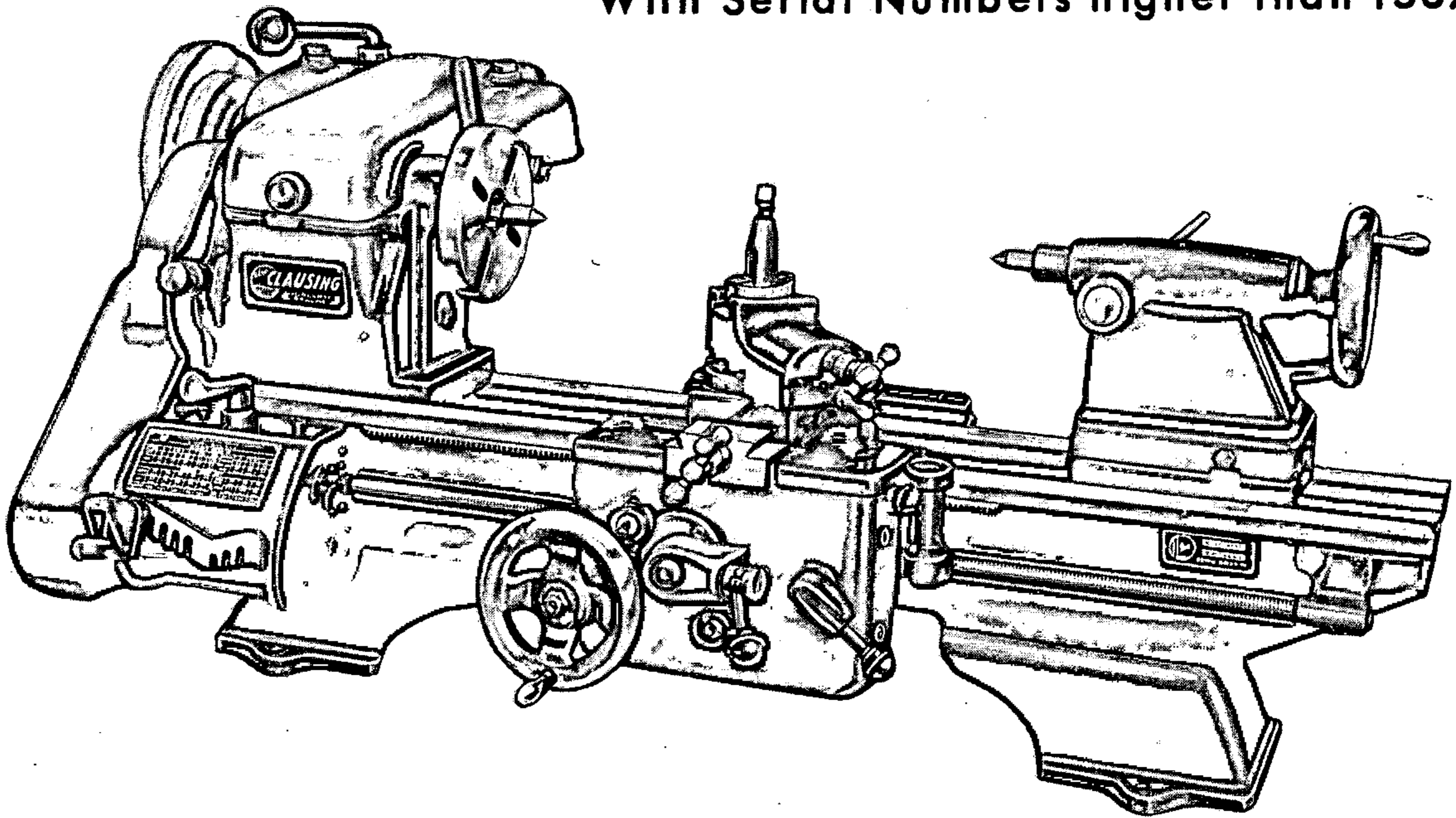




INSTRUCTIONS AND REPAIR PARTS

No. 4800 SERIES 12" LATHES

With Serial Numbers higher than 15670



CLAUSING

DIVISION

ATLAS PRESS COMPANY

KALAMAZOO, MICHIGAN, U. S. A.

Do Not Operate The Lathe Until . . .

- it is properly mounted and leveled. Clousing lathes pass rigid inspection and operating tests before shipment - to maintain its built-in accuracy it must be properly installed.
- you are acquainted with the lathe and understand all the controls and their functions.
- you have oiled the lathe.
- you have carefully read all the instructions.

Then operate the lathe in back gear - get the "feel" of the controls - set up different threads and feeds - engage the power feeds - get acquainted with the lathe before starting a job - doing that will save time and produce better work.

I N D E X

	<i>Page</i>
Mounting and Leveling.....	3
Lubrication.....	6
Maintenance and Controls.....	7
Setting up for Threads and Feeds.....	9
Adjustments.....	10
Repair Parts.....	13
Numerical Parts List.....	21

INSTRUCTIONS FOR ORDERING REPAIR PARTS

IMPORTANT: The following information must be furnished on all repair part orders:

1. Model Number and Serial Number of your lathe. This is found on the plate attached to the bed.
2. Part Number and Name of part.
3. Quantity required.

Parts shown coded are standard parts and should be purchased locally.

Parts price will be quoted on request.

We reserve the right to make changes in design and specifications without notice.

Instructions For Mounting and Leveling The Lathe

IT IS YOUR RESPONSIBILITY to properly level the lathe - it is the first essential for accurate work and long service life. Satisfactory performance is impossible if the lathe bed is out of level as little as one thousandth of an inch.

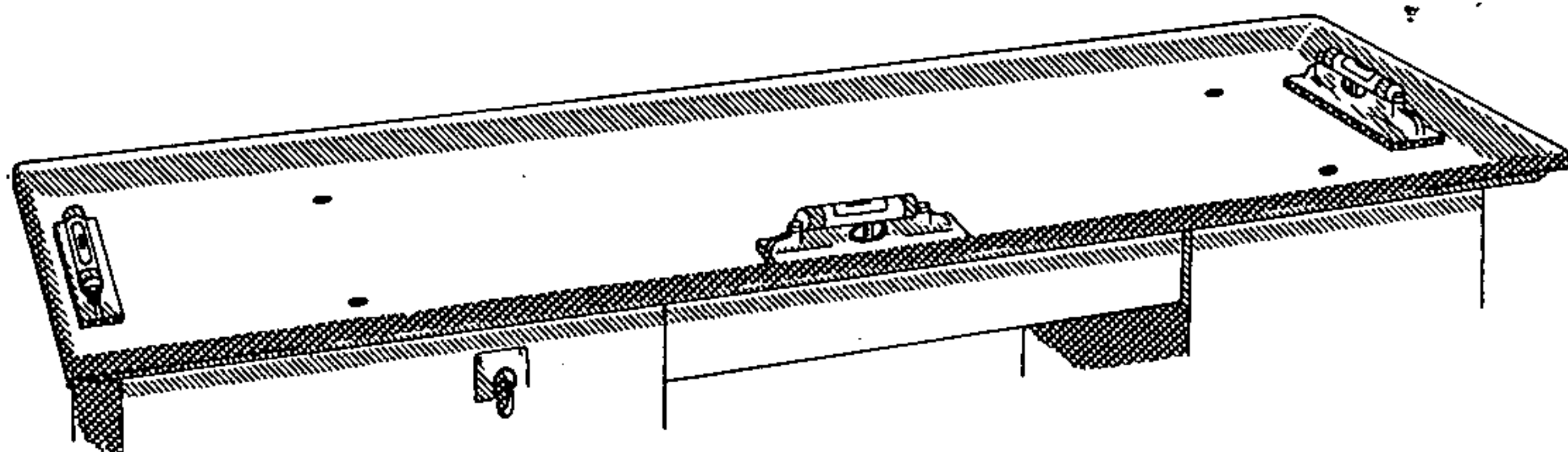
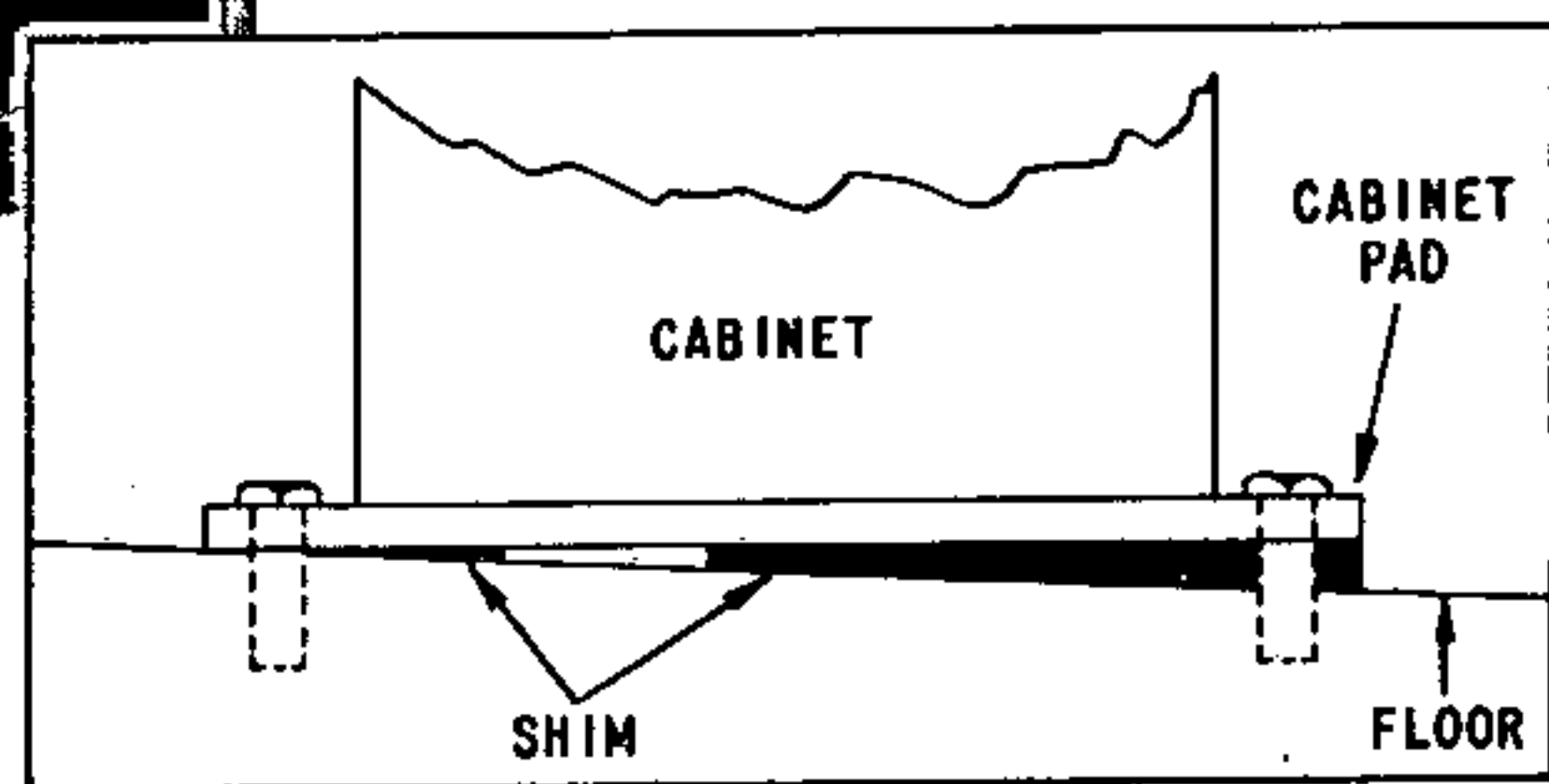
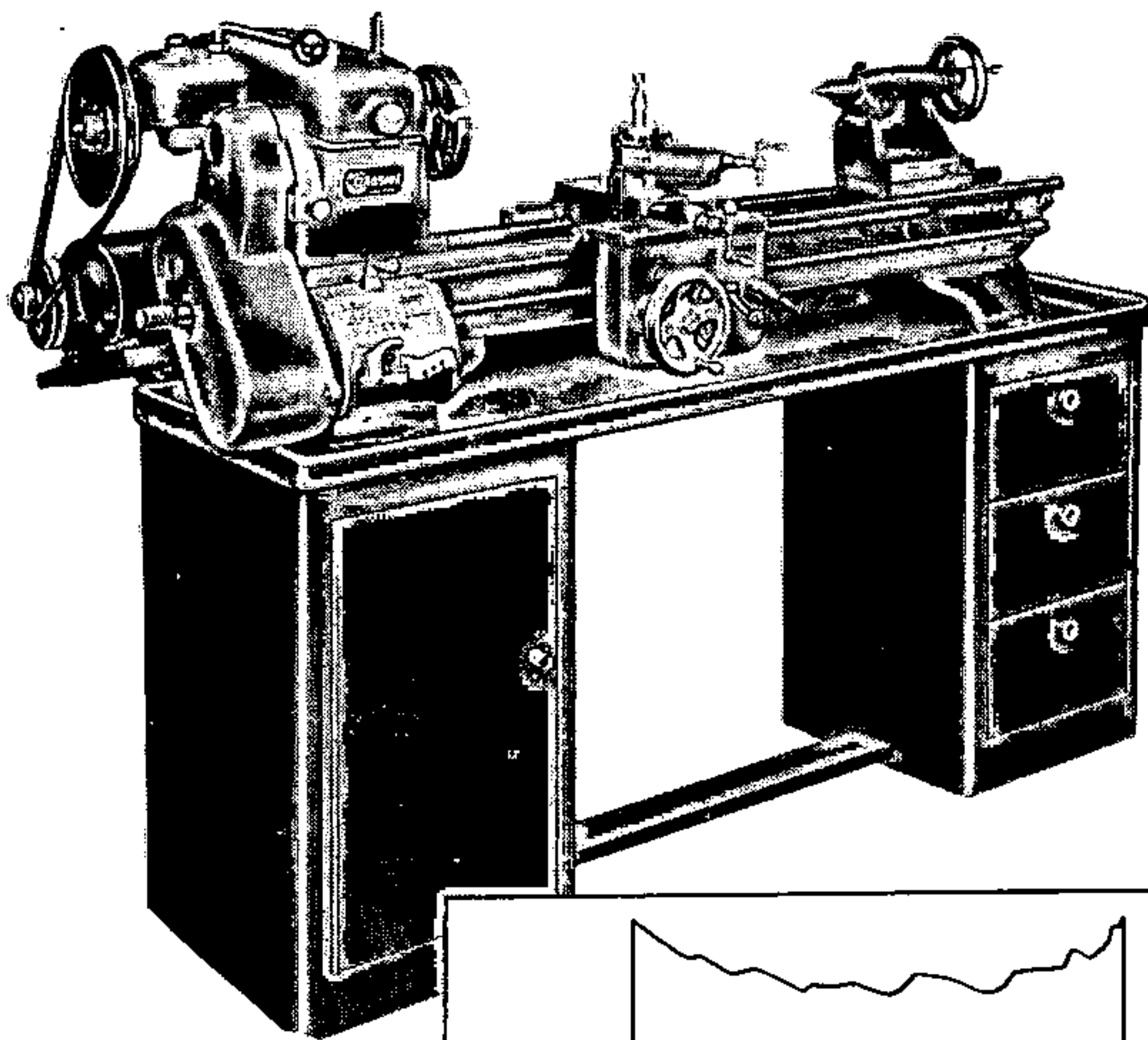
TO DO IT RIGHT-

- First bolt cabinet or bench to the floor
- Next level the cabinet or bench
- Then level the lathe

METAL CABINET INSTALLATION

1. Mount cabinet on a concrete floor or base whenever possible - if a wood floor is used, it should be well braced, capable of absorbing vibration and withstanding the load. Make sure cabinet rests solidly on the floor.

2. Fasten cabinet to concrete floor by marking location of mounting holes and drilling holes large enough to receive expansion bolts, or set studs or bolts in melted lead. Use lag screws or bolts to fasten cabinet to a wood floor.



(Above) Lathe mounted on steel cabinet. (Center) Use shims as shown to level cabinet. (Below) Positions for checking level readings on cabinet or bench top.

Cabinet must be bolted to floor, otherwise vibration will result.

3. Level the cabinet - use a precision machinists level. Place shims as required between cabinet pads and floor to accurately level the top. Shims should be of hardwood or metal and bear under at least 75% of the cabinet pad as shown in insert, Figure 1.

