

*File 1 1/2 in*

*Long*

OPERATING INSTRUCTIONS  
AND PARTS LIST FOR

# Craftsman Lathe

Model Number 109.20630

This is the Model Number on your lathe. It will be found on a plate located on the tailstock end of the lathe. Always mention the Model Number when communicating with us regarding your lathe or when ordering parts.

This list is valuable. It will assure your being able to obtain proper parts service at all times. We suggest you keep it with other valuable papers.

SEARS, ROEBUCK AND COMPANY

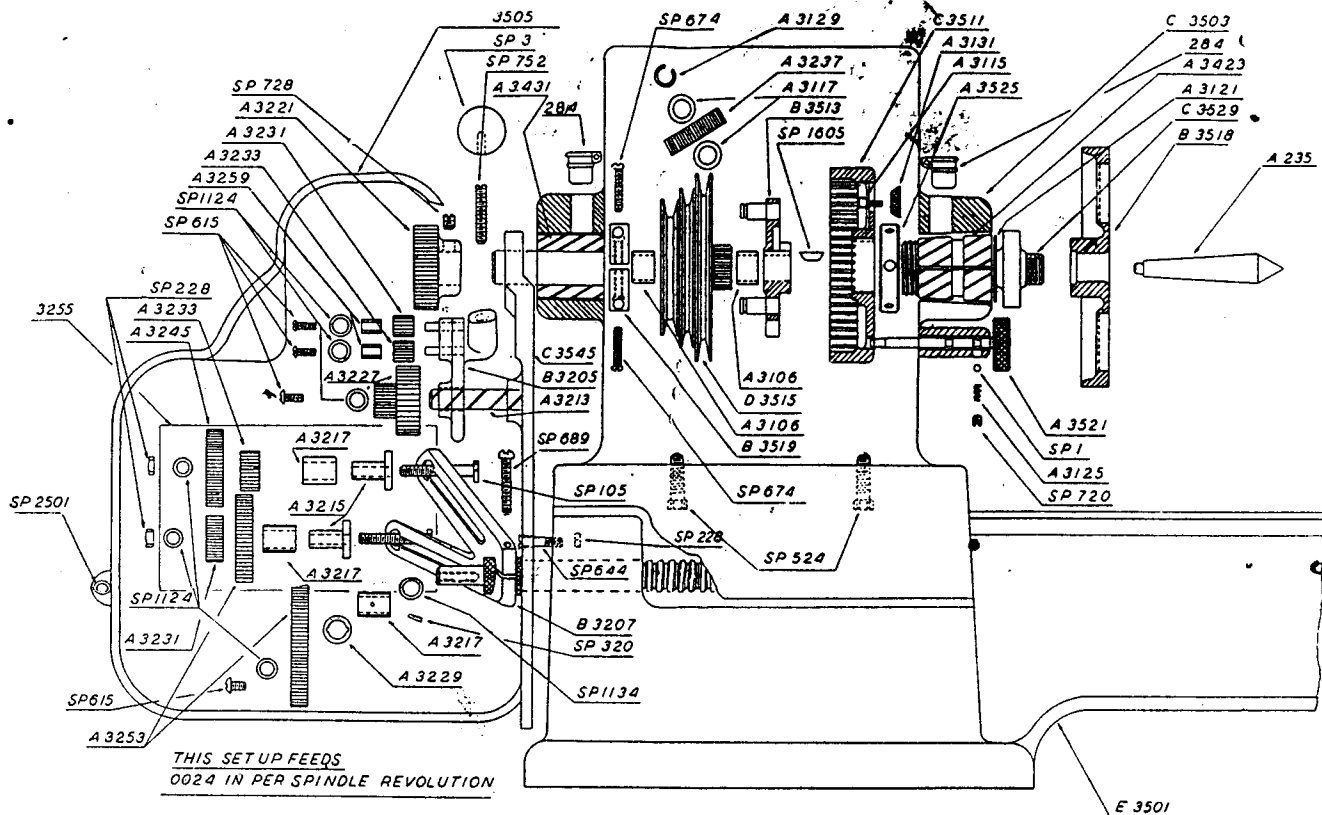
NOVEMBER, 1945

*Sears 6" x 12"*

# POWER FEED & HEADSTOCK ASSEMBLY

Model Number 109.20630

## PARTS DIAGRAM FOR CRAFTSMAN LATHE



## HOW TO ORDER REPAIR PARTS FOR CRAFTSMAN LATHE

Model Number 109.20630

All parts may be ordered through any Sears retail store which serves the territory in which you live. When ordering always give the following information:

1. Part number; 2. Part name and price; 3. Model number, which will be found on a plate located on the tailstock end of the lathe.

