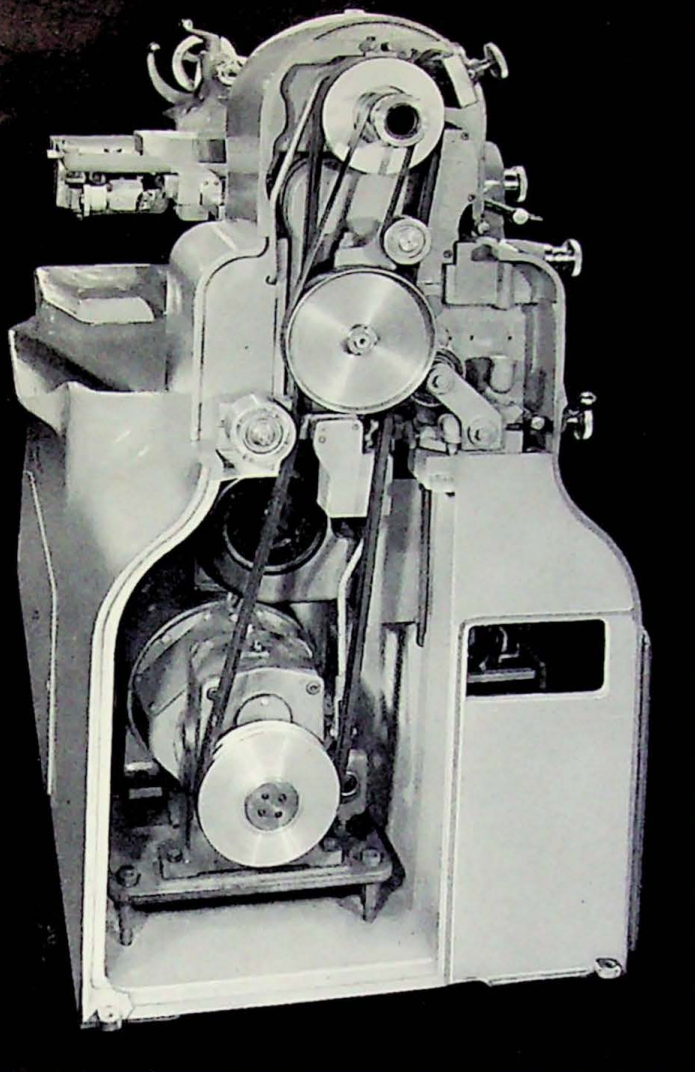
The Bed. Strong, dense and wear-resistant bed casting made of chromium-alloy iron • All four bed ways flame hardened to a depth of $\frac{1}{8}$ " plus and a Scleroscope reading of 70 to 72 Shore • Ways ground to a tolerance of .0005" over-all • Microscopic reservoirs on ground way surfaces retain lubricant more tenaciously than is the case on a hardened steel surface • Hardened surface area blends into tough, resilient cast iron underbody which has unequalled vibration-dampening effect.



The Headstock. Drive to spindle direct through multiple "V" belts • No gears in the spindle drive • Standard spindle range infinitely variable, forward or reverse, between 6 and 3000 R.P.M.; optional range, between 8 and 4000 R.P.M. • Spindle comes to dead stop in less than two seconds, attains full speed in less than three seconds • Large tachometer indicates any spindle speed within entire stepless range • American standard Camlock spindle nose for quick, rigid and accurate chuck and fixture mounting • Spindle lock knob provided. Interlock prevents starting main motor drive with lock knob engaged • Another safety interlock prevents engagement of speed reducing unit above a spindle speed of 250 R.P.M.

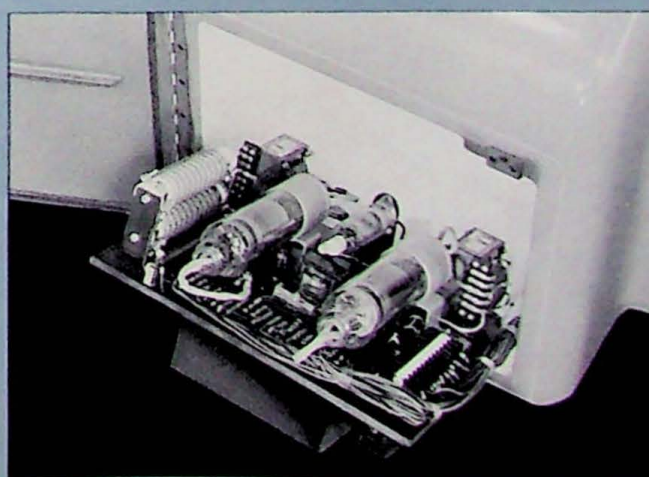
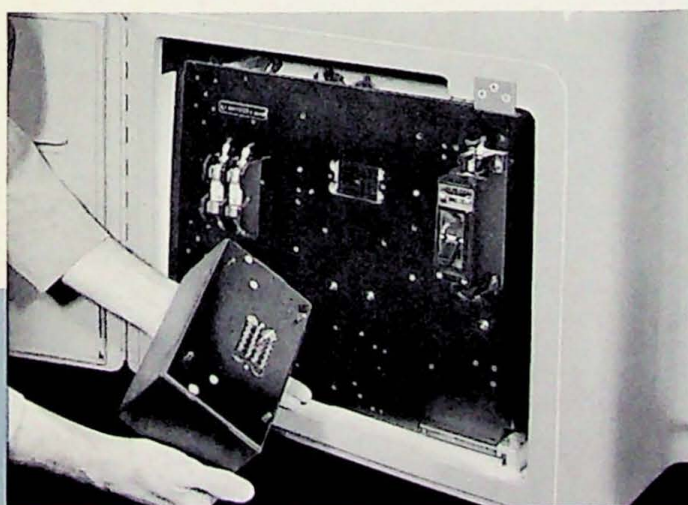
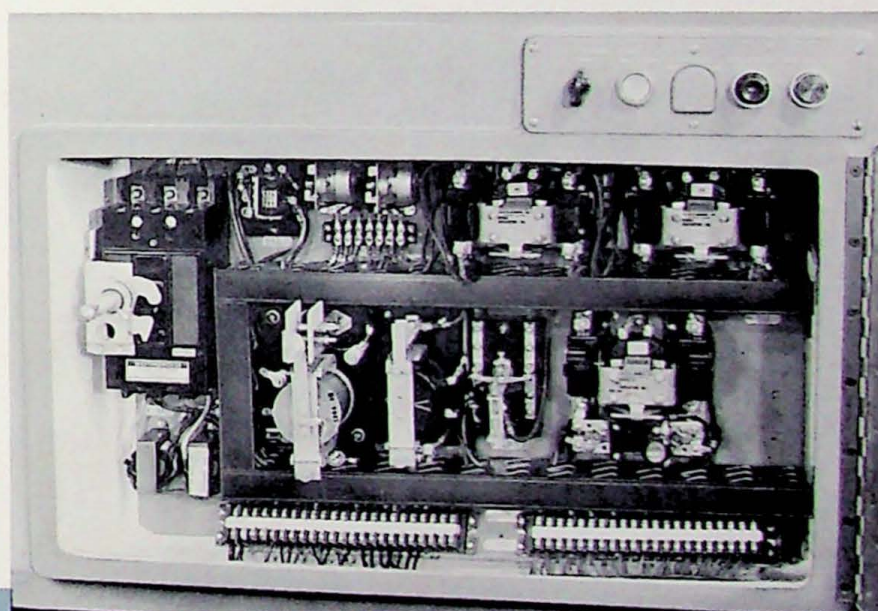
The Gear Box. Totally enclosed and automatically lubricated • Drive from spindle to gear box through endless belt for all feeds, thereby reserving gear train solely for thread chasing • Settings made by large knurled knob in conjunction with a particularly legible index plate • On special order a Metric gear box furnished instead of regular English gear box.



