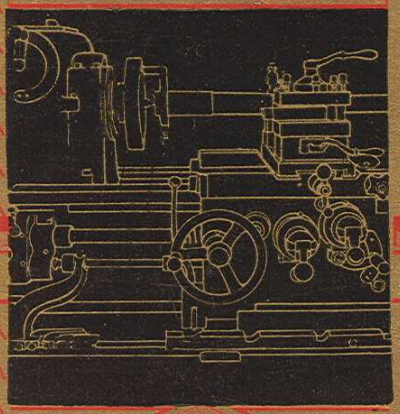
BULLETIN 444

.....THE NEW "AMERICAN"



MULTI-PRODUCTION LATHE

THE AMERICAN TOOL WORKS COMPANY

LATHES RADIALS SHAPERS

CINCINNATI, U.S.A.

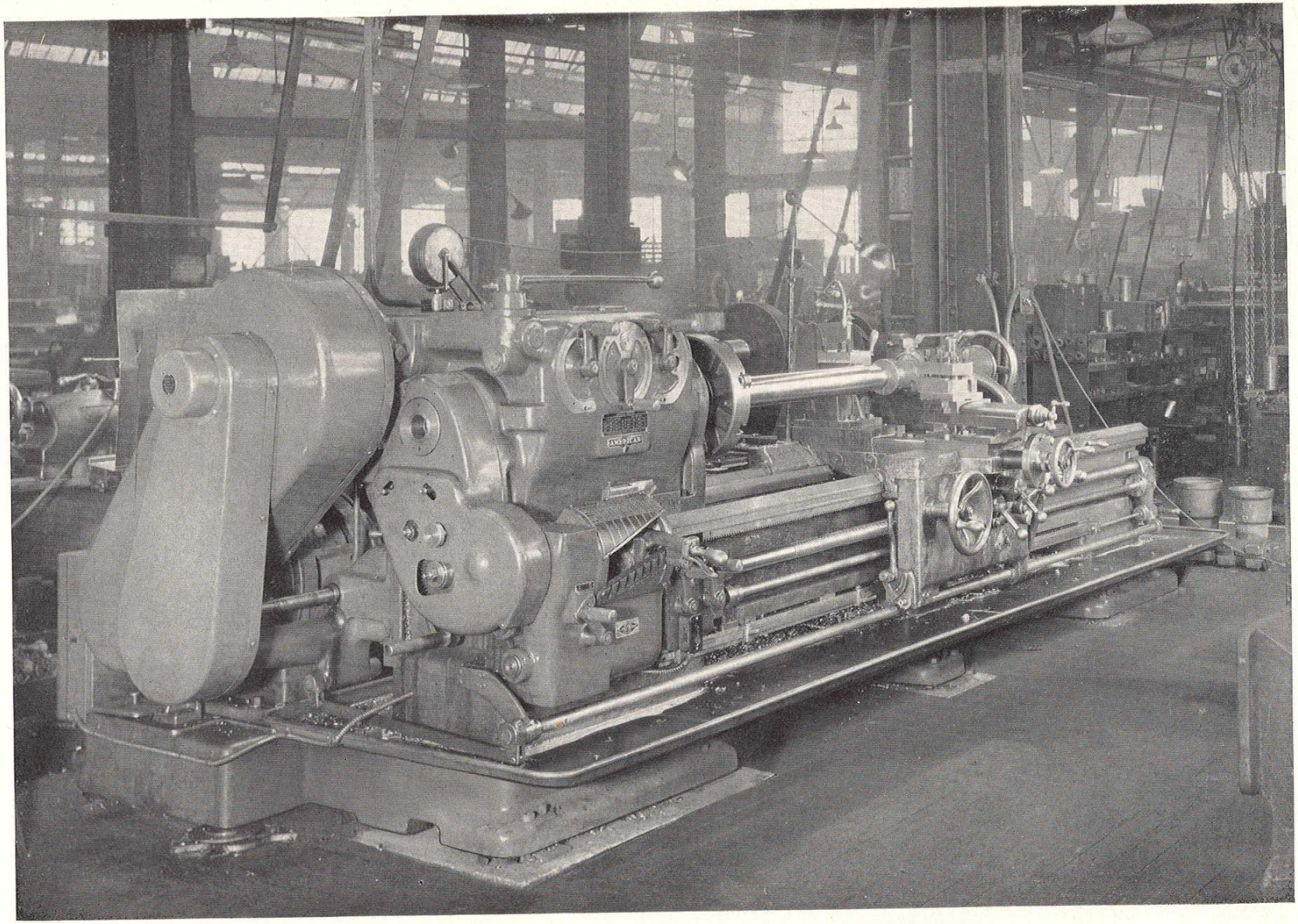
BULLETIN 444

The NEW

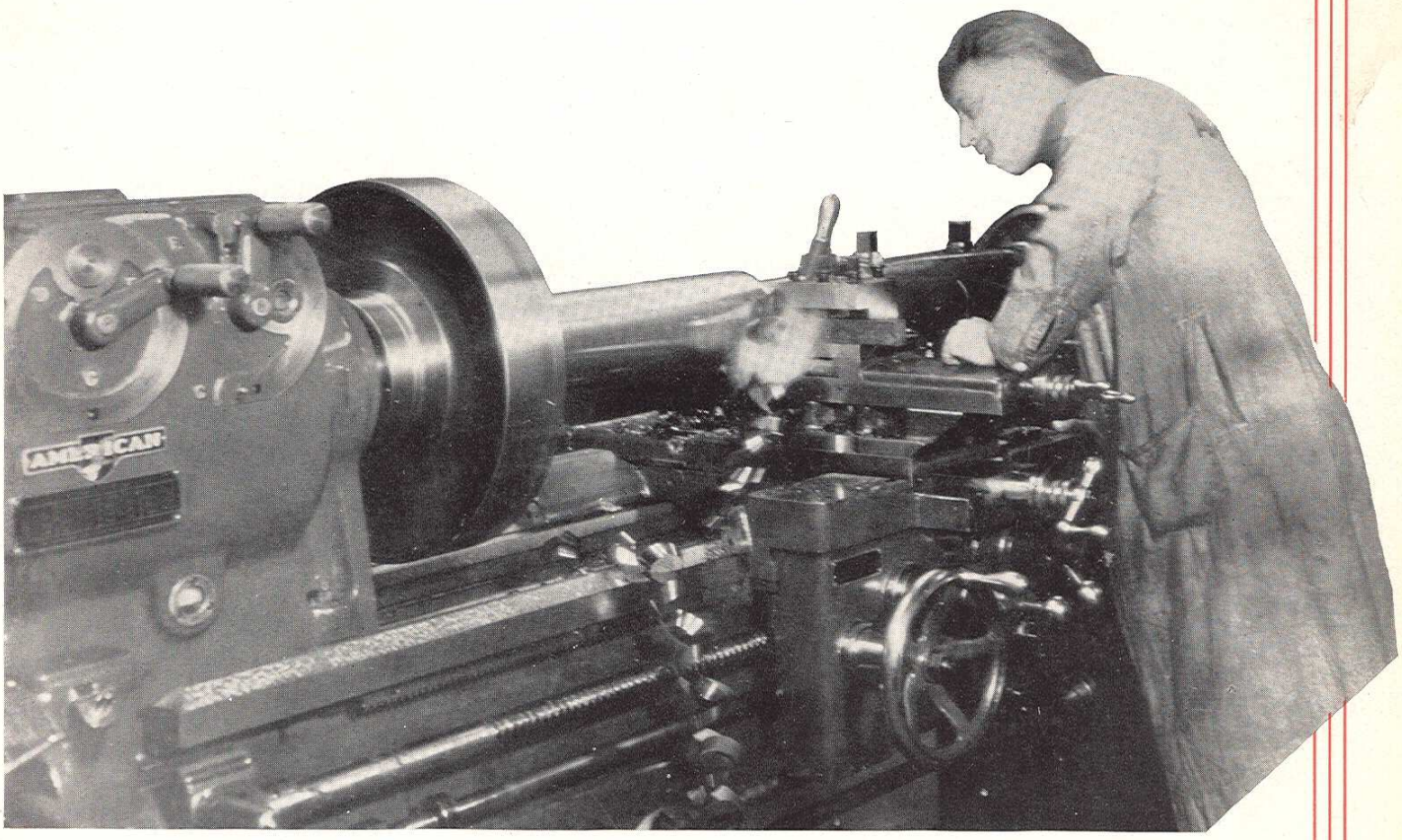
"AMERICAN" Multi-Production LATHE

DUPLICATE WORK AT A FRACTION
OF FORMER COST

THE AMERICAN TOOL WORKS COMPANY
LATHES » » RADIALS » » SHAPERS
CINCINNATI, U. S. A.



