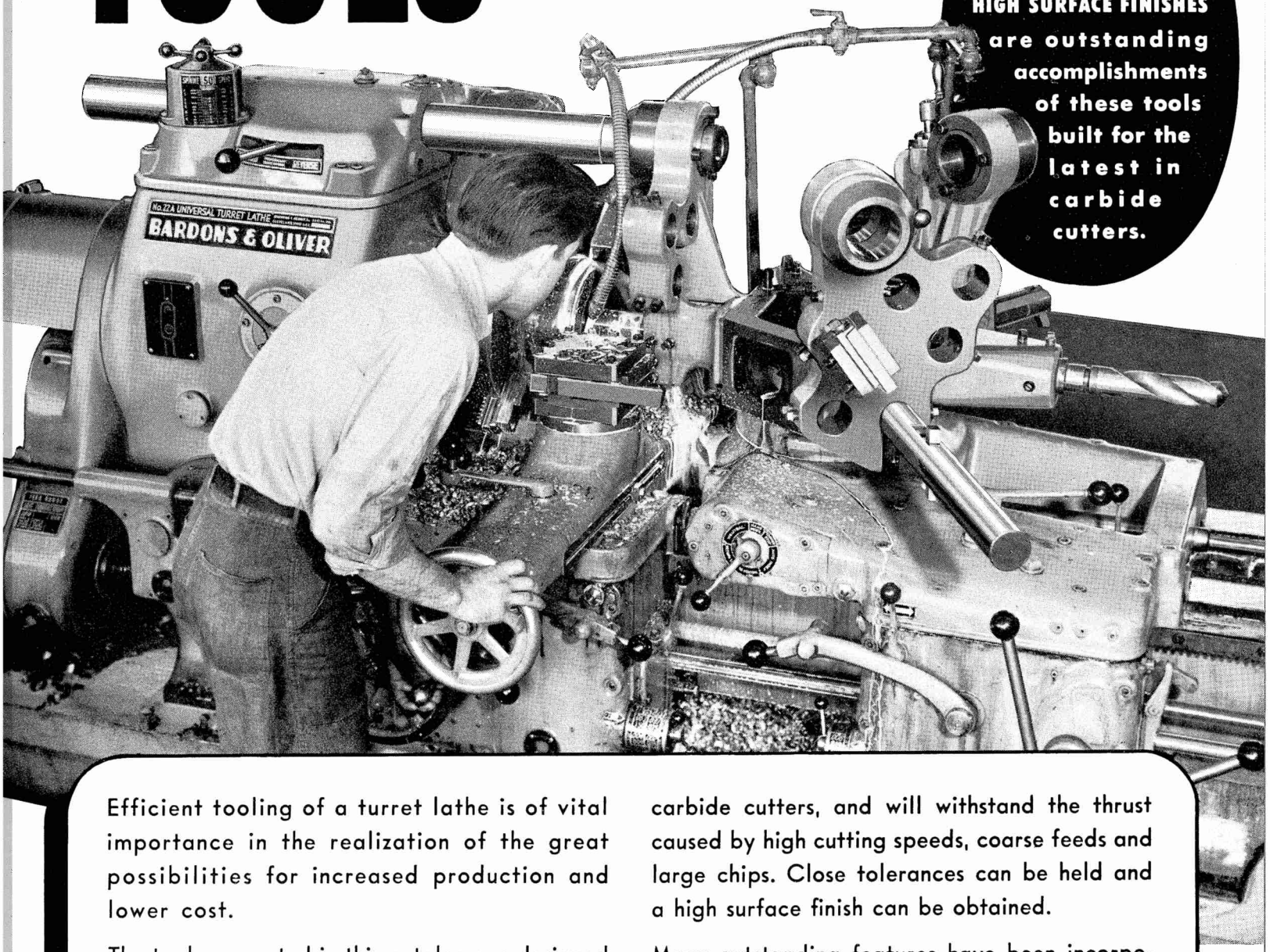
BARDONS & OLIVER

TOOLS FOR NOS. 21 and 22 SADDLE TYPE TURRET LATHES

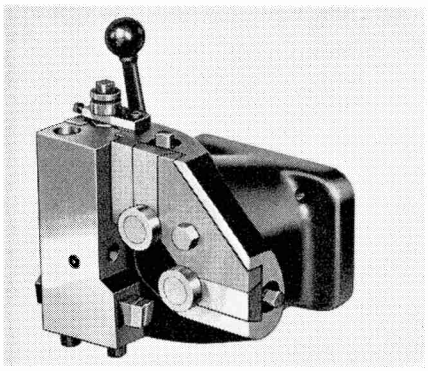
GREATLY INCREASED PRODUCTION, PRECISION AND HIGH SURFACE FINISHES are outstanding accomplishments of these tools built for the latest in carbide cutters.



Efficient tooling of a turret lathe is of vital importance in the realization of the great possibilities for increased production and lower cost.

The tools presented in this catalog are designed for the use on Bardons & Oliver Nos. 21 and 22 Saddle Type Turret Lathes. They are capable of utilizing to the full the inherent capacity for fast production of the latest and most modern carbide cutters, and will withstand the thrust caused by high cutting speeds, coarse feeds and large chips. Close tolerances can be held and a high surface finish can be obtained.

Many outstanding features have been incorporated. The tool bodies are made of steel, alloy, malleable iron, or other high tensile strength material. Cutter holder shanks and boring bars are hardened and ground.

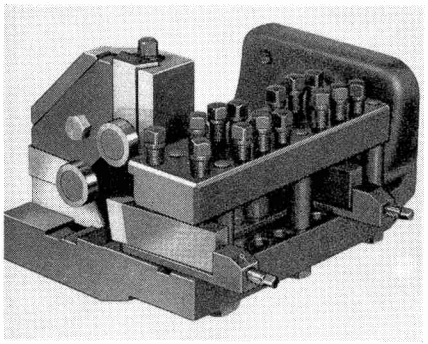


SINGLE CUTTER TURNER WITH TOOL RELIEF

Bar stock may be quickly and accurately reduced in diameter. Coarse feeds and heavy cuts can be taken. Size and adjustment, when setting up, is made quickly and easily by the micrometer graduated screw actuating the cutter slide. The cutter is mounted tangentially below and behind the work. The chips and the coolant are deflected downward towards the pan. The most efficient cutting action, the highest accuracy and maximum tool life is assured.

The lever clamps the cutter slide rigidly to the tool body and also actuates the tool relief. The work is not marred by the cutter when the tool is withdrawn. The needle bearing back rest rollers are easy to adjust. The roll slides are rigidly clamped to the tool body.

