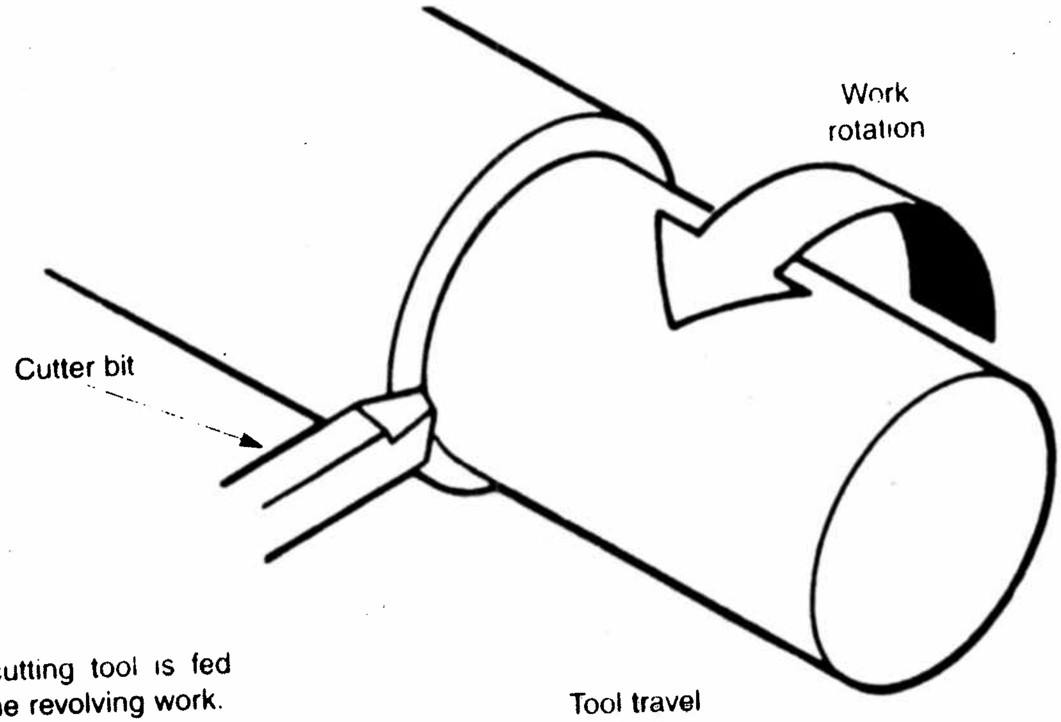
Engine

Lathe

Information

Package

Lathe Operation



The cutting tool is fed into the revolving work.