THIS 24-INCH "AMERICAN" MULTI-PRODUCTION LATHE HAS REDUCED COSTS OVER 40%
IN ONE OF THE LARGE MID-WEST MANUFACTURING PLANTS



18-INCH "AMERICAN" MULTI-PRODUCTION LATHE TURNING 1045 STEEL AT 300 FEET PER MINUTE WITH .022" FEED

THE NEW MULTI-PRODUCTION LATHE

A NEW ADDITION

This new addition to the "American" lathe family was developed for the specific purpose of filling the gap between the standard engine lathe and the highly specialized, single-purpose, automatic lathe. On the one hand, the standard lathe is not capable of the rapid production of duplicate parts required in some plants, while, on the other hand, a single-purpose automatic lathe does not have the adaptability and the range so often necessary. The "American" Multi-Production Lathe is designed to fit in between these two. By retaining all the standard engine lathe features it offers the same adaptability and range as a standard lathe, while through its combination of automatic length stops, positive diameter stops, and special tooling it offers the advantages of very rapid production of duplicate parts.

BELT OR MOTOR DRIVE

The basis of this new machine is the "American" High Duty Lathe with patented automatically oiled geared head arranged for either belt or motor drive. This fact in itself insures a highly efficient producing unit, for

the "American" High Duty Lathe has proven itself to be an unexcelled producer of high-quality work. The enormous power capable of being transmitted through the patented geared headstock, with its powerful multiple-disc initial clutch, its very large diameter and wide face, chrome-manganese steel, heat-treated, hardened and machine lapped or ground gears and its heat-treated, alloy-steel shafts and spindle, combined with such refinements as automatic pump lubrication through oil purifier to all bearings, and anti-friction bearings of the highest quality, produces a most excellent power-transmitting unit of absolute dependability.

SCIENTIFICALLY PROPORTIONED

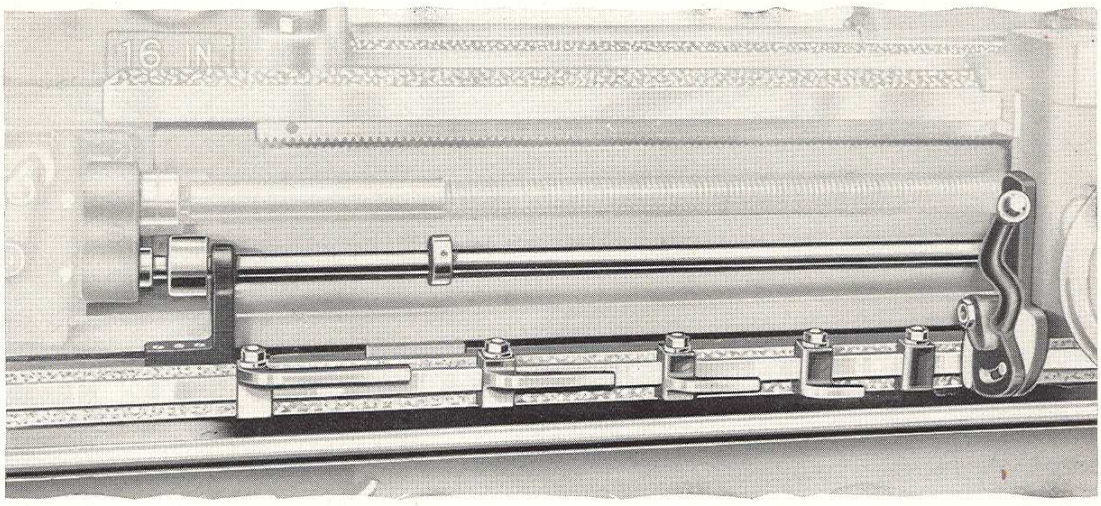
To effectively utilize the maximum power transmission through the headstock, all other units such as the bed, the carriage, the apron, the quick-change mechanism, the tailstock and the tool rests are scientifically proportioned, with a generous factor of safety.

MULTI-PRODUCTION FEATURES

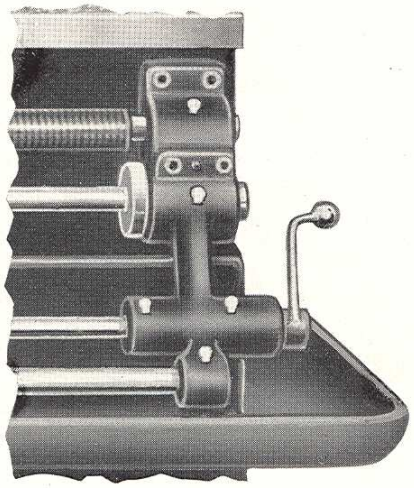
To this highly efficient producing unit has been added the Multi-Production Features, in order to increase its capacity for producing duplicate pieces, by eliminating time-loss due to measuring and calipering, and to further reduce production costs by reducing the amount of spoiled work to the very minimum. These features consist primarily of a highly developed automatic longitudinal stop mechanism, a set of positive, hand-operated diameter stops, and tool rests especially adapted to the work.

AUTOMATIC LONGITUDINAL STOPS

The Automatic Longitudinal Stop Mechanism, as its name implies, automatically trips the longitudinal feed at pre-determined points thru



DETAILS OF AUTOMATIC LONGITUDINAL STOP MECHANISM
(Patent applied for)



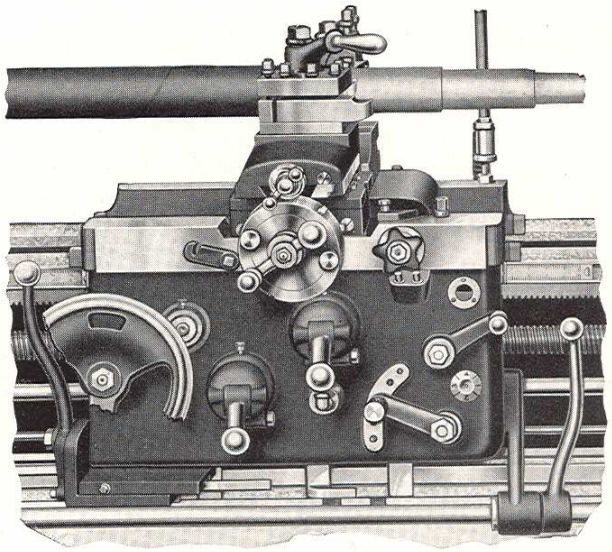
CONTROL LEVER FOR ACCURATE SETTING OF STOP DOGS
(Patent applied for)

adjustable dogs spaced as desired along the stop bar. As the apron contacts with these dogs a clutch in the feeding mechanism is disengaged, stopping the carriage instantly. The instant the pressure of the apron against the stop dog is removed the feed clutch automatically re-engages, and the carriage is ready to move on to the next stop. The advantage of the automatic stop mechanism is in eliminating delays due to work measurement, and thus permitting the lathe to actually cut metal more minutes per hour, naturally resulting in more finished pieces of work per day.

ACCURATE SETTING OF STOP DOGS

A novel arrangement is provided for convenient and accurate setting of the stop dogs along the bar, which is decidedly in advance of anything yet supplied for this purpose. By throwing the bar control lever at the tail-stock end of bed 180 degrees, the stop bar is moved endwise against a positive stop and the feed clutch automatically held in its disengaged position, while the stop dogs are being located. The bar control lever is then returned to its original operative position and the automatic stop mechanism is ready to function. With this arrangement the stop dogs can be conveniently set by means of gauge or scale measurements with the absolute assurance that the feed will trip automatically at exactly the right point for every shoulder. This dog setting arrangement entirely eliminates guess work in locating the stop dogs and thus inspires confidence in the results. It can be depended upon to produce any quantity of duplicate work to very close limits of accuracy. This construction provides the combined advantage of an automatic trip for the feed at pre-determined points and positive locating points for squaring up shoulders, grooving and necking for grinding.

CENTER HOLE COMPENSATOR



CENTER HOLE COMPENSATOR (Fig. No. 1)

Occasionally variation in center hole depths prevents the accuracy required, consequently a center hole depth compensating mechanism is provided to compensate for the varying center depths and thus maintain a constant accuracy of shoulder lengths and positions without changing the settings of the stop dogs.