A minimum charge of 25c made on any order. All standard nuts, bolts, washers, etc., are usually purchased locally.

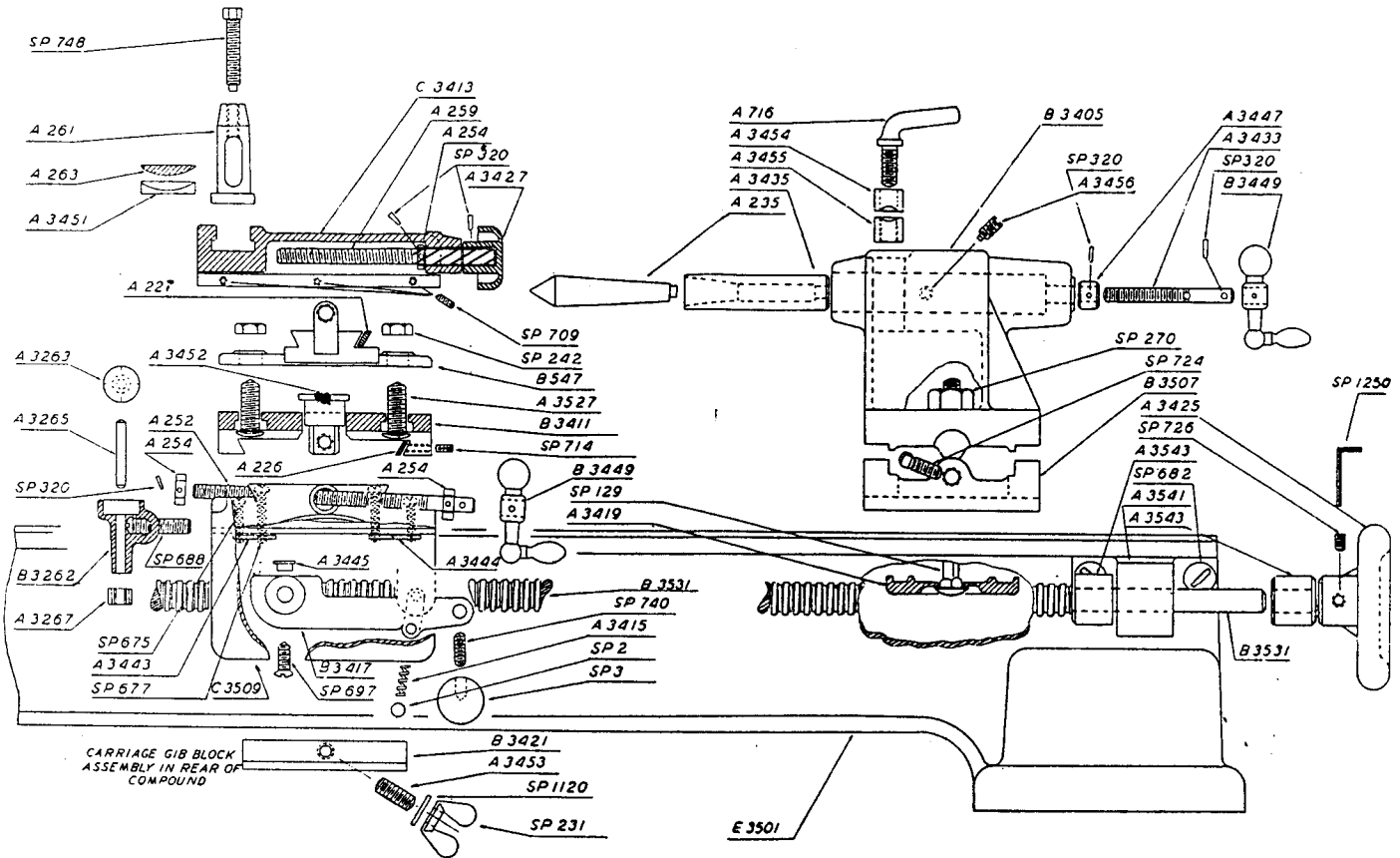
**ALL PRICES ARE SUBJECT TO CHANGE WITHOUT NOTICE.**

All Parts Are Shipped Prepaid

# PARTS DIAGRAM FOR CRAFTSMAN LATHE

Model Number 109.20630

## COMPOUND & TAILSTOCK ASSEMBLY



We suggest that you write your orders for repairs like the following:

SEARS, ROEBUCK and COMPANY

Enclosed find my check for \$1.25 for which please send me by parcel post the following parts for my CRAFTSMAN LATHE, Model Number 109.20630:

1 each Number A-3521 Plunger .....	\$ .50
1 each Number A-261 Tool Post.....	.75
<b>TOTAL.....</b>	<b>\$.125</b>

Yours truly,

JOHN MARTEN,:

Box 128,  
Richmond, Indiana

*3. Jaw Chuck #383.22950  
1/2" x 20 thread*

# PARTS LIST FOR NO. 109.20630 CRAFTSMAN LATHE

PART NUMBER	NAME OF PART	Prepaid	PART NUMBER	NAME OF PART	Prepaid
		Selling Price EACH			Selling Price EACH
284	Oil Cup	.10	A-3447	Ejection-Retraction Screw Collar	.25
A-226	Swivel Base Gib	.15	B-3449	Ball Crank Handle	.75
A-227	Tool Post Slide Gib	.15	A-3451	Tool Post Collar	.25
A-235	*60° "O" Morse Taper Center	.80	A-3452	Compound Swivel Nut	.75
A-252	Swivel Base Feed Screw	.25	A-3453	Carriage Lock Stud	.10
A-254	Feed Screw Collar	.15	A-3454	Tailstock Spindle Lock Collar	.25
A-259	Tool Post Slide Feed Screw	.20	A-3455	Tailstock Spindle Lock Nut	.25
A-261	Tool Post	.75	A-3456	Tailstock Spindle Key Screw	.25
A-263	Tool Post Wedge	.15	E-3501	Lathe Bed	9.75
681	*V-Belt, 3/8-36	1.10	C-3503	Headstock	6.00
B-547	Tool Post Slide Swivel	3.00	3505	Cover with Hinge and Chart	4.00
A-716	Tail Stock Locking Handle	.35	B-3507	Riser Block	1.60
A-3106	Back Gear Pulley Bearing	.20	C-3509	Carriage-Saddle	5.25
A-3115	Locking Pin	.10	C-3511	Internal Gear Drum—Back Gear	1.50
A-3117	Thrust Washer	.10	B-3513	Spider—Back Gear	2.00
A-3121	Thrust Washer	.10	D-3515	Lathe Drive Pulley—Back Gear	2.20
A-3125	Plunger Retaining Spring	.10	B-3518	Face Plate 4"—1/2-20 Thread	2.25
A-3129	Retaining Ring	.10	B-3519	Collar—2 Halves with Screws	.75
C-3130	Motor Pulley—1 1/2-1 29/32-2 7/16-2 15/16	1.10	A-3521	Plunger	.50
A-3131	Thumb Nut	.20	A-3525	Bearing Adjusting Nut	.65
B-3205	Forward and Reverse Lever	1.60	A-3527	Swivel "T" Bolt	.15
B-3207	Change Gear Spider	1.45	C-3529	Head Stock Spindle 1/2-20 Thread	4.75
A-3213	Lever Carrier Stud	.25	B-3531	Lead Screw	1.75
A-3215	Collared Shaft	.25	A-3541	Lead Screw End Bearing	.50
A-3217	Keyed Bushing	.25	A-3543	Lead Screw Collar	.50
A-3221	Spindle Gear	.50	C-3545	Mounting Plate	3.25
A-3227	Spindle Stud Gear	.40	SP-1	5/32" Dia. Finished Ball	.10
A-3229	Keyed Spacer	.25	SP-2	5/16" Dia. Finished Ball	.10
A-3231	20-Tooth Gear	.50	SP-3	1" Dia. Plastic Ball	.15