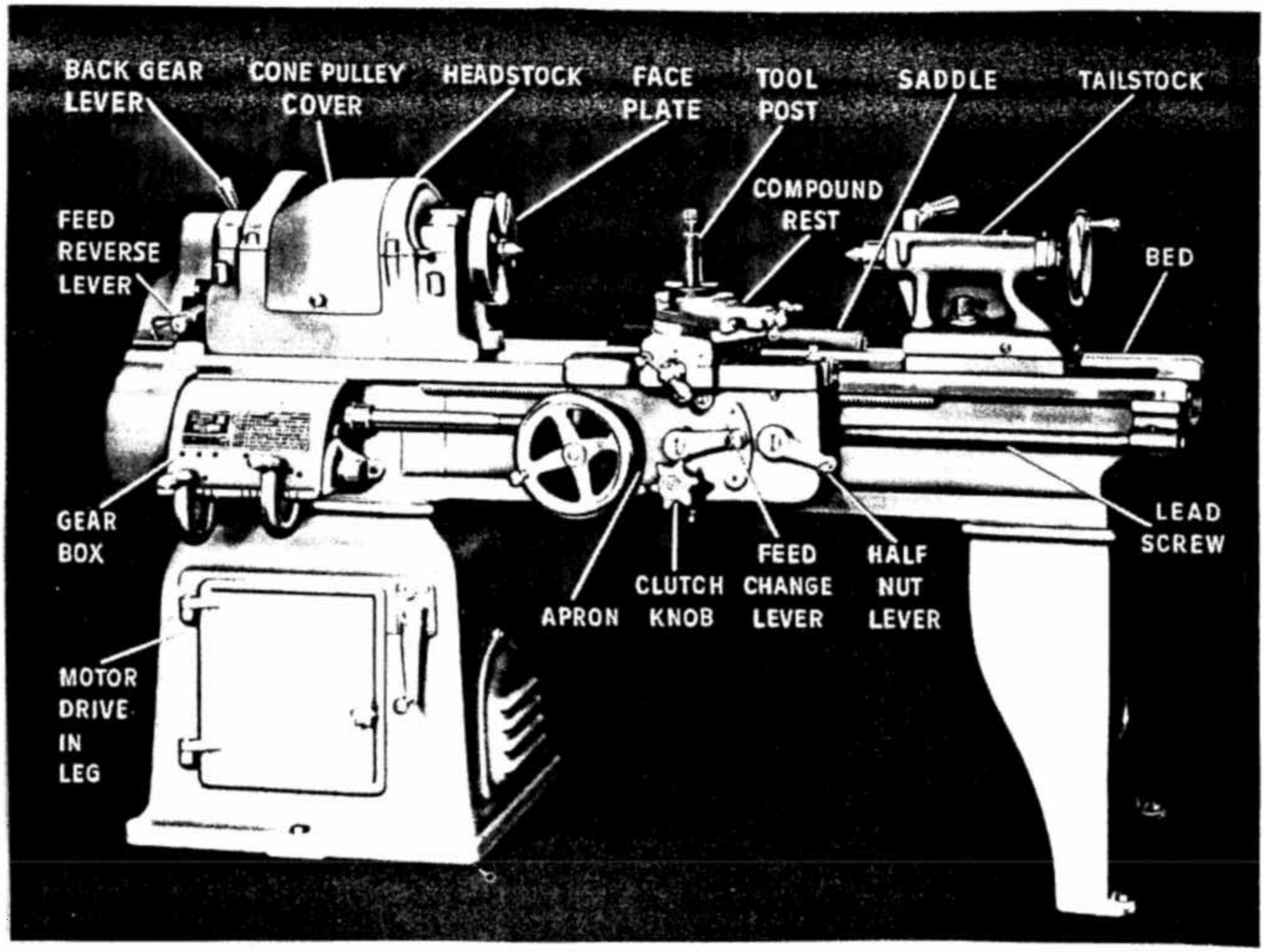
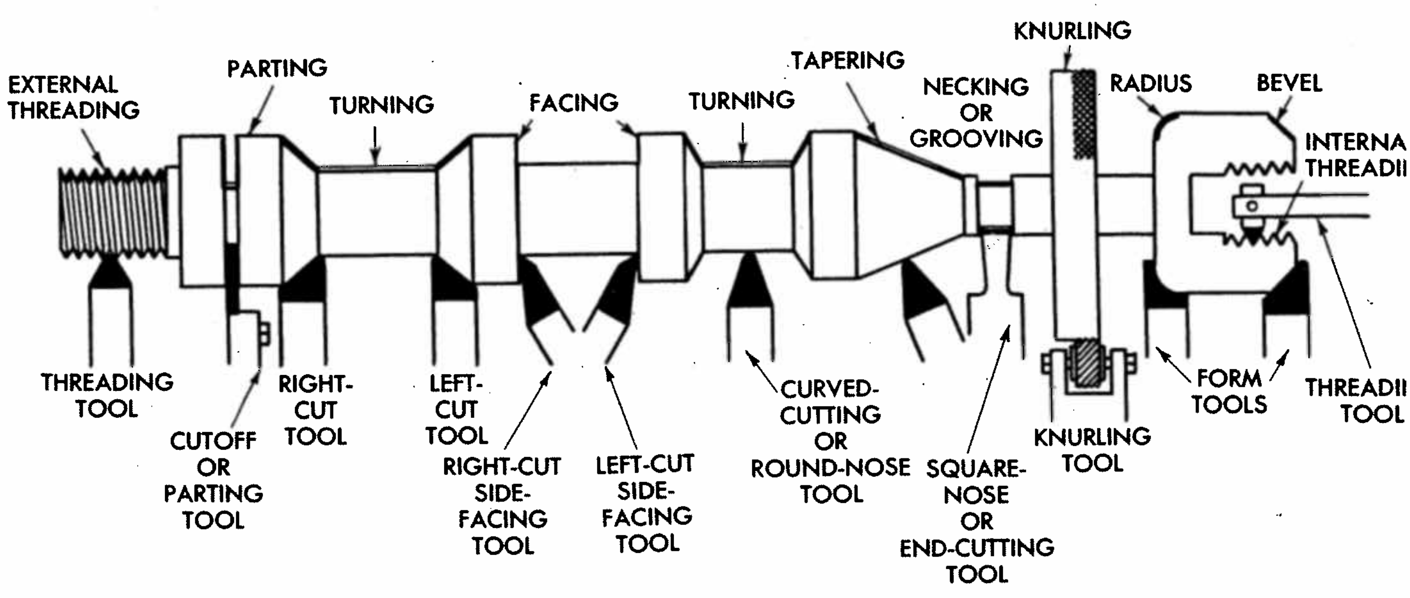
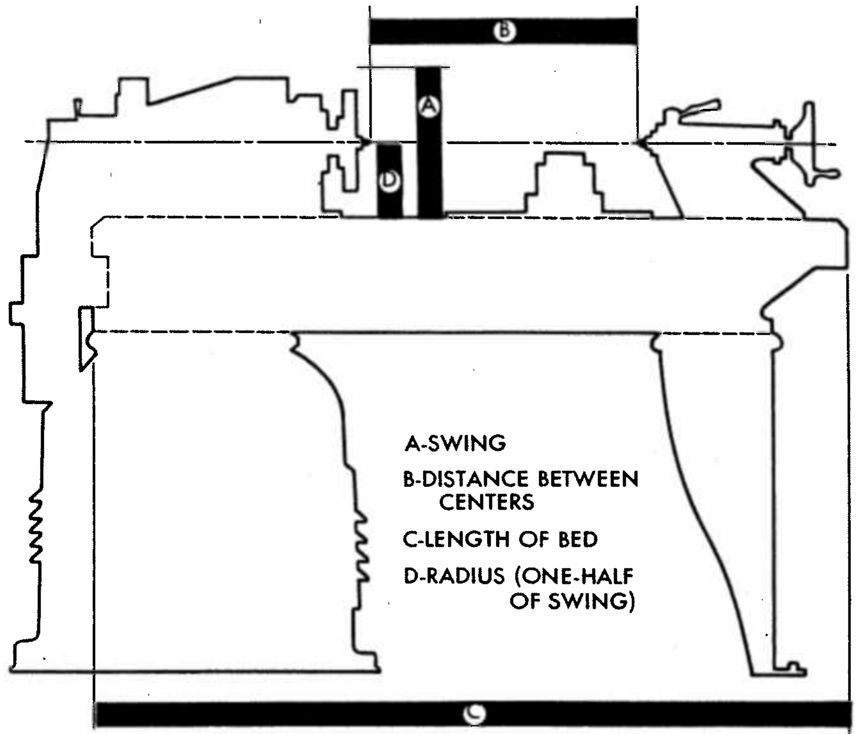
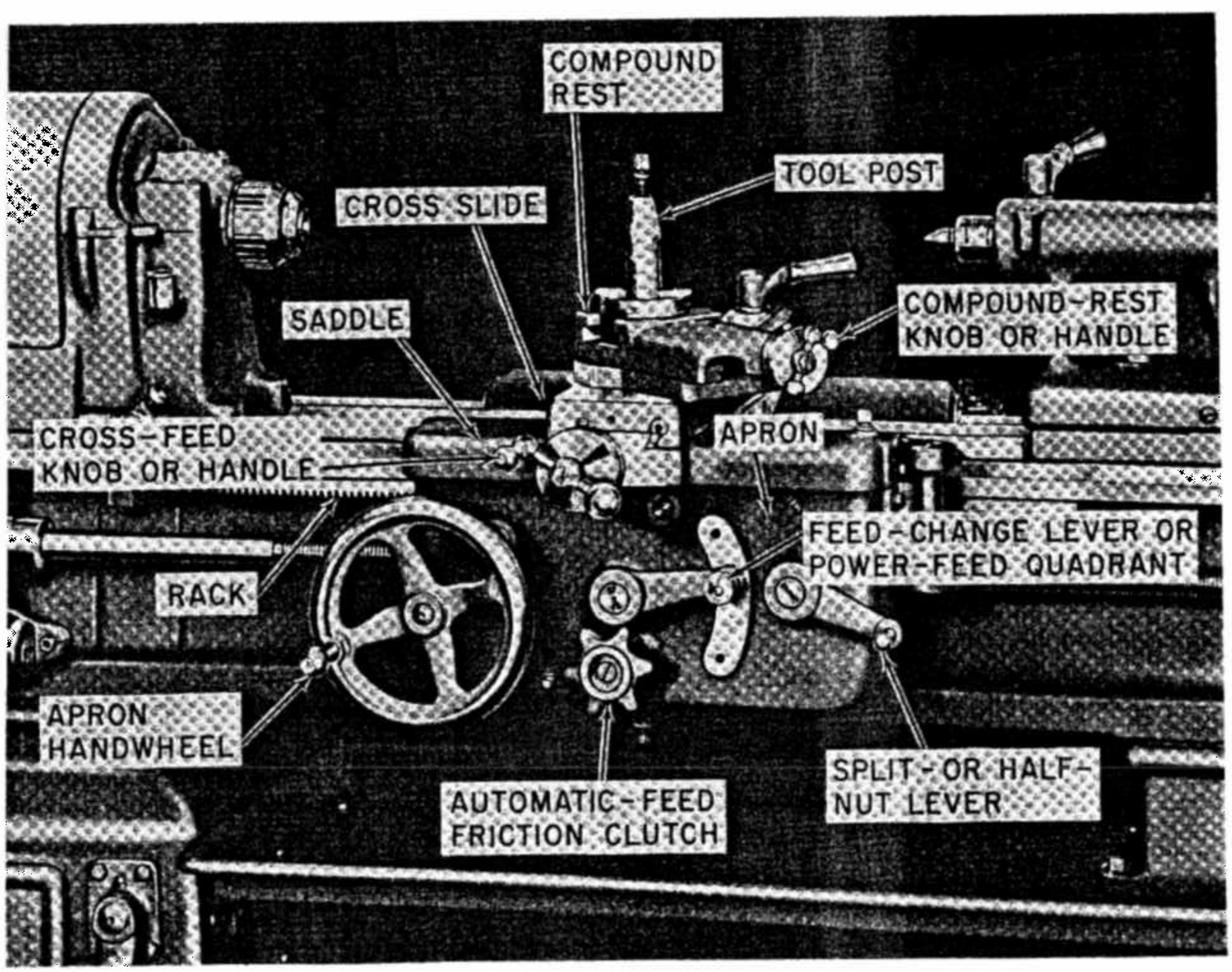