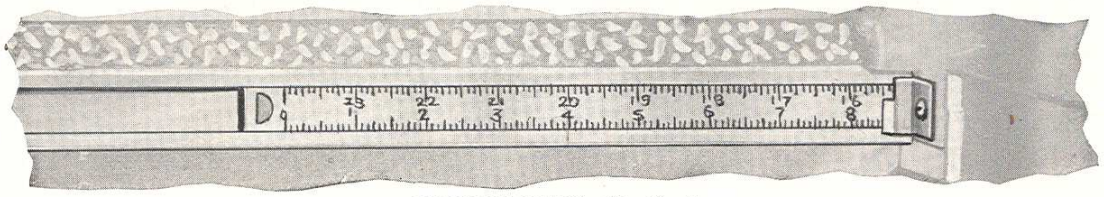
This mechanism is located at the lower left-hand side of the apron and consists of an adjustable stop contactor actuated by a fine pitch screw. The adjustment of this contactor, either forward or backward to contact with the initial stop dog when the cutting tool is set at the starting point of the cut, will produce the correct relation between the starting point and the first stop dog, thus compensating for differences in the depths of the center holes in the work. Seldom, however, is this mechanism required as only occasionally do shouldered shafts require such a high degree of accuracy.

QUICK-SET SCALES

This entirely new and decidedly valuable feature is now available for accelerating the setting of the longitudinal stop dogs. The new "American" Quick-Set Scale is a recent development for which there has been a crying need ever since longitudinal stops came into use. It consists of a long chromium-plated scale, graduated from both ends in 64ths, adjustably fitted to the front wall of the bed vee. Two knife-edge pointers fixed to the carriage are provided for indicating the scale reading.

The right-hand pointer is used for locating shoulder lengths from the tailstock end of the work, and the other pointer for locating the remaining shoulders on the opposite end, after the work is reversed between centers.

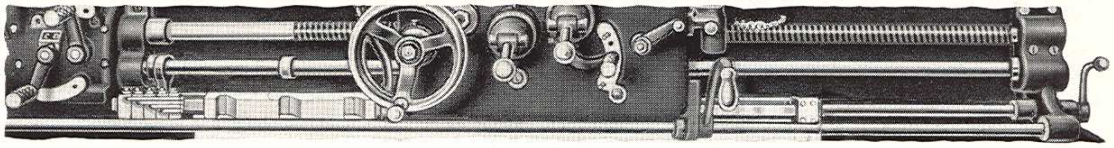
The Quick-Set Scale, in our opinion, is the most important improvement ever made in a multiple longitudinal stop mechanism, for it not only minimizes errors of measurement but its use cuts stop-setting time to a fraction of what it was formerly.



QUICK-SET SCALE (Fig. No. 2)

TEMPLET BAR

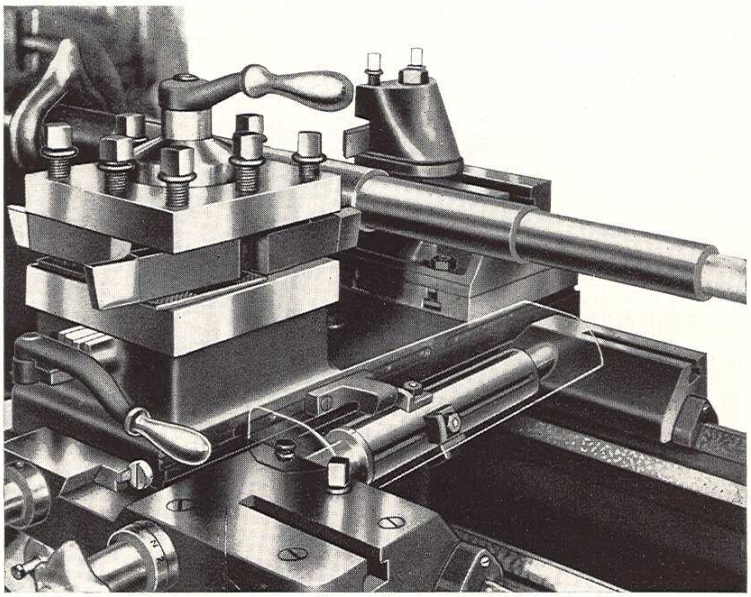
In addition to the stop dogs a templet bar may be furnished, which may be permanently notched to correspond to the work shoulders, and used in place of the stops for tripping the carriage feed at the points determined by the notches. This is used in preference to the adjustable dogs when frequent runs of duplicate work are encountered. The templet bar is removed when the run is finished, and placed aside until the same work returns to the lathe later on. This eliminates setting of dogs each time the same job is to be done, as the bar serves as a fixed master for the work.



TEMPLET BAR IN OPERATING POSITION (Fig. No. 1)

POSITIVE DIAMETER STOPS

The Positive Diameter Stops are hand operated and determine the limit of cross feed for each diameter. This mechanism consists of a slotted cylinder at the right-hand side of and paralleling the carriage bridge, with a star knob for operating, conveniently placed for the operator. Five slots, each with an adjustable dog, are supplied around the cylinder, providing for five different work diameters. The operating star knob carries a collar numbered from 1 to 5 to assist the operator in identifying the correct stop set-up for each diameter. Between each stop position is a neutral point, shown on the star knob dial by the letter N, indicating a point at which the tool rests will pass over the stop dogs without interference. If both front and rear tools are used, stop dogs may be used for each. The use of positive diameter stops eliminates the necessity of calipering the work.



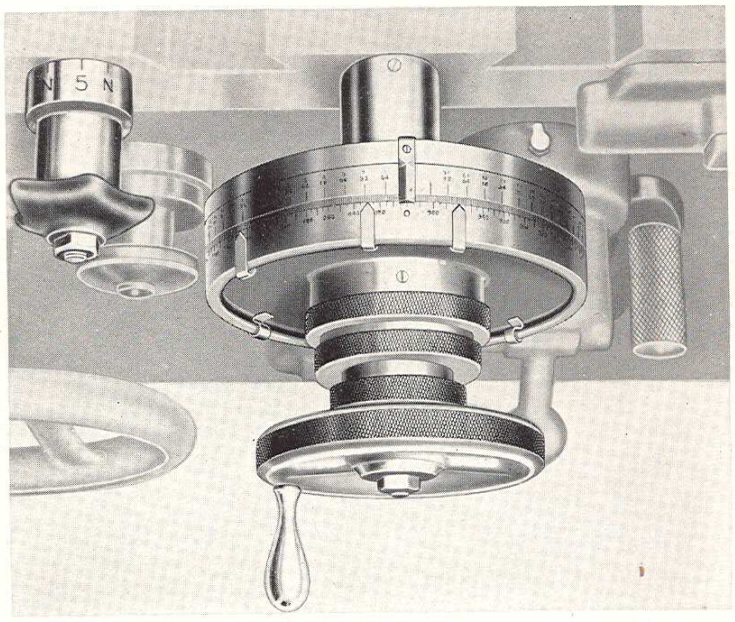
POSITIVE DIAMETER STOPS (Fig. No. 2)

DUAL DIRECT-READING CROSS FEED DIALS

Likely, the greatest advance ever made in cross feed measuring equipment is represented by the newly developed "American" Dual Direct-Reading Cross Feed Dials. These dual or twin dials are large in diameter, providing plenty of space for legible graduations, and are geared to the cross feed screw so as to provide direct reading for diameter reductions. For example, one complete revolution of the dials indicates a one-inch reduction of the work, while a fractional setting, for example $\frac{1}{4}''$ or a decimal setting, for example .015″ will produce a reduction of those exact amounts. This direct and positive reading feature, which completely eliminates mental gymnastics on the part of the operator, is a great improvement over the usual type of cross feed micrometer dial that is not only difficult to read but indicates only one-half of the actual work reduction, presenting a problem in arithmetic for the operator to solve each time the dial is used.

The dual dials operate either independently or in unison. One dial is graduated from zero in fractions with each sixty-fourth inch numbered in progression; the other is graduated from zero in thousandths with each .020″ numbered in progression. A fixed knife-edge pointer facilitates the reading of dial graduations. The use of these Dual Direct-Reading Dials furnishes an ease, rapidity and accuracy of tool settings never before possible, while the further advantage of determining the exact amount of reduction in either fractions or decimals is obvious.

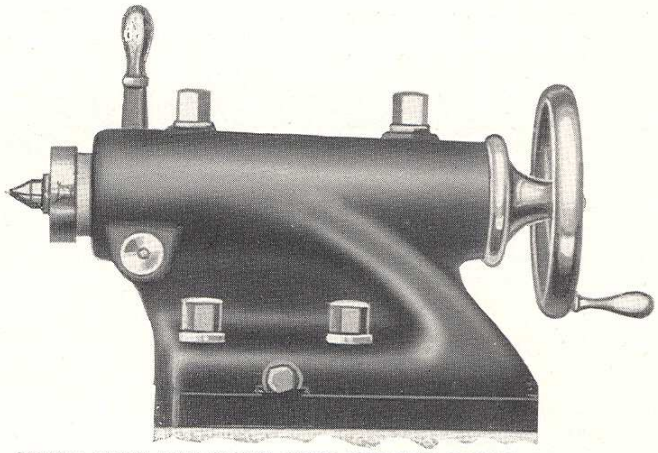
When multiple diameter stops are furnished, the setting of the stop dogs is greatly facilitated and accuracy assured by the use of the dual dials. The Dual Direct-Reading Cross Feed Dials can be furnished for any size "American" Lathe.