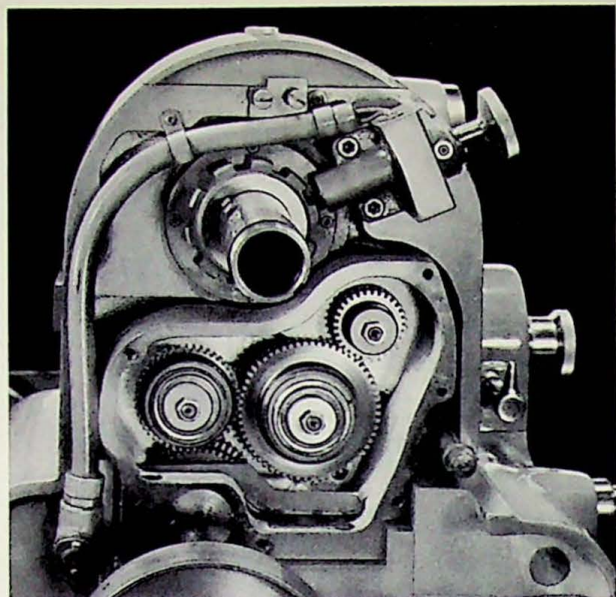


The Main Drive. 5 H.P. motor along with integral, 5 to 1 speed reduction unit mounted on adjustable plate for altering of tension on driving belts • Speed reduction unit separately bolted to plate for extra rigidity and to provide outboard support for drive shaft • All normal driving belt tension adjustment secured through repositioning of two adjustable idlers • Flat endless belt drive from end of spindle to gear box.

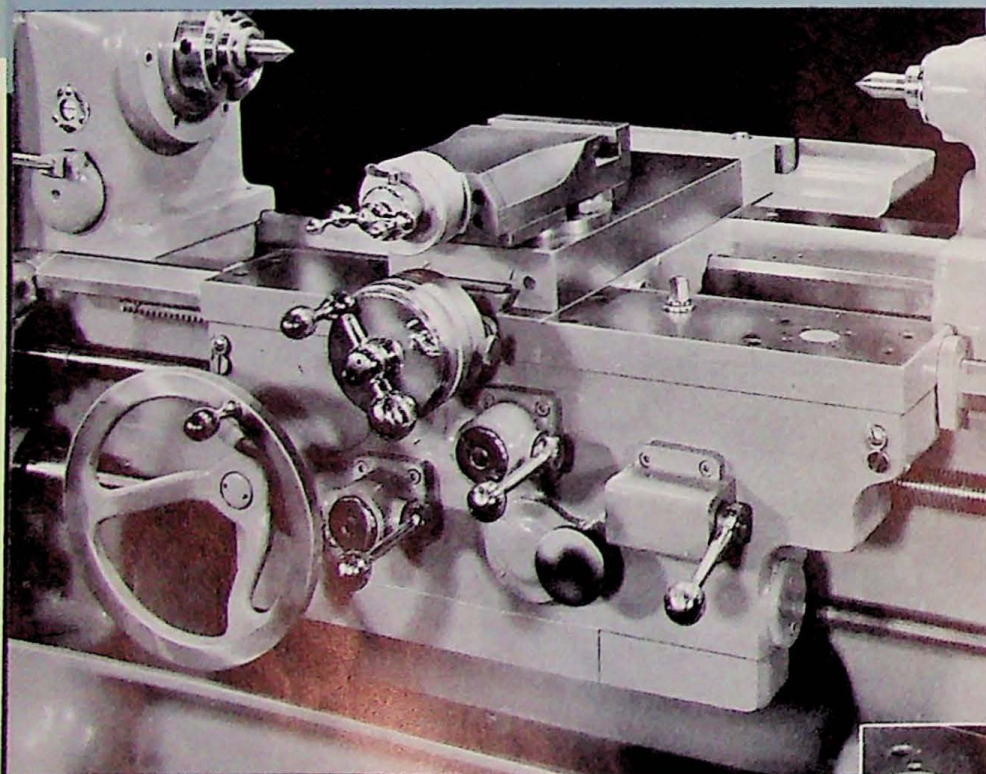
The Power Supply. 5 H.P., D.C. main drive motor secures its power through an electronic unit which utilizes almost any source of A.C. current • Electronic elements located in force-ventilated compartment and relays and starters in separate dust-tight compartment; both at front of base • Control circuitry in form of plug-in module for ease of maintenance • Only three tubes used along with silicon diodes and other static types of electrical components • Electrical equipment conforms to N.M.T.B.A. standards; furnished optionally in conformity with J.I.C. standards.



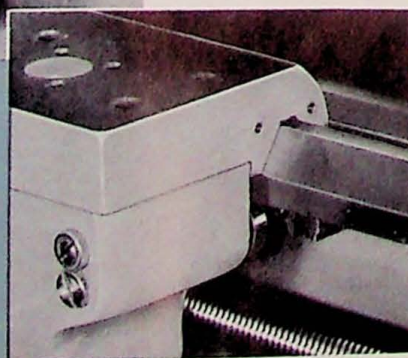
features of design



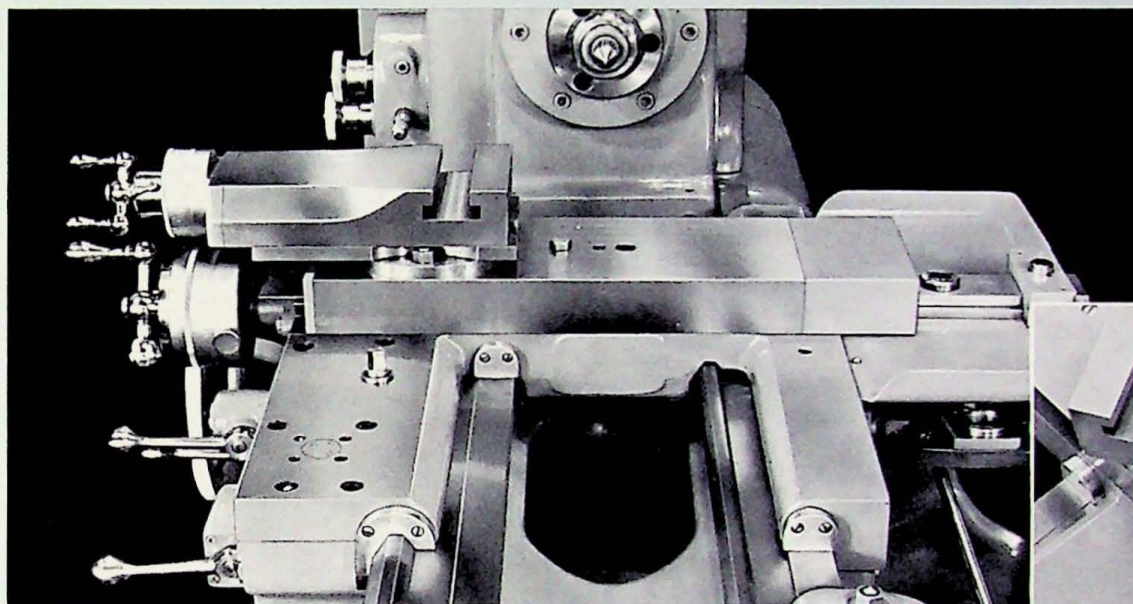
The End Gearing. Totally enclosed and automatically lubricated • Gear train used only for thread chasing • Removal of cover permits quick change of gears for the securing of odd leads or the substitution of Metric transposing gears.



The Apron. Fast, sensitive control of longitudinal feed, cross feed, half nut and feed reverse • Downward motion of their respective control levers engages longitudinal feed, cross feed and half nut; upward motion disengages them • Both longitudinal feed and cross feed through large, cone type, friction clutches • Leadscrew, used only when threading, and feed rod cannot be engaged simultaneously • Four, permanent, oil-sealed, self-aligning, ball bearing, eccentric mounted carriage gibs directly under the carriage wings.