MACHINE	21	22
TOOL NUMBER	2101	2201
MAXIMUM CAPACITY	2 5/8 x 5 3/4	3 1/2 x 6 7/8
MINIMUM DIAMETER TURNED	3/8	3/8
CLEARANCE HOLE	2 5/8	3 1/8
SIZE OF CUTTER	5/8 x 23/32	5/8 x 1 1/4



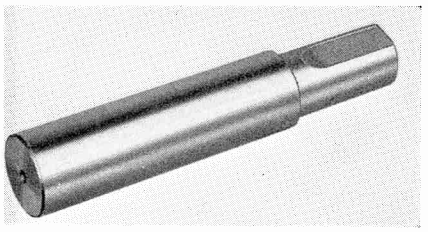
MULTIPLE CUTTER TURNER

Several diameters can be turned simultaneously. Shoulder distances may be held very short, as cutters can be placed touching side by side.

Rigidly mounted in individual cradles on the tool body, the cutters are easily adjusted for size of work by graduated screws. The needle bearing back rest rollers are readily adjustable and the tool slides are securely clamped. The back rest body is interlocked to the top cap. This feature adds greatly to the overall rigidity.

The tool is regularly furnished with one back rest unit only. A second back rest unit is of value on long, slender work and can be readily supplied as an extra.

MACHINE	21	22
TOOL NUMBER	2102	2202
MAXIMUM CAPACITY	2 5/8 x 10	4 x 12 1/4
MINIMUM DIAMETER TURNED	3/8	7/16
CLEARANCE HOLE	2 1/16	3
SIZE OF CUTTER	3/4 x 3/4	1 1/4 x 3/4
MAXIMUM BETWEEN CUT	8 9/16	10 3/16

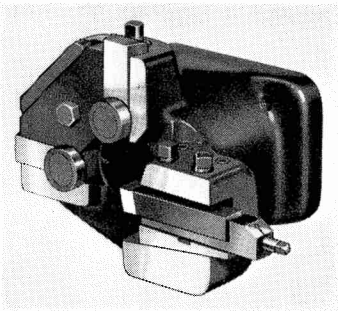


CORNER STOCK STOP

This bar stock gage is mounted on the seventh or corner position of the hexagon turret. Its use makes all six turret faces available for tooling and is of great value on complicated set ups. Tool No. 2106 is also used on No. 22 turret lathe.

MACHINE	21
TOOL NUMBER	2106
SHANK DIAMETER	1
BODY DIAMETER	1 1/4
BODY LENGTH	4 1/2
SHANK LENGTH	2

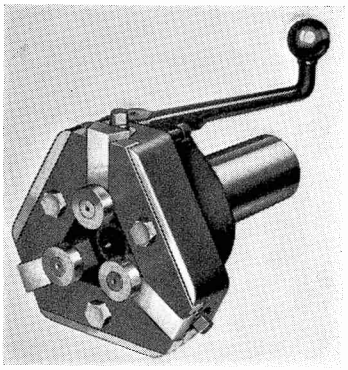
SINGLE CUTTER TURNER AND END FACING TOOL



Coarse feeds and heavy cuts can be taken for turning bar stock. End facing and forming can be done to advantage. The cutter is mounted on a cradle and is easily adjustable by a graduated screw. The needle bearing back rest rollers are carried by individual slides with micrometer screw adjustment for diameter of work. The roll slides are clamped rigidly to the tool body.

MACHINE	21	22
TOOL NUMBER	2103	2203
MAXIMUM CAPACITY	2 5/8	3 5/8
MINIMUM DIAMETER TURNED	3/8	7/16
SIZE CUTTER	3/4 x 3/4	1 1/4 x 3/4

CENTER DRILLING TOOL



The work to be center drilled is accurately located and supported by three steady rest rollers. These are mounted on individual slides adjustable by micrometer screws and rigidly clamped to the tool body.

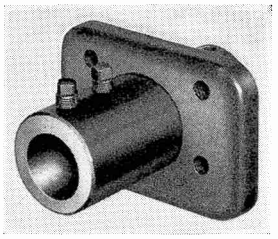
The center drill is held in a collet and is movable lengthwise by the lever on top of the tool. An adjustable stop screw acting in conjunction with the lever gages the depth of the center. The collet is available in the following three sizes.

No. 2105 A—.300″ No. 2105 B—7/16″ No. 2105 C—1/2″
Tool No. 2105 is also used on No. 22 turret lathe.

MACHINE	21
TOOL No. COMPLETE	2105
MAXIMUM CAPACITY	2 5/8
SHANK DIAMETER	2

FLOATING REAMER HOLDER

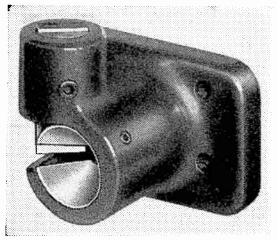
A small but adequate amount of float or free movement of the tool holder is permitted. This allows the reamer to center itself in the drilled or bored hole, thus improving the accuracy and finish. Split tool holder bushings are used with straight shank and drill sockets with taper shank reamers



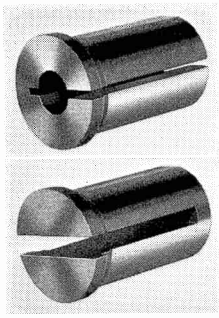
MACHINE	21
TOOL NUMBER	2110
HOLE DIAMETER	2
HOLE DEPTH	3 3/8

CHAMFERING TOOL

The purpose of this tool is to chamfer the ends of bars to assure a true start for turning cuts when using a roller back rest turner. A hardened steel bell-mouthed bushing supports the end of the stock during the cutting operation. The tangentially mounted cutter can be either carbide or high speed steel.



MACHINE	21
TOOL No.	2113
MAXIMUM CAPACITY	3 1/8
SIZE CUTTER	3/4 x 2

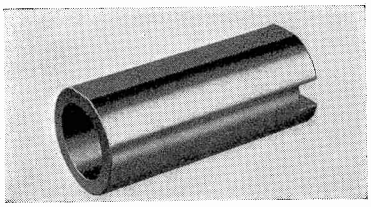


TOOL HOLDER BUSHINGS

By means of these bushings various tools and cutters can be adapted to the flanged tool holders, the several cutter heads and slide tools.

When ordering the split bushing, it is necessary to specify the size of the hole.

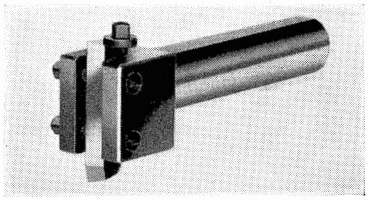
MACH.	SPLIT		FLAT CUTTER		Dia.	Length
	Tool No.	Max. Hole	Tool No.	Slot		
21	712-A	1 5/8	712-B	1/2	2	3 9/16
22	2212-A	2	2212-B	5/8	2 1/2	4



DRILL SOCKET

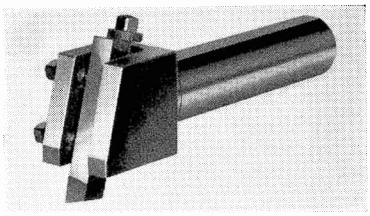
These adapt taper shank drills and reamers to the several different types of tool holders and cutter heads. The number of Morse taper must be specified when ordering.