DIRECT-READING CROSS FEED DIALS WITH ADJUSTABLE CLIPS FOR INDICATING DIAMETERS (Patent applied for)

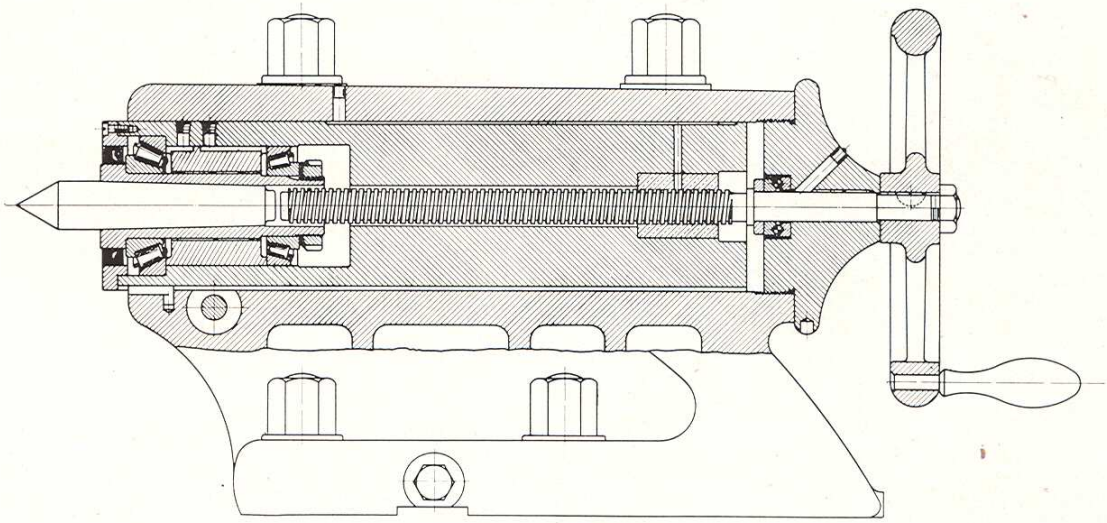
BUILT-IN ROLLER-BEARING TAILSTOCK CENTER

When turning work at the high speeds made possible by cemented carbide cutting tools, we strongly recommend that the work be mounted on a live or revolving tailstock center. If the work is mounted on a dead center considerable frictional heat is apt to develop, resulting in elongation of the work with its consequent difficulties. Cutting at these high speeds also directs very heavy thrusts against the tailstock spindle which often badly distort the center hole in the work and destroy the center itself when a dead center is used.



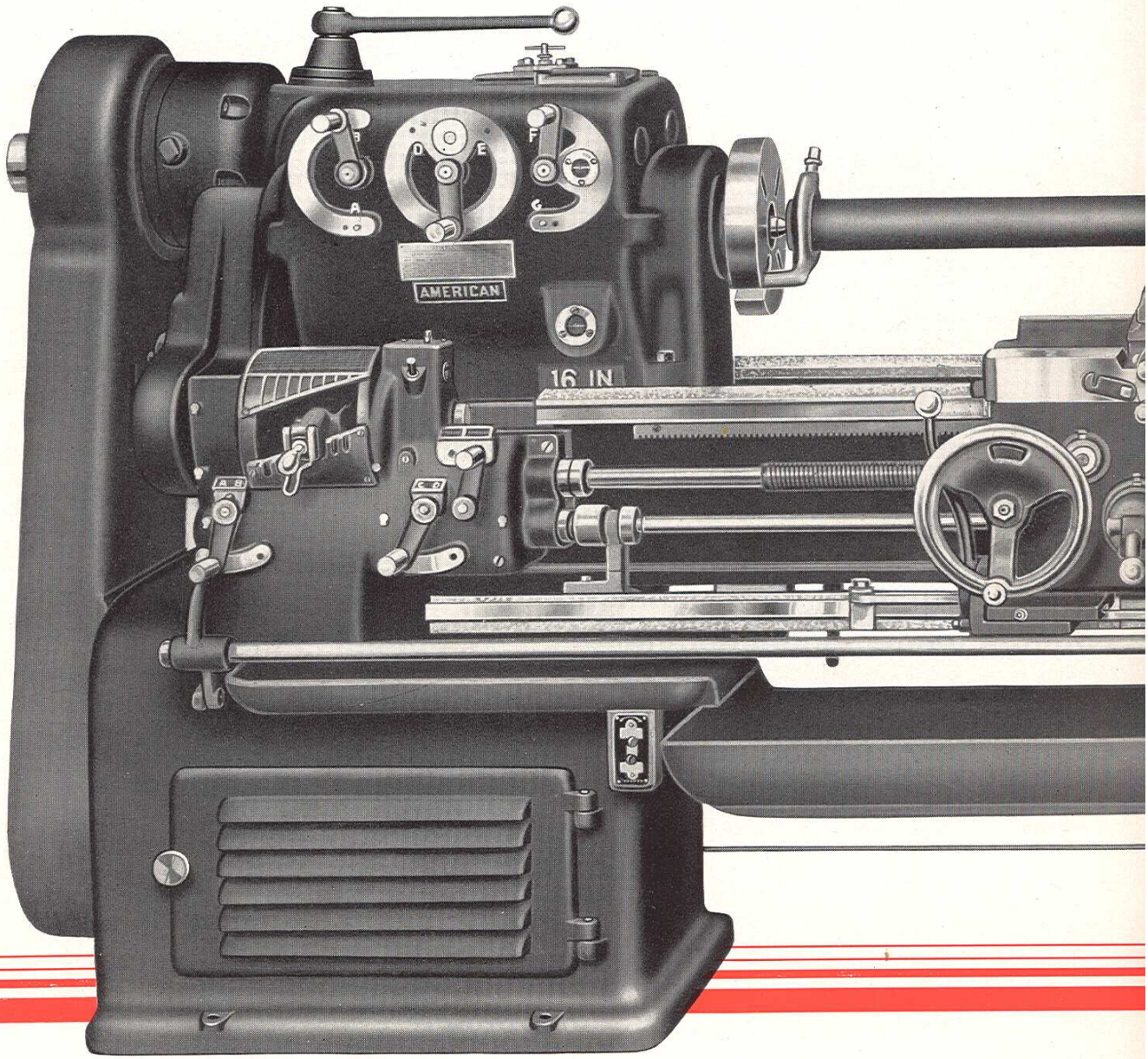
HEAVY DUTY TAILSTOCK WITH BUILT-IN ROLLER-BEARING CENTER (Fig. No. 1)

We have, therefore, found it highly advisable to use a live center mounting for this class of work and have developed for this purpose our "Built-In Roller-Bearing Tailstock Center" shown by the accompanying illustration. This unit consists primarily of a very heavy tailstock with enlarged barrel, ball-bearing thrust, and oversize spindle. In this large diameter spindle, the removable center is seated in a sleeve which is mounted in two large Timken Roller Bearings with adjustment means provided for wear compensation. This anti-friction unit is so designed that it may be easily and quickly removed and replaced by the standard type of plain spindle and dead center. For high-speed turning of any kind of material, we recommend the "Built-In Roller-Bearing Tailstock Center."