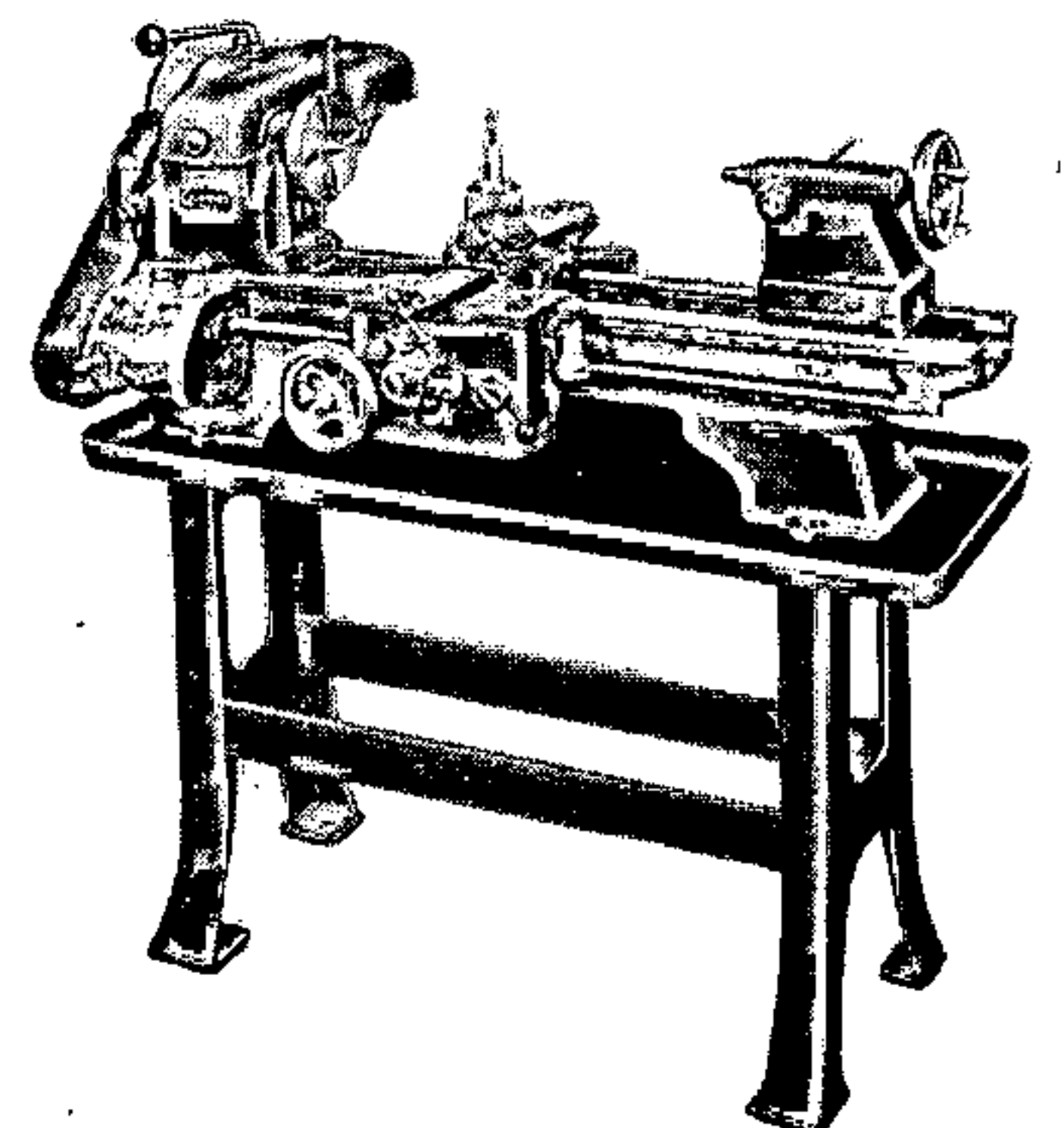
Don't use the lathe bedways to level the cabinet. Place level on cabinet top in the positions shown in sketch, Figure 1.

4. Mount the lathe. Bolt lathe to bench using 3/8" dia. bolts - they may be inserted from either top or underneath side. Do not tighten bolts securely. Lathe may now be leveled - see instructions, page 5.

BE SURE YOU HAVE FOLLOWED THESE INSTRUCTIONS COMPLETELY BEFORE LEVELING THE LATHE.

LATHE BENCH INSTALLATION

1. Mount bench on a concrete floor or base whenever possible - if a wood floor is used, it should be well braced capable of absorbing vibration and withstanding the load. Make sure bench rests solidly on the floor.



2 Lathe mounted on lathe bench with chip pan

2. Fasten bench to concrete floor by marking location of mounting holes and drilling holes large enough to receive expansion bolts, or set studs or bolts in melted lead. Use lag screws or bolts to fasten bench to a wood floor.

3. Level the bench - use a precision machinists level. Place shims as required between bench legs and floor to accurately level the top.

4. Mount the lathe. Bolt lathe to bench using 3/8" dia. bolts - they may be inserted from either top or underneath side. Do not tighten bolts securely. Lathe may now be leveled - see instructions, page 5.

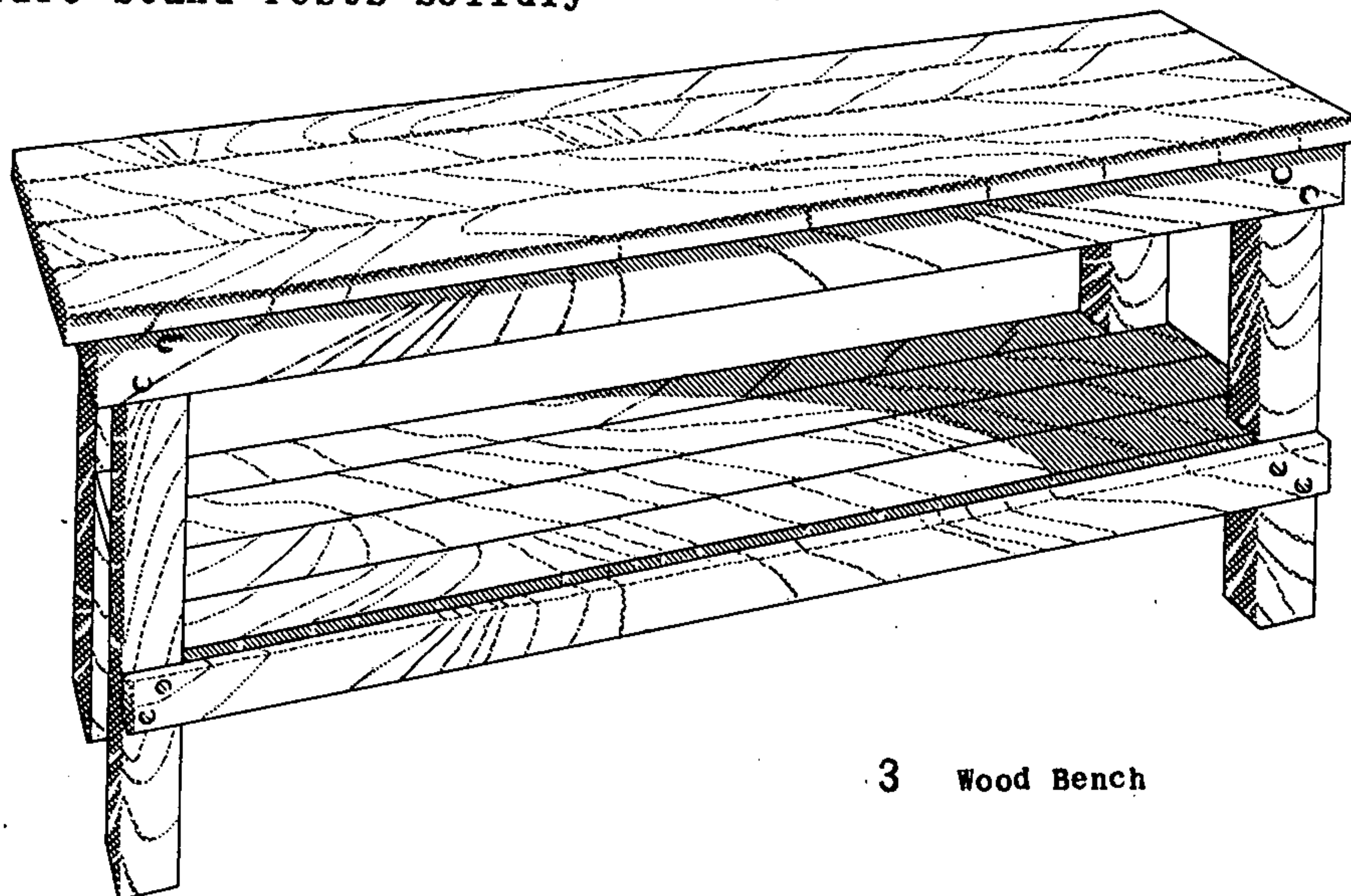
BE SURE YOU HAVE FOLLOWED THESE INSTRUCTIONS COMPLETELY BEFORE LEVELING THE LATHE.

WOOD BENCH REQUIREMENTS and INSTALLATION

1. Bench top must be semi-hard or hard wood at least 1 5/8" thick, cleated or well doweled to form a rigid table. **DO NOT USE SOFTWOODS OR BOARDS NOT CLEATED TOGETHER.**

2. Legs should be of heavy construction - preferably 4" x 4" lumber, provided with lugs for bolting bench to floor. overall height of bench should be about 28".

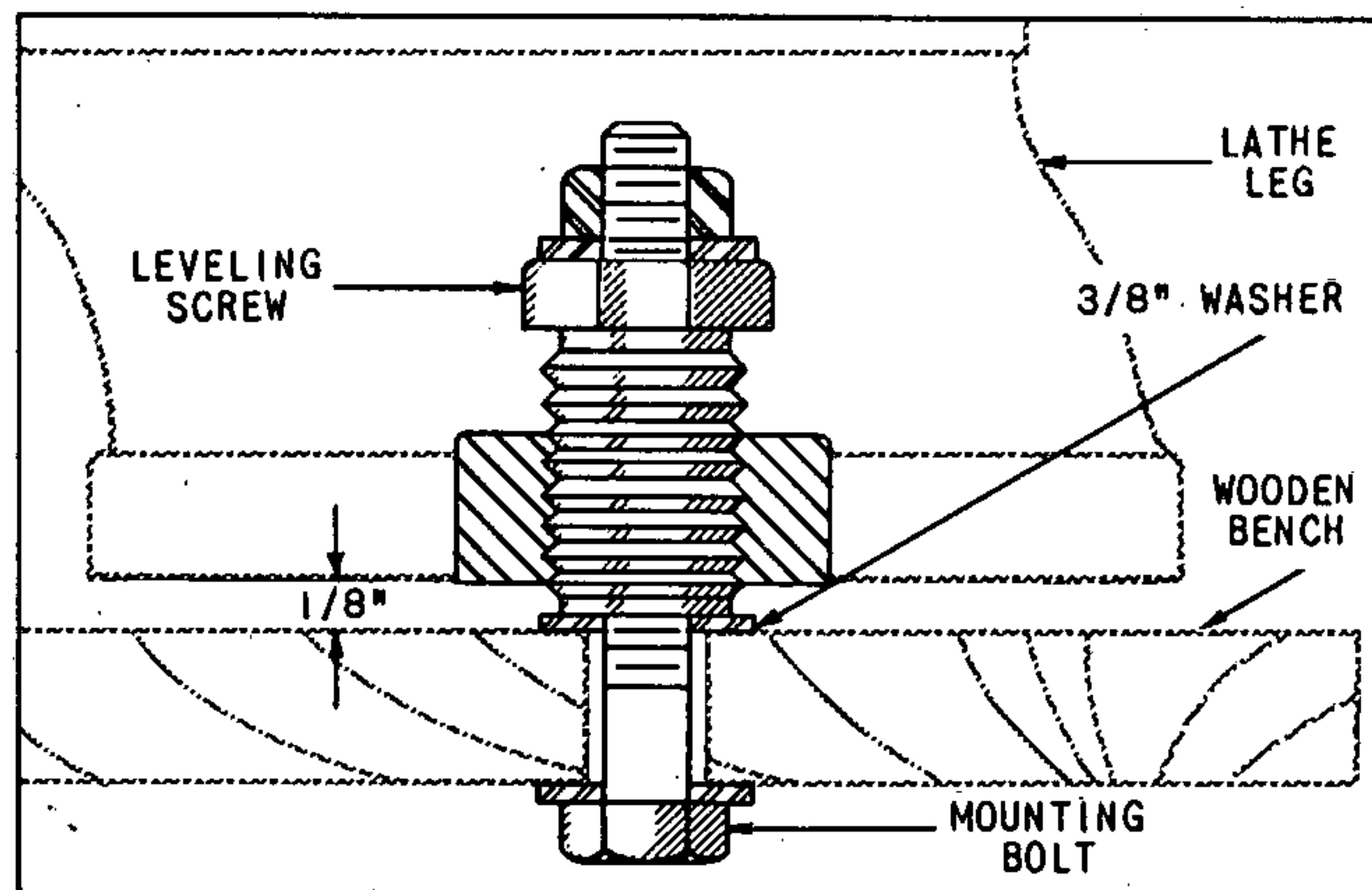
3. Mount bench on a concrete floor or base if possible - if a wood floor is used, it should be well braced, capable of absorbing vibration and withstanding the load. Make sure stand rests solidly on the floor.



3 Wood Bench

4. Fasten stand to concrete by marking location of mounting holes and drilling holes large enough to receive expansion bolts, or set studs or bolts in melted lead. Use lag screws or bolts to fasten bench to a wood floor.

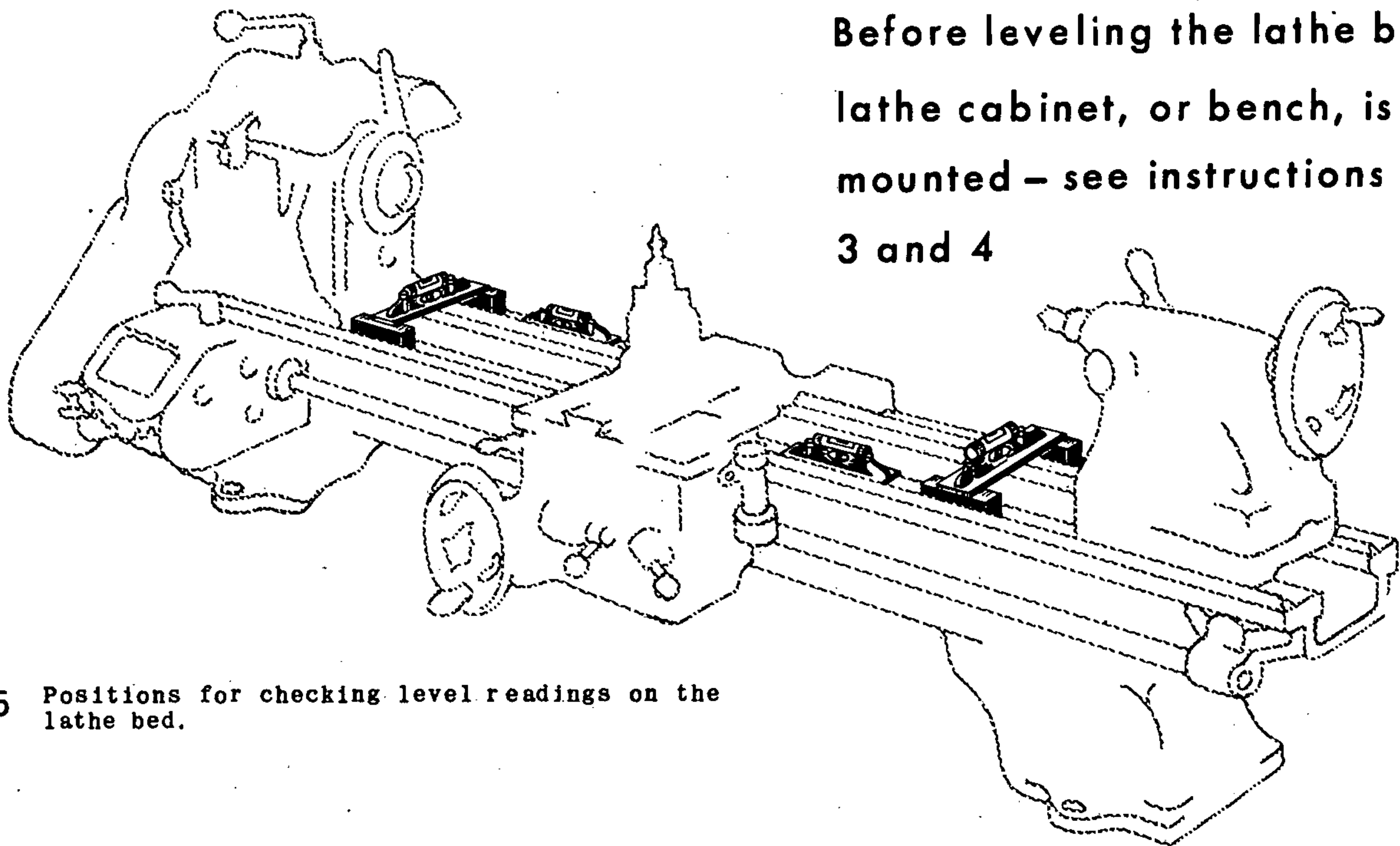
5. Level bench before mounting lathe - use a precision machinists level. Place shims as required between leg pads and floor to accurately level the top.



4 Make sure a metal washer is placed between leveling screw and top when using a wood bench.

6. Mount the lathe. Mark and drill four 7/16" dia. holes in bench top under corresponding holes in lathe legs. Bolt lathe to top using 3/8" dia. bolts, placing a 3/8" washer between lathe leg and bench top - see Figure 4. Bolts may be inserted from either top or underneath side. Do not tighten bolts securely.

BE SURE YOU HAVE FOLLOWED THESE INSTRUCTIONS COMPLETELY BEFORE LEVELING THE LATHE.



5 Positions for checking level readings on the lathe bed.

Before leveling the lathe be sure the lathe cabinet, or bench, is properly mounted - see instructions on pages 3 and 4

Leveling The Lathe

1. Screw down the four leveling screws, raising the lathe so that lathe legs at no point touch cabinet top - approximately 1/8" clearance is sufficient - see figure 7.

2. Use a precision machinists spirit level to level the lathe. A VERY SENSITIVE LEVEL SHOULD BE USED. Level should be at least 6" long and should show a distinct bubble movement when a .003" shim is placed under one end of the level.