MACHINE	21	22
TOOL NUMBER	715	2215
DIAMETER MORSE TAPER No.	2 1-2-3-4-5	2 1/2 4-5



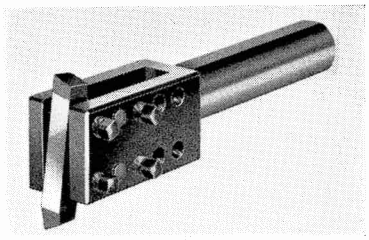
STRAIGHT CUTTER HOLDER

The cutter head is off-set in relation to the shank. Either end of the head can be used towards the work. This design has the advantage of affording better and more rigid cutter support, thus making possible less overhang. The cutter adjusting screw is of value in more easily obtaining the correct diameter of work.



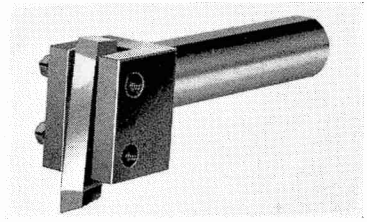
ANGLE CUTTER HOLDER

The angular cutter mounting makes this holder excellently adapted for turning and boring close up to a shoulder.



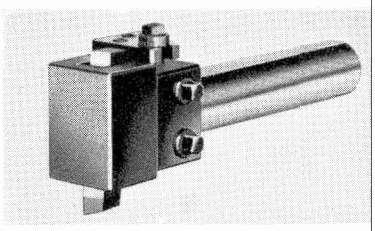
MULTIPLE CUTTER HOLDER

Two or more cutters can be mounted in this holder for multiple boring or turning. The off-set shank makes it possible to minimize cutter overhang by reversing the holder. Two screws with spacers tie the two sides together for added rigidity.



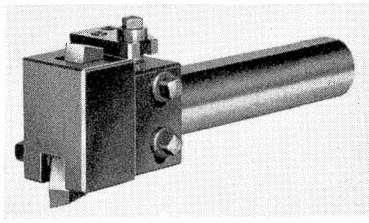
REVERSIBLE CUTTER HOLDER

The cutter can be mounted either straight or at angle to suit the work. The off-set shank makes it possible to reverse the holder and minimize cutter overhang.



ADJUSTABLE STRAIGHT CUTTER HOLDER

The cutter slide is adjustable by a fine pitch screw graduated to read .001 inch. The accurate setting of the cutter for close tolerances of work thus becomes quick and easy. The two screws on the front side clamp the slide rigidly to holder. The cutter is mounted in a straight position.

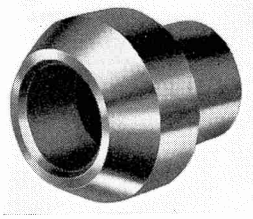


ADJUSTABLE ANGLE CUTTER HOLDER

This is of similar design to the adjustable straight cutter holder, except that the cutter is mounted angularly. This is of advantage when working close up to a shoulder.

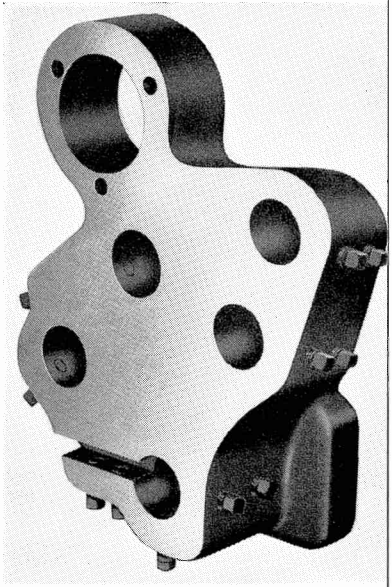
Mach.	STRAIGHT		ANGLE		MULTIPLE	
	Tool No.	Size Cutter	Tool No.	Size Cutter	Tool No.	Size Cutter
21	2121-A	1x1	2121-B	1x1	2121-C	1x1
22			2221-B	1 1/4x1 1/4	2221-C	1 1/4x1 1/4

Mach.	REVERSIBLE		ADJ STRAIGHT		ADJ ANGLE	
	Tool No.	Size Cutter	Tool No.	Size Cutter	Tool No.	Size Cutter
21	2121-J	1x1	2121-K	1x1	2121-M	1x1
22	2221-J	1 1/4x1 1/4			2221-M	1 1/4x1 1/4



OVERHEAD PILOT BUSHING

The adjustable double bearing overhead pilot bushing is fastened directly to each of the several turning heads in a manner to insure rigidity and accuracy of alignment. (See next page and column for table.)

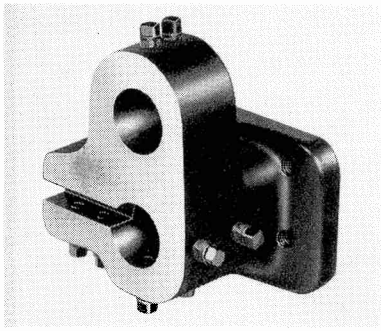


MULTIPLE TURNING HEAD

Drilling, boring and turning cuts can be combined and taken simultaneously for fast production. This tool is very rigid and is designed to be used efficiently at the full power capacity of the machine. The several styles of cutter holders available for the use with this turning head are shown above. The tool holes are spaced at evenly increasing radial distances from the center. There is no interference between adjacent cutter holders or cutters.

The center hole may be used for drills, stub boring bars, piloted boring bars or a center pilot bar. An overhead pilot bushing can be mounted in the top hole. The overhead pilot bar adds greatly to the rigidity and increases the cutter life. Its use is strongly recommended.

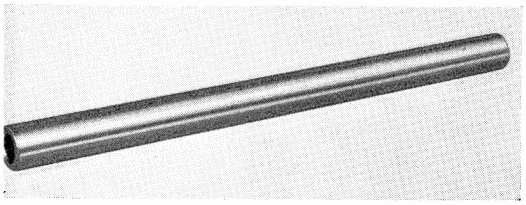
MACHINE	21	22
TOOL NUMBER	2121	2221
OVERHEAD PILOT	Yes	Yes
No. TOOL HOLES	5	6
DIAMETER HOLES	2	2 1/2
MAXIMUM DIAMETER TURNED	14	17 1/4



SINGLE TURNING HEAD

Simple and light turning, boring, and facing operations are performed satisfactorily with this turning head.