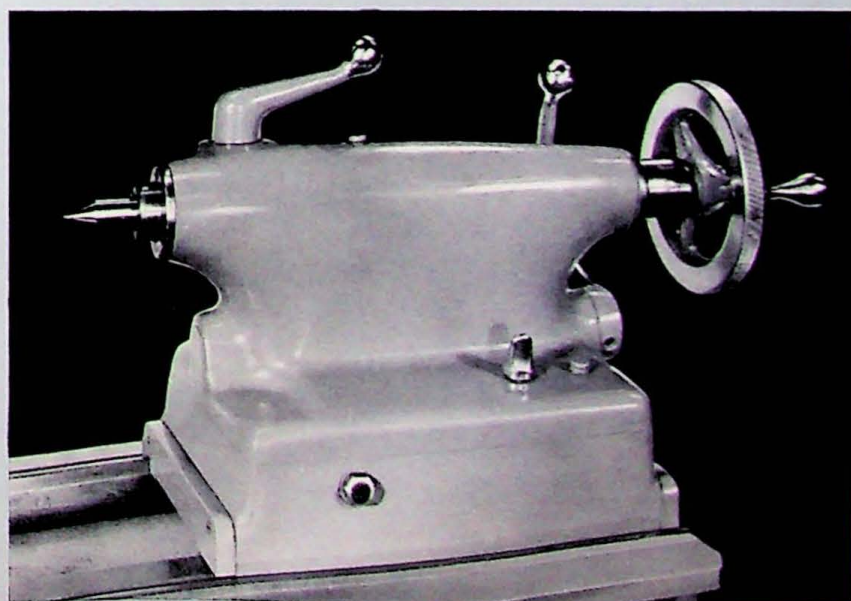
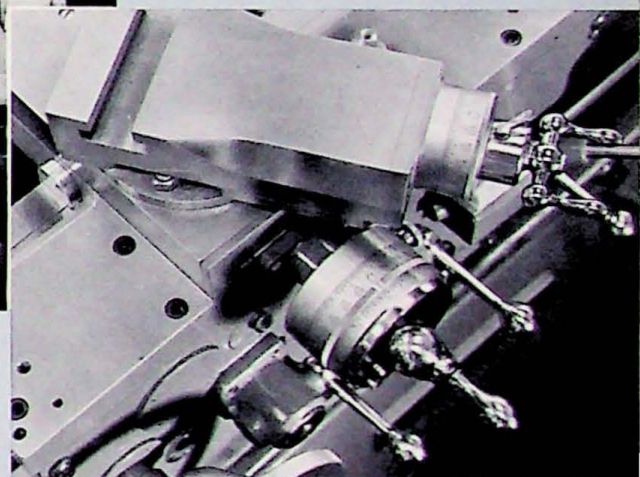


Monarch Model EE Precision Toolmaker's Lathe

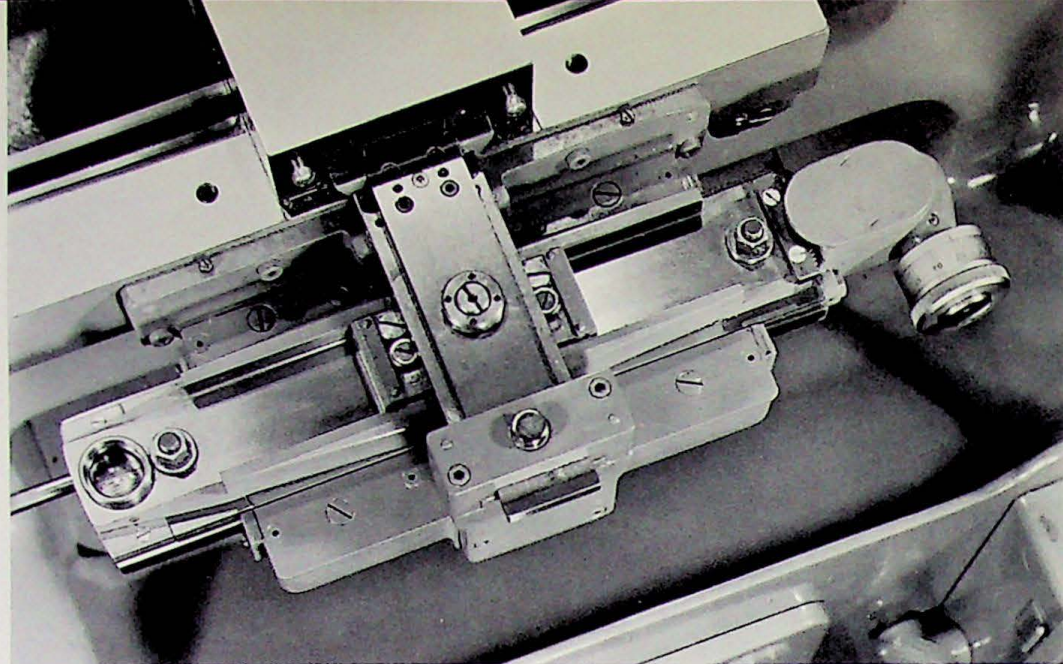


The Carriage, Cross Slide and Compound.

Sturdy tool support for ultra-precision work assured by generously proportioned slides • Large diameter cross feed and compound micrometer dials graduated in thousandths to read in diameter • Note in accompanying illustration the extreme legibility of the graduations, so necessary for critical tool adjustment • Compound may be rotated through 360° on its accurately graduated swivel • When chasing threads, cross slide chasing stop allows quick tool withdrawal and repositioning to depth of last cut without disturbing original setup • Full length tapered gibs in compound and cross slide, both with double screws for adjusting.



The Tailstock. Hardened spindle graduated at front end to facilitate drilling operations • Graduated micrometer feed also provided • Arranged for quick clamping to bed.



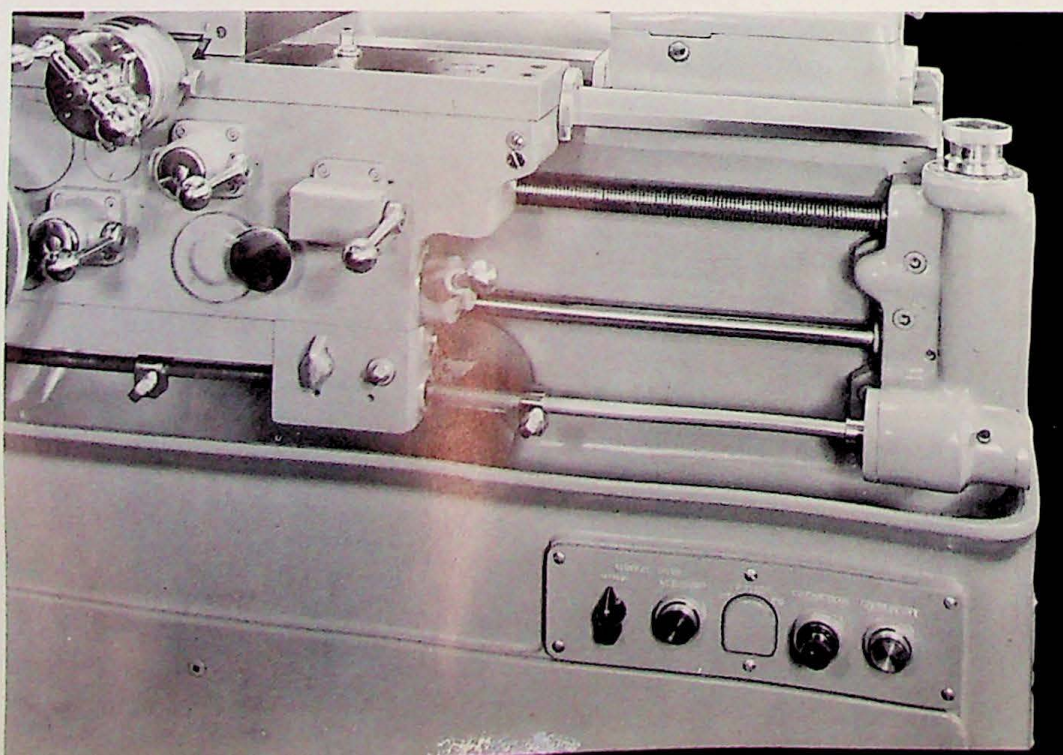
Taper Turning Attachment. All ball bearing design which practically eliminates lost motion, backlash and friction • Ball bearings have permanent, sealed-in lubrication and are mounted on adjustable eccentric studs • Bearing surfaces against which ball bearings

take a bearing flame hardened and precision ground • Vernier setting at headstock end • Graduations both in degrees and inches per foot protected by glass cover with lucite magnifier • Turns up to 6" length at one setting, 15° included angle.