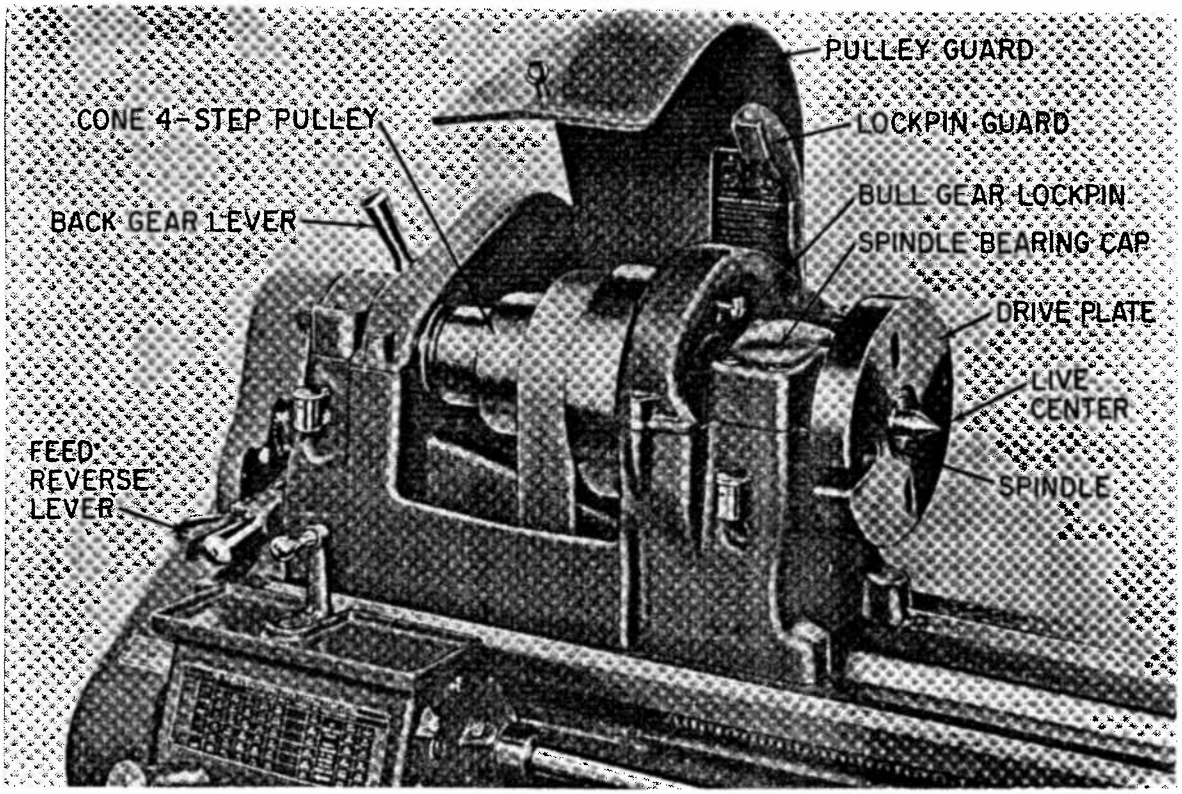
Fig. 34-3. Common cuts made by different cutting tools.



14-4. The size of the lathe is indicated
e swing and length of the bed.







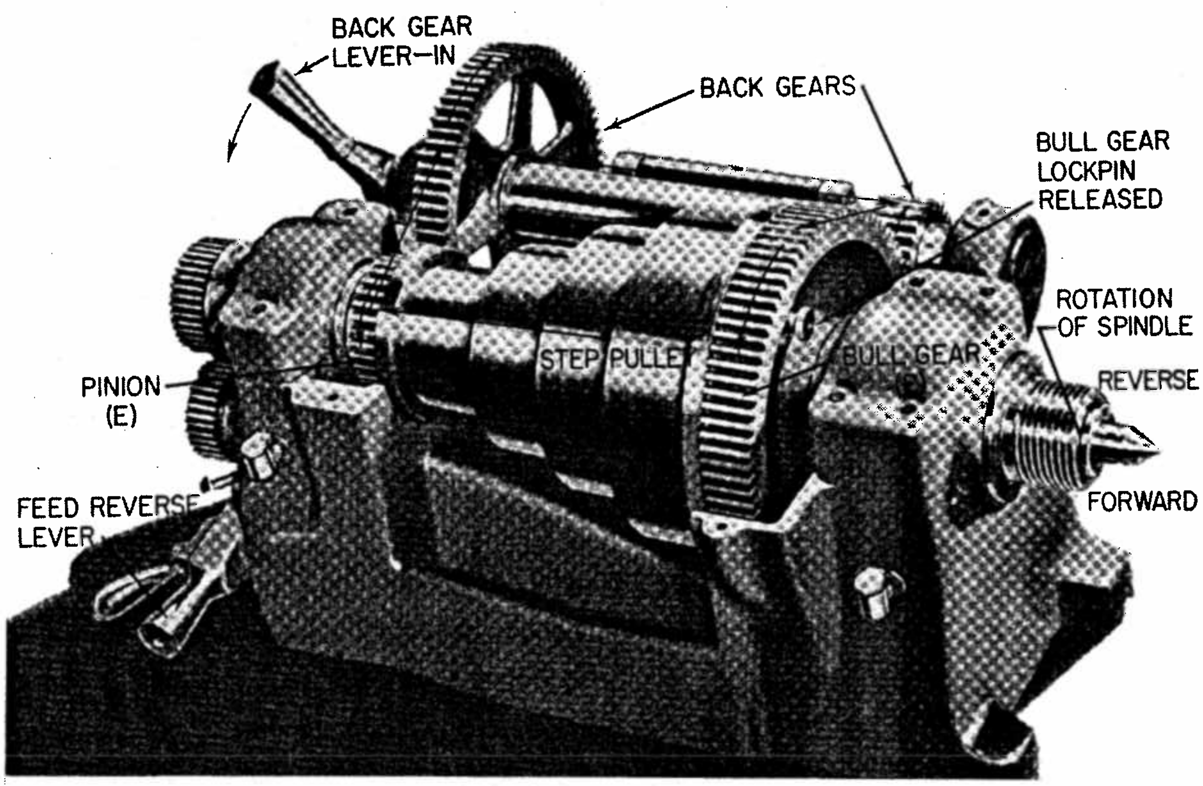
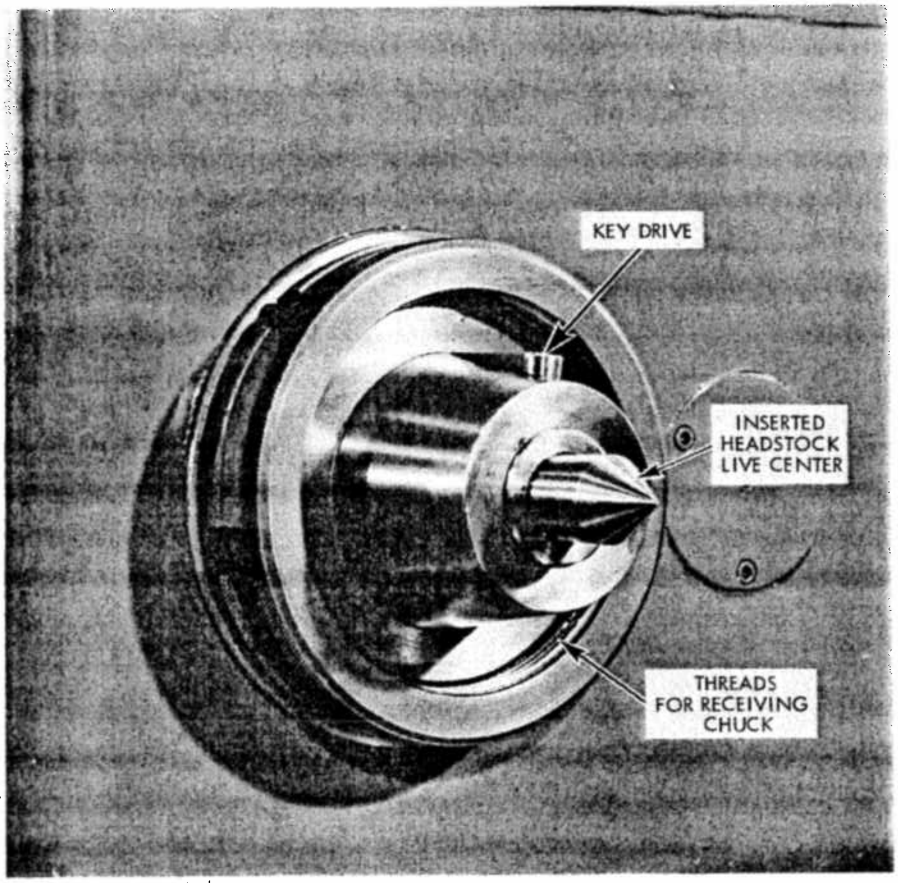
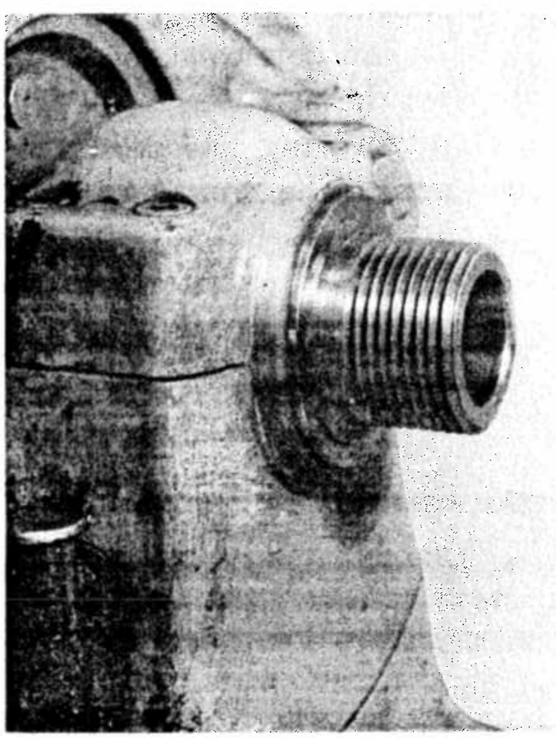