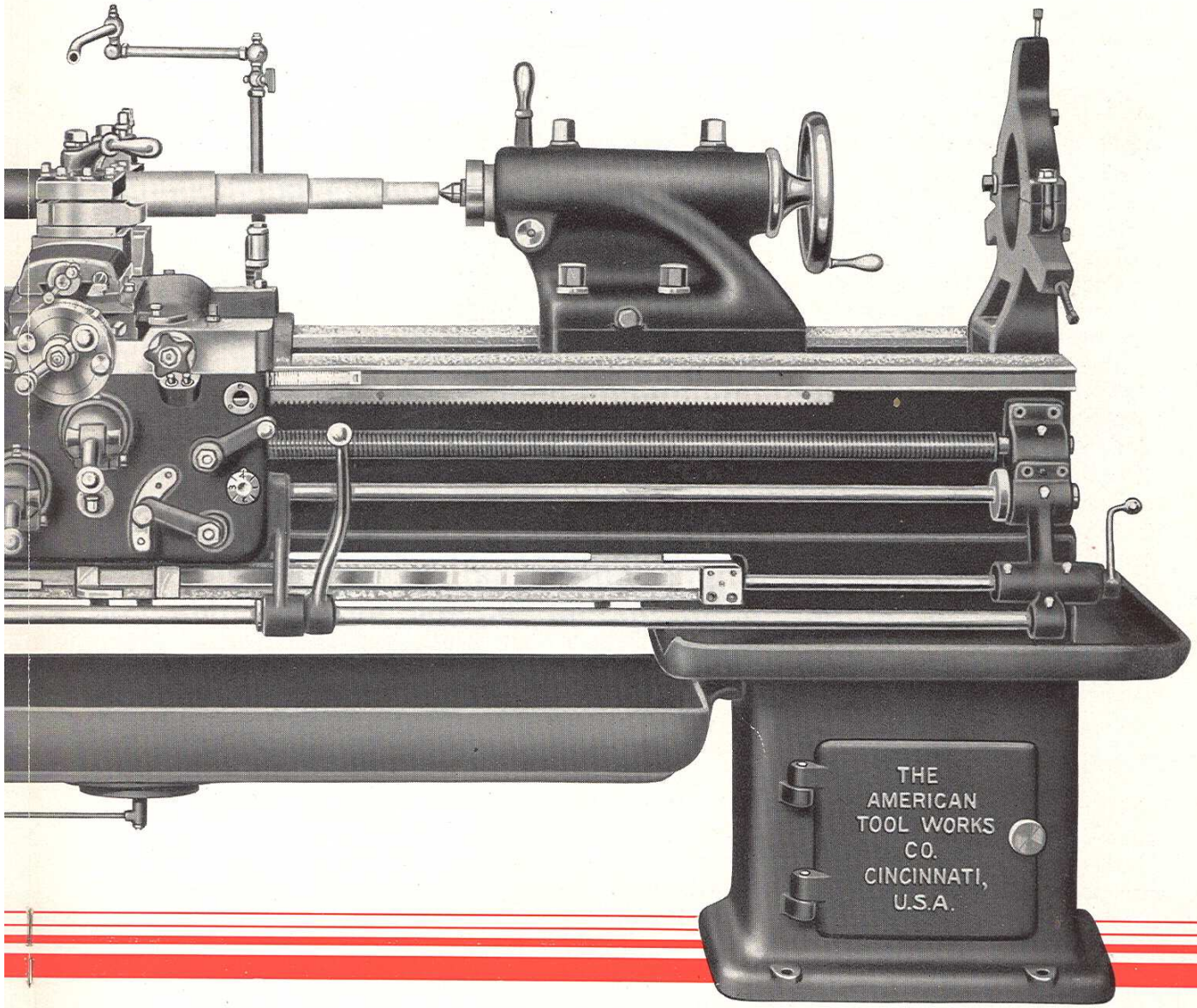


SECTIONAL VIEW OF REMOVABLE BUILT-IN ROLLER-BEARING CENTER (Fig. No. 2)

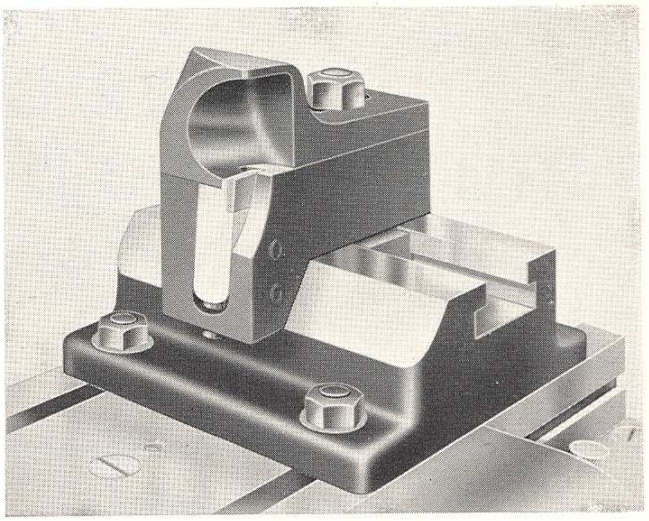
"AMERICAN"



THE NEW "AMERICAN" MULTI-PRODUCTION • LATHE •

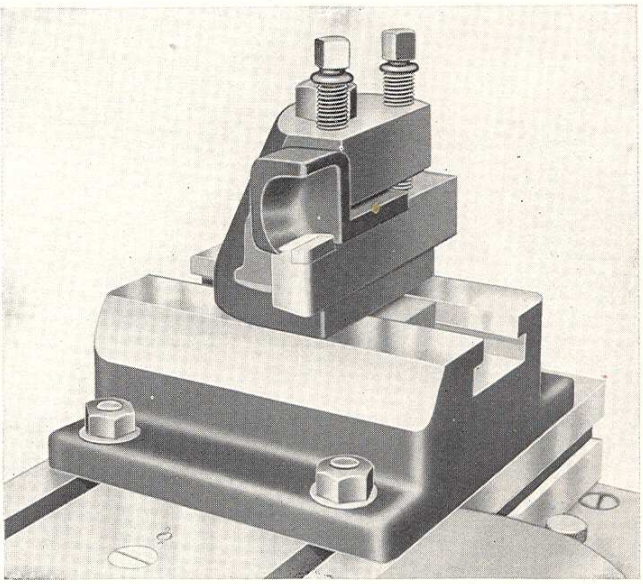


RIGID TOOL MOUNTINGS



VERTICAL TOOL HOLDER AND CHIP-BREAKER (Fig. No. 1)
(Patented)

If cemented carbide tools are to be used successfully for cutting steel the complete elimination of vibration is essential, for it has been found that vibration is a most destructive agent in the use of this type of tool; consequently the greatest care must be exercised in order to prevent it. In the elimination of vibration the mounting of the tool is of great importance. If cutting tool is insecurely mounted or if supporting rest is weak, vibration will result. The importance of this subject has demanded a great deal of study and experimentation in order to secure just the right combination to provide the greatest rigidity. As a result of our research we have developed both a vertical and a horizontal tool mounting as shown by the accompanying illustrations, which provide the required rigidity and in actual practice have proven highly successful. Owing to the unsurpassed rigidity of the tool mounting provided by the vertical tool holder, the vertical type is preferred for very severe straight turning operations. On the other hand, greater adaptabilty of the horizontal type of holder results in that type being favored by the majority.



HORIZONTAL TOOL HOLDER AND PATENTED
CHIP-BREAKER (Fig. No. 2)

CHIP-BREAKER (Patented)

Obviously an operator could not safely operate a lathe at the speeds permitted by the latest types of cemented carbide tools, especially when cutting steel, were it not for the protection from flying chips afforded by our patented chip-breaker and controller. This unit is applied to the cutting tool in such a way as to break up the chips into small sections and direct them into the chip pan. Were it not for this chip-breaker the red-hot chips would come off in ribbons or curls and fly in every direction, endangering operator and making satisfactory operation of lathe impossible.

TOOL RESTS

A great variety of tool rest combinations is available to select from, facilitating the selection of just the proper tooling arrangement for the work. This is a great asset to any production lathe inasmuch as the actual amount of work produced is often largely dependent upon the correct tooling for it.

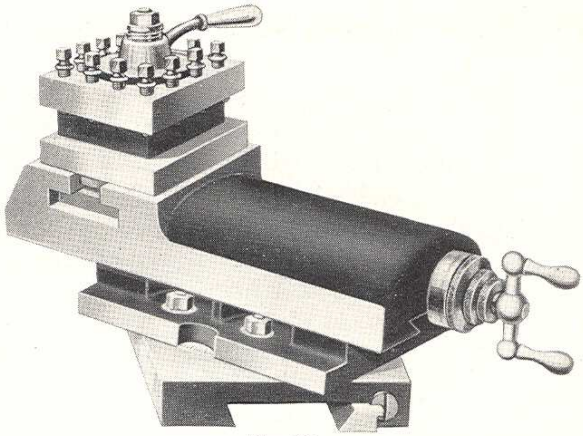


Fig. 503
Compound Rest with 4-way Tool Block

PAN, PUMP AND PIPING

When cutting steel at the high speeds made possible by the new "American" Multi-Production Lathe and especially when using cemented carbide cutting tools, a copious flow of coolant on the cutting tool is imperative. Without the coolant, intense heat is generated which quickly destroys the cutting tool and heats up the work, causing elongation which in turn reacts severely upon the tailstock center as well as causing inaccuracy in the work. In view of the necessity for coolant in modern shaft production, Multi-Production Lathes should always be provided with coolant equipment such as pan, pump and piping.