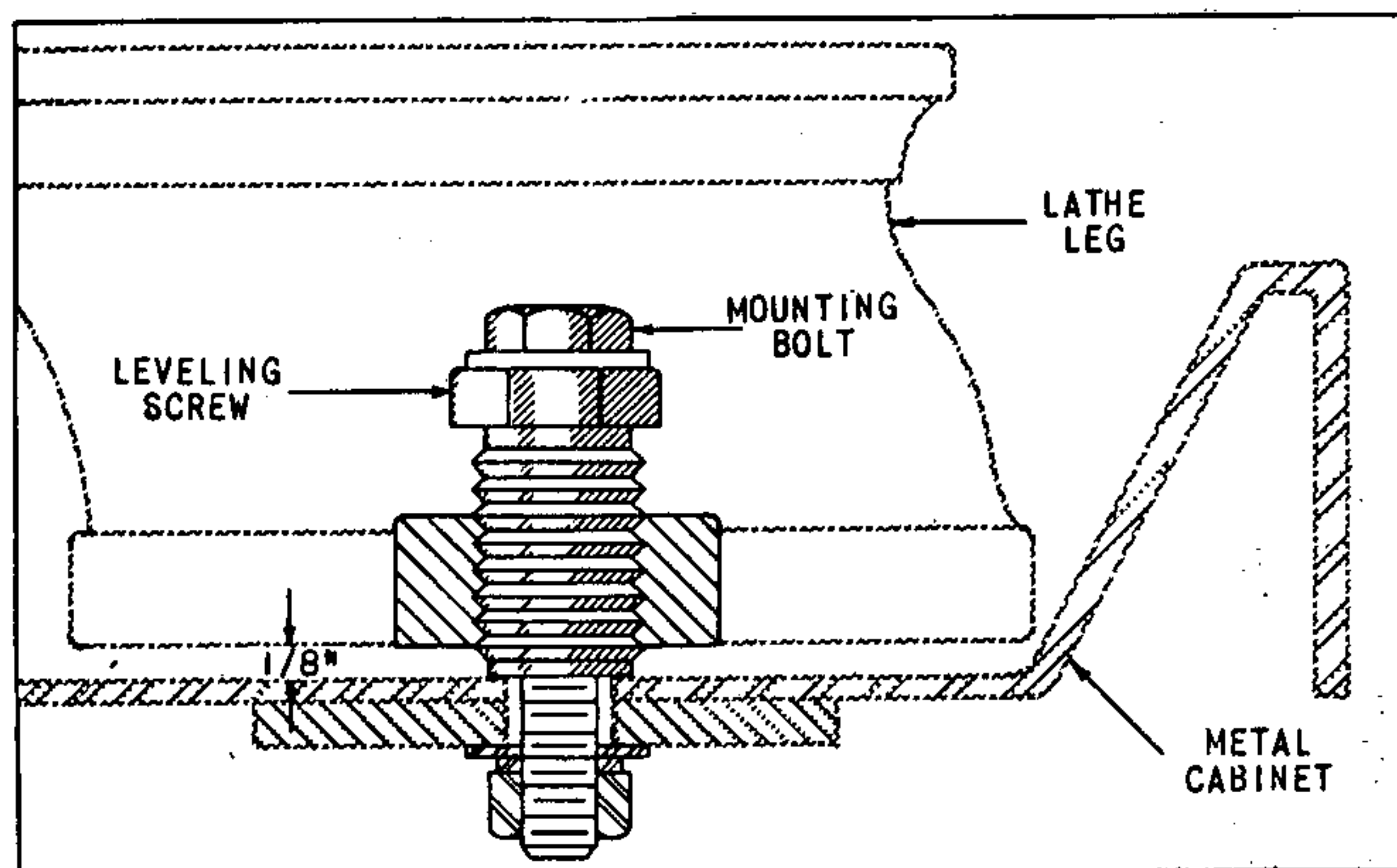
3. Both ends of the lathe bed - the headstock end and the tailstock end - should be checked with a level placed parallel and at right angles to the

lathe bed - see Figure 5. Check level readings at right angles to lathe bed with parallel bars or two metal blocks of exact equal thickness. Bars must be placed on the flat ways and must be wide enough to clear the V ways.

4. Level readings in the four positions must be identical. Compensate variations of bubble readings by turning the leveling screws until lathe is level - see Figure 6.

5. Now tighten the four mounting bolts securely.

6. Again check the level of the lathe with the level. Tightening the bolts may have pulled lathe bed out of level. If further adjustment is necessary, hold bolt head with wrench while adjusting leveling screws.

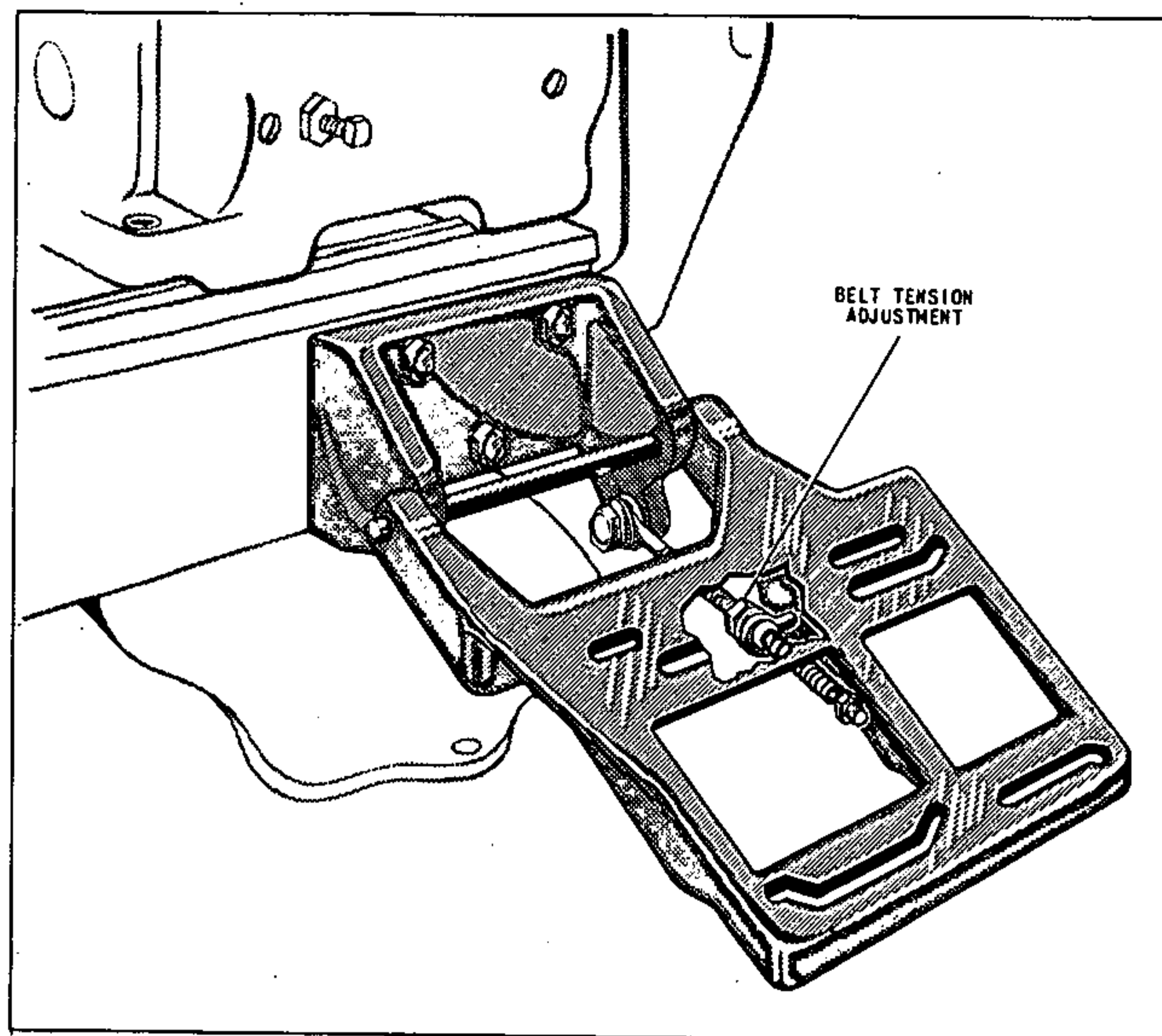


6 Illustration of leveling screw - the four screws furnished with lathe will quickly and accurately level the lathe.

CHECK THE LEVEL OF THE LATHE AT FREQUENT INTERVALS to assure accurate turning. If the lathe is not properly leveled, it will twist the bed resulting in misalignment of the headstock and tailstock with the ways, causing lathe to chatter - turn taper - uneven wear - bore taper - face convex or concave - ruin spindle bearings and make carriage bind.

MOUNTING THE MOTOR

1. Mount motor base assembly to the lathe bed with the three screws furnished.
2. Slide pulley on motor with large step next to motor.
3. Mount motor on motor base and fasten in place with the four bolts furnished.
4. Place belt over pulleys and shift motor until pulleys are aligned and belt is straight, then tighten motor mounting bolts.
5. Adjust spring to obtain proper belt tension - see Figure 7. Belt should be just tight enough to prevent slipping.



7 Motor base mounted to lathe bed. Adjust spring for proper belt tension.

Oiling The Lathe

Apron To fill oil reservoir in apron remove pipe plug on side of apron and use hole for supplying oil. Fill apron to level indicator on side of apron. Maintain this oil level at all times. Use S. A. E. No. 20 machine oil.

Use the lubrication chart furnished with the lathe as a guide for locating the oiling positions.

Gear Train Lubrication points can be reached through holes in guard. Fill oil cup on quadrant and on reverse handle - add oil daily. Oil holes on ends of reverse gear studs and sliding gear handle require daily lubrication. Fill zerk fitting monthly with a light grease for quadrant gear lubrication.

Gear Box Apply oil frequently thru oil cups on top of gear box for general lubrication of all moving parts. Gear box bearings are sealed-for-life ball bearings and do not require lubrication.

Lubricate the following points in headstock and countershaft by raising hood.

Headstock Lubricate the spindle bearings thru the two oil cups on both ends of headstock. Lubricate back gear bearings thru oil hole in back gear shaft quill. To oil spindle pulley bearing, remove set screw in spindle drive pulley. Oil these bearings once a week.

Countershaft Lubricate the countershaft and pulley roller bearings by filling grease cups on both ends of countershaft spindle with automotive cup grease. Give grease cups a turn every time lathe is used. Oil clutch closer and clutch expander pin once a week.

Other parts to oil occasionally are:

1. Right lead screw bearing
2. Tailstock ram
3. Tailstock Screw
4. Carriage handwheel shaft
5. Leadscrew
6. Carriage and compound dovetail ways
7. Lathe bed ways
8. Felt wipers on carriage saddle
9. Rim of threading dial.

KEEP YOUR LATHE CLEAN - Oil and dirt form an abrasive compound which can easily damage carefully fitted bearing surfaces. Wipe the bed and all polished parts with a clean oily rag at frequent intervals. Use a brush to clean spindle threads, gear teeth, lead screw threads, etc.

Maintenance and Controls

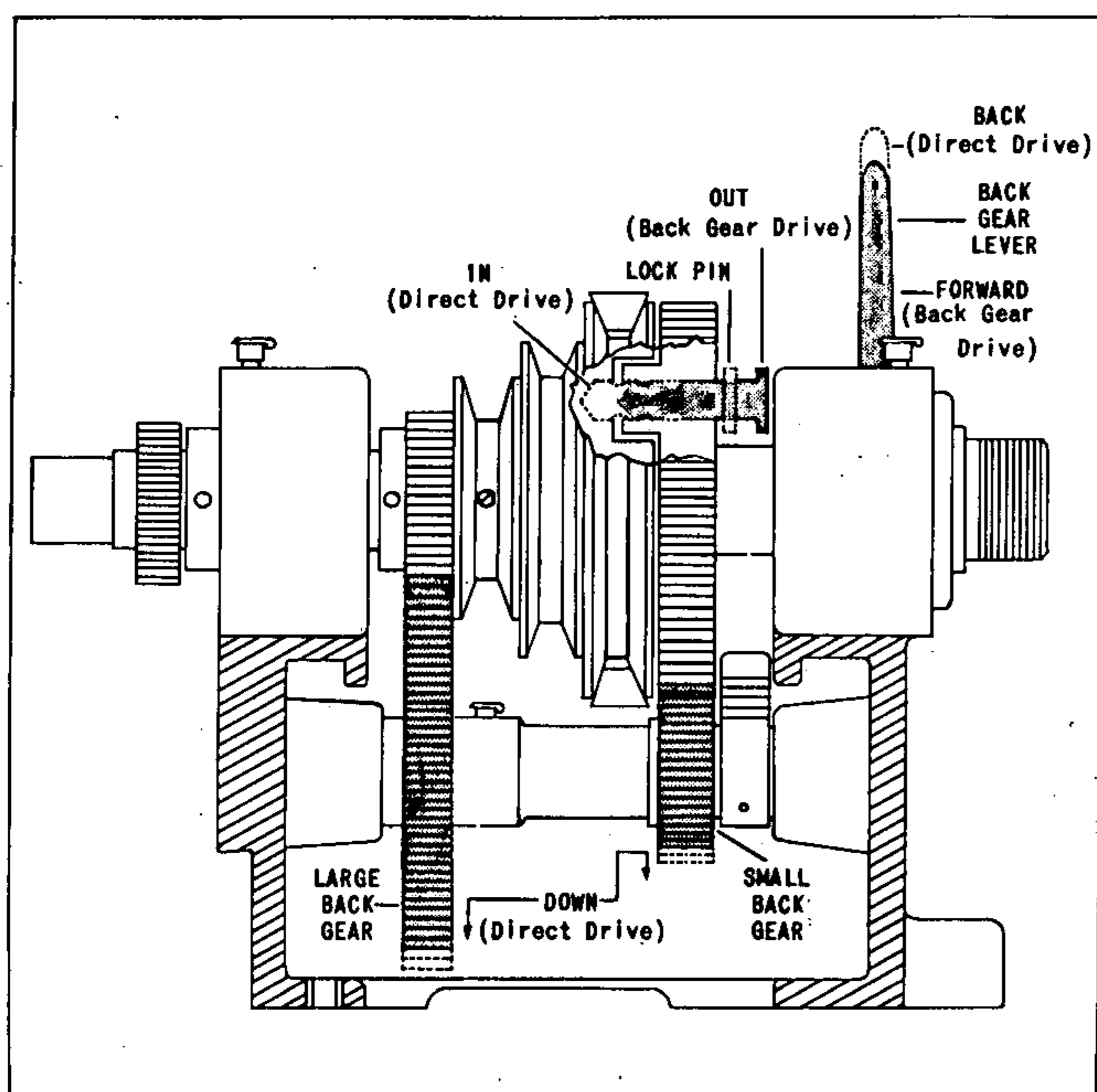
DO NOT OPERATE THE LATHE - until you are thoroughly familiar with all the controls and their functions (read carefully the instructions MAINTENANCE AND CONTROLS). Then operate the lathe in back gear - get the "feel" of the controls - set up different threads and feeds - engage the power feeds - get acquainted with the lathe before you start a job - it will save time and produce better work.

SPINDLE DRIVE, See Figure 8

FOR DIRECT DRIVE - turn pulley until lock pin can be reached and engage lock pin with the pulley, locking pulley to the bull gear and spindle. Place back gear lever in the disengaged position, or away from headstock. Lathe is now in direct drive.

FOR BACK GEAR DRIVE - pull out lock pin, disengaging bull gear from pulley. Shift back-gear lever to the forward position, meshing back gears with spindle gears - it may be necessary to rotate spindle pulley to mesh gears.

CAUTION - Always stop motor before changing from one drive to another.