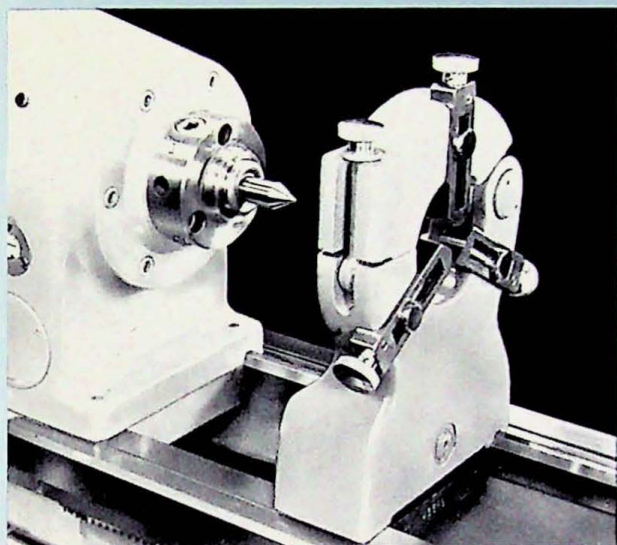
Electric Leadscrew Reverse. A great time saver when chasing either external or internal threads, being particularly valuable for internal threading blind holes • Twist of convenient knob adapts mechanism for either a right hand or a left hand thread or makes it inoperative • Automatic stops in both directions of travel • Work rotation stops automatically at end of each cut • Operation of one lever

reverses entire machine for return of cutting tool to starting position for next cut, thus retaining perfect timing between tool and work.

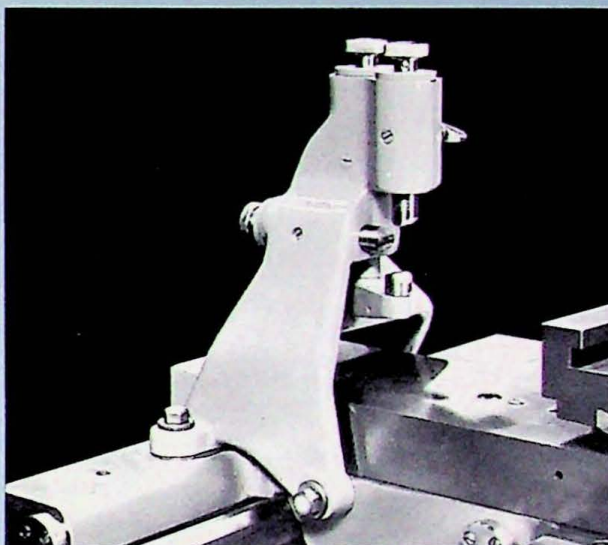
Variable Reverse Speed Control. Saves still additional time when used in conjunction with electric leadscrew reverse • Permits operator to preset reverse speed of main drive motor, thereby accelerating return of threading tool.



accessory equipment



Steady Rest. Three-jaw type with a capacity of 3" • Bronze jaws, each with a knurled screw adjustment • Friction hinged top.

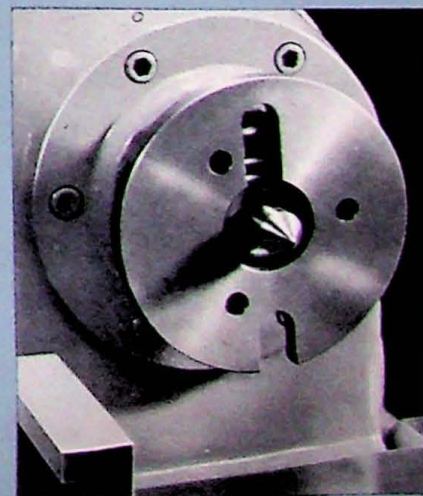
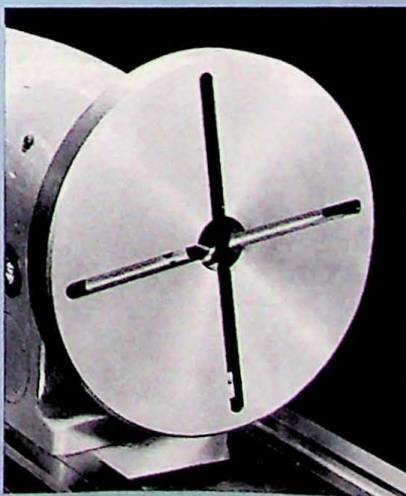
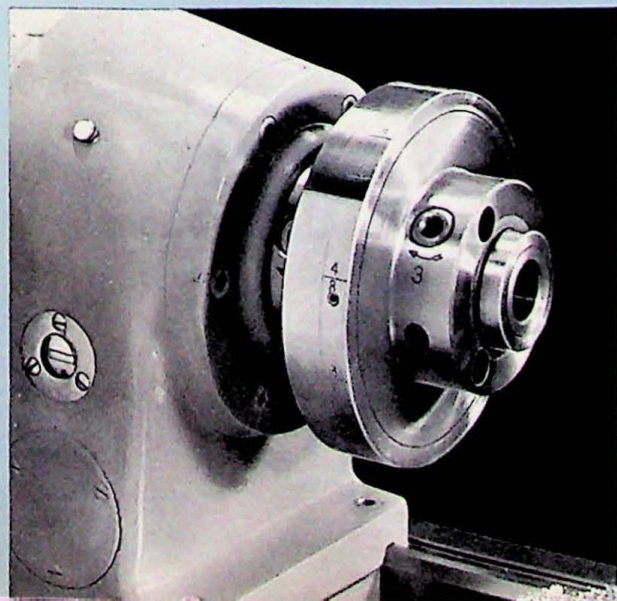


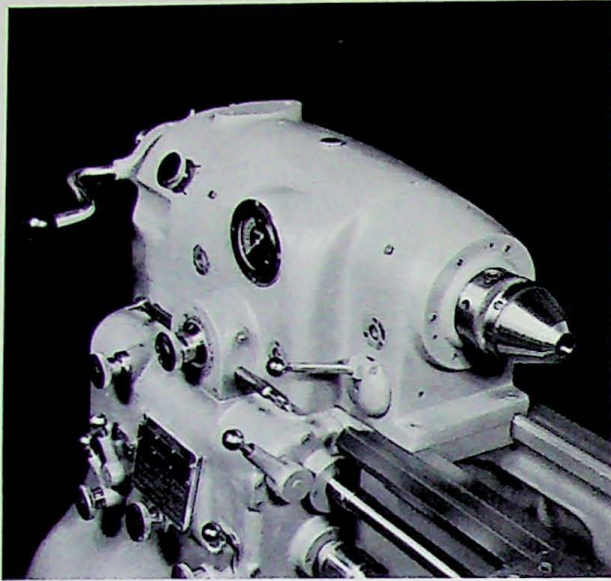
Follow Rest. Three renewable tip jaws, each with a knurled screw adjustment • Capacity $\frac{1}{4}$ " to 2".