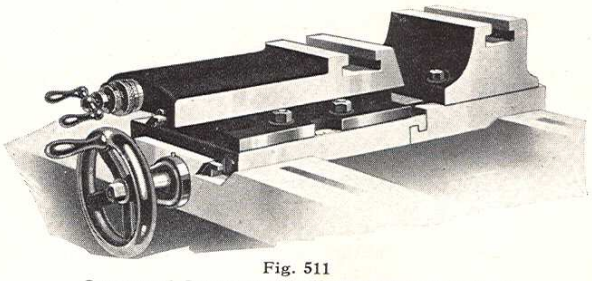


Fig. 511
Connected Compound and Adjustable Rear Rest

In considering the new "American" Multi-Production Lathe it is important to know that this machine is capable of producing not only at the maximum speeds and feeds permitted by the best high-speed steel cutting tools, but is amply powered, provides adequate spindle speeds, and possesses ample stamina for utilization of cemented carbide cutting tools to their very limit.

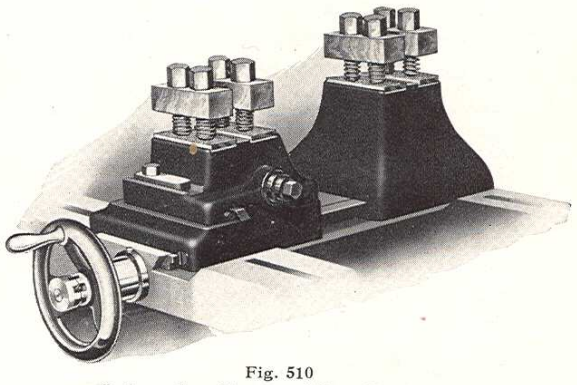


Fig. 510
Independent Front and Rear Tool Rests

For the production of multiple work at an amazingly low unit cost the new "American" Multi-Production Lathe in sizes from 12-inch to 27-inch inclusive, is unexcelled.

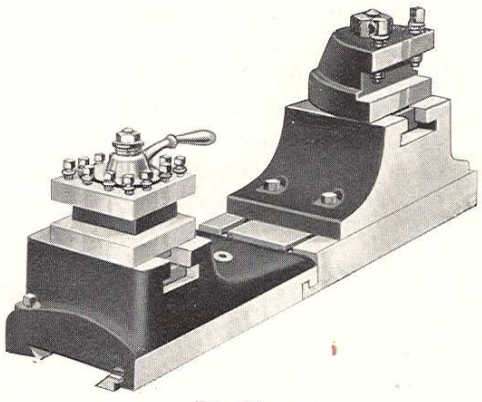
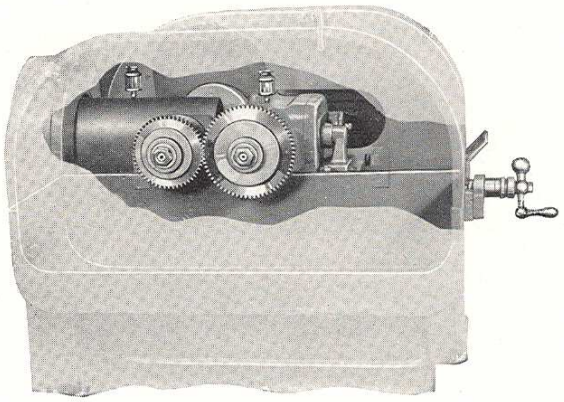


Fig. 514
Combined Plain Block Rest with 4-way Tool Holder at Front and Adjustable Block Rest and High-Duty Tool Holder at the Rear.

EXAMPLES OF HIGH-SPEED PRODUCTION AND FINE FINISH

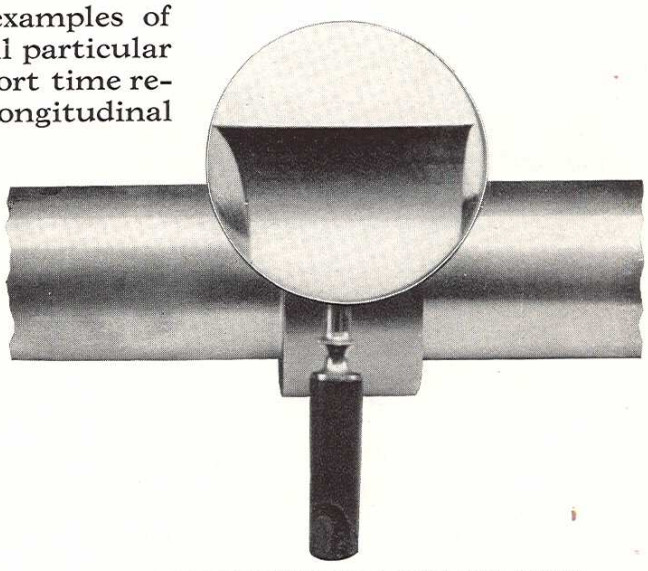
The following examples vividly illustrate the productivity of the "American" Multi-production Lathe using both high-speed steel and cemented carbide cutting tools. Each of these examples is an actual production performance—not merely a time estimate. These remarkable production accomplishments are undeniable proof of the power, stamina, quick and convenient operation of "American" Multi-Production Lathes. Not only do these lathes produce quantity, they also produce quality. Their vibrationless structure, their smooth-running, machine-lapped transmission, their perfectly fitted slides and inherent structural quality combine to produce work amazingly free from blemish and imperfections. Gear and chatter marks are as foreign to these lathes as acorns to a chestnut tree.



GEAR LAPPING (Fig. No. 1)

When considering a multi-production lathe care should be exercised to avoid selecting too small a size. It is impossible to predict what the future holds in store for the cutting tool. We have reason to believe that the present cutting alloys, in spite of their amazing efficiency, have not reached their peak and that the future will witness further improvement that may greatly increase the cutting ability of these or other alloys over those available at present. In selecting a new machine, anticipate future developments in cutting tools as far as possible and select a machine with sufficient capacity to use an improved cutting tool satisfactorily.

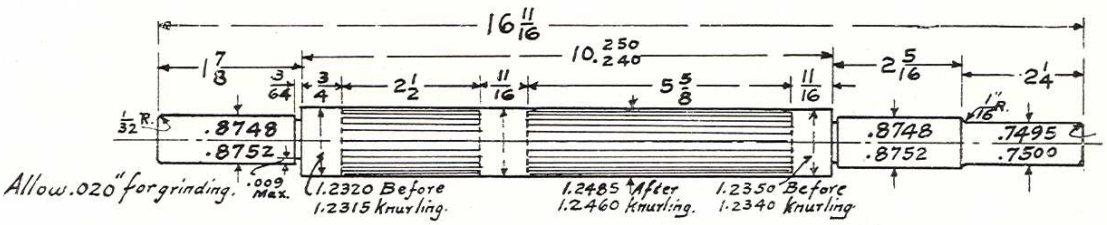
In analyzing the following examples of work production we wish to call particular attention to the amazingly short time required for setting cross and longitudinal stops. This extremely low set-up time is due largely to the Quick-Setting feature of the longitudinal stop mechanism and the use of the Dual Direct-Reading Cross Feed Dials in setting cross stops. The great advantage of the quick-setting feature of these stops lies in the fact that their low set-up time makes these stop mechanisms useful and profitable on much smaller runs of duplicate work than ever before possible.



EXAMPLE OF FINE FINISH FREE FROM GEAR MARKS AND VIBRATION BLEMISHES (Fig. No. 2)

16" MULTI-PRODUCTION LATHE
BAR STOCK 1 3/8" DIAM.—S.A.E. 1045 STEEL

ARMATURE SHAFT



1st Setting—Turn for grinding, 1 end	No. of Cuts	Cut Length	Cut Speed	Feed	Minutes
Mount work between centers	.....	.....	.....	.....	0.35
Turn .875 dia. from end	1	4 9/16"	340′	.010"	0.60
Turn 1.248 dia. from shoulder	1	6"	340′	.010"	0.60
Turn .750 dia. from end	1	2¼"	340′	.010"	0.10
Face end and break corner	1	.....	340′	Hand	0.35
Form 1 fillet	1	.....	340′	Hand	0.10
Neck 1 groove	1	.....	340′	Hand	0.10
Remove work	.....	.....	.....	.....	0.25
Tool positioning and stop manipulations	.....	.....	.....	.....	2.00
	Total minutes				4.45

2nd Setting—Turn other end	No. of Cuts	Cut Length	Cut Speed	Feeds	Minutes
Mount between centers	.....	.....	.....	.....	0.35
Turn .875" diameter	1	2⅝"	340′	.010"	0.10
Turn 1.248" diameter	1	4¼"	340′	.010"	0.45
Face end and break corner	1	.....	340′	Hand	0.35
Neck 1 groove	1	.....	340′	Hand	0.10
Knurl short end	1	2½"	50′	.031"	0.50
Knurl long end	1	5⅝"	50′	.031"	1.50
Remove work	.....	.....	.....	.....	0.25
Tool positioning and stop manipulations	.....	.....	.....	.....	2.00
	Total minutes				5.60