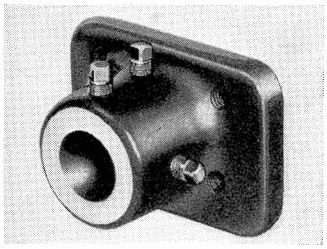
MACHINE	21
TOOL NUMBER	2123
MAX. CAPACITY	4 1/2
DIA. HOLES	2
SIZE CUTTER	7/8th



OVERHEAD PILOT BAR

This pilot bar is of large diameter and is mounted directly in the head housing—thus affording the maximum in rigidity and in accuracy of alignment. The cutter life and the efficiency of the cutting action for heavy turning are greatly enhanced by the overhead piloting of the several turning heads.

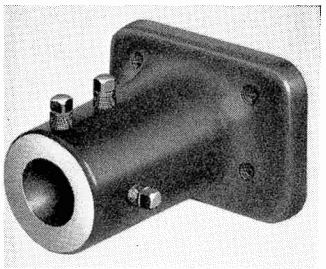
Mach.	Tool Number Overhead Pilot Bushing	Tool Number Overhead Pilot Bar	Dia. of Bar	Length of Bar
21	2121-H	2122-A	3	41
22	2221-H	2222-A	3 1/2	55



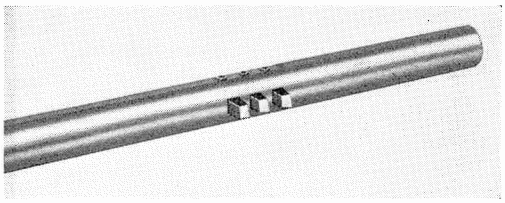
FLANGED TOOL HOLDERS—SHORT AND LONG

The center drilling tool, the releasing tap holder, boring bars, cutter holders, drills and many other tools are mounted in these. They are available in two lengths to better suit the requirements of different tooling setups.

Mach.	Short Tool No.	Short Tool Over-all Length	Hole Dia. Both Holders
21	2125-S	4 3/4	2
22	2225-S	4 3/4	2 1/2



Mach.	Long Tool No.	Long Tool Over-all Length	Hole Dia. Both Holders
21	2125-L	8	2
22	2225-L	9 1/4	2 1/2



PILOTED BORING BAR (See Next Column)

MACHINE	21	22
TOOL NUMBER	731	2231
DIAMETER OF BAR	2	2 1/2
DIAMETER OF PILOT	2	2 1/2
LENGTH	16	30
CUTTER SPACING	1 1/8	1 3/8
SIZE CUTTER	1/2 x 1/2	3/4 x 3/4

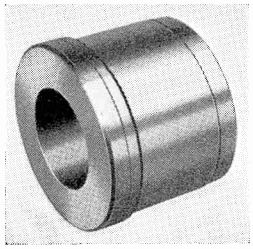
PILOTED BORING BAR—Continued

When taking heavy single or multiple boring cuts, the bar should be piloted in the spindle.

The standard bar has three square cutters at right angles to the bar. This arrangement of holes makes for adaptability to different lengths of work and is very convenient when bar is used with other turret tools.

ROLLER BEARING CENTER PILOT BUSHING

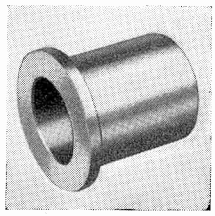
The pilot bushing is mounted directly in the spindle bore. The bearing rollers are sealed against chips and dust.



MACHINE	22
TOOL NUMBER	2231-A
DIAMETER	4 3/8
BORE	2 1/2
LENGTH	3 7/32

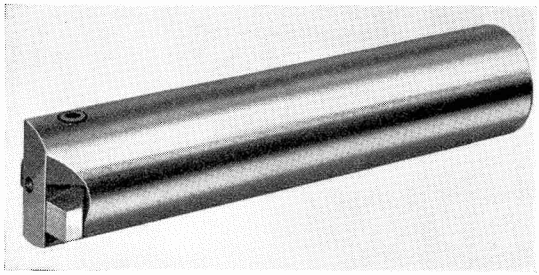
CENTER PILOT BUSHING SLEEVE

Smaller diameter piloted boring bars can be accommodated by this sleeve. When ordering, it is necessary to specify the size of the hole desired.



MACHINE	22
TOOL NUMBER	2231-B
DIAMETER	2 1/2
LENGTH	2 3/4

STUB BORING BAR

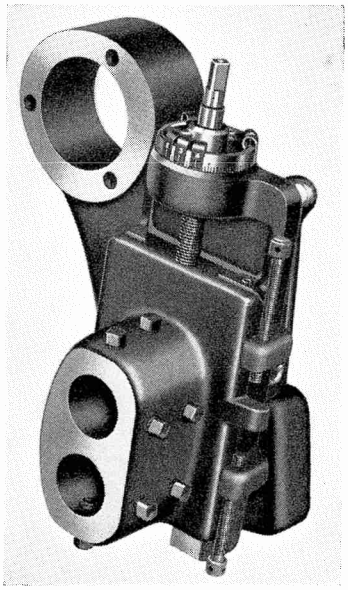


The square cutter is mounted at an angle with the bar to facilitate boring up to a shoulder or in a blind hole. It may be used in either the flanged tool holders, the turning heads or the slide tools.

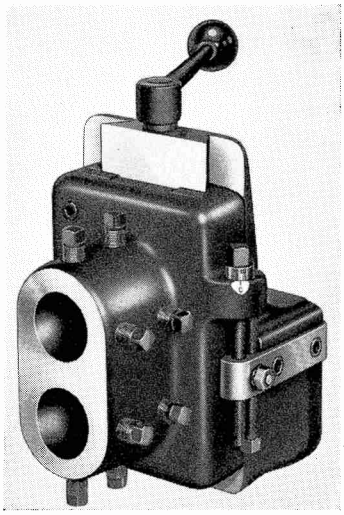
MACHINE	21	22
TOOL NUMBER	732	2232
DIAMETER	2	2 1/2
LENGTH	11	12
SIZE OF CUTTER	5/8 x 5/8	3/4 x 3/4

OVERHEAD PILOTED SLIDE TOOL

Combining versatility with rigidity and accuracy, this slide tool is a real time saver on boring, facing and recessing operations. The slide screw carries a large diameter accurately graduated dial with clips for the duplication of work. Two stop screws are mounted on the side of the tool body. The two tool holes provide adequate reach and capacity and will receive boring bars, cutter holders, tools, bushings or adapters.