Multiple Index Face Plate. Graduated for engaging teeth of index gear for 2, 3, 4, 6 and 8 multiple start threading • Fits Camlock spindle nose • Provided with same size Camlock nose as spindle for interchangeability of chucks, plates and fixtures.

Dog Plate. 5" in diameter • Two driving slots • Fits Camlock spindle nose.

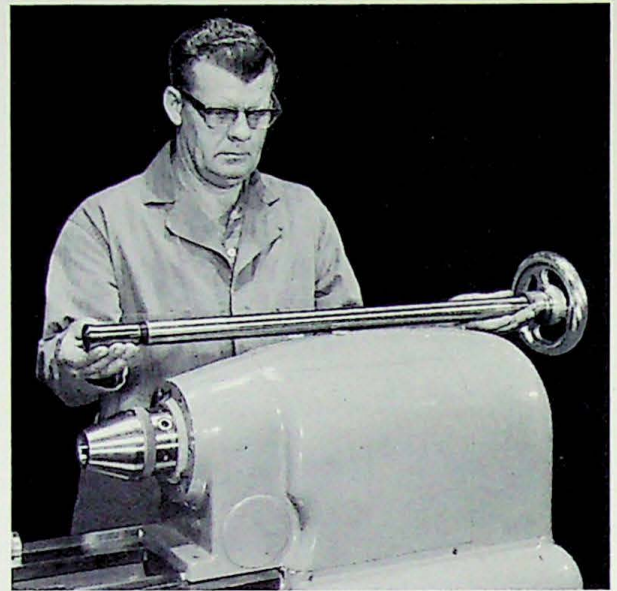
Face Plate. 11" in diameter • Four milled T-slots • Fits Camlock spindle nose.



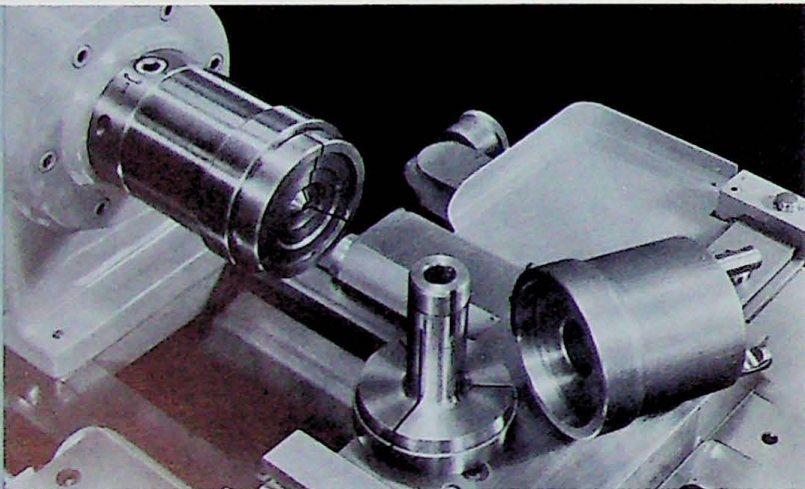


Lever Operated Collet Attachment. May be arranged at factory for either pull or push type collets • Recommended as a substantial time saver in connection with manufacturing operations.

Drawbar Type Collet Attachment. Up to 1" round maximum collet capacity • Operated by handwheel • Collet closer fits on Camlock spindle nose.

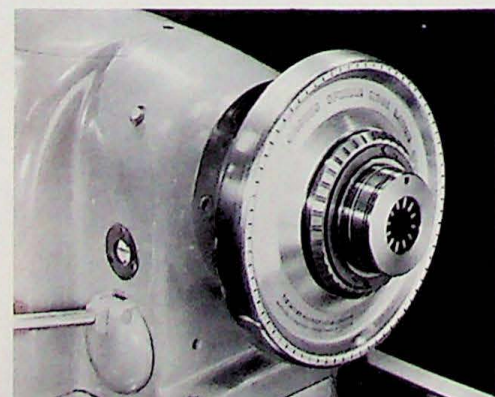
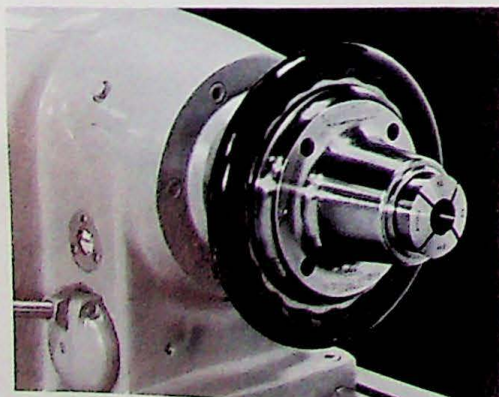


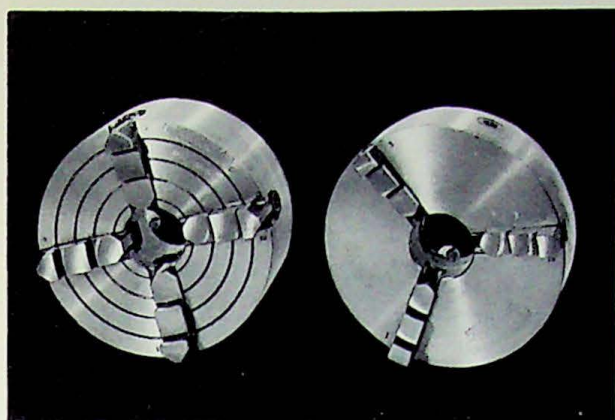
Step Chuck and Closer. Available in 3", 4", 5" or 6" capacity • Attaches directly to Camlock spindle nose • Operated by simple handwheel type drawbar, same as supplied with drawbar type collet attachment.



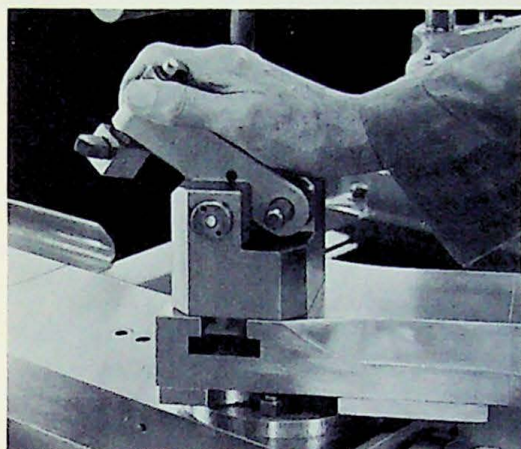
Sjogren Handwheel Type Collet Chuck. Maximum collet capacity, 1³/₈" • Fits directly on Camlock spindle nose.

Jacobs Spindle Nose Chuck and Rubber-Flex Collets. Impact tightening chuck mounts directly on Camlock spindle nose • Used only with Jacobs Rubber-Flex collets • Each collet handles wide range of work diameters, the standard set of eleven taking all diameters from 1/16" through 1³/₈".