Fig. 34-10. This shows how the back gears reduce the speed and increase the power.





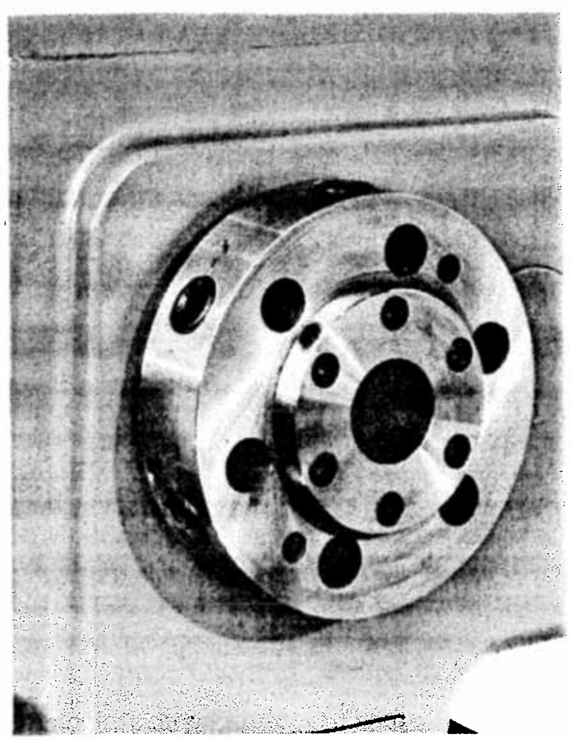
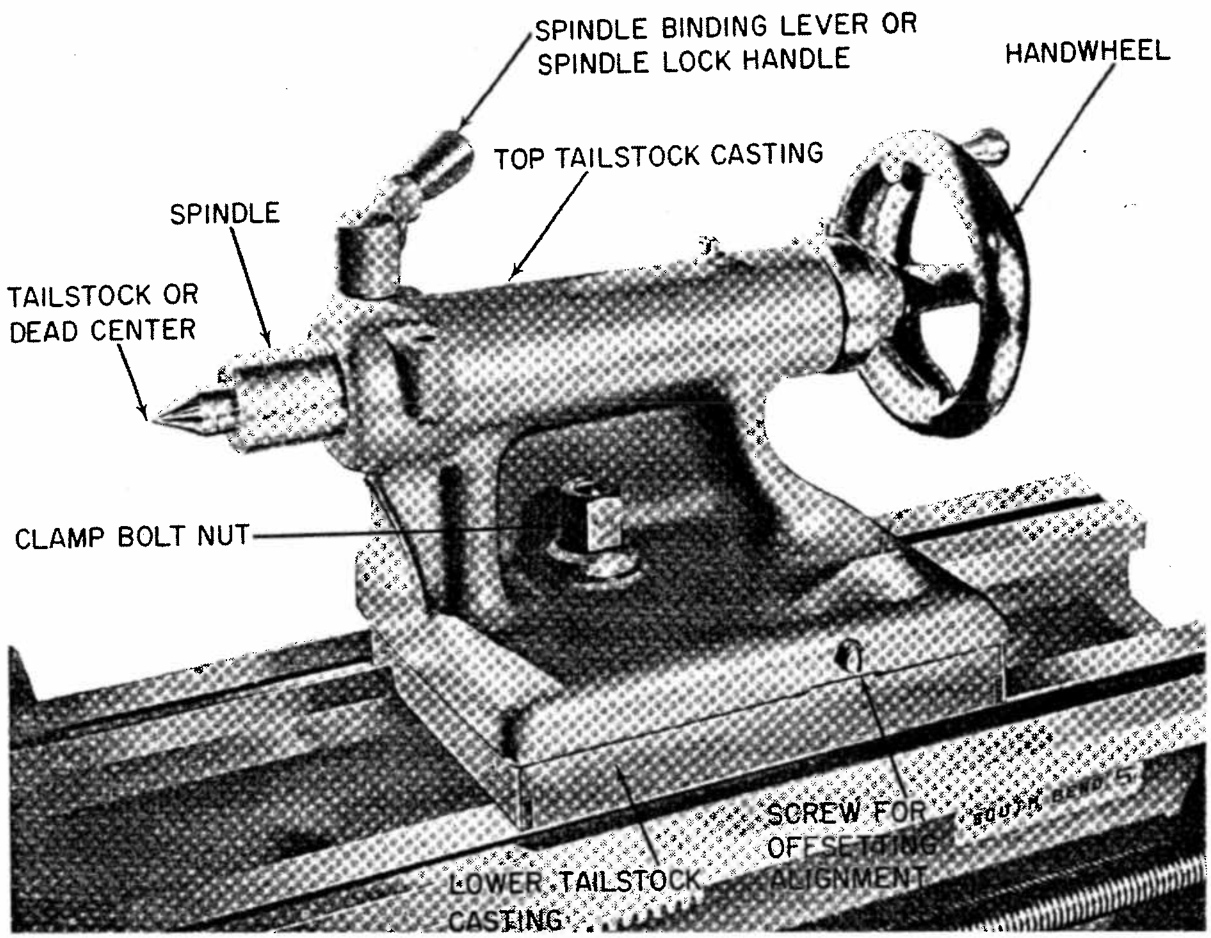
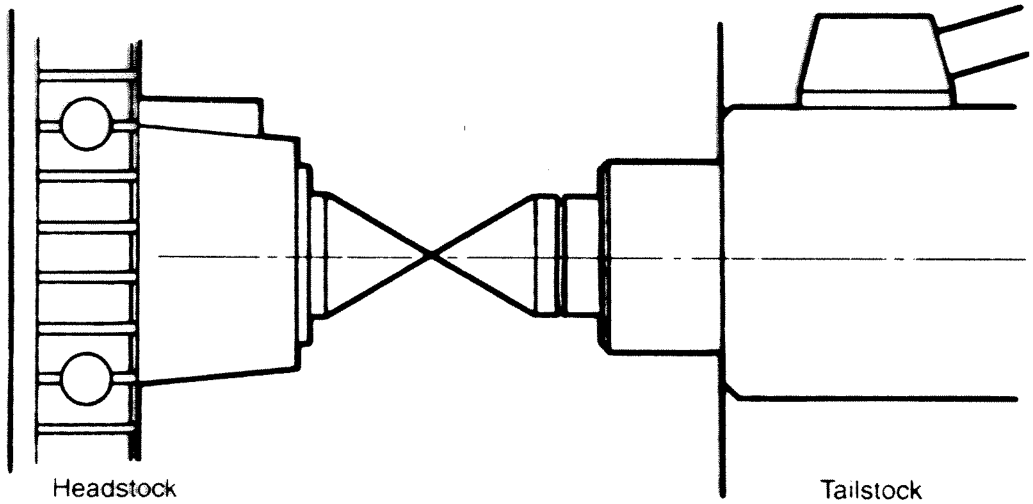