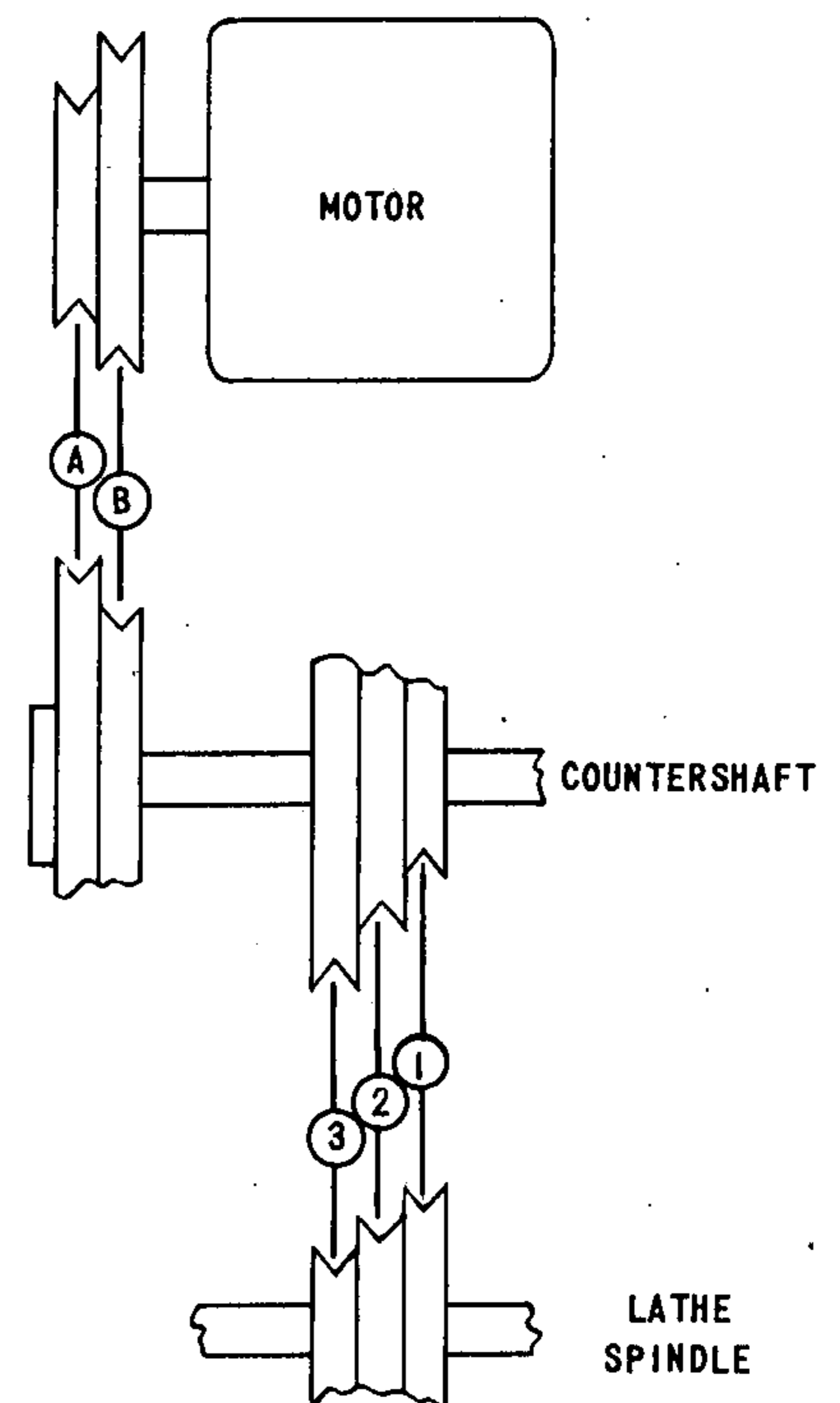


8 Position of back-gears, lever and lock pin for spindle drive in "back-gear" (shaded) and in "direct drive" (broken line).

LATHE COUNTERSHAFT

Countershaft has friction clutch and brake for instant starting and stopping of the spindle without stopping the motor. Moving clutch lever to left engages spindle drive - to the right disengages it. Moving lever to extreme right tightens the brake shoe stopping the spindle.

Speed changes are made by raising the guard which slackens the drive belt for easy belt changes. The chart, Figure 9, lists the speeds available and shows how they are obtained.

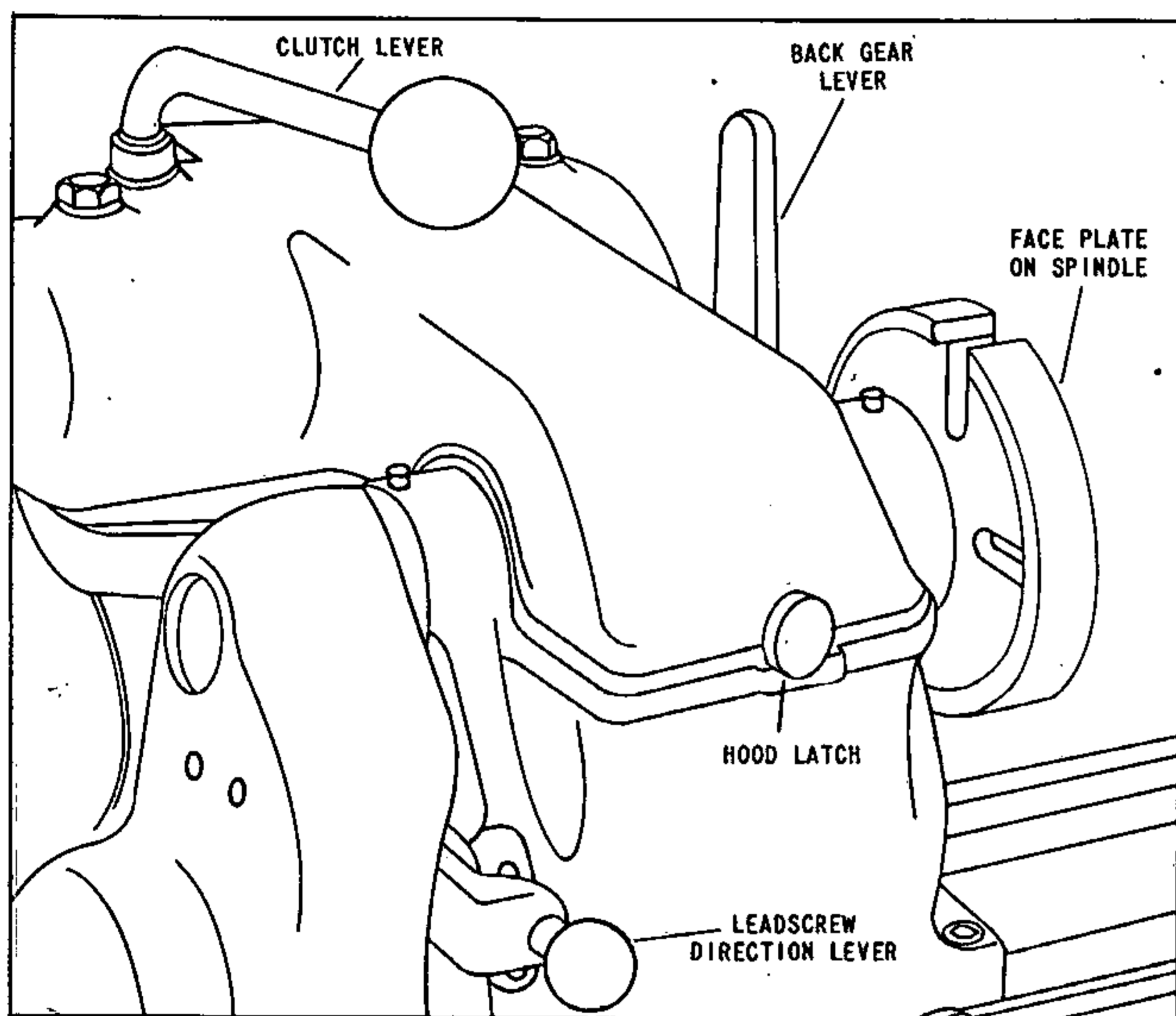


BACK GEAR DRIVE				DIRECT CONE DRIVE			
MOTOR BELT POSITION	SPINDLE BELT POS.			MOTOR BELT POSITION	SPINDLE BELT POS.		
	1	2	3		1	2	3
A	32	56	128	A	192	338	768
B	89	180	362	B	536	1080	2170

9 Spindle Speed Chart

FEED REVERSE LEVER

The feed reverse lever, or lead screw direction lever, is located on left side of headstock, Figure 10. Lever has three positions. Center position is neutral and disengages gear train. Upper position moves carriage toward tailstock. Lower position moves carriage toward headstock. *This lever should not be moved while lathe is operating at high speeds - it may strip the gears or result in serious damage to the lathe.* It is possible to quickly reverse lead screw at lower speeds if desired.



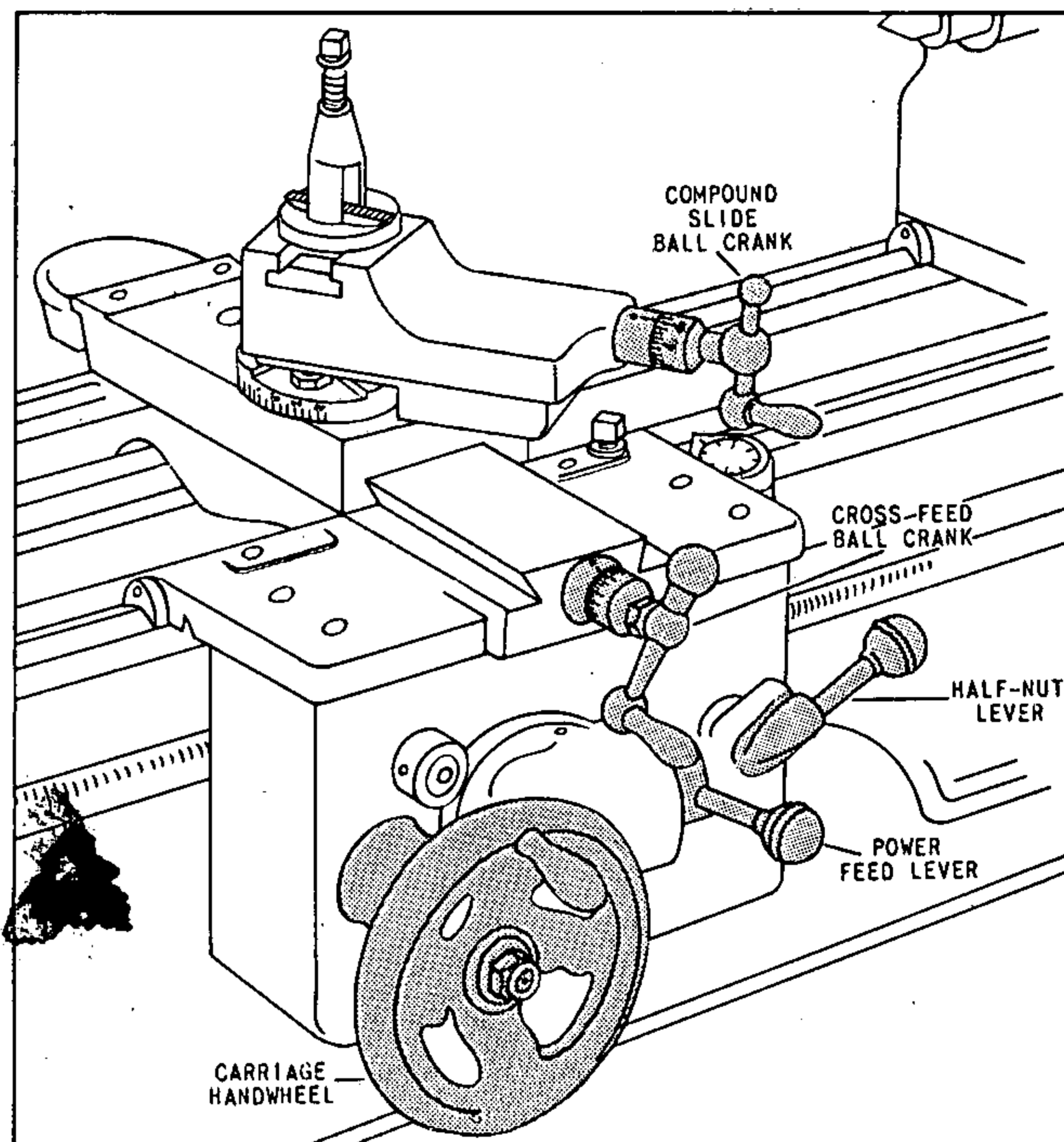
10 Lathe headstock showing location of feed reverse lever.

AUTOMATIC APRON

Figure 11 gives the names and positions of the carriage controls. The carriage handwheel moves the carriage along the

lathe bed. The cross feed and compound slide ball cranks move the carriage slide and tool rest in and out.

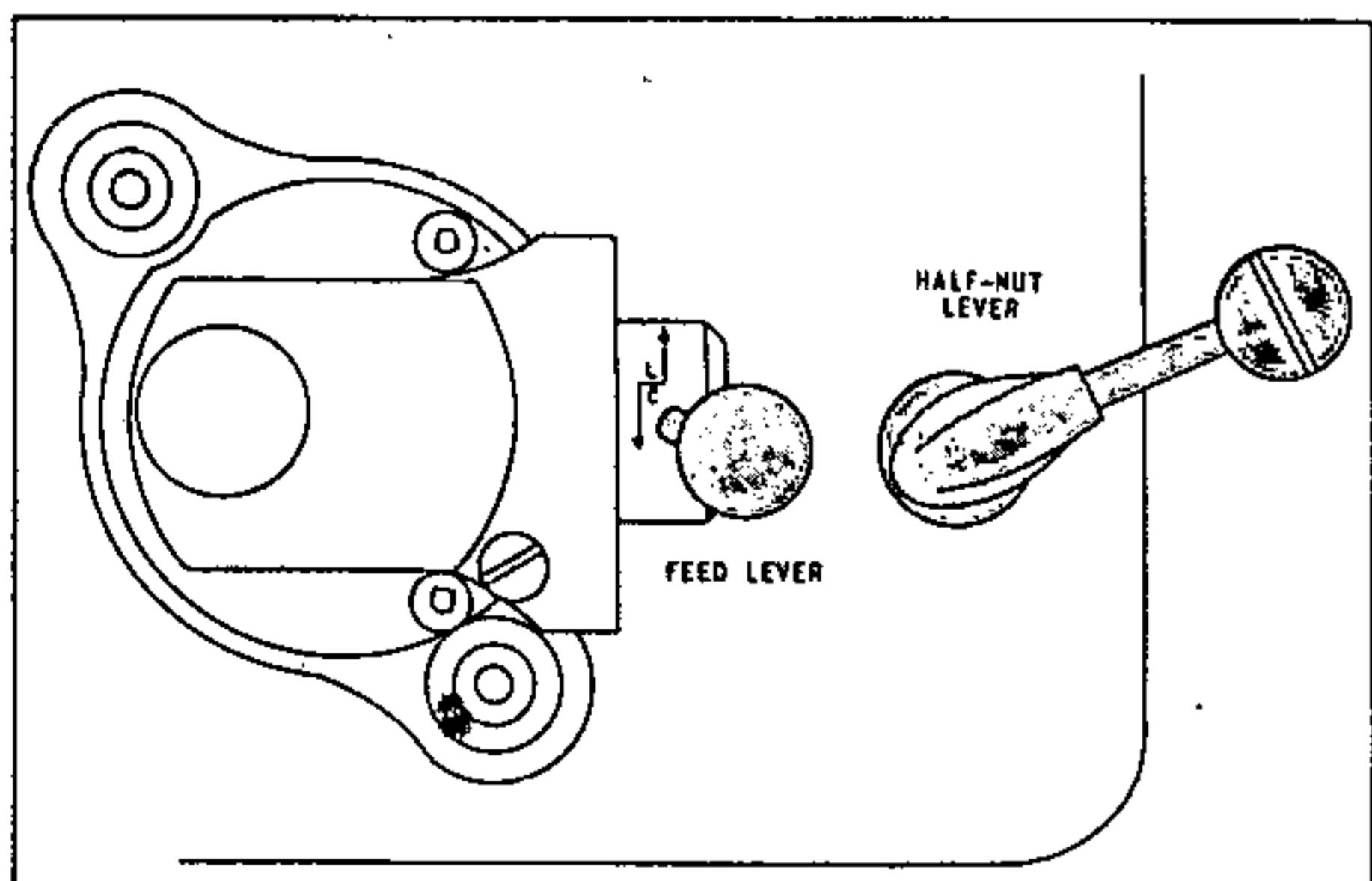
The carriage lock screw is used to lock the carriage to the bed - use it for facing or cut-off operations only.



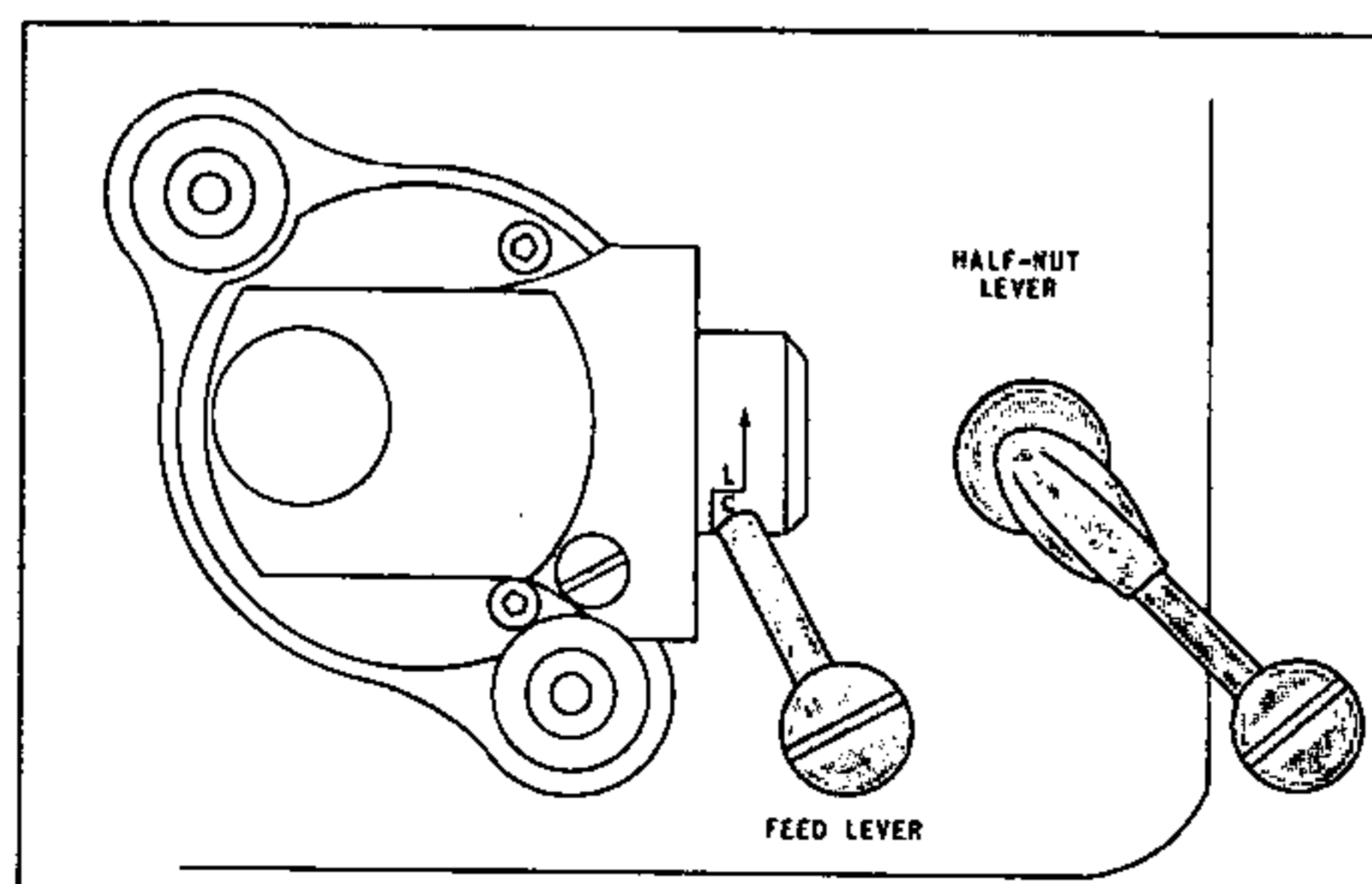
11 Controls on the lathe carriage

IMPORTANT - Use the half-nut lever for threading only - never for feeds. It will prolong the life of the lead screw, and preserve its accuracy for threading operations.