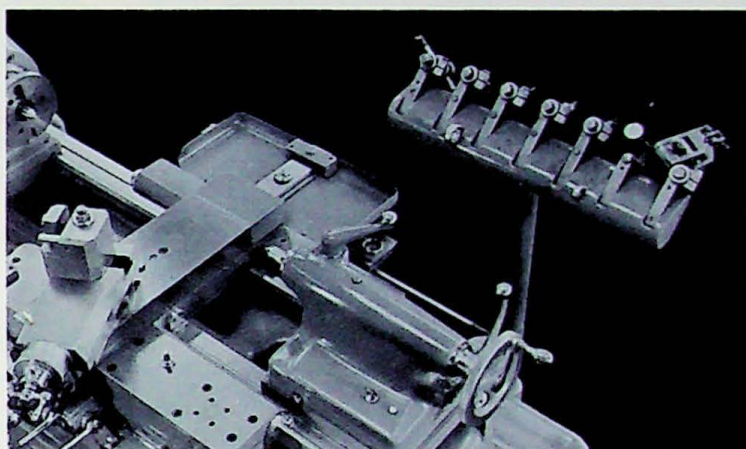




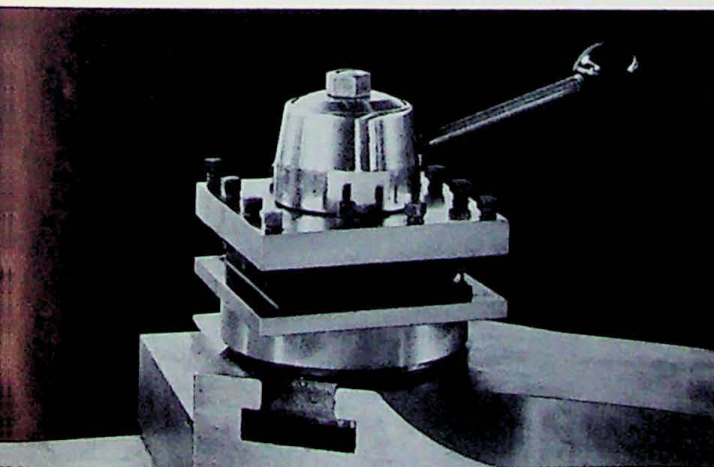
Mechanical Chucks. Four-jaw independent chucks available in 6" and 8" sizes; three-jaw universal chucks in 5", 6" and 8" sizes • Both types and all sizes have steel bodies and solid reversible jaws.



Quik-Tool Ready-Set Tooling. Precision made tool block and holders permit immediate tool change for different operations without need for lengthy setup time • Tools, preset at beginning of run, automatically position themselves when slipped on locating pin and swung

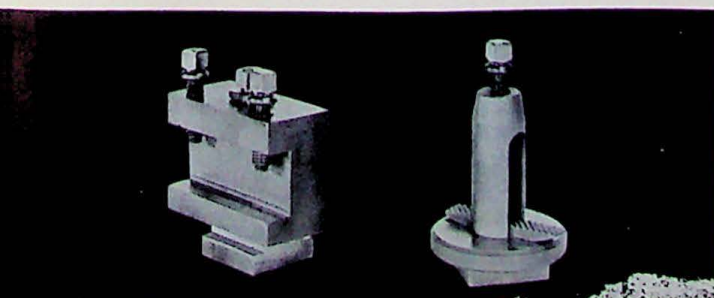


into slot of tool block • Standard tooling used • Regular Quik-Tool set consists of seven holders; three for turning tools, one for boring, one for cut-off, one for knurling including knurling tool and six sets of knurling wheels and one for indicating including indicator calibrated in ten thousandths of an inch • Tray and pipe mounting also furnished.



Monarch 4-Way Turret. Indexes accurately to four positions • Fits directly to T-slot of compound • Size of square, 3 1/2"; maximum tool capacity, 3/8" x 3/8".

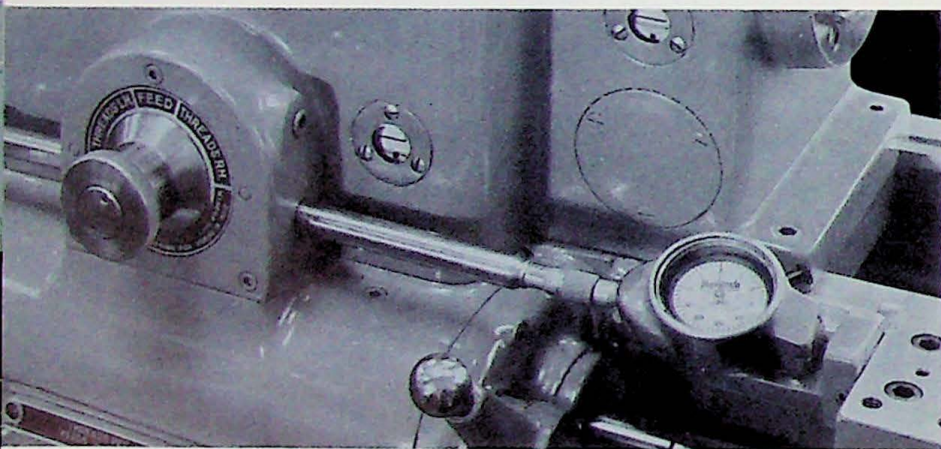
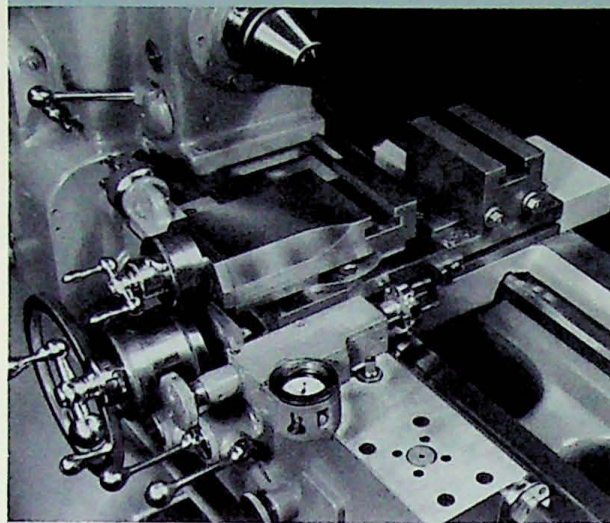
Heavy Duty Tool Block. Alloy steel block provided with two large, unbreakable screws • Maximum size tool accommodated, 1/2" x 3/4".



Round Tool Post. Compound mounted • Maximum size tool accommodated, 3/8" x 7/8".

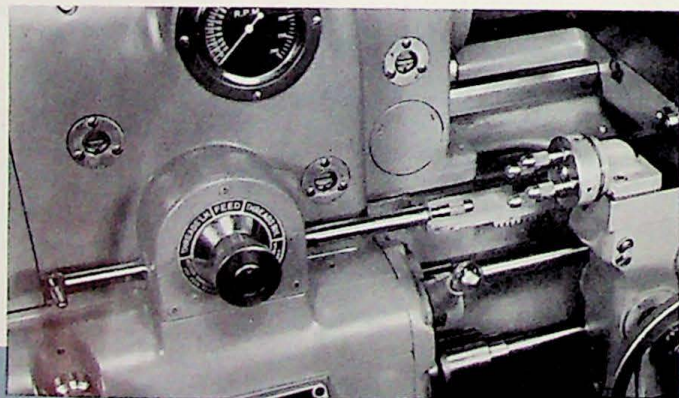
Connected Compound and Plain Block Rear Rest. Both the compound rest and rear tool block mounted on same bottom slide • Bottom slide dovetailed at rear for mounting of rear block, thus permitting in and out positioning of block • T-slot of rear block accommodates the regular round tool post and heavy duty tool block.

Dial Type Indicator Cross Feed Stop. Provides four diameter stops which may be indexed by knob at front of carriage • Precision type dial indicator graduated in ten thousandths for ultra-precision results • Adjustable stop dog clamped in T-slot at side of cross slide • Frequently used with rear adjustable tool block as illustrated.