Fig. 9. *Top:* A key-drive tapered spindle nose. (The Lodge & Shipley Co.) *Lower Left:* A threaded spindle nose. *Lower Right*: A cam-lock spindle nose. (R. K. LeBlond Machine Tool Co.)

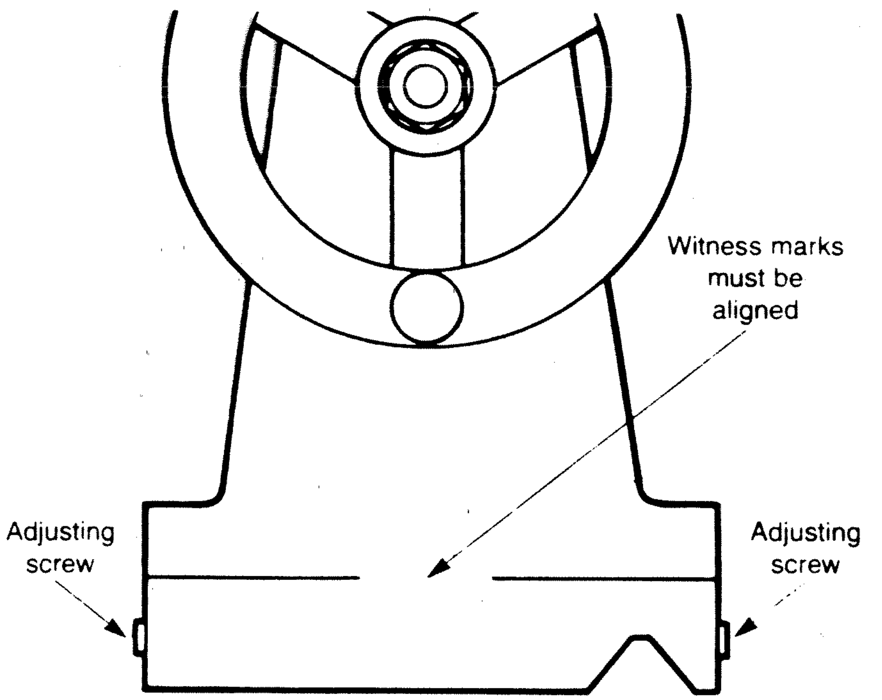
Fig. 34-11. The tailstock assembly.



Checking Center Alignment

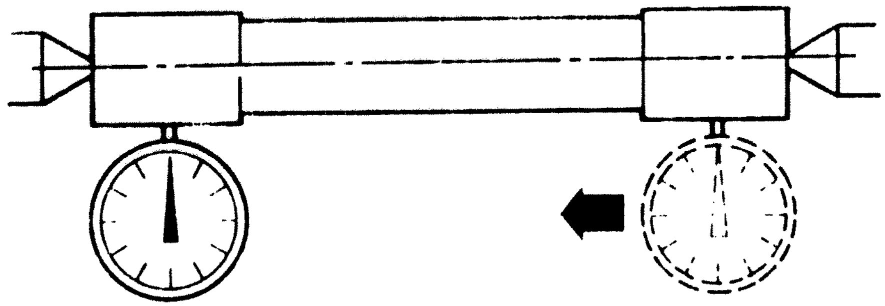


Checking Alignment by Bringing Points Together
(View is looking down on top of centers.)

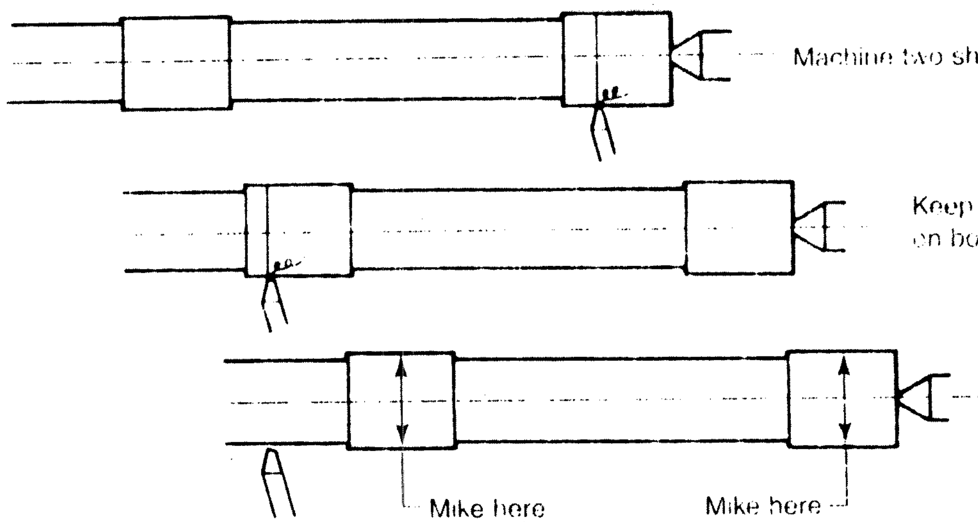


Checking Alignment by Checking Witness Lines on Base of Tailstock

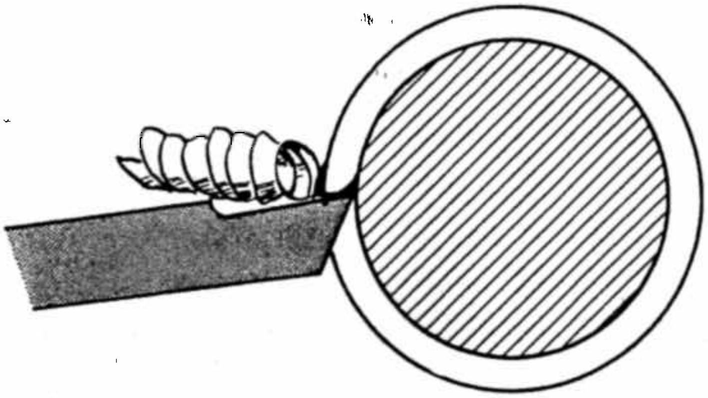
Checking Center Alignment



Using a Test Bar and Dial Indicator



Using a Section of Scrap and a Micrometer



Cutting speed is influence[d]
by:

1. Type of cutter bit.
2. Type of material.
3. Condition of the lathe.
4. Amount of feed.
5. Depth of cut.
6. Type of cut being made—roughing or finishing.