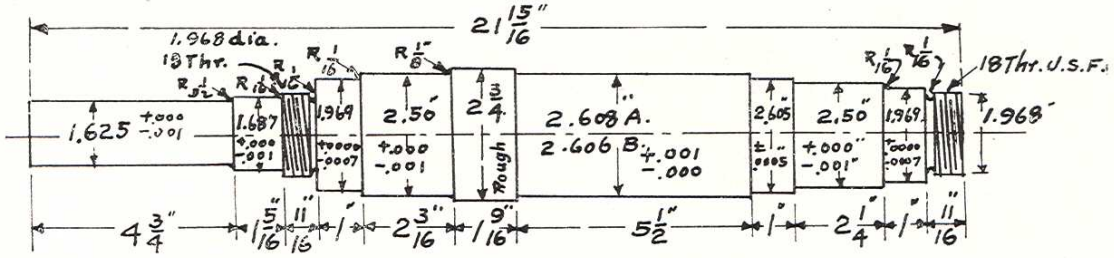
Entire Time ..... 10.05 minutes

Stop-Setting Time Applying to Entire Lot

Time to set 6 diameter stop dogs (2 settings) ..... 4 minutes
Time to set 5 length stop dogs (1 setting) ..... 3 minutes
Total stop setting time for entire lot ..... 7 minutes

16" MULTI-PRODUCTION LATHE
BAR STOCK 2 7/8" DIAM.—S.A.E. 1045 STEEL

ROTOR SHAFT



1st Setting—Turn one end	No. of Cuts	Cut Depth	Cut Length	Cut Speed	Feed	Minutes
Mount work between centers						0.50
Turn 2.50" diameter	1	1/4"	3 15/16"	300'	.022"	0.60
Turn 2.608" diameter	1	3/16"	6 1/2"	300'	.022"	0.90
Turn 2 3/4" diameter	1	1/8"	1 5/8"	300'	.022"	0.25
Turn 1.9694" diameter	1	1/4"	1 11/16"	300'	.022"	0.25
Form fillets and face shoulders. (Rear gang tools)	1		13/16"	300'	Hand	0.50
Chase threads	10		9/16"	40'	1/18"	5.25
Remove work						0.50
Tool positioning and stop manipulations						6.50
	Total minutes					15.25

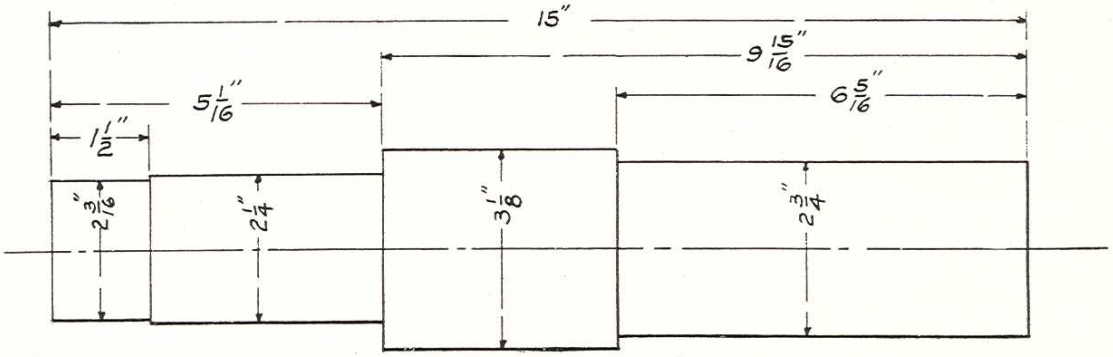
2nd Setting—Turn other end	No. of Cuts	Cut Depth	Cut Length	Cut Speed	Feed	Minutes
Mount work between centers						0.50
Turn 2.50" diameter	1	1/4"	9 15/16"	300'	.022"	1.40
Turn 1.9694" diameter	1	1/4"	7 3/4"	300'	.022"	1.10
Turn 1.625" diameter	1	11/64"	4 3/4"	300'	.022"	0.45
Turn 1.687" diameter	1	9/64"	1 5/16"	300'	.022"	0.15
Form fillets and face shoulders. (Rear gang tools)	1		5/8"	300'	Hand	0.50
Chase Threads	10		9/16"	40'	1/18"	5.25
Remove work						0.50
Tool positioning and stop manipulations						6.50
	Total minutes					16.35

Entire Time ..... 31.6 minutes

Stop-Setting Time Applying to Entire Lot

Time to set 5 diameter stop dogs (2 settings) ..... 10 minutes
Time to set 5 length stop dogs (2 settings) ..... 5 minutes
Total stop-setting time for entire lot ..... 15 minutes

20" MULTI-PRODUCTION LATHE
BAR STOCK 3 1/4" DIAM.—S.A.E. 1045 STEEL



Comparison of Production Time Using High-Speed Steel and Cemented Carbide Cutting Tools

	WITH HIGH-SPEED STEEL TOOLS			WITH CEMENTED CARBIDE TOOLS		
1st Setting	Cut Speed	Feed Per Rev.	Minutes	Cut Speed	Feed Per Rev.	Minutes
Turn 2¾" diameter 1 cut.....	80′	.011" by hand	6.50	300′	.022" by hand	1.50
Face and neck for grinding....	80′			300′		
Turn 3⅛" diameter 1 cut.....	80′	.011"	4.00	300′	.022"	1.00
		Total minutes...10.50			Total minutes....2.50	

	WITH HIGH-SPEED STEEL TOOLS			WITH CEMENTED CARBIDE TOOLS		
2nd Setting	Cut Speed	Feed Per Rev.	Minutes	Cut Speed	Feed Per Rev.	Minutes
Turn 2 3/16" diameter 1st cut....	80′	.011"		300′	.022"	
Turn 2 3/16" diameter 2nd cut...	68′	.011"	3.50	255′	.022"	0.80
Face and neck for grinding....	80′	by hand		300′	by hand	
Turn 2¼" diameter 1st cut....	80′	.011"		300′	.022"	
Turn 2¼" diameter 2nd cut...	68′	.011"	8.00	255′	.022"	1.50
Face and neck for grinding....	80′	by hand		300′	by hand	
		Total minutes...11.50			Total minutes....2.30	

Entire Time with High-Speed Steel Tool.....22 minutes
Entire Time with Cemented Carbide Tool..... 4.8 minutes
Saving in machine time, per piece, using Cemented Carbide Cutting Tool.....17.2 minutes

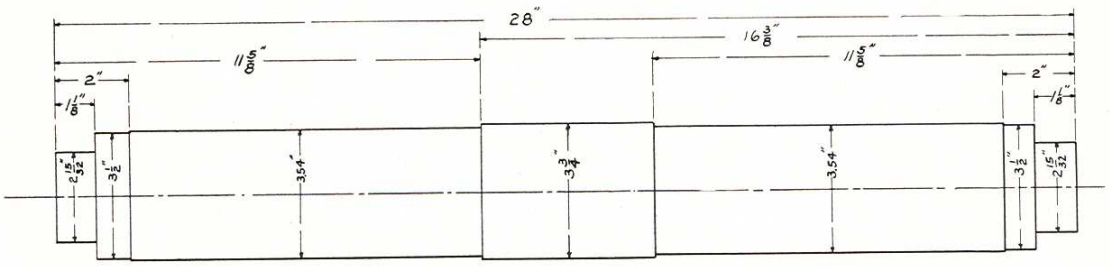
Stop-Setting Time Applying to Entire Lot

Time to set 4 diameter stop dogs—4 minutes
Time to set 6 length stop dogs—3 minutes

Total stop-setting time for lot—7 minutes

NOTE—Owing to the smoothness with which Cemented Carbide Tools cut, a coarser feed can be used when turning for grinding with a Cemented Carbide Tool than with a high-speed steel tool.