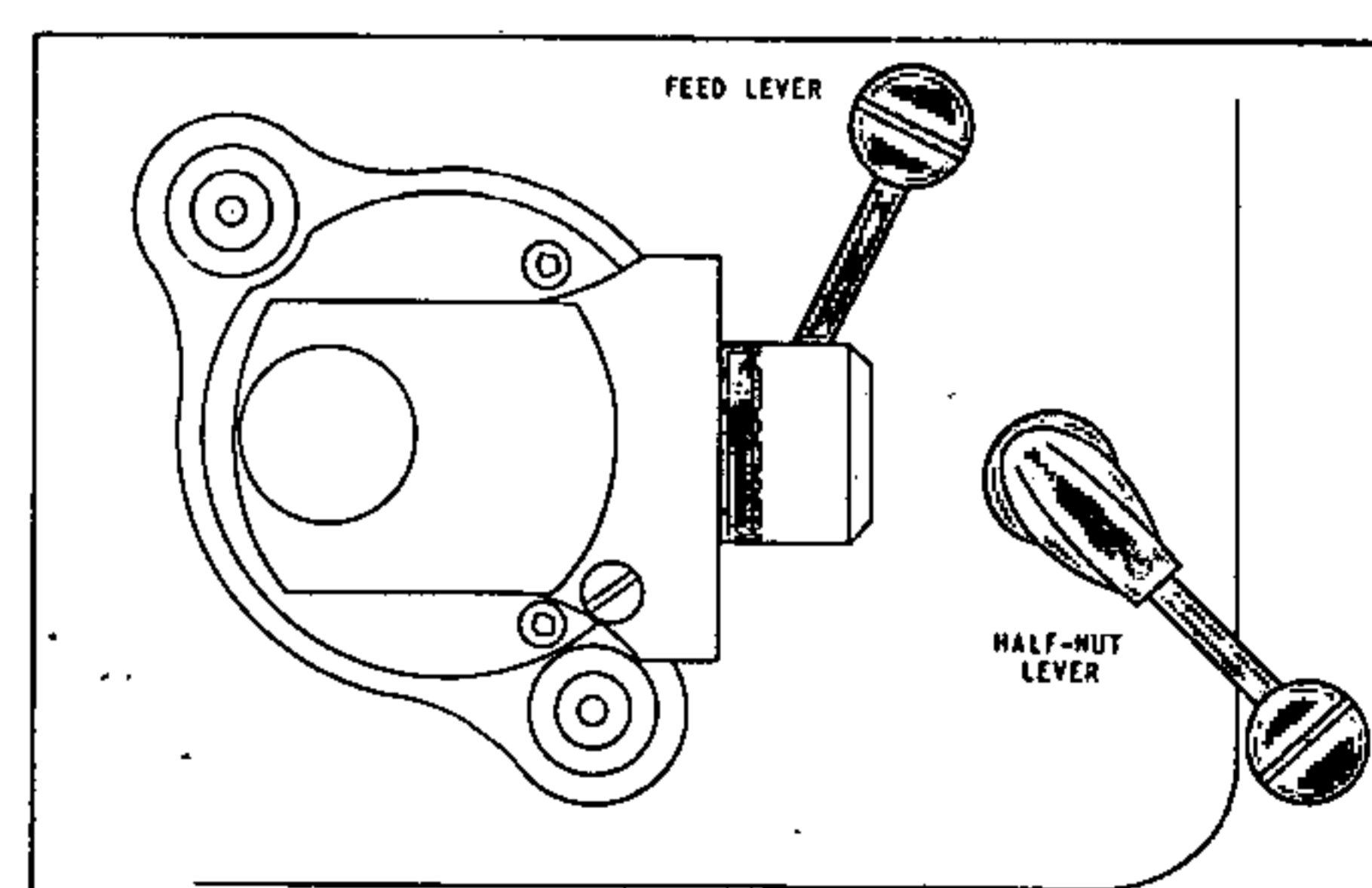
The power feed lever controls the operation of both power longitudinal and power cross feeds - the half-nut lever engages the half-nuts with the lead screw. When one of these levers is en-



12 **THREADING** - Place feed lever at the horizontal position. Shift half-nut lever upwards to engage half-nuts with lead screw. Use the half-nuts for threading only - never for feeds.



13 **POWER CROSS FEED** - To engage power cross feed, place half-nut lever in the down position - the feed handle cannot be moved until half-nut lever is in this position. Move feed handle downward to the vertical position.



14 **LONGITUDINAL FEED** - To engage longitudinal feed, first make sure half-nut lever is in the down position. Shift feed lever sideways to the right about 1/4", and then upwards to the vertical position.

gaged, the other is locked and cannot be moved - DO NOT FORCE. The positions of the levers to obtain a thread or feed are illustrated in Figures 12, 13 and 14. The direction of feed is controlled by the reverse lever on front of headstock.

SELECTION OF THREADS AND FEEDS

Study the chart on the gear box - it lists the threads and feeds available and indicates the position of the controls for thread or feed desired. Figure 15 illustrates and names these controls.

NOTE: The gear chart shows only the carriage longitudinal feeds that are commonly used. Many other feeds can be obtained - these are shown in the table, Figure 16, along with the cross feeds available. To obtain one of these longitudinal or cross feeds, set up the lathe gear box for the equivalent thread as shown in the table. FOR EXAMPLE - To obtain a carriage longitudinal feed of .0033", set up the controls to cut 44 threads.

SEQUENCE OF ENGAGING CONTROLS FOR THREADS OR FEEDS ARE OUTLINED BELOW:

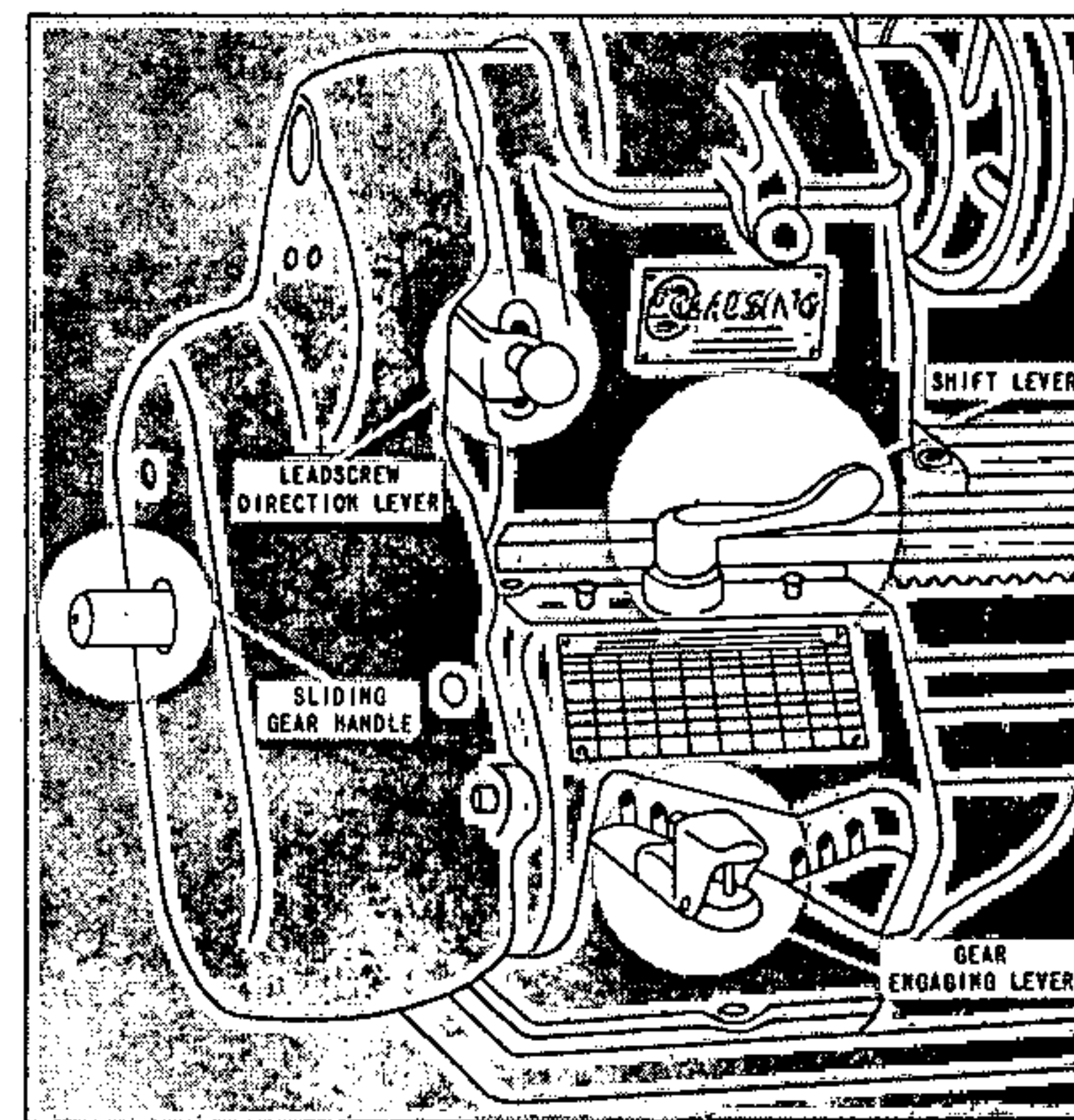
1. Disengage the carriage feed controls.
3. Move sliding gear handle "In" or "Out" as indicated on chart for thread or feed desired.
3. Release and lower gear engaging lever.
4. To make sure gears in the quick-change gear box will engage, first start motor. Now move gear engaging lever to the slot directly below thread or feed desired. Raise lever and snap plunger into position.
5. Next, check the chart for position of the shift lever. There are three positions - center, left and right. Shift the lever to position indicated on chart. (It may take a few seconds for the dog gears to engage if lathe is in back gear or turning slowly.) Lathe is now ready to cut thread or feed.

The threading dial is used in thread cutting and indicates the proper time to engage the half-nut lever so that

the cutting tool will enter the same groove of the thread for each cut.

When cutting even numbered threads engage the half-nut lever at any one of the markings on the threading dial for each cut of the thread. When cutting odd numbered threads, engage the half-nut lever for the first cut and all successive cuts at either the 1 or 2 positions on the dial. When cutting half-numbered threads, engage the half-nut lever at the same mark on the threading dial for each cut of the thread.

15 Name and location of controls used to obtain a thread or feed.



CARRIAGE FEED CHART

Thds. Per Inch	Carriage Long Feed	Thds. Per Inch	Thds. Per Inch	Carriage Long Feed	Thds. Per Inch
4	.0367	.00917	32	.0046	.0011
4.5	.0326	.0081	36	.0041	.0010
5	.0293	.0073	40	.0036	.0009
5.5	.0267	.0066	44	.0033	.0008
5.75	.0255	.0063	46	.0031	.00079
6	.0244	.0061	48	.0030	.00076
6.5	.0226	.0056	52	.0028	.00070
7	.0209	.0052	56	.0026	.00065
8	.0183	.0045	64	.0022	.00057
9	.0163	.0040	72	.0020	.00052
10	.0147	.0036	80	.0018	.00045
11	.0134	.0033	88	.0017	.00041
11.5	.0127	.0032	92	.0016	.00039
12	.0122	.0030	96	.0015	.00038
13	.0113	.0028	104	.0014	.00035
14	.0105	.0026	112	.0013	.000325
16	.0092	.0023	128	.0011	.00027
18	.0081	.0020	144	.00094	.000235
20	.0073	.0018	160	.00092	.000225
22	.0066	.00166	176	.00083	.00020
23	.0063	.00159	184	.00079	.000197
24	.0061	.00152	192	.00076	.000190
26	.0056	.0014	208	.00070	.000175
28	.0052	.0013	224	.00065	.00016

16 Chart listing available threads per inch with equivalent carriage, longitudinal and power cross feeds.

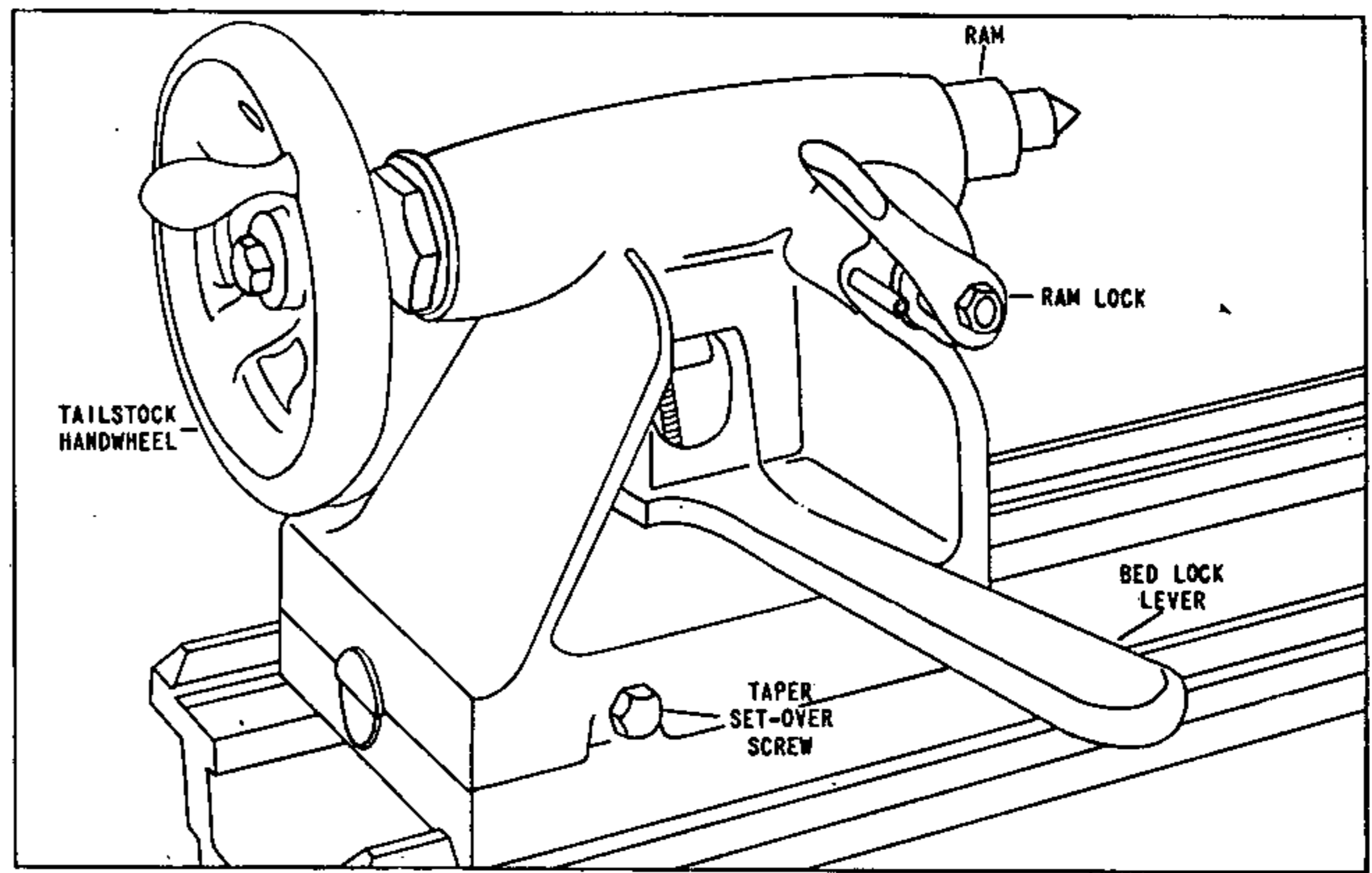
TAILSTOCK, See Figure 17

Tailstock is securely locked to the bed with the lever-controlled bed lock located on the rear of the tailstock. Graduations on the ram simplify accurate boring and drilling. Ram is locked in place with the lock handle located on top of tailstock. Before inserting the center in the tailstock ram, clean both tapers thoroughly with a dry cloth.