MACHINE	21	22
TOOL NUMBER	2135	2235
DIAMETER OF HOLES	2	2½
DEPTH OF HOLES	4¼	4¼
HOLE SPACING	2¾	3
SLIDE MOVEMENT	2½	3½

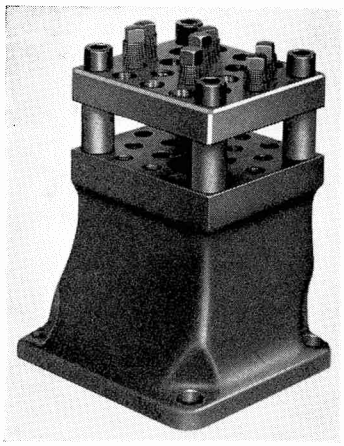


QUICK-ACTING SLIDE TOOL

Back facing, internal necking and recessing operations are performed with accuracy and ease. Standard stub boring bars, forged cutters or special facing bars can be readily adapted.

The convenient hand lever lends to the tool slide a correct feeding rate and a quick return. An accurately adjustable screw stop at each end of the stroke predetermines size and facilitates ease of handling.

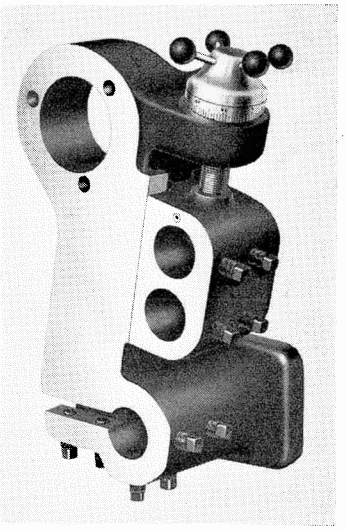
MACHINE	21
TOOL NUMBER	2136
DIA. OF HOLES	2
DEPTH OF HOLES	3 9/16
HOLE SPACING	2¾
SLIDE MOVEMENT	2⅛



REAR CROSS SLIDE CUTTER BLOCK

Extremely flexible and versatile, this cutter block is a real time saver for a large variety of work. Multiple facing and forming cuts can be taken. Limits between the machined faces are held without individual carriage stops. Cutters of many shapes can be used and mounted at any angle with the work. Because of this, two or more adjacent faces can be machined at one time. The tie screws and spacers holding down the top plate can be placed in any available position, thus allowing use of the full width of the tool.

MACHINE	21	22
TOOL No.—REAR BLOCK	2142	2242
WIDTH OF BLOCK ON TOP	5	6 15/16
HEIGHT OF CUTTER	1¼	1¼



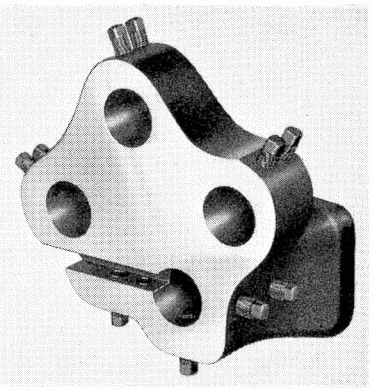
ADJUSTABLE TURNING HEAD

The cutter holders are carried by an adjustable slide. For quick and accurate setting, the slide screw carries a large diameter precision graduated dial. The slide is rigidly clamped to the tool body.

MACHINE	21	22
TOOL NUMBER	2137	2237
HOLE DIAMETER	2	2½
MAX. DIA. TURNED	15¼	17½
MOTION OF HEAD	2⅜	2⅞
No. TOOL HOLES	3	3
OVERHEAD PILOT	Yes	Yes

PLAIN MULTIPLE TURNING HEAD

Medium heavy turning, boring and facing operations are performed efficiently. The overhead pilot bar is not used in connection with this turning head.

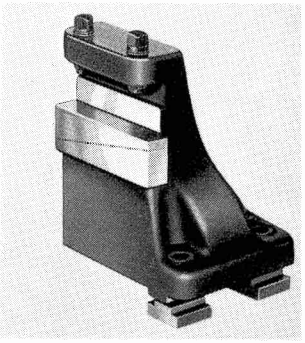


MACHINE	21	22
TOOL NUMBER	2138	2238
OVERHEAD PILOT	No	No
NO. TOOL HOLES	4	4
DIAMETER HOLES	2	2½
MAX. DIA. TURNED	11	12½

REAR CROSS SLIDE TOOL POST

Used primarily for facing and cutting-off, this tool post can serve equally well for turning and forming. Two serrated taper wedges provide parallel height adjustment for the cutter.

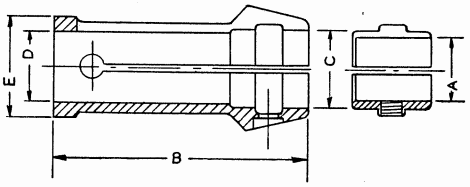
This tool post is furnished as standard equipment with all machines.



Machine	Tool Number Single Cutter Tool Post Rear	Size Cutter
21	2141	1¼×⅝
22	2241	1¼×¾

MASTER COLLETS AND FALSE JAWS

The master collets are made of the highest quality alloy steel, correctly heat treated and accurately ground. Dimension "A" of the false jaws is the maximum capacity available in each case.



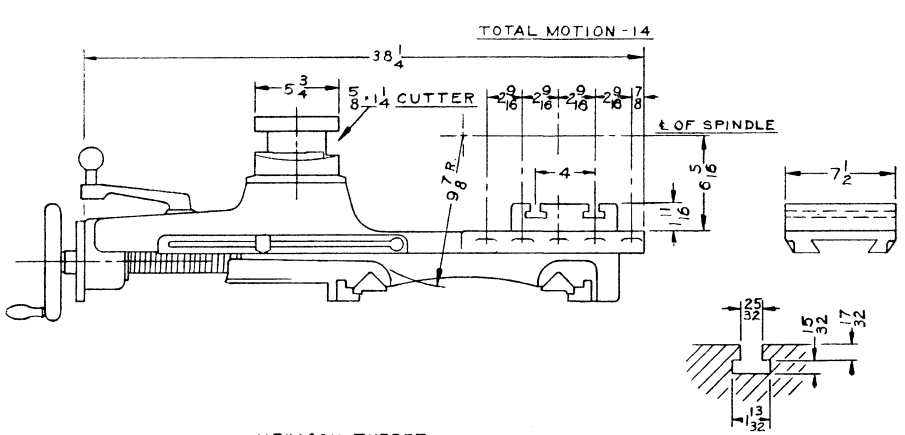
When changing false jaws, it is not necessary to remove the master collet from the machine. The jaw screws can be reached easily through holes in the collet hood.