$\frac{3''}{16}$ DEPTH OF CUT
DIAMETER REDUCED TWICE
DEPTH OF CUT

79-11. The diameter of the workpiece being turned is reduced twice the depth of the cut.

Direct → Dial in .001" / Cut .001"
Conventional → Dial in .001" / Cut .002"

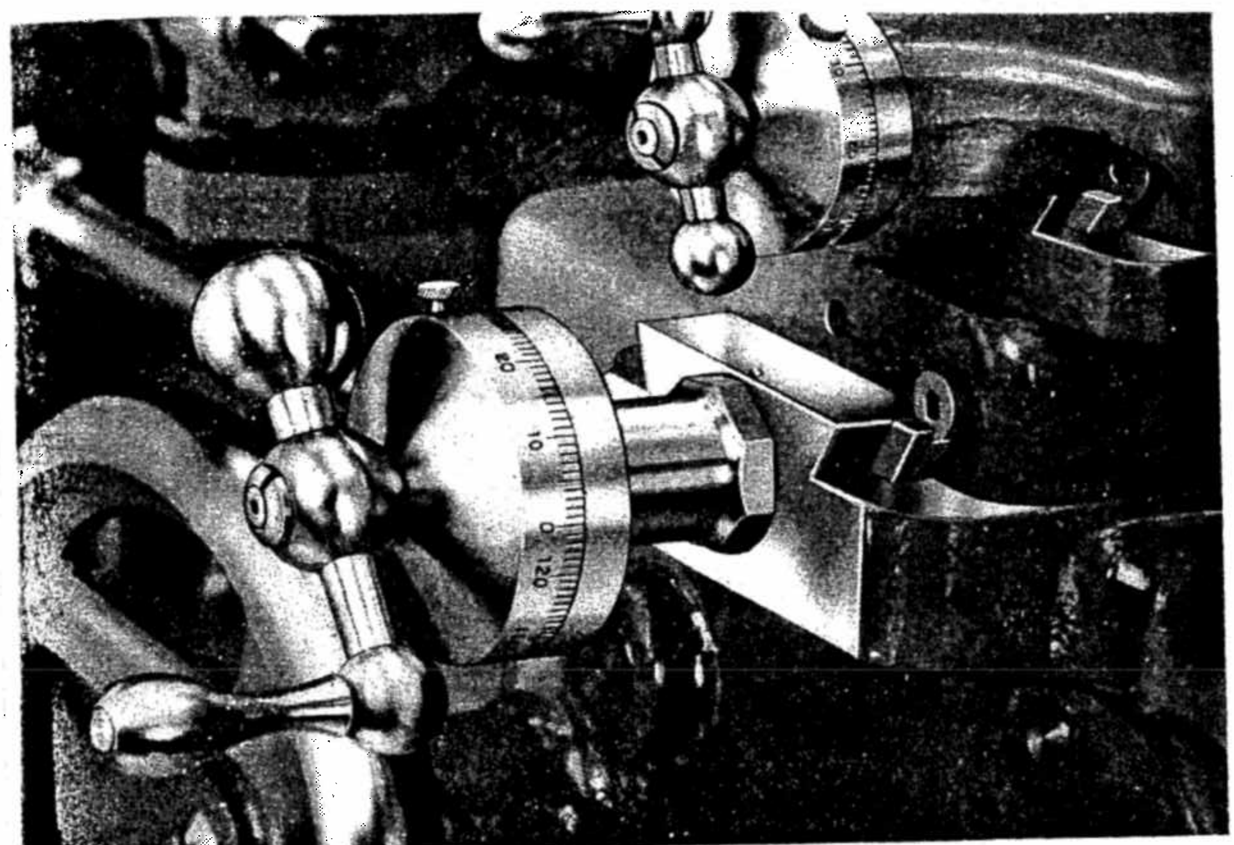


Fig. 14-9. The micrometer collar on cross-feed screw. (*The South Bend Lath[e] Works*)

Cutting Speeds for Turning—Drilling—Tapping With High Speed Steel Cutting Tools

Material	Turning Speeds		Drilling Speeds		Tapping Speeds	
	Ft. per Minute	Lubricant	Ft. per Minute	Lubricant	Ft. per Minute	Lubricant
Aluminum	300-400	Comp. or Kerosene	200-330	Comp. or Kerosene	90-110	Kerosene & Lard Oil
Brass, leaded	300-700	Dry or Comp.	200-500	Comp.	150-250	Comp. or Lt. Base Oil
Brass, red and yellow	150-300	Comp.	75-250	Comp.	60-150	Comp. or Lt Base Oil
Bronze, leaded	300-700	Comp.	200-500	Comp.	150-250	Comp. or Lt. Base Oil
Bronze, phosphor	75-150	Comp.	50-125	Comp.	30- 60	Comp. or Lt. Base Oil
Cast Iron	50-110	Dry	100-165	Dry	70- 90	Dry or Comp.
Cast Steel	45- 90	Comp.	35- 45	Comp.	20- 35	Sul. Base Oil
Copper, leaded	300-700	Comp.	200-500	Comp.	150-250	Lt. Base Oil
Copper, electro.	75-150	Comp.	50-125	Comp.	30- 60	Lt. Base Oil
Chrome Steel	65-115	Comp.	50- 65	Comp.	20- 35	Sul. Base Oil
Die Castings	225-350	Compound	200-330	Compound	60- 80	Kerosene & Lard Oil
Duralumin	275-400	Compound	250-375	Compound	90-110	Comp. or Ker. and Lard Oil
Fiber	200-300	Dry	175-275	Dry	80-100	Dry
Machine Steel	115-225	Compound	80-120	Compound	40- 70	Comp., Sul. Base Oil or Kero. & Para
Malleable Iron	80-130	Dry or Comp.	80-100	Dry or Comp.	35- 70	Comp. or Sul. Base Oil
Mang. Bronze	150-300	Comp.	75-250	Comp.	60-150	Lt. Base Oil
Mang. Steel	20- 40	Comp.	15- 25	Comp.	10- 20	Comp. or Sul. Base Oil or Ker. & Para
Moly. Steel	100-120	Comp.	50- 65	Comp.	20- 35	Sul. Base Oil
Monel Metal	100-125	Comp. or Sul. Base	40- 55	Sul. Base	20- 30	Sul.Base or Kero. and Lard Oil
Nickel Silver 18%	75-150	Comp.	50-125	Comp.	30- 60	Sul.Base or Kero. and Lard Oil
Nickel Silver, leaded	150-300	Comp.	75-250	Comp.	60-150	Sul.Base or Kero. and Lard Oil
Nickel Steel	85-110	Comp. or Sul. Base	40- 65	Sul. Base Oil	25- 40	Sul. Base Oil
Plastics, hot-set molded	200-600	Dry	75-300	Dry	40- 54	Dry or Water
Rubber, Hard	200-300	Dry	175-275	Dry	80-100	Dry
Stainless Steel	100-150	Sul. Base	30- 45	Sul. Base	15- 30	Sul. Base
Tool Steel	70-130	Comp.	50- 65	Comp.	25- 40	Sul. Base or Kero. and Lard Oil
Tungsten Steel	70-130	Comp.	50- 65	Comp.	20- 35	Sul. Base
Vanadium Steel	85-120	Comp.	45- 65	Sul. Base	25- 40	Sul. Base

The above speeds have been collected from several sources and are suggested as practical for average work. Special conditions may necessitate the use of higher or lower speeds for maximum efficiency.