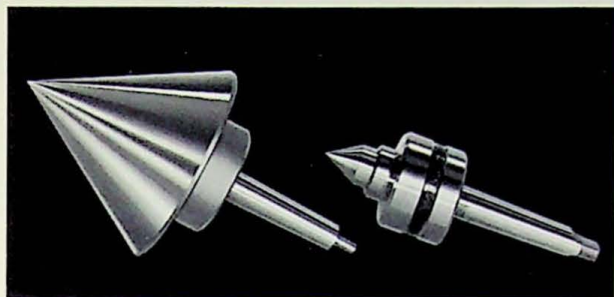


Dial Indicator Carriage Stop. Precision type dial indicator, graduated in thousandths, mounted in bracket on left hand carriage wing • Stop bar with micrometer head carried by housing at front of headstock • Micrometer head in bed-mounted bracket also supplied for long work beyond lateral movement of regular stop bar.

Multiple Positive Length Stops. Indexing cylinder with four micrometer heads attached to left hand carriage wing • Detent plunger in cylinder provides positive stop at proper position for each head to engage stop bar • Stop bar with micrometer head carried by housing at front of headstock.



Coolant System. Individually motor driven coolant pump of the impeller type mounted in compartment at right end of base • Quickly accessible by removal of one cover.

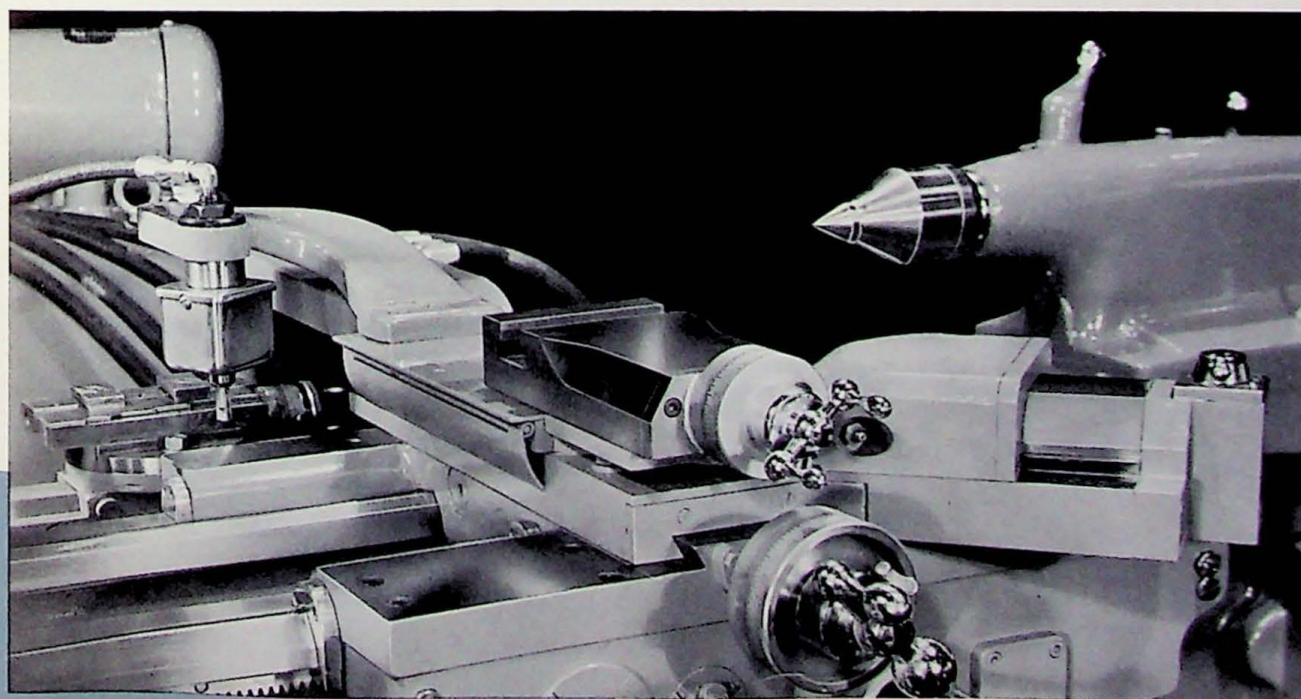
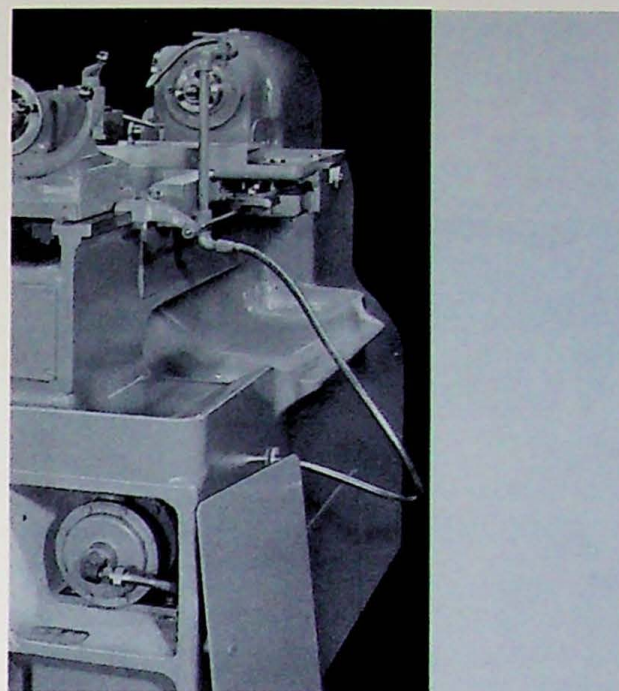


Centers. In addition to regular work centers furnished with all machines, pipe center and anti-friction center also available. All are interchangeable • Pipe center of anti-friction type has capacity of 0 to 4".

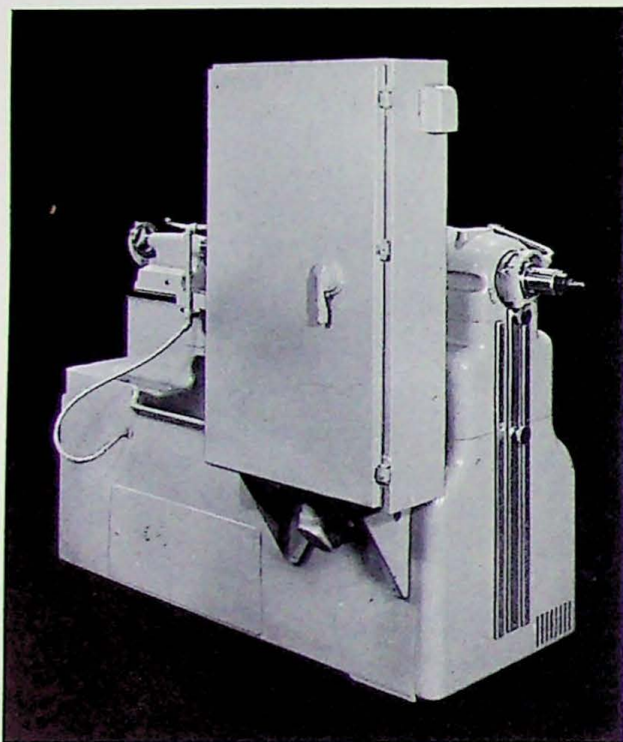
"Air-Gage Tracer." A versatile means for making the 10" Model EE quickly convertible to a production machine for straight or contour turning, boring or facing • Template controlled. Reproduces accuracy of template within $\pm .001$ " when roughing; $\pm .0005$ " when finishing • Imparts a smooth, stepless finish on almost any combination of cuts because of

the use of a single, running tool.