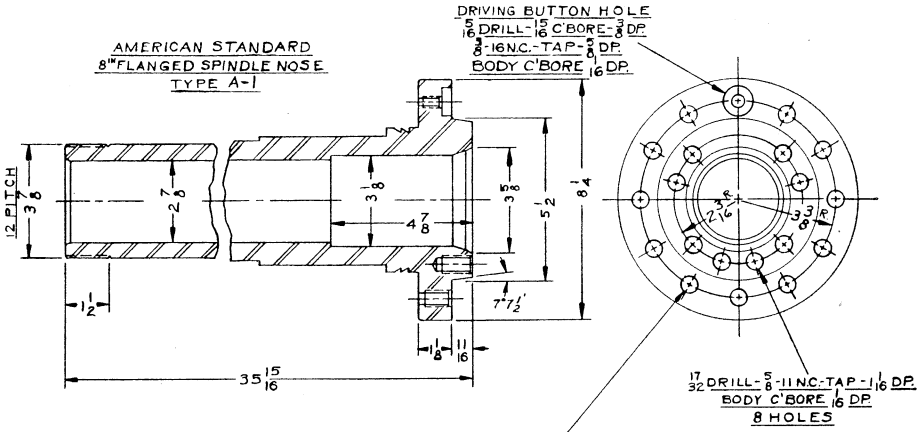
In ordering, specify the size of the machine and the hole in the false jaws wanted.

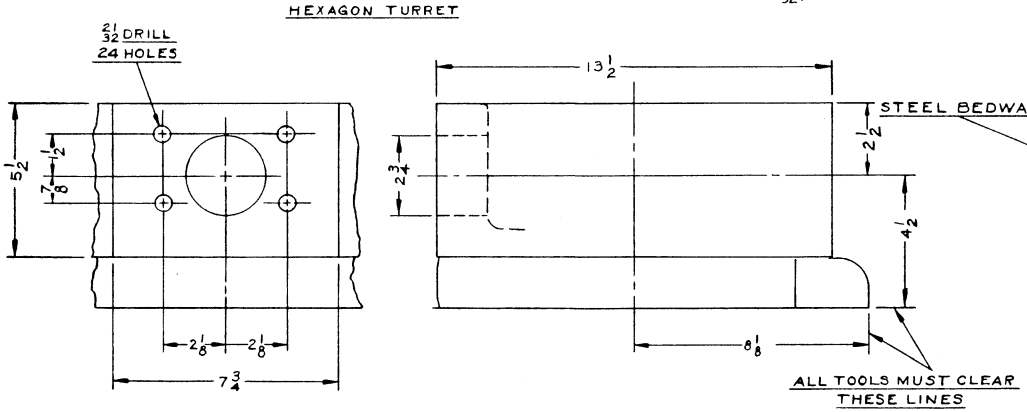
MACHINE	21A	21B	22A	22B
COLLET	Master	Master	Master	Master
No. OF SLOTS	4	4	6	6
A ROUND	2½	3	3½	4½
SQUARE	1¾	2⅛	2½	3 3/16
HEXAGON	2⅛	2 9/16	3	3⅞
B	6¾	6½	8	9½
C	3⅛	3⅝	4⅛	5⅜
D	2 9/16	3⅛	3⅝	4⅝
E	3⅛	3⅞	4⅜	5⅜

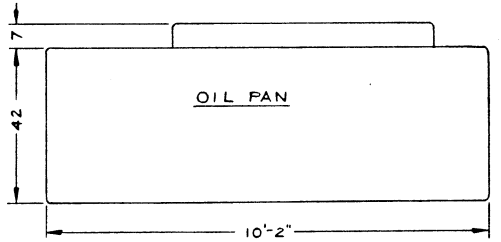
In addition to the tools illustrated on the preceding pages, we list below a number of other tools which are often useful on the No. 21 or No. 22 Saddle Type Turret Lathes. The complete 500 and 700 series of tools are illustrated and described in our separate tool catalog entitled "Turret Lathe Tools".

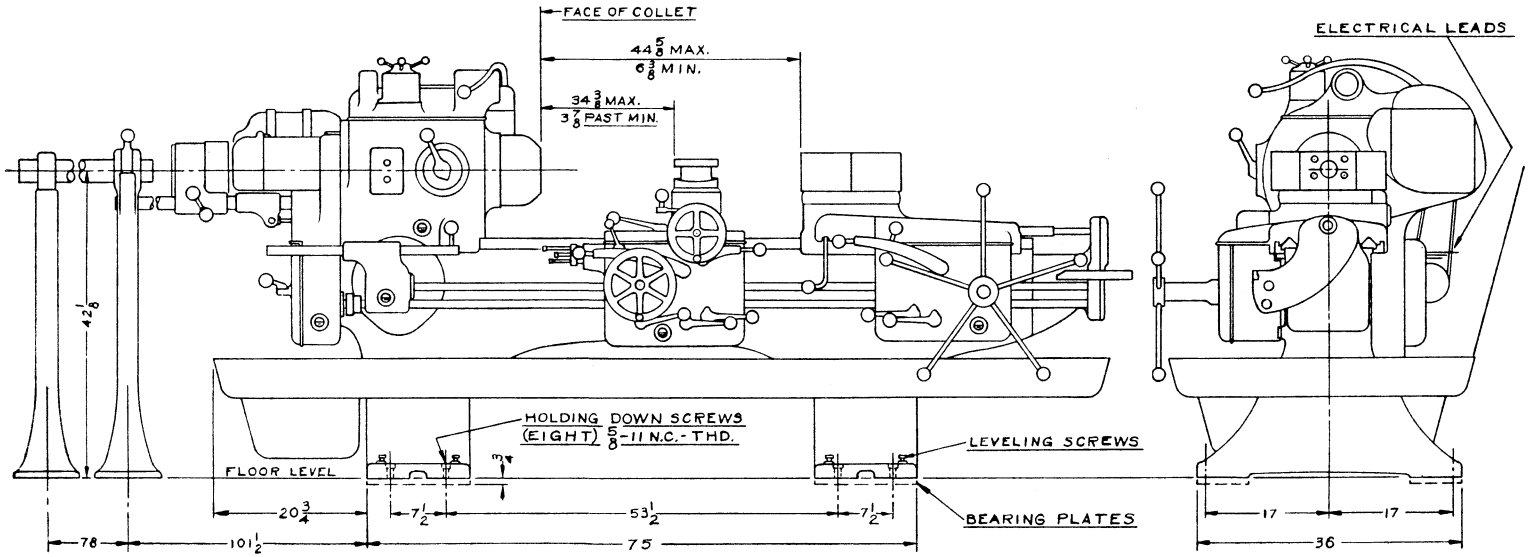
Tool No. 707	Center
Tool No. 710	Floating Reamer Holder
Tool No. 712	Plain Tool Holder
Tool No. 712-A	Split Tool Holder Bushing
Tool No. 712-B	Flat Cutter Holder Bushing
Tool No. 714	Drill Chuck
Tool No. 716	Releasing Tap Holder
Tool No. 716-A	Tap Collet
Tool No. 718	Adjustable Tool Holder
Tool No. 721-F	Center Pilot Bar
Tool No. 725-A	Rocker Cutter Adapter
Tool No. 727	Facing Tool
Tool No. 731	Pilot Boring Bar
Tool No. 731-A	Center Pilot Bushing
Tool No. 732	Stub Boring Bar
Tool No. 543	Rear Necking Tool Block
Tool No. 544	Rear Circular Forming Cutter Holder
Tool No. 545	Rear Straight Forming Cutter Holder
Tool No. 550	Cutting Off Blade Holder
	15" Diameter Plain Face Plate
	15" Diameter T Slotted Face Plate