Lathe Competencies

No. 12 - Feed Rate

Information Sheet #1

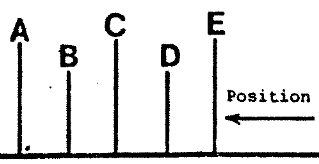
South Bend Precision Lathe

Cat. No. CLC 145B

Bed Length 5

Chart No. 1

Stop Machine Before Shifting Tumbler Levers



Feed Cross Feed .375 Times Longitudinal Feed

Stud Gear	Left Hand Tumbler	Threads Per Inch Feeds in Thousandths							
48	A	4 C841	4 1/2 .0748	5 .0673	5 1/2 .612	5 3/4 .0585	6 .0561	6 1/2 .0518	7 .0481
24	A	8 .0421	9 .0374	10 .0337	11 .0306	11 1/2 .0293	12 .0280	13 .0259	14 .0240
24	B	16 .0210	18 .0187	20 .0168	22 0153	23 .0146	24 .0140	26 .0129	28 .0120
24	C	32 .0105	36 .0093	40 .0084	44 .0076	46 .0073	48 .0070	52 .0065	56 .0060
24	D	64 .0053	72 .0047	80 .0042	88 .0038	92 .0037	96 .0035	104 .0032	112 .0030
24	E	128 .0026	144 .0023	160 .0021	176 .0019	184 .0018	192 .0017	208 .0016	224 .0015
		1	2	3	4	5	6	7	8

CHART FOR QUICK CHANGE GEAR BOX

Note: The top numbers are for threads per inch and the lower numbers are the feed rate in thousands per revolutional.

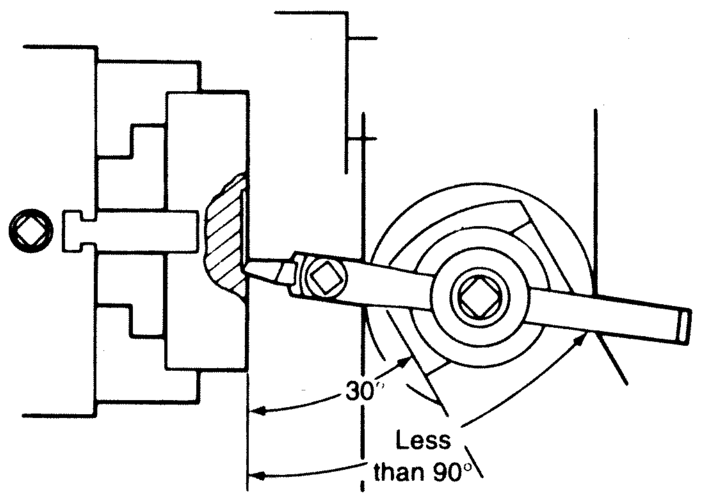
Examples

1. .0015 = 1½ thousand per revolution
2. .0030 = 3 thousand per revolution
3. .0017 = 17 ten-thousands per revolution
4. .010 = 10 thousands per revolution
5. .021 = 21 thousands per revolution

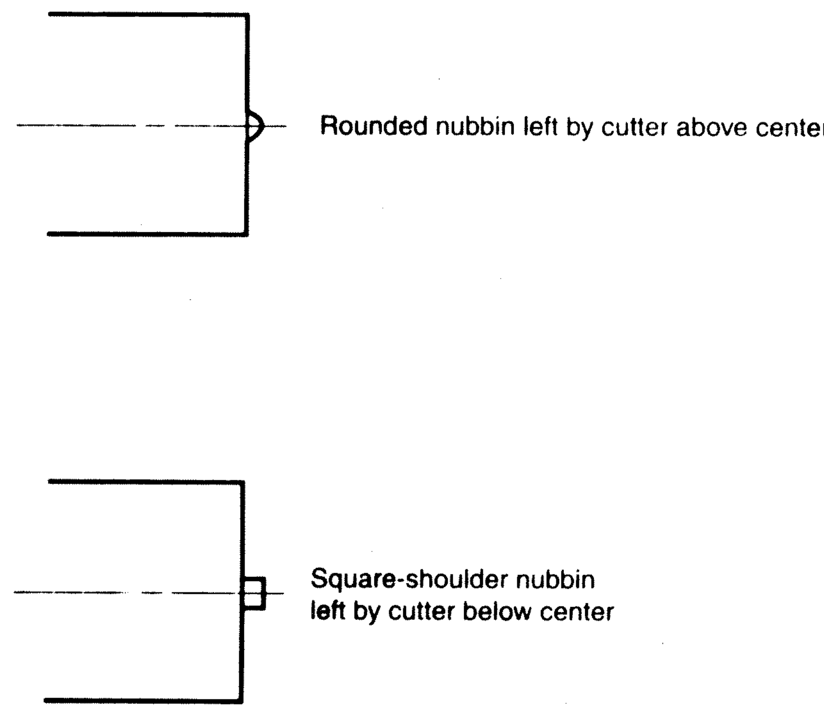
Feeds For Turning Using High Speed Steel

MATERIAL	ROUGH CUT	FINISH CUT
Aluminum	.015 - .030	.005 - .010
Brass	.015 - .030	.003 - .010
Cast Iron	.015 - .025	.003 - .012
Machine Steel	.010 - .020	.003 - .010

Facing in a Chuck



Correct tool and tool holder positions for facing.