Tailstock can be set over 1" for taper turning by first loosening the bed clamp and then adjusting the screws on front and back of tailstock base.

MOUNTING CHUCKS AND FACE PLATES

1. Carefully wipe face of chuck hub and threads (or face plate) clean of dirt and chips.
2. Carefully wipe spindle threads and shoulder clean of any dirt and chips.
3. Oil lathe spindle threads with a light film of clean oil - chuck or face plate will thread more freely on spindle.
4. Tighten belt, or place lathe in back gear to hold spindle firmly in position.
5. Screw chuck or face plate on spindle, turning it rapidly as it nears spindle shoulder so it will seat firmly against spindle shoulder face. Make



17 Controls on the lathe tailstock.

sure threads are not crossed - chuck or face plate should thread on spindle easily.

TO REMOVE CHUCK OR FACE PLATE

1. To remove chuck, rotate chuck until wrench hole is on top. Lock spindle by engaging back gears without pulling out lock pin. Now place chuck wrench in chuck and pull. If chuck doesn't release, tap BASE OF WRENCH lightly with a mallet. Remove chuck carefully so as not to damage spindle threads. Disengage back gears.
2. To remove face plate, lock spindle by engaging back gears without pulling out lock pin, tap slot in face plate with a lead or brass hammer in a counterclockwise direction. Remove face plate carefully so as not to damage spindle threads. Disengage back-gears.

CAUTION - Do not turn power on with the spindle locked - never remove chuck or face plate while lathe is running.

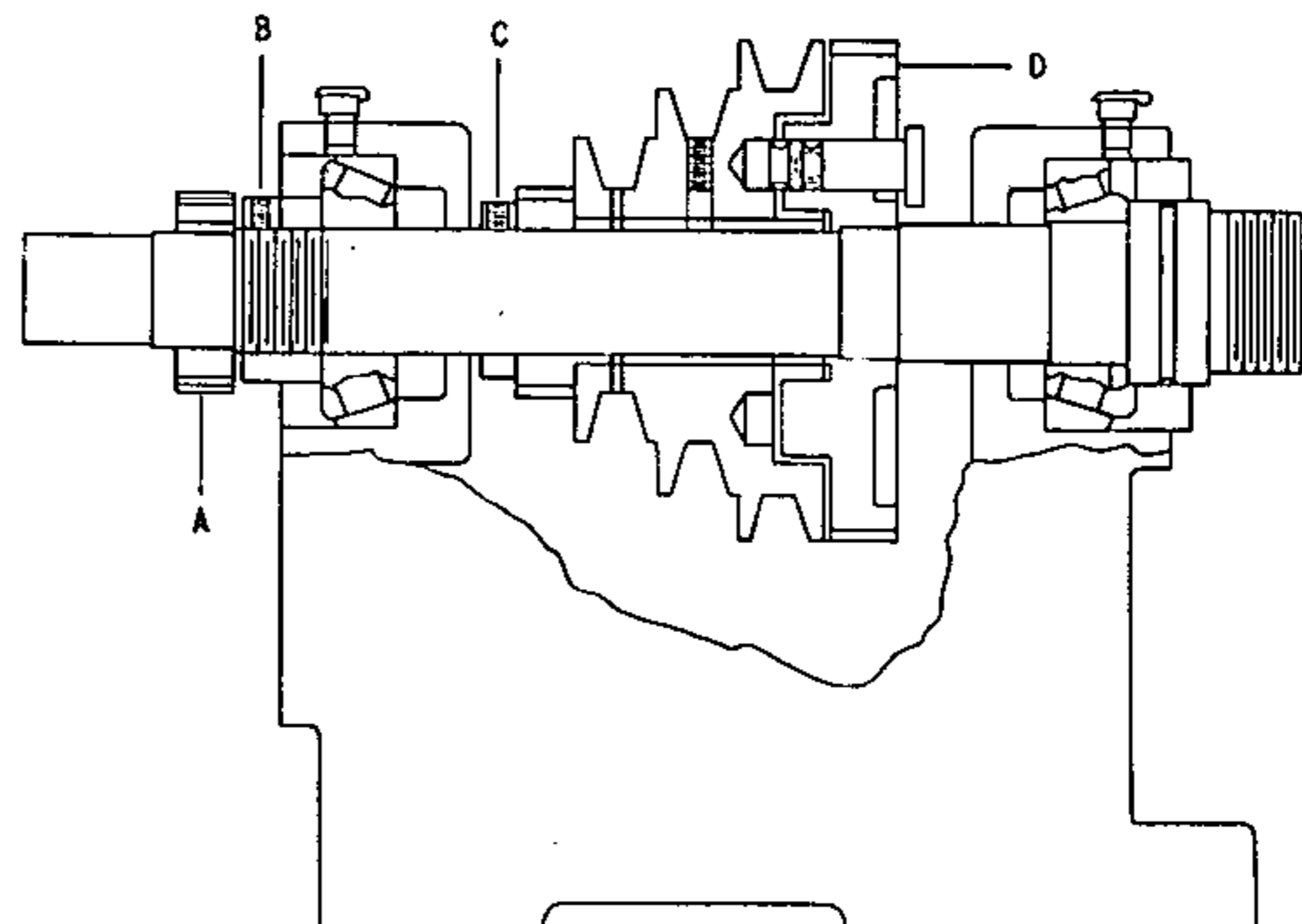
Adjustments

SPINDLE BEARING ADJUSTMENT

If the spindle turns too freely, or if play is noticeable when spindle is pushed back and forth, adjust the bearings as follows:

1. Loosen lock screw in take-up collar "B" (Figure 18) and tighten collar until all spindle play has been removed.
2. To determine correct bearing preload, give spindle pulley a sharp spin with your hand - pulley should rotate about one turn. If it doesn't, adjust collar B, than recheck.

CAUTION - Do not tighten collar too tightly - spindle should rotate freely.



18 Spindle bearing adjustment locations.

BELT ADJUSTMENT

SPINDLE BELT - This belt can be easily adjusted with the four countershaft adjusting screws. Belt should be just tight enough to prevent its slipping when hood is lowered.

IMPORTANT - Do not tighten the four countershaft adjusting screws too tightly - it may compress the outer bearing sleeve and distort the bearing, causing permanent damage. Turn screws up until they are finger tight, then about 1/8" turn more, and lock.

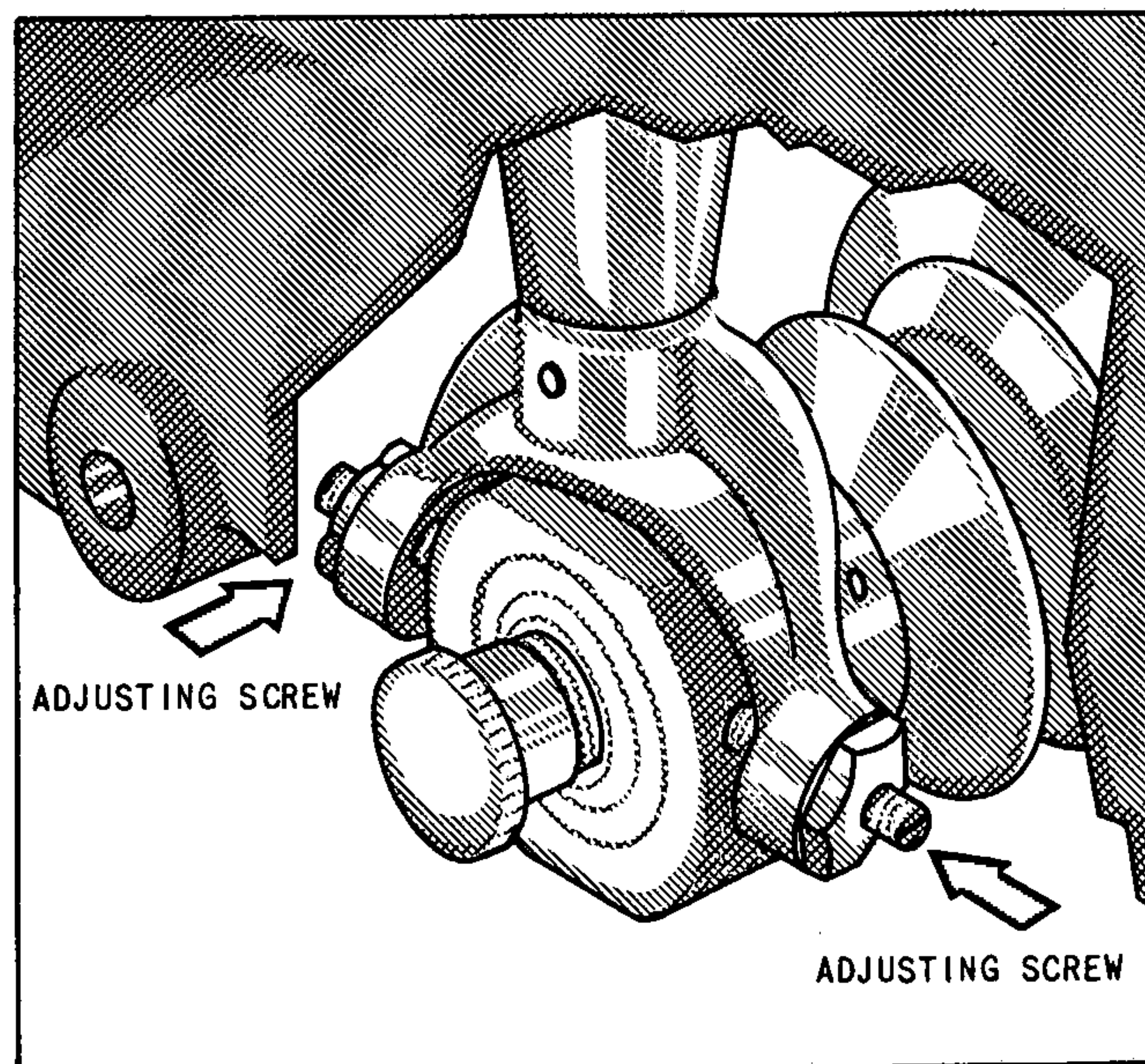
MOTOR BELT - Correct motor belt tension is obtained by adjusting the spring tension nut located on underneath side of motor base - see Figure 7. Belt should be just tight enough to prevent slipping.

HOW TO REMOVE HEADSTOCK SPINDLE, See Figure 18

1. Remove gear train guard.
2. Lower the gear quadrant by loosening the lock screw at bottom of quadrant and remove screw that holds top end of quadrant to headstock.
3. Slide feed reverse lever assembly from headstock to prevent possible damage to the gears when spindle is being removed.
4. Remove spindle gear "A" from spindle by tapping gear with a block of wood and hammer until there's enough clearance between gear and take-up collar to use a pulley puller to remove gear.
5. Remove key from spindle with pliers.
6. Loosen lock screw in take-up collar "B" and remove collar by turning counterclockwise.
7. Loosen set screw in collar "C".
8. Wedge two pieces of wood between headstock and large spindle gear "D" on both sides of spindle. Then, with a wood hammer drive spindle out of the headstock. Remove the rear spindle bearing cone when it is released from the spindle.
9. Remove belt from countershaft by

loosening the two countershaft adjusting screws on right end of countershaft spindle - see Figure 19.

Complete countershaft can be removed by loosening all four countershaft adjusting screws and the lock screw that holds clutch lever in shift yoke.



19 Loosen the two adjusting screws to remove belt from countershaft.

RE-ASSEMBLY

1. Lightly file all burrs, if any, from the spindle.
2. Clean all parts thoroughly, including the bearings.
3. Place new belt, or bearings, in position and replace spindle. **CAUTION** - Use the palm of the hand as much as possible when replacing the spindle - it will avoid damaging the precision surfaces of the spindle nose. Slide large spindle gear against the spindle shoulder. Then slide on the pulley until pulley bushing is against the gear.
4. Tighten collar "C" against small gear with just enough clearance to permit pulley to turn freely but with no play.
5. Carefully tap rear spindle bearing cone in place using a brass rod and hammer.
6. Replace take-up collar "B" and tighten until all play has been removed from the spindle - check by tapping spindle back and forth with the hand. Do not tighten collar too tightly - spindle should rotate freely.

To determine correct bearing preload, give spindle pulley a sharp spin with your hand - pulley should rotate about one turn. If it doesn't, adjust collar B, than recheck.