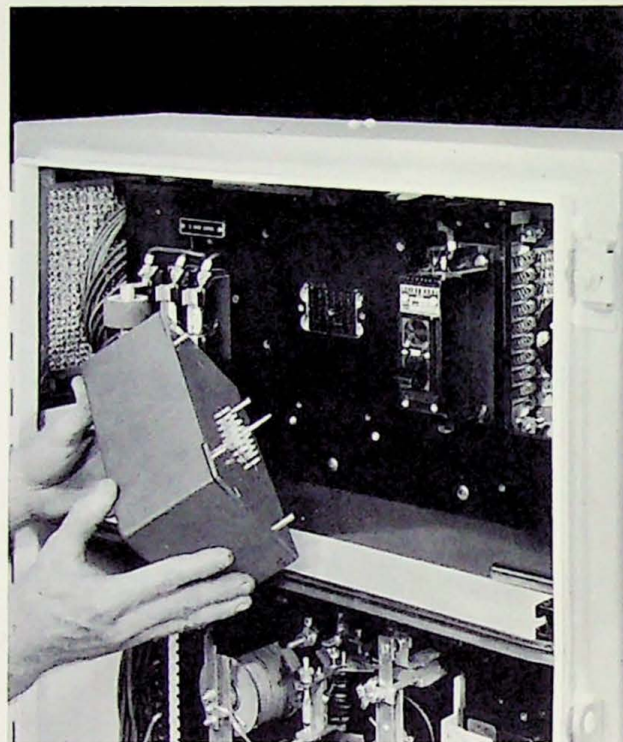
Often halves amount of stock left for grinding; sometimes eliminates grinding and polishing operations • Allows a complete setup change in as little as 15 to 20 minutes; tool change in 1 minute • Available only factory applied to new machines • Ask the Monarch representative for further details.



Metric Transposing Gears. Furnished for chasing Metric threads with a minimum pitch of .225 mm to a maximum pitch of 4.0 mm.

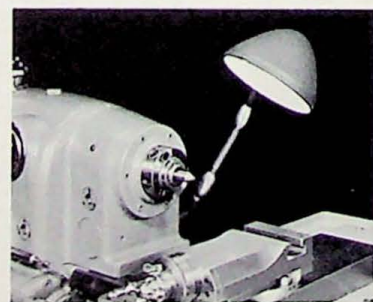


J.I.C. Controls. On machine with J.I.C. controls, electrical control cabinet mounted on base to rear of headstock • Control equipment in two compartments, one containing the electronic elements and force-ventilated; the other, a dust-tight compartment housing the



relays and starters • Control circuitry in the form of a plug-in module for ease of maintenance (illustration, above right) • Main drive motor electronics consist of only three tubes along with silicon diodes and other static types of electrical components.

Work Light Mounting. Work light may be positioned at any desired angle by means of universal joint arrangement.



Tool Cabinet. Sturdy steel cabinet has generous storage space for chucks, rests, plates, wrenches, collets and assorted tools • Top of cabinet convenient location for operator's personal tool box.

specifications for Monarch 10" model EE precision toolmaker's lathe

Regular Equipment

All Monarch 10" Model EE Precision Toolmaker's Lathes are furnished with the following regular equipment: 5 H.P. 100 to 1 variable speed electric drive with magnetic switch with start and stop push button station • Built-in leadscrew reverse operated from headstock • Built-in oil pan of the Reservoir type • Cabinet base • Large T-slotted face plate • Dog plate • Compound rest • Steady rest • Precision dial-type indicator carriage stop • Chasing dial • Chasing stop • Tool post • Center sleeve • Two centers • Wrenches

GENERAL

Swing over bed	12½"
Swing over cross slide	7¼"
Distance between centers	20"
Distance, spindle center to floor	43½"
Floor space	29" W x 64" L

HEADSTOCK

Hole through spindle	1½"
Center, Morse taper	No. 2
Spindle bearings, ball	Precision
American standard Camlock spindle nose	3"-D-1
Optional spindle speeds (range No. 1 furnished unless otherwise specified on order.)	

A. C. Supply

Range No. 1

Range No. 2

Direct

30 to 3000 R.P.M.

40 to 4000 R.P.M.

Speed Reducer

6 to 600 R.P.M.

8 to 800 R.P.M.

GEAR BOX

Leadscrew diameter and threads per inch	1"-8 thd.
Range of threads	3 to 184
Range of feeds through endless belt	.0005" to .016"
Number of thread changes	60
Number of feed changes	50
Actual threads cut: 3, 3¼, 3⅝, 3½, 3¾, 4, 4½, 5, 5½, 5¾, 6, 6½, 6¾, 7, 7½, 8, 9, 10, 11, 11½, 12, 13, 13½, 14, 15, 16, 18, 20, 22, 23, 24, 26, 27, 28, 30, 32, 36, 40, 44, 46, 48, 52, 54, 56, 60, 64, 72, 80, 88, 92, 96, 104, 108, 112, 120, 144, 160, 176 and 184	

TAILSTOCK

Tailstock spindle diameter	1¼"
Tailstock spindle traverse	3½"

STEADY REST

Steady rest opening	3"
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CARRIAGE AND COMPOUND

Carriage length	20½"
Carriage bridge width	5"
Compound rest top slide travel	2"
Size of lathe tool	⅜" x 7/8"

BED

Width of bed	10½"
Depth of bed	10¼"

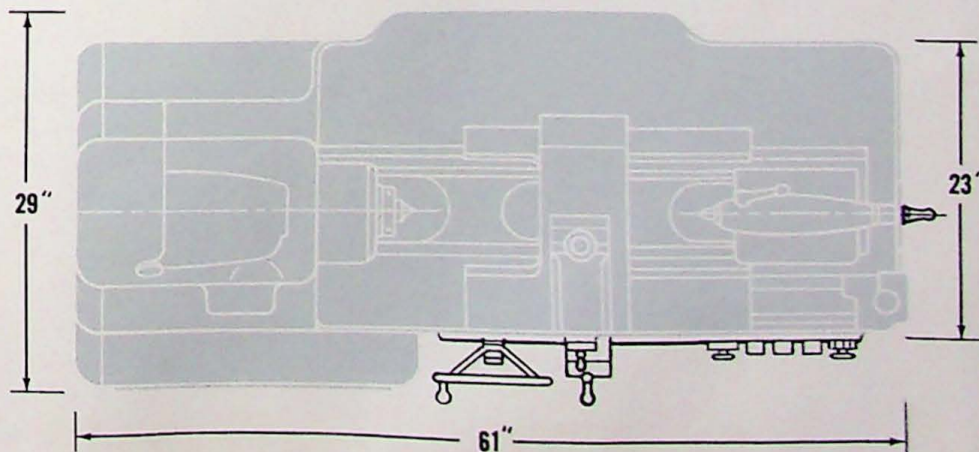
MOTOR DATA

Motor size	5 H.P.
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SHIPPING DATA

Net weight, with regular equipment only, including electrical equipment	3250 lbs.
Domestic shipping weight, as above	3450 lbs.
Export shipping weight, as above	4100 lbs.
Cubic content—boxed for export, as above	105 cu. ft.

Floor Space Requirements





SMALL and MEDIUM SWING LATHES

Precision Toolmaker's Lathe—10" Model EE
Precision Manufacturing Lathe—10" Model EE
Precision Lathe—Series EE, Model 1000
612 Lathes—for manufacturing and toolroom use
Dyna-Shift Lathes—Series 62—for manufacturing and toolroom use

HEAVY DUTY LATHES

Dyna-Shift Lathes—Series 80
Dyna-Shift Lathes—Series 91
Missile Master Lathes—Series 170

PRODUCTION LATHES

Mona-Matic—Model 20-H
Mona-Matic—Model 21-H
Pathfinder Numerical Control

TRACER CONTROLS

Air-Tracer Pak
"Air-Gage Tracer"
Rotary Profile Tracer Lathe
Monarch-Keller Contour Turning Lathes
Electro-Gage Tracer

SPECIAL PURPOSE LATHES

Speedi-Matic—Model B
Heavy Duty Roll Turner
Machinability Test Lathes

THE MONARCH MACHINE TOOL COMPANY • SIDNEY, OHIO