12

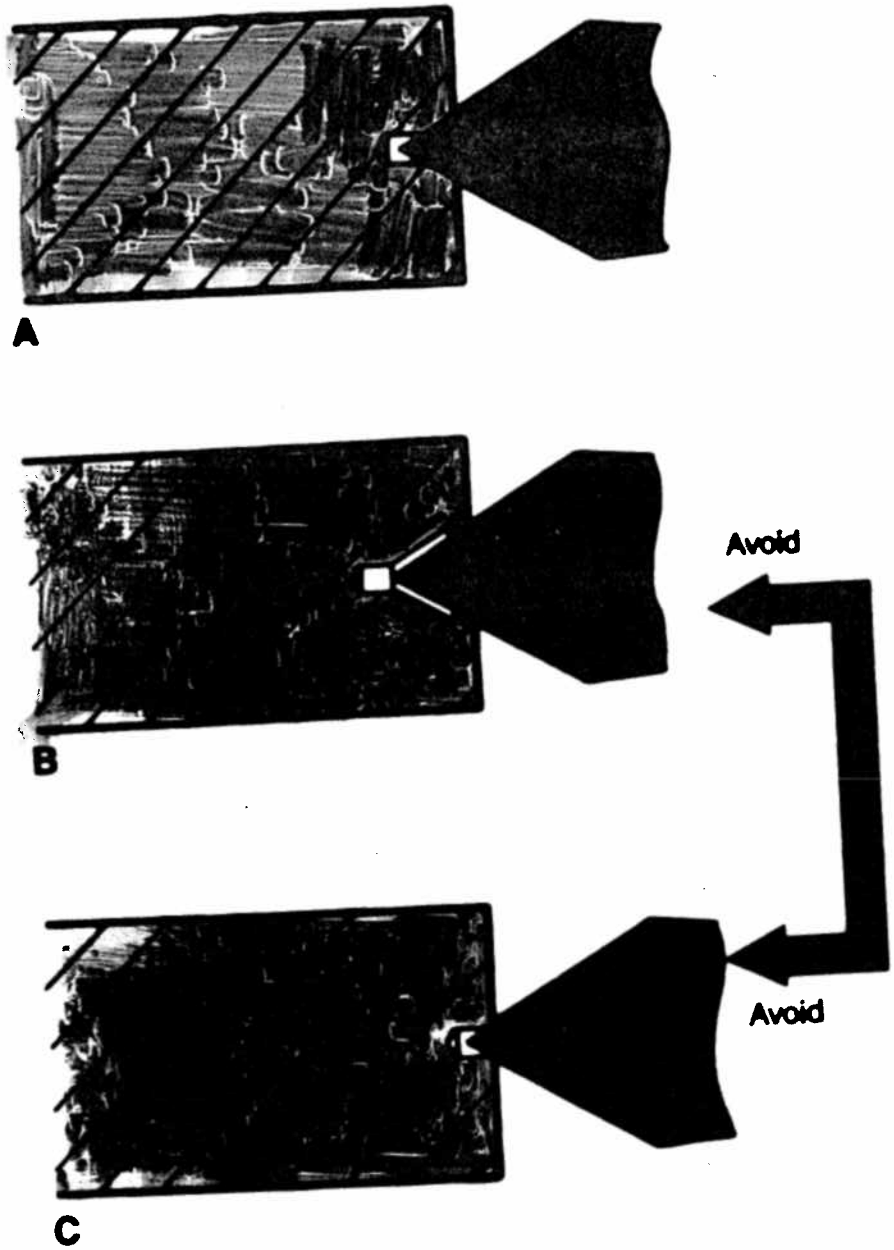


Figure 13-60. Correctly and incorrectly drilled center holes. A—Properly drilled center hole. B—Hole drilled too deep. C—Hole not drilled deep enough. Does not provide enough support; if used with a dead center, the center point will burn off.

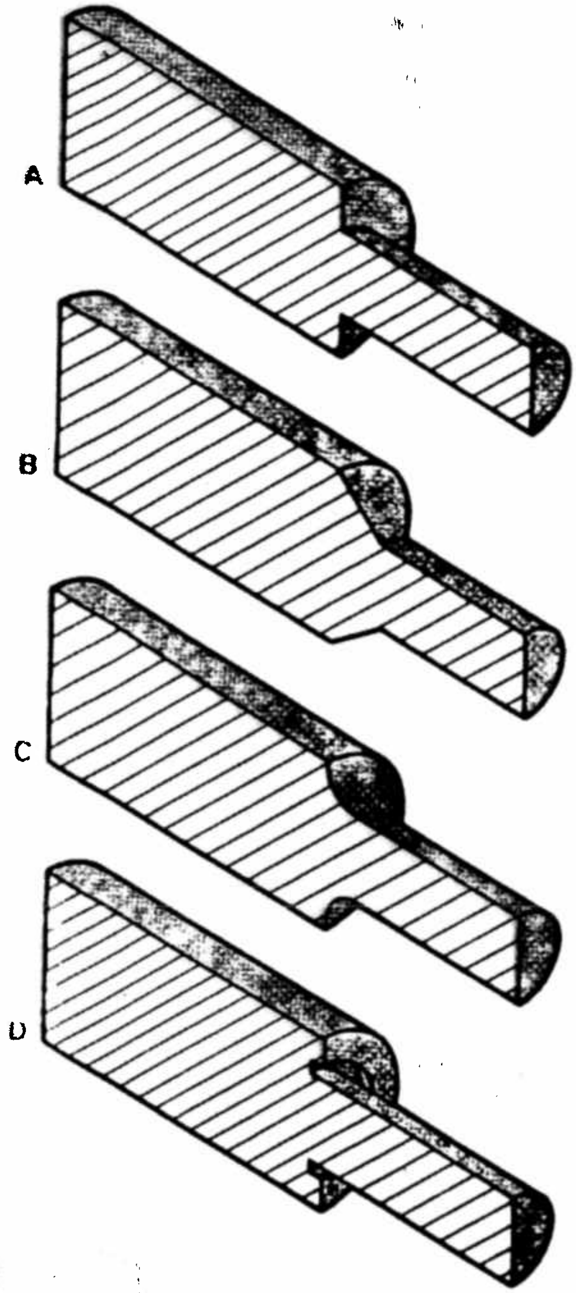


Figure 13-76. Four types of shoulders. A—Square. B—Angular. C—Filleted. D—Undercut.

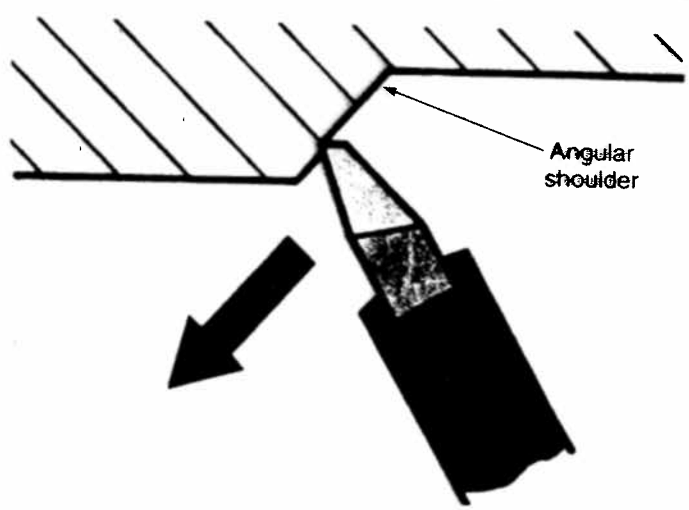


Figure 13-77. To machine an angular shoulder, cut is made from smaller diameter to larger diameter.

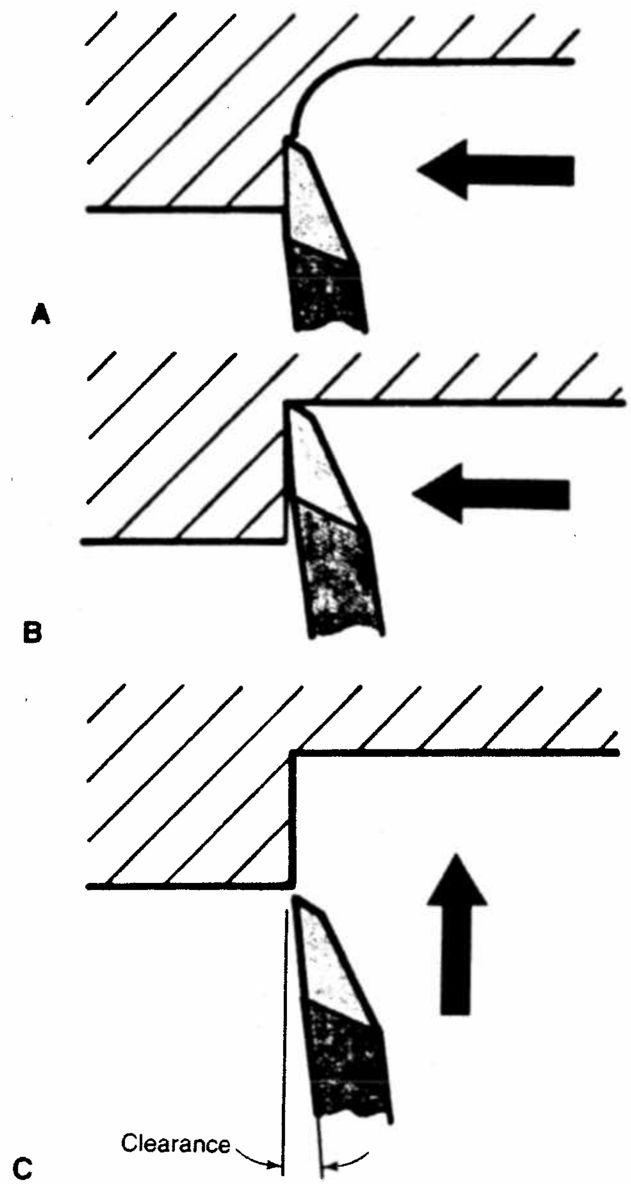


Figure 13-78. Machining sequence used for cutting a square shoulder. A—First cut. B—Second cut. C—Facing cut.