SPINDLE SPEEDS

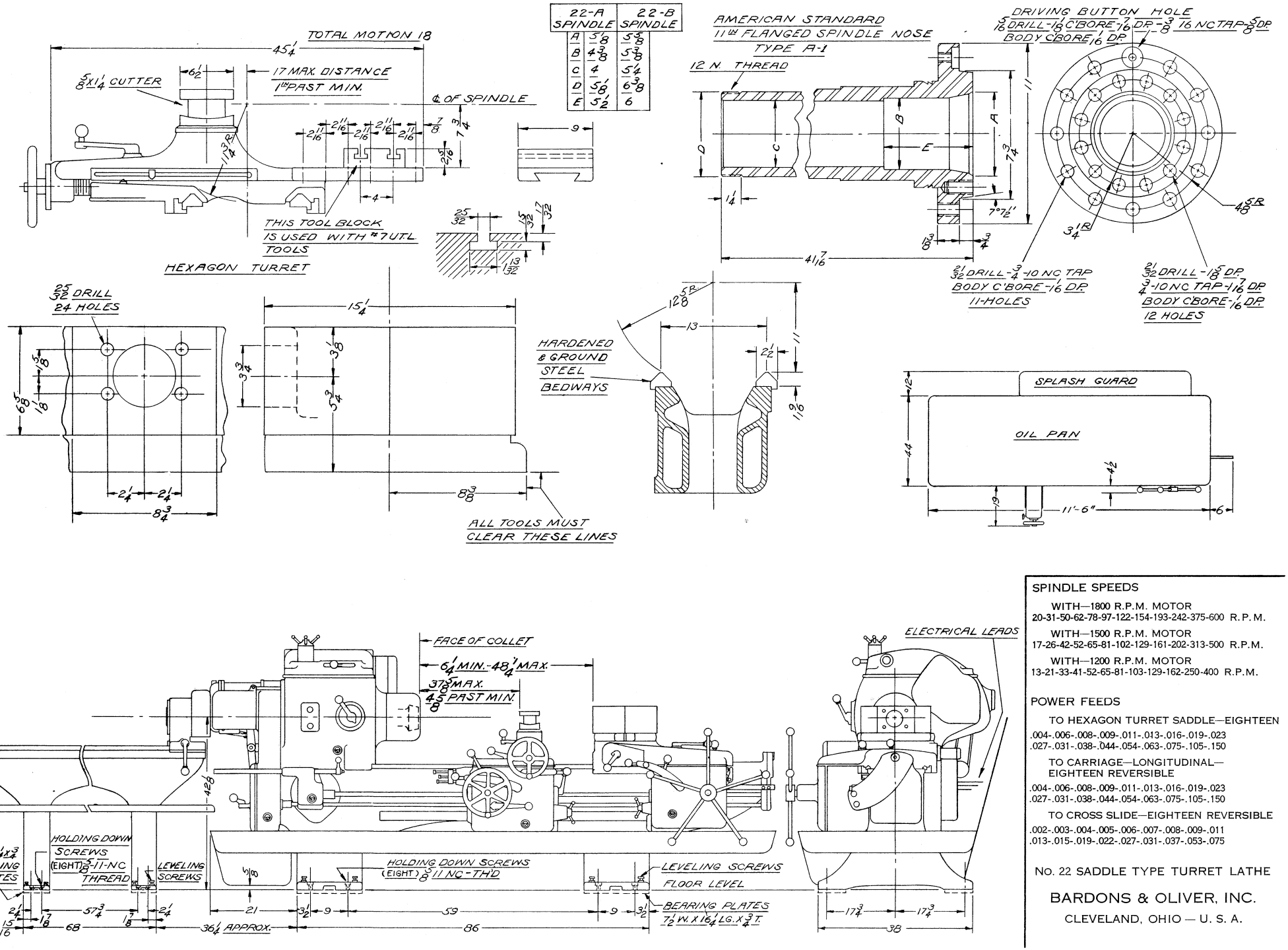
WITH—1800 R.P.M. MOTOR
28-45-68-84-101-134-161-206-247-305-482-743 R.P.M.
WITH—1500 R.P.M. MOTOR
23-37-57-70-84-112-134-172-206-254-401-619 R.P.M.
WITH—1200 R.P.M. MOTOR
19-30-45-56-67-89-107-137-165-203-321-495 R.P.M.

POWER FEEDS

TO HEXAGON TURRET SADDLE—EIGHTEEN
.004-.006-.008-.009-.011-.013-.016-.019-.022
.026-.031-.037-.044-.052-.062-.073-.100-.142
TO CARRIAGE—LONGITUDINAL—EIGHTEEN REVERSIBLE
.004-.006-.008-.009-.011-.013-.016-.019-.022
.026-.031-.037-.044-.052-.062-.073-.100-.142
TO CROSS SLIDE—EIGHTEEN REVERSIBLE
.002-.003-.004-.005-.006-.007-.008-.009-.011
.013-.015-.018-.022-.026-.031-.036-.050-.070

No. 21 SADDLE TYPE TURRET LATHE

BARDONS & OLIVER, INC.
CLEVELAND, OHIO — U. S. A.



SPINDLE SPEEDS

WITH—1800 R.P.M. MOTOR
20-31-50-62-78-97-122-154-193-242-375-600 R.P.M.

WITH—1500 R.P.M. MOTOR
17-26-42-52-65-81-102-129-161-202-313-500 R.P.M.

WITH—1200 R.P.M. MOTOR
13-21-33-41-52-65-81-103-129-162-250-400 R.P.M.