7. Replace Woodruff key and spindle gear.

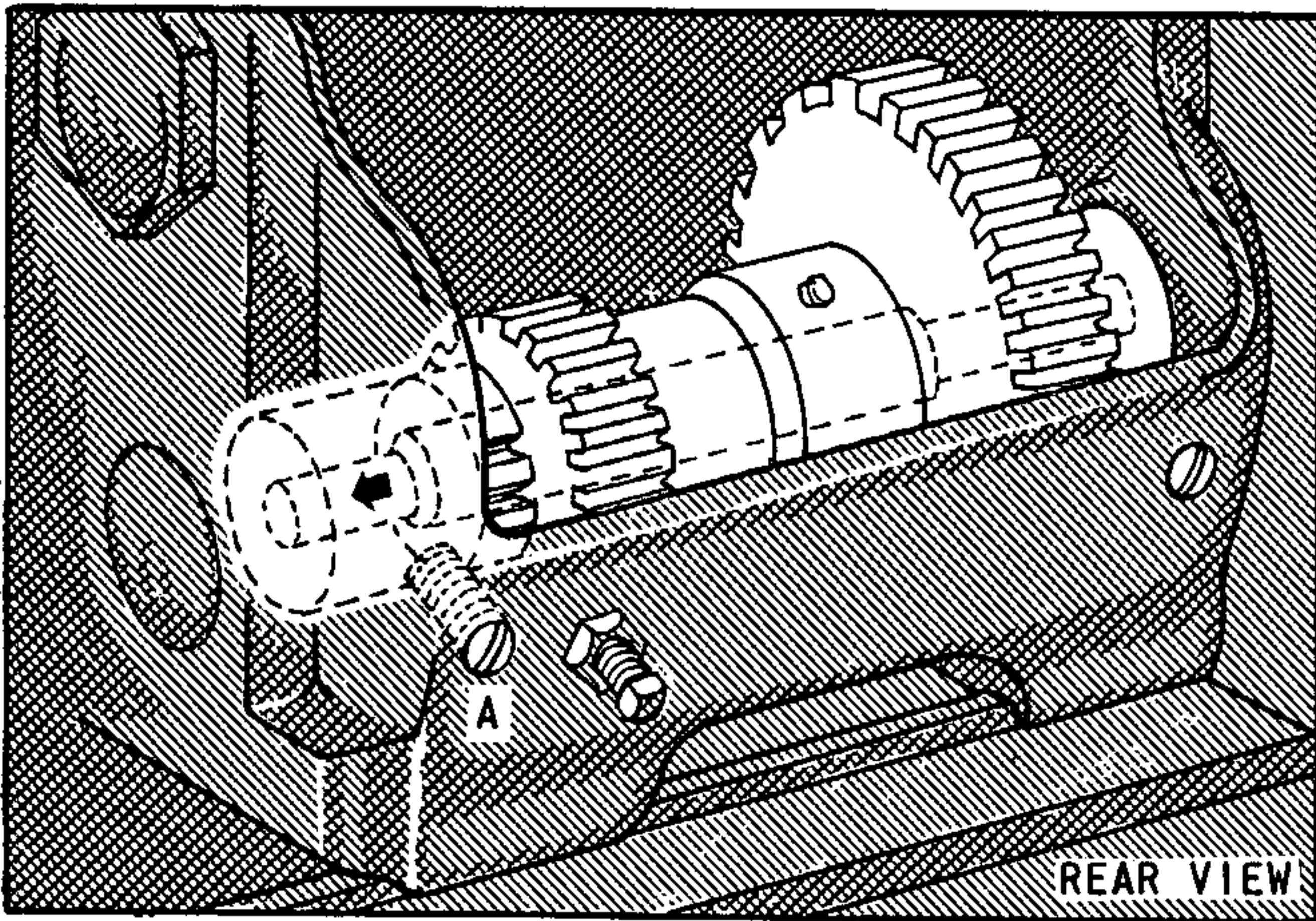
HOW TO REMOVE BACK-GEARS

1. Remove headstock spindle - see instructions "HOW TO REMOVE HEADSTOCK SPINDLE", page 11.

2. Loosen lock screw "A", see Fig. 20.

3. Now drive out back-gear shaft in the direction indicated by the arrow, Figure 20.

4. Remove back-gears from the headstock.



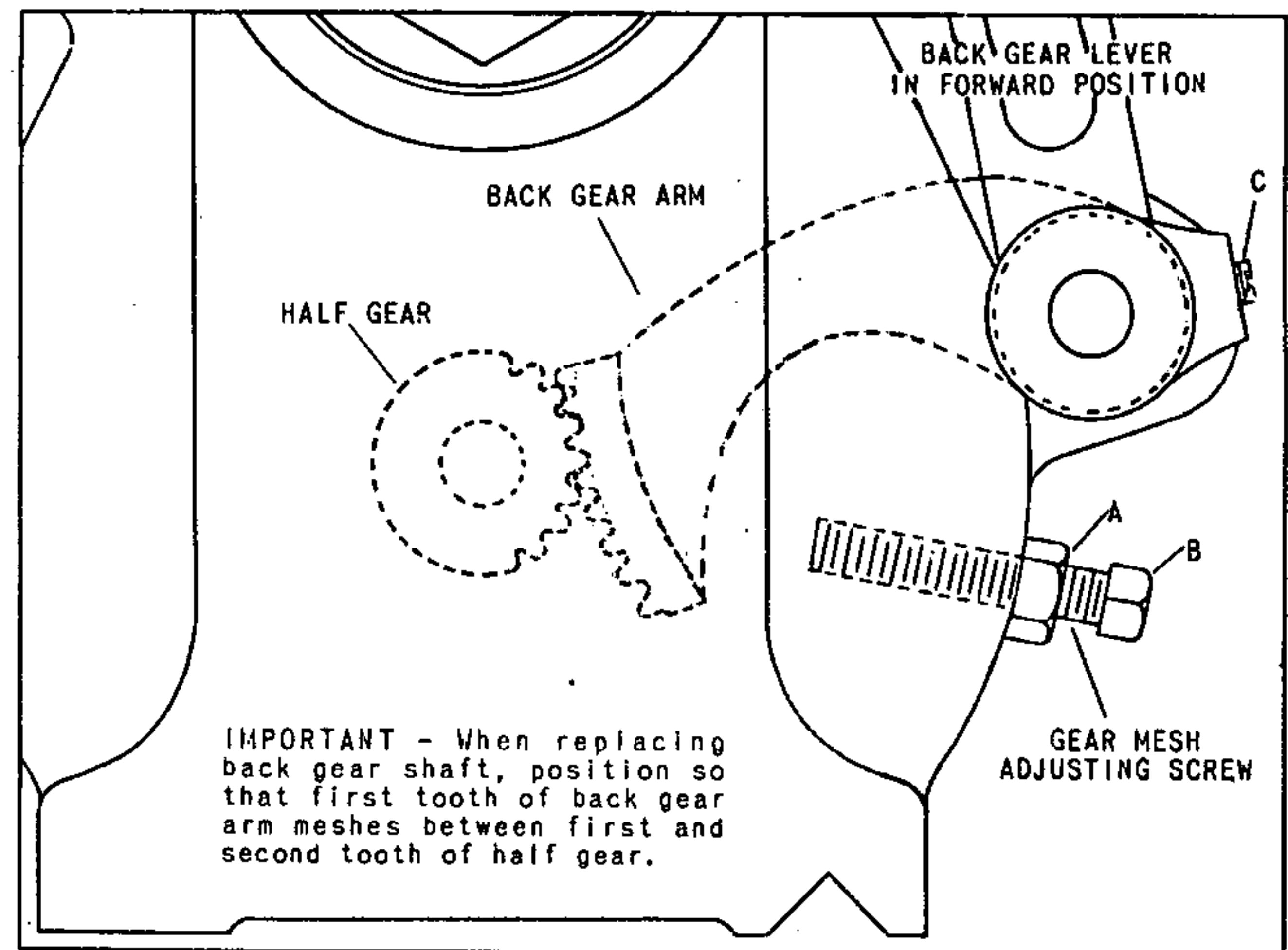
20 Adjusting and removing spindle back-gears.

RE-ASSEMBLING THE BACK-GEARS

1. Move back-gear lever to the forward or back-gear drive position, see Figure 21.

2. Place back-gears in headstock and replace back-gear shaft. The teeth of the half-gear on the shaft must slip into mesh with the teeth on the back-gear arm in only one position - see Figure 21. This is necessary so that the full travel of the back-gears is obtained.

3. Replace sleeve and plug. Lock sleeve in position with lock screw "A", Figure 20.



21 Correct mesh of back-gear arm with half-gear and location of adjustment nuts.

BACK-GEAR ADJUSTMENTS

TO ADJUST GEAR MESH, or gear play, between back-gears and spindle-gears; first place back-gear lever in the forward position. Then loosen lock nut "A", Figure 21, and turn adjusting screw "B" until gears properly mesh. Tighten lock nut "A".

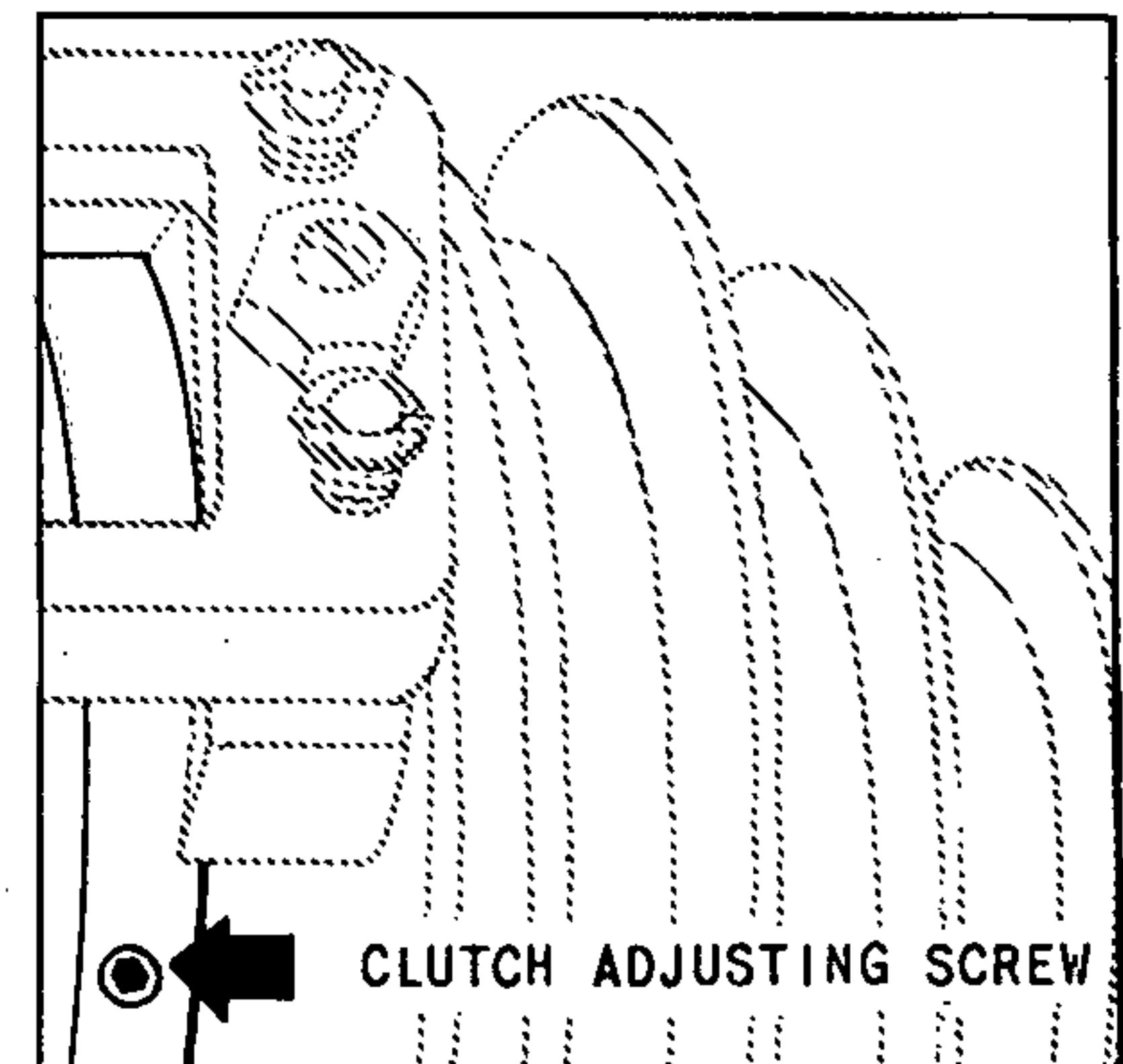
TO PREVENT GEARS FROM JUMPING OUT OF MESH tighten screw "C", see Figure 21.

CLUTCH COUNTERSHAFT ADJUSTMENT

If the countershaft clutch slips when the spindle drive is engaged, adjust as follows:

First remove the lock screw that's just ahead of the clutch adjusting screw - see Figure 22. Then tighten clutch adjusting screw just enough to prevent slippage. DO NOT tighten screw too tight - spindle drive will not disengage when clutch lever is moved to the right if screw is too tight.

22 Tighten clutch-adjusting screw if countershaft clutch slips when spindle drive is engaged.

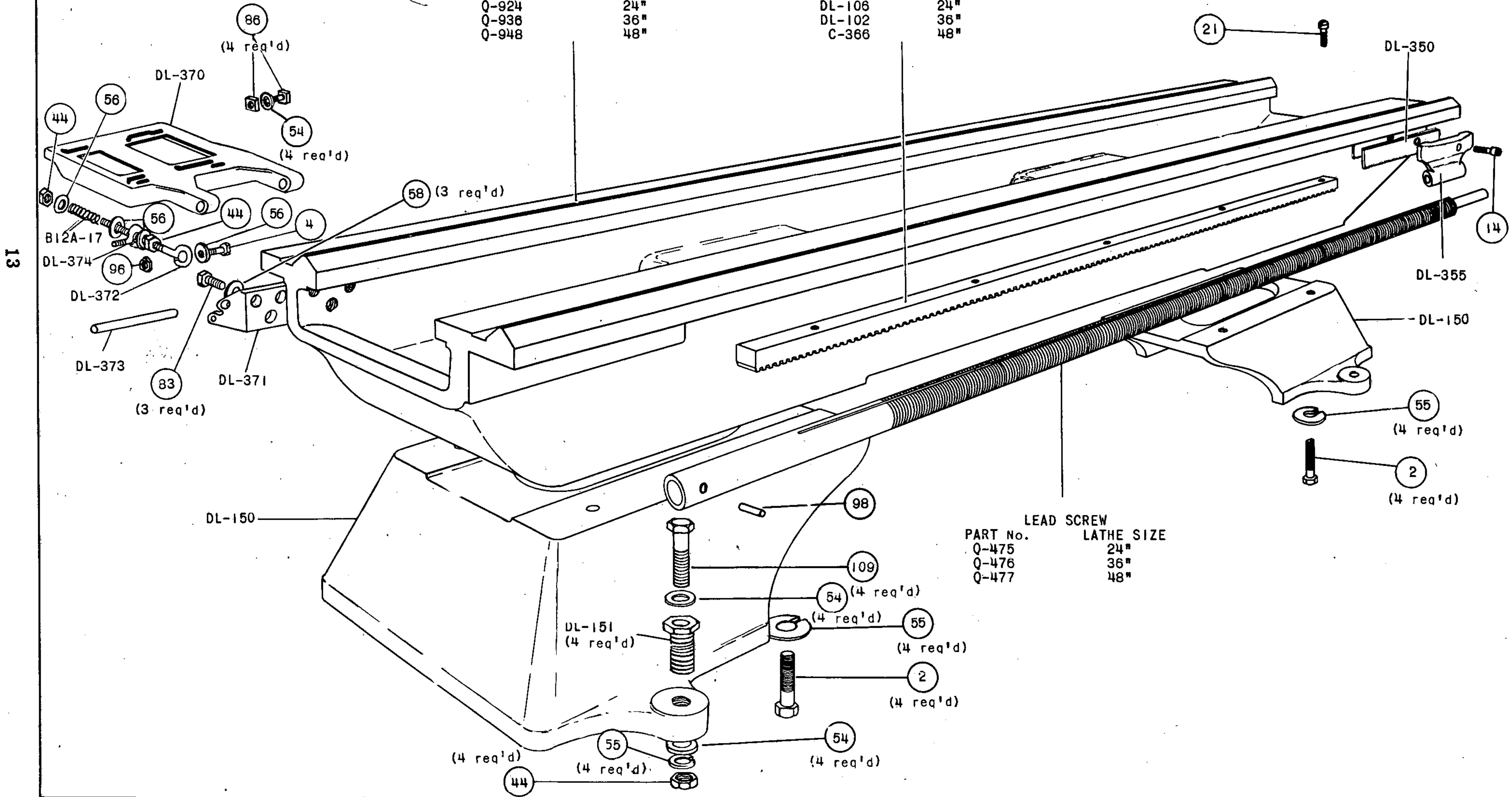


BED AND LEADSCREW ASSEMBLY

LATHE BED	
PART No.	LATHE SIZE
Q-924	24"
Q-936	36"
Q-948	48"

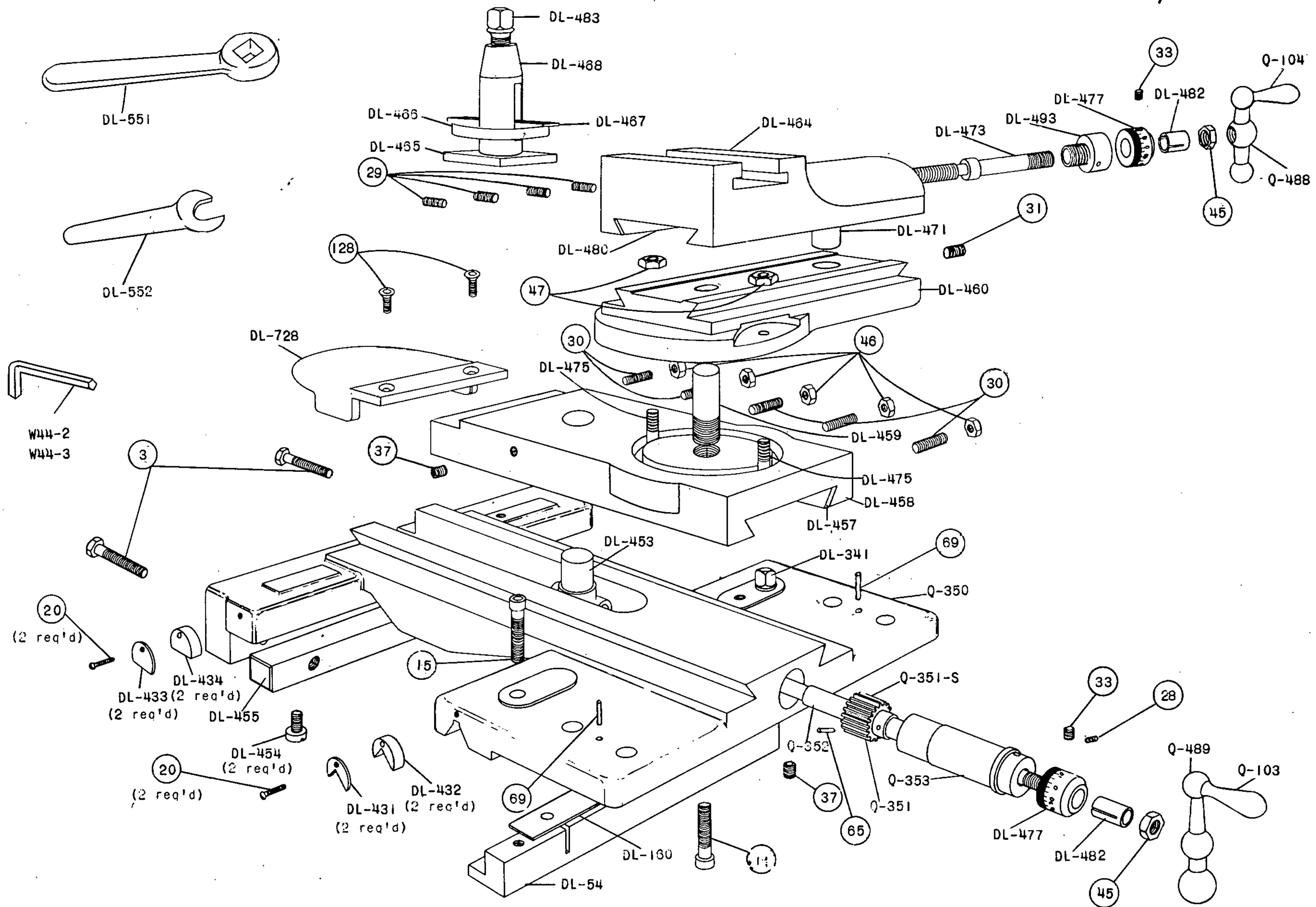
RACK	
PART No.	LATHE SIZE
DL-106	24"
DL-102	36"
C-366	48"

LEAD SCREW	
PART No.	LATHE SIZE
Q-475	24"
Q-476	36"
Q-477	48"



13

CARRIAGE SADDLE AND COMPOUND ASSEMBLY



NUMERICAL PARTS LIST

For No. 4800 SERIES 12-inch LATHES

ORDERING INFORMATION

Order all parts by PART NUMBER and NAME. Standard parts (coded) beginning on Page 24 should be purchased locally. Parts prices will be furnished on request. We reserve the right to make changes in design and specifications without notice.