20" MULTI-PRODUCTION LATHE
BAR STOCK 3 7/8" DIAM.—S. A. E. 1045 STEEL



Comparison of Production Time Using High-Speed Steel and Cemented Carbide Cutting Tools

	WITH HIGH-SPEED STEEL TOOLS			WITH CEMENTED CARBIDE TOOLS		
1st Setting	Cut Speed	Feed Per Rev.	Minutes	Cut Speed	Feed Per Rev.	Minutes
Turn 2 15/32" diameter 1st cut	81′	.011"	3.00	300′	.022"	0.50
Turn 2 15/32" diameter 2nd cut	65′	.011"		235′	.022"	
Face and neck for grinding	81′	by hand		300′	by hand	
Turn 3½" diameter 1 cut	81′	.011"	1.50	300′	.022"	0.30
Face and neck for grinding	81′	by hand		300′	by hand	
Turn 3.54" diameter 1 cut	81′	.011"	12.00	300′	.022"	1.70
Face and neck for grinding	81′	by hand		300′	by hand	
Turn 3¾" diameter 1 cut	81′	.011"	6.00	300′	.022"	1.00
		Total minutes	22.50		Total minutes	3.50

	WITH HIGH-SPEED STEEL TOOLS			WITH CEMENTED CARBIDE TOOLS		
2nd Setting	Cut Speed	Feed Per Rev.	Minutes	Cut Speed	Feed Per Rev.	Minutes
Turn 2 15/32" diameter 1st cut	81′	.011"	3.00	300′	.022"	0.50
Turn 2 15/32" diameter 2nd cut	65′	.011"		235′	.022"	
Face and neck for grinding	81′	by hand		300′	by hand	
Turn 3½" diameter 1 cut	81′	.011"	1.50	300′	.022"	0.30
Face and neck for grinding	81′	by hand		300′	by hand	
Turn 3.54" diameter 1 cut	81′	.011"	12.00	300′	.022"	1.70
Face and neck for grinding	81′	by hand		300′	by hand	
		Total minutes	16.50		Total minutes	2.50

Entire Time with High-Speed Steel Tool . . . . . 39 minutes
Entire Time with Cemented Carbide Tool . . . . . 6 minutes
Saving in machine time, per piece, using Cemented Carbide Cutting Tool . . . . . 33 minutes

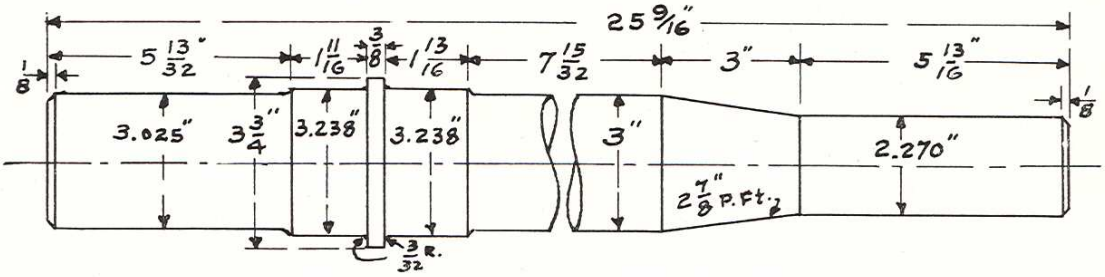
Stop-Setting Time Applying to Entire Lot

Time to set 4 diameter stop dogs (2 settings) . . . . . 8 minutes
Time to set 5 length stop dogs (2 settings) . . . . . 5 minutes
Total stop-setting time for entire lot . . . . . 13 minutes

NOTE—Owing to the smoothness with which Cemented Carbide Tools cut, a coarser feed can be used when turning for grinding with a Cemented Carbide Tool than with a high-speed steel tool.

20" MULTI-PRODUCTION LATHE
BAR STOCK 3 3/4" DIAM.—S. A. E. 3140 STEEL

JACK SHAFT



1st Setting—Turn long end	No. of Cuts	Cut Length	Cut Speed	Feed	Minutes
Mount between centers	.....	.....	.....	.....	1.50
Rough turn 3" diameter	1	16 9/32"	200'	.016"	5.50
Rough turn 3.238" diameter	1	1 13/16"	200'	.016"	0.60
Rough turn 2.270" diameter	1	5 13/16"	200'	.016"	1.75
Rough turn taper portion	2	3"	200'	.016"	2.00
Face collar and form fillet	1	1/4"	200'	Hand	0.10
Form fillet at shoulder	1	3/32"	200'	Hand	0.10
Face end and chamfer	1	1"	200'	Hand	0.60
Tool positioning and stop manipulations	.....	.....	.....	.....	4.00
Remove work	.....	.....	.....	.....	1.50
	Total minutes				17.65

2nd Setting—Turn short end	No. of Cuts	Cut Length	Cut Speed	Feed	Minutes
Mount between centers	.....	.....	.....	.....	1.50
Rough turn 3.025" diameter	1	5 13/32"	200'	.016"	1.50
Rough turn 3.238" diameter	1	1 11/16"	200'	.016"	0.60
Face collar and form fillet	1	1/4"	200'	Hand	0.10
Form fillet at shoulder	1	3/32"	200'	Hand	0.10
Face end and chamfer	1	1 3/8"	200'	.016"	0.75
Tool positioning and stop manipulations	.....	.....	.....	.....	3.00
Remove work	.....	.....	.....	.....	1.50
	Total minutes				9.05

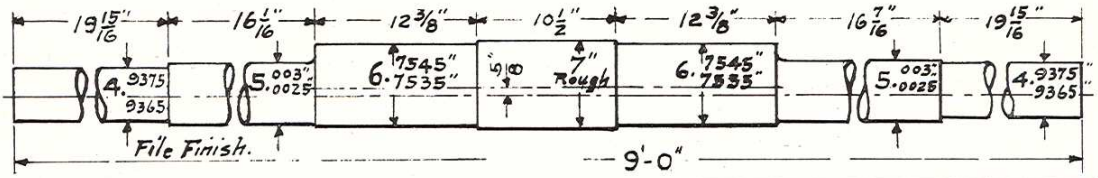
Entire Time ..... 26.7 minutes

Stop-Setting Time Applying to Entire Lot

Time to set 5 diameter stop dogs ..... 5 minutes
Time to set 8 length stop dogs ..... 4 minutes
Total stop-setting time for entire lot ..... 9 minutes

24" MULTI-PRODUCTION LATHE
BAR STOCK 7" DIAM.—S.A.E. 5150 STEEL

ECCENTRIC SHAFT



1st Setting—Rough turn one end	No. of Cuts	Cut Length	Cut Speed	Feeds	Minutes
Mount between centers					1.50
Turn 2 spots for steady rests (on 6.75" dia.)	2	2"	65'	1/64"	20.00
Adjust 2 steady rests to spots					3.00
Rough turn 4.937" diameter	3	19 15/16"	250'	.030"	21.50
Rough turn 5.003" diameter	3	16 7/16"	250'	.030"	17.50
Remove work					2.00
	Total minutes				65.50

2nd Setting—Rough turn other end	No. of Cuts	Cut Length	Cut Speed	Feed	Minutes
Mount between centers and 2 steady rests					3.00
Rough turn 4.937" diameter	3	19 15/16"	250'	.030"	21.50
Rough turn 5.003" diameter	3	16 7/16"	250'	.030"	17.50
Remove work					2.00
	Total minutes				44.00

3rd Setting—Rough and finish turn eccentrics	No. of Cuts	Cut Length	Cut Speed	Feed	Minutes
Mount between centers (2 eccentric sleeves on 5.003" dia.)					1.50
Set 2 steady rests and eccentric sleeves					4.00
Rough turn 6.754" diameter (one end)	1	12 3/8"	250'	.030"	3.75
Rough turn 7" diameter	1	10 1/2"	250'	.030"	3.25
Finish turn 6.754" diameter (one end)	1	12 3/8"	400'	.009"	7.00
Reverse work between centers and rests					8.00
Rough turn 6.754" diameter (other end)	1	12 3/8"	250'	.030"	3.75
Finish turn 6.754" diameter	1	12 3/8"	400'	.009"	7.00
Remove Work					3.00
	Total minutes				41.25

4th Setting—Finish turn ends	No. of Cuts	Cut Length	Cut Speed	Feeds	Minutes
Mount between centers and 1 steady rest on 6.75" dia.					3.00
Finish turn 4.937" diameter	1	19 15/16"	400'	.009"	7.50
Finish turn 5.003" diameter	1	16 7/16"	400'	.009"	6.75
Face end and 2 shoulders, and form fillet	1 each		400'	Hand	1.50
Reverse work between centers and rest					5.00
Finish turn 4.937" diameter	1	19 15/16"	400'	.009"	7.50
Finish turn 5.003" diameter	1	16 7/16"	400'	.009"	6.75
Face end and 2 shoulders, and form fillet	1 each		400'	Hand	1.50
Remove work					2.00
Tool positioning and stop manipulations					3.00
	Total minutes				4.50

Entire Time ..... 3¼ hours

Stop-Setting Time Applying to Entire Lot

Time to set 10 diameter stop dogs ..... 10 minutes
Time to set 11 length stop dogs ..... 6 minutes
Total stop-setting time for entire lot ..... 16 minutes

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