POWER FEEDS

TO HEXAGON TURRET SADDLE—EIGHTEEN
.004-.006-.008-.009-.011-.013-.016-.019-.023
.027-.031-.038-.044-.054-.063-.075-.105-.150

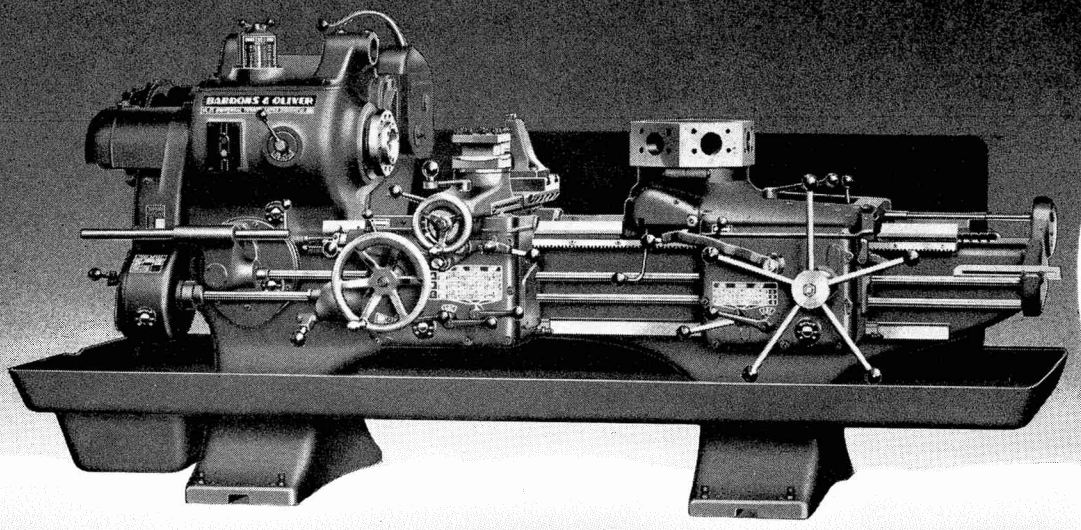
TO CARRIAGE—LONGITUDINAL—EIGHTEEN REVERSIBLE
.004-.006-.008-.009-.011-.013-.016-.019-.023
.027-.031-.038-.044-.054-.063-.075-.105-.150

TO CROSS SLIDE—EIGHTEEN REVERSIBLE
.002-.003-.004-.005-.006-.007-.008-.009-.011
.013-.015-.019-.022-.027-.031-.037-.053-.075

No. 22 SADDLE TYPE TURRET LATHE

BARDONS & OLIVER, INC.

CLEVELAND, OHIO — U. S. A.



Outstanding Features of the No. 21 SADDLE TYPE TURRET LATHE

A single lever controls the speed changing, starting, stopping, reversing and braking of the spindle.

The spindle speeds are preselective by the large dial drum in both r.p.m. and f.p.m.

The head is exceptionally smooth running and vibrationless, and is capable of transmitting power in excess of requirements.

The powerful collet chuck and the bar feed are hydraulically operated.

The unclamping, indexing, and clamping of the hexagon turret is accomplished by a single lever conveniently located on the saddle.

Power rapid traverse is provided for longitudinal movement of both the saddle and the carriage on the bed.

The full length stop carrier for the turret saddle is rigidly mounted in the bed and carries 12 highly accurate stops, two for each turret face.

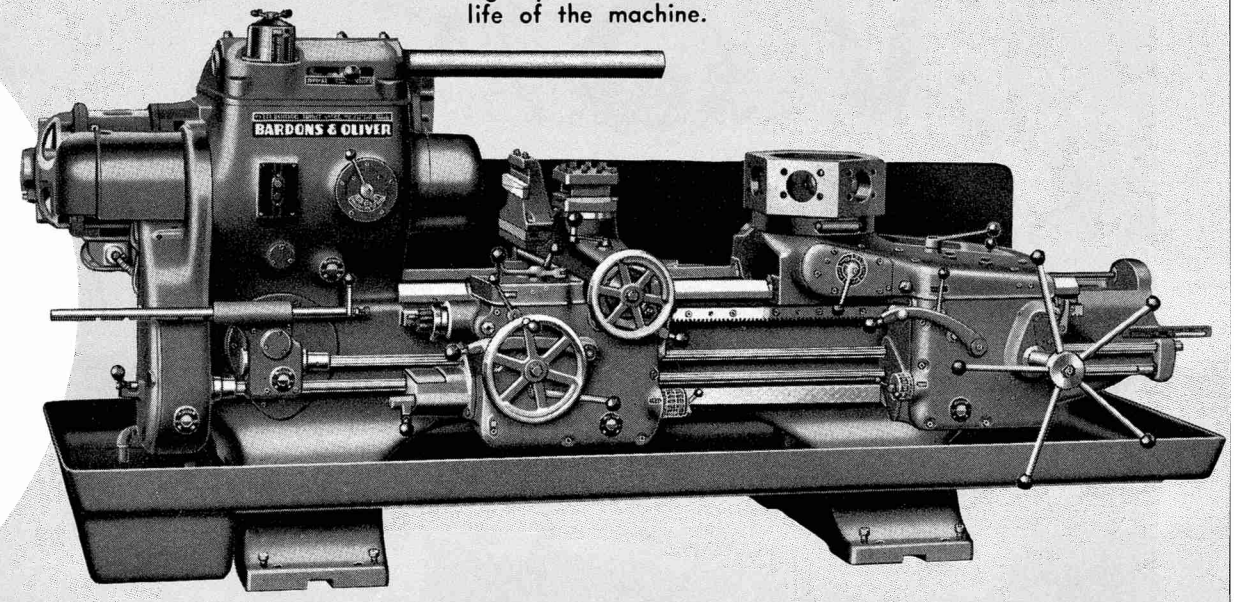
The square turret is automatically unlocked, indexed, locked and clamped.

The bridge type design of the carriage greatly increases the rigidity and makes possible the use of rear cross slide cutter blocks.

The double side walls, together with the closely spaced "X" type ribs throughout the entire length of the bed, provide utmost rigidity.

The hardened and ground V-type alloy steel bedways are rigidly mounted on the bed and prolong the precision and life of the machine.

Outstanding Features of the No. 22 SADDLE TYPE TURRET LATHE



An anti-clash, hydraulic governor permits instant spindle speed changes and insures increased life of the change gears.

A single lever effortlessly controls the speed changing, starting, stopping, reversing and braking of the spindle.

The spindle speeds are preselective by the large dial drum in both r.p.m. and f.p.m.

The powerful double multiple disc drive clutch is hydraulically operated.

The head is exceptionally smooth running and vibration free and is capable of transmitting power in excess of requirements.

The powerful collet chuck and the bar feed are hydraulically operated.

The unclamping, indexing and clamping of the hexagon turret are actuated hydraulically.

Power rapid traverse is provided for the saddle, the carriage and the cross slide.

The independent feed changes in the two aprons are preselective and are actuated hydraulically.

The full length stop carrier for the turret saddle is rigidly mounted in the bed and carries 12 highly accurate stops, two for each turret face.

The square turret is automatically unlocked, indexed, locked and clamped.

The bridge type design of the carriage greatly increases the rigidity and makes possible the use of rear cross slide cutter blocks.

The double side walls, together with the closely spaced "X" type ribs throughout the entire length of the bed, provide utmost rigidity.

The hardened and ground V-type alloy steel bedways are rigidly mounted on the bed and prolong the precision and life of the machine.

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