PART NUMBER	DESCRIPTION	PAGE	PART NUMBER	DESCRIPTION	PAGE
9 SERIES			DL-150	Foot.....	13
9-88	No. 2 M.T. Center.....	14, 20	DL-151	Jack Screw.....	13
9-98	Countershaft Collar.....	17	DL-160	Carriage Shim.....	18
9-108	Countershaft Bearing Race	17	DL-203	Bushing.....	14
9-109	Roller Bearing.....	17	DL-205	32T Bronze Gear.....	14
9-111	Felt Washer.....	17	DL-210	Headstock Clamp (Rear)...	14
9-206	Grease Cup.....	17	DL-217	Knob (purchase DL-221-S).	14
18 SERIES			DL-220	78T Bull Gear.....	14
18-1073	Oil Level Window.....	19	DL-221-S	Lock Pin with Knob.....	14
50 SERIES			DL-229	Headstock Spindle.....	14
50-18	Ball Bearing.....	16	DL-230	Take-up Nut.....	14
B SERIES			DL-231-S	Bearing.....	14
B12A-17	Spring.....	13	DL-232-S	Bearing.....	14
BD SERIES			DL-233	Spacing Collar.....	14
BD1-24	Collar.....	17	DL-237	Reducing Sleeve.....	14
BD3B-10	Bumper.....	17	DL-239	28T Headstock Gear.....	14, 15
C SERIES			DL-240	Expanding Plug.....	14
C-281	Shifter Lever.....	19	DL-241	Dust Cover (Left).....	14
C-300	Retaining Ring.....	19	DL-242	Dust Cover (Right).....	14
C-300A	Retaining Ring.....	19	DL-252	Hood Bolt Sleeve.....	17
C-320	Bushing.....	19	DL-285	Back Gear Lever.....	14
C-322	Knob.....	19	DL-286	Back Gear Shift.....	14
C-331	Headstock Clamp (Front)...	14	DL-286-S	Back Gear Arm with Shaft.	14
C-332B	Spring.....		DL-287	Arm Shaft (purchase	
C-363A	Oil Cup.....	14, 15, 16, 19		DL-286-S).....	14
C-364-S	Screw w/Ball & Spring....	19	DL-288	Shaft Sleeve.....	14
C-365	Dog Gear Shaft.....	19	DL-291	Eccentric Shaft.....	14
C-366	48" Rack.....	13	DL-292	Shaft Bushing.....	14
C-389	Pipe Plug.....	19	DL-293	Bushing Screw.....	14
DL SERIES			DL-294	Quill (purchase DL-294SS)	14
DL-54	Carriage Bearing Plate...	18	DL-295	Bushing.....	14
DL-102	36" Rack.....	13	DL-296	Small Back Gear	
DL-106	24" Rack.....	13		(purchase DL-294-SS)....	14
			DL-297	78T Back Gear	
				(purchase DL-294-SS)....	14
			DL-299	Eccentric Shaft Gear.....	14
			DL-300	Headstock.....	14
			DL-310	Spring.....	14
			DL-318	Spring.....	14
			DL-326-S	27T Idler Gear.....	14, 15
			DL-327	Stud Gear Shaft.....	14, 15
			DL-328	Key.....	14, 15

PART NUMBER	DESCRIPTION	PAGE
DL-329	Reverse Bracket.....	14, 15
DL-331	28T Reverse Gear.....	14, 15
DL-333	Idler Gear Stud.....	14, 15
DL-334	Oilite Bushing.....	14
DL-335	Latch Handle.....	14, 15
DL-336	Plunger.....	14
DL-337	Reverse Bracket Barrel...	14
DL-341	Lock Bolt.....	18
DL-350	Shim.....	13
DL-355	Bracket Tail.....	13
DL-370	Motor Base.....	13
DL-371	Bracket.....	13
DL-372	Tension Bolt.....	13
DL-373	Hinge Pin.....	13
DL-374	Eye Bolt.....	13
DL-377-S	Latch Stud with Knob.....	17
DL-378	Hood Latch.....	14
DL-379	Hood Latch Spring.....	17
DL-380	Knob (purchase DL-377-S).	17
DL-421	Washer.....	16, 19
DL-426	Split Nut Gib.....	19
DL-431	Felt Wiper Clip.....	18, 20
DL-432	Felt Wiper.....	18, 20
DL-433	Felt Wiper Clip.....	18, 20
DL-434	Felt Wiper.....	18, 20
DL-438	Scroll.....	19
DL-453	Cross Slide Screw Nut....	18
DL-454	Special Cap Screw.....	18
DL-455	Rear Gib.....	18
DL-457	Cross Slide Gib.....	18
DL-458	Cross Slide.....	18
DL-459	Cross Slide Swivel Post..	18
DL-460	Compound Swivel.....	18
DL-464	Upper Compound Slide.....	18
DL-465	Tool Post Clamp.....	18
DL-466	Tool Post Ring.....	18
DL-467	Tool Post Rocker.....	18
DL-468	Tool Post.....	18
DL-471	Compound Slide Nut.....	18
DL-473	Compound Screw.....	18
DL-475	Compound Bolt.....	18
DL-477	Micrometer Dial.....	18
DL-480	Compound Slide Gib.....	18
DL-482	Split Bushing.....	18
DL-483	Tool Post Screw.....	18
DL-493	Bushing.....	18
DL-501	Tailstock Base.....	20
DL-502	Off-Set Nut.....	20
DL-510	Wrench.....	20
DL-511	Bed Clamp Nut.....	20
DL-512	Bed Clamp.....	20
DL-514	Wrench Nut.....	20
DL-515	Wrench Pin.....	20
DL-517	Tailstock.....	20
DL-518	Tailstick Bearing.....	20
DL-520	Spindle Key	20
DL-521	Lock Bolt.....	20

PART NUMBER	DESCRIPTION	PAGE
DL-522	Spindle Lever.....	20
DL-523	Tailstock Spindle.....	20
DL-524	Collar.....	20
DL-525	Tailstock Screw.....	20
DL-525-S	Screw w/Collar.....	20
DL-526	Lock Sleeve.....	20
DL-527	Lock Sleeve.....	20
DL-528	Clamp Bolt.....	20
DL-529	Off-Set Bolt.....	20
DL-530	Tapered Key.....	20
DL-551	Tool Post Wrench.....	18
DL-552	Wrench.....	18
DL-555	6" Face Plate.....	14
DL-585	32T Gear.....	16
DL-625	Thread Dial Body.....	19
DL-628	Thread Dial Gear.....	19
DL-630-S	Thread Dial and Shaft....	19
DL-645	Collar.....	17
DL-658	Ball.....	17
DL-666	Steel Ball.....	14
DL-680	Shift Handle.....	17
DL-681	Clutch Pusher.....	17
DL-682	Slip Ring (Upper).....	17
DL-683	Slip Ring (Lower).....	17
DL-686	Key.....	17
DL-728	Rear Apron.....	18
DL-802	Spindle Pulley.....	14
DL-807	Hood Bracket.....	14
DL-811	Countershaft Drive Pulley	17
DL-812	Countershaft Pulley Key..	17
DL-844	Clutch Countershaft Pulley	17
DL-849	Hood.....	17
DL-854	Hanger Stud.....	17
DL-855	Countershaft Hanger.....	17
DL-858	Spindle Belt.....	14
DL-859	Countershaft Pulley Collar	17
DL-872	Clutch Adjuster.....	17
DL-874	Clutch Hub.....	17
DL-875-S	Clutch Ring Assembly.....	17
DL-877	Clutch Expander w/Pin....	17
DL-882	Motor Pulley, 3/4" bore..	17
DL-887	Countershaft Spindle.....	17
DL-888	Clutch Push Arm.....	17
DL-889	Key.....	17
DL-891-S	Brake Shoe Assembly.....	17
DL-892	Brake Shoe Pin.....	17
DL-895	Roller Bearing.....	17

L SERIES

L2-21	Oiler.....	14
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O SERIES

O-264	Belt 1/2" wide x 36" long	17
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OQ SERIES

OQ-217A	Split Nut Lever.....	19
OQ-231	Dowel Pin.....	19

PART NUMBER	DESCRIPTION	PAGE	PART NUMBER	DESCRIPTION	PAGE
Q SERIES					
Q-23	Handwheel.....	19, 20	Q-424	Clutch Shaft (purchase	
Q-103	Handle.....	18		Q-426-S).....	16
Q-104	Handle.....	18	Q-426-S	Shifter Gear with Shaft..	16
Q-294	Lock Arm Shaft.....	19	Q-427	Clutch Slide.....	16
Q-295	Gasket.....	19	Q-428	Shifter Bar.....	16
Q-296	Cover Plate.....	19	Q-436	Bearing Cover.....	16
Q-299	Apron Housing.....	19	Q-437	Bearing Cover.....	16
Q-301	Idler Gear.....	19	Q-441	Key.....	16
Q-302	Idler Gear Shaft.....	19	Q-445	Gear Chart.....	16
Q-309	Rack Pinion.....	19	Q-446	Bearing Cover.....	16
Q-310	Handwheel Shaft Pinion...	19	Q-447	Adj. Washer, 1/64" thick.	16
Q-312	44T Pinion Gear.....	19	Q-448	Adj. Washer, 1/32" thick.	16
Q-313	Sliding Lock Arm.....	19	Q-449	Adj. Washer, 1/16" thick.	16
Q-314	50T Dog Gear.....	19	Q-451	Key.....	16
Q-316	Scroll Shaft Cam.....	19	Q-452	Bushing.....	16
Q-318	Dog Gear Shift Lever.....	16	Q-454	Collar.....	16
Q-323	Idler Shaft Collar.....	19	Q-455	Index Spring.....	15, 16
Q-328	Scroll Shaft.....	19	Q-456	5/16" Steel Ball.....	15, 16
Q-329	Shaft Collar.....	16, 19	Q-458	24T Gear.....	16
Q-330	50T Sliding Gear.....	19	Q-460	Paddle Spring.....	16
Q-334	20T Dog Gear.....	19	Q-461	Thumb Paddle.....	16
Q-335	Lock Arm Spring.....	19	Q-462	Paddle Plunger.....	16
Q-341	Feed Control Sleeve.....	19	Q-464	Paddle Pin.....	16
Q-343	18T Pinion.....	19	Q-465	Bronze Bushing.....	16
Q-344	Feed Control Index.....	19	Q-466	32T Gear.....	16
Q-347-A	Bearing.....	19	Q-467	16T Gear.....	16
Q-348-A	Dog Gear Bushing.....	19	Q-475	24" Leadscrew.....	13
Q-349	Pin.....	19	Q-476	36" Leadscrew.....	13
Q-350	Carriage Saddle.....	18	Q-477	48" Leadscrew.....	13
Q-351	14T Cross Slide Gear.....	18	Q-480	Gear Box.....	16
Q-351-S	Cross Slide Screw w/Gear.	18	Q-481	16T Gear and Shaft.....	16
Q-352	Cross Slide Screw.....	18	Q-482	Tumbler Shaft.....	16
Q-353	Bushing.....	18	Q-484	Ball Bearing w/Sleeve....	16
Q-370	Feed Control Housing.....	19	Q-485	Shim.....	16
Q-375	Expansion Plug.....	19	Q-486	Spacer.....	16
Q-380	Thrust Washer, Bronze....	19	Q-488	Ball Crank w/Handle.....	18
Q-382	Thrust Washer, Steel.....	19	Q-489	Ball Crank w/Handle.....	18
Q-383	Thrust Washer, Steel.....	19	Q-490	Shim.....	19
Q-384	28T Worm Gear.....	19	Q-501	Tumbler Arm.....	16
Q-385	Dog Gear Stop.....	19	Q-515	24T Gear.....	16
Q-387	Expansion Plug.....	19	Q-516	Tumbler Gear Shaft.....	16
Q-390	Leadscrew Worm.....	19	Q-517	20T Gear.....	16
Q-391-S	Key with Pin.....	19	Q-523	Gear Nut.....	15
Q-392	Bushing.....	19	Q-525	18T Gear.....	14, 15
Q-395	Split Nut (pair).....	19	Q-528	60T Gear.....	15
Q-396	Split Nut Gib Shim.....	19	Q-529	18T Sliding Gear & Handle	15
Q-403	Dog Clutch Shaft.....	16	Q-530	75T Gear.....	15
Q-404	Sleeve.....	16	Q-531	Stud.....	15
Q-408	Key.....	16	Q-532	Stud Bolt.....	15
Q-414	18T Gear.....	16	Q-533	Stop Disc.....	15
Q-415	20T Gear.....	16	Q-535	Quadrant.....	15
Q-416	22T Gear.....	16	Q-536	Gear Cover.....	15
Q-417	23T Gear.....	16	Q-537	Cover Stud.....	15
Q-418	24T Gear.....	16	Q-540-S	30-72T Gear.....	15
Q-419	26T Gear.....	16	Q-543	Hinge Pin.....	16
Q-420	28T Gear.....	16	Q-544	Tumbler Arm Plate.....	16
			Q-924	24" Bed.....	13

PART NUMBER	DESCRIPTION	PAGE	PART NUMBER	DESCRIPTION	PAGE
Q-936	36" Bed.....	13	S8 SERIES		
Q-948	48" Bed.....	13	S8-67	Spring.....	17
S7 SERIES			W SERIES		
S7-105	Wheel Handle.....	19,20	W44-2	Allen Wrench 1/4".....	18
S7-181	Washer.....	20	W44-3	Allen Wrench 5/16".....	18

STANDARD PARTS

CODE NO.	DESCRIPTION	CODE NO.	DESCRIPTION
2	5/16"-18 x 1 1/4" Hex Cap Screw	77	1/4" x 1 3/4" Roll Pin
3	5/16"-18 x 1 1/2" Hex Cap Screw	78	No. 3 Woodruff Key
4	3/8"-16 x 1 1/4" Hex Cap Screw	80	3/8"-16 x 1/2" Hex Cap Screw
7	1/2"-13 x 2" Hex Cap Screw	81	3/8"-16 x 2 1/4" Hex Cap Screw
9	No. 10-24 x 1/2" Allen Cap Screw	82	7/16"-14 x 2" Hex Cap Screw
11	1/4"-20 x 3/4" Allen Cap Screw	83	1/2"-13 x 1 1/4" Hex Cap Screw
12	5/16"-18 x 3/4" Allen Cap Screw	84	3/8"-16 x 1 1/2" Allen Cap Screw
13	5/16"-18 x 7/8" Allen Cap Screw	85	No.10-24 x 3/8" Self Tapping Scr.
14	5/16"-18 x 1" Allen Cap Screw	86	5/16"-18 x 1 3/4" Sq.Hd.Mach.Bolt
15	5/16"-18 x 1 1/4" Allen Cap Screw	91	5/16"-18 x 2 1/4" Sq.Hd.Set Scr.
16	3/8"-16 x 3/4" Allen Cap Screw	92	5/16" -18 x 3/4" Allen Set Scr.
17	3/8"-16 x 1" Allen Cap Screw	93	No.6 x 5/16", Parker-Kalon Dr.Scr.
19	5/16"-18 x 7/8" Fill. Cap Screw	94	1/2"-13 Hex Nut
20	No. 8-32 x 1/2" Self Tapping Scr.	95	5/8"-18 Hex Nut
21	No.10-24 x 1/2" Fill.Hd.Mach.Scr.	96	3/8"-16 Jam Nut
25	1/4"-20 x 1/2" Flat Hd.Mach. Scr.	97	1/8" x 1/2" (T-1) Groov Pin
28	No.10-24 x 3/16" Hdless Set Screw	98	1/8" x 7/8" (T-1) Groov Pin
29	1/4"-20 x 1/2" Hdless Set Screw	99	1/8" x 1 1/4" (T-1) Groov Pin
30	1/4"-20 x 3/4" Hdless Set Screw	100	3/16" x 1/2" (T-4) Groov Pin
31	5/16"-18 x 1/2" Hdless Set Screw	102	1/4" x 5/8" (T-4) Groov Pin
33	1/4"-20 x 1/4" Allen Set Screw	104	3/32" x 1/4" Roll Pin
37	5/16"-18 x 5/16" Allen Set Screw	107	Zerk Fitting 5/16"
39	5/16"-18 x 1/2" Allen Set Screw	108	Lead Shot
40	3/8"-16 x 1/2" Allen Set Screw	109	3/8"-16 x 2 1/2" Hex Cap Screw
41	No. 2 x 3/16" Parker-Kalon Dr.Scr.	110	5/16"-18 x 7/16" Allen Set Scr.
43	5/16"-18 Hex Nut	111	3/16" x 1 1/4" (T-1) Groov Pin
44	3/8"-16 Hex Nut	112	1/4" -20 x 3/8" Allen Set Screw
45	3/8"-24 Hex Nut	113	3/8" -16 x 1 3/4" Hdless Set Screw
46	1/4"-20 Jam Nut	114	1/4" x 1 1/4" (T-2) Groov Pin
47	5/16"-18 Jam Nut	116	1/4" Plain Washer
50	1/2"-13 Jam Nut	117	3/32" x 3/8" (T-1) Groov Pin
51	1/2"-20 Jam Nut	118	3/8"-16 x 1 1/2" Hex Cap Screw
52	5/8"-18 Jam Nut	119	10-24 x 9/16" Flat Hd.Mach. Scr.
54	5/16" Plain Washer	120	10-24 Jam Nut
55	5/16" Lock Washer	121	5/16"-18 x 1 1/4" Hdless Set Screw
56	3/8" Plain Washer	122	10-32 x 3/8" Allen Set Scr., dg.pt.
57	3/8" Lock Washer	123	3/16" x 3/4" (T-1) Groov Pin
58	1/2" Plain Washer	124	3/16" x 5/8" (T-7) Groov Pin
59	5/8" Lock Washer	126	1/8" x 1/2" Roll Pin
61	1/8" x 3/8" (T-1) Groov Pin	127	5/16"-18 x 3/8" Allen Set Screw
64	1/8" x 1/2" (T-6) Groov Pin	128	1/4"-20 x 3/4" Allen Cap Scr. (Flt.Hd.)
65	1/8" x 3/4" (T-5) Groov Pin	129	1/4"-20 x 5/16" Allen Set Scr.
67	1/8" x 1" (T-1) Groov Pin	130	10-32 1/4" Allen Set Scr., flt.pt.
69	1/4" x 3/4" (T-2) Groov Pin		
73	3/8" x 3/4" (T-4) Groov Pin		