A-3233	24-Tooth Gear	.50	SP-105	*1/4-20 x 1 1/2 Machine Bolt	.10
A-3235	32-Tooth Gear	.75	SP-129	*3/8-16 x 2 1/4 Carriage Bolt	.10
A-3237	36-Tooth Gear	.75	SP-228	*1/4-20 Hex. Nut—Plain-Jam	.10
A-3239	40-Tooth Gear	.75	SP-231	*1/4-20 Wing Nut—Plated	.10
A-3241	44-Tooth Gear	.75	SP-242	*5/16-18 Hex. Nut—Plated	.10
A-3243	46-Tooth Gear	1.00	SP-270	*3/8-16 Hex. Nut—Plain	.10
A-3245	48-Tooth Gear	1.00	SP-320	*No. 0000 x 1/2" Taper Pin	.10
A-3247	52-Tooth Gear	1.25	SP-524	5/16-18 x 1 1/4 Hex. Hd. Cap Screw	.10
A-3249	54-Tooth Gear	1.50	SP-615	*1/4-20 x 3/8 Rd. Hd. Machine Screw	.10
A-3251	56-Tooth Gear	1.50	SP-644	*1/4-20 x 3/4 Flat Hd. Machine Screw	.10
A-3253	64-Tooth Gear	1.50	SP-674	*8-32 x 5/8 Fillister Hd. Machine Screw	.10
3255	Threading Chart	1.50	SP-675	*8-32 x 7/8 Fillister Hd. Machine Screw	.10
A-3259	Gear Bushing	.15	SP-677	*8-32 x 1 1/8 Fillister Hd. Machine Screw	.10
B-3262	Thread Dial Body	.80	SP-682	*10-24 x 5/8 Fillister Hd. Machine Screw	.10
A-3263	Thread Dial	.50	SP-688	*1/4-20 x 1" Fillister Head Screw	.10
A-3265	Thread Dial Shaft	.25	SP-689	*1/4-20 x 1 1/4 Fillister Head Machine Screw	.10
A-3267	Thread Dial Gear	.50	SP-697	*1/4-20 x 7/8 Oval Hd. Machine Screw	.10
B-3405	Tailstock	2.80	SP-709	*8-32 x 1/4 Headless Set Screw, Cone Pt.	.10
B-3411	Compound Swivel Base	2.25	SP-714	*8-32 x 3/8 Headless Set Screw, Cone Pt.	.10
C-3413	Tool Post Slide	2.50	SP-720	*10-32 x 3/16 Headless Set Screw, Flat Pt.	.10
A-3415	Feed Lever Catch Spring	.10	SP-724	*10-24 x 1" Square Hd. Set Screw, Cup Pt.	.15
B-3417	Feed Lever	2.05	SP-726	*1/4-20 x 1/4 Socket Hd. Set Screw, Cup Pt.	.20
A-3419	Tailstock Lock Block	.15	SP-728	*1/4-20 x 1/4 Headless Set Screw, Cup Pt.	.10
B-3421	Carriage Gib Block	.25	SP-740	*1/4-20 x 3/4 Headless Set Screw, Cup Pt.	.10
A-3423	Front Spindle Taper Bearing	.80	SP-748	*1/4-20 x 1 1/4 Sq. Hd. Set Screw, Semi-Dog. Pt.	.25
A-3425	Hand Wheel	1.00	SP-752	*1/4-20 x 1 3/4 Headless Set Screw, Cup Pt.	.15
A-3427	Knob	.50	SP-1120	*1/4 Spring Locking Washer	.10
A-3431	Front Spindle Sleeve Bearing	.25	SP-1124	*1/4 S.A.E. Washer	.10
A-3433	Ejection-Retraction Screw	.25	SP-1134	*3/8 S.A.E. Washer	.10
A-3435	Tailstock Spindle	1.00	SP-1250	*1/4" Allen Wrench	.20
A-3443	Left Side—Carriage Front Gib	.20	SP-1605	*1/2 x 1/16 Woodruff Key	.10
A-3444	Right Side—Carriage Front Gib	.20	SP-2501	*3/8 Spring Ball Catch	.15
A-3445	Feed Lever Bushing	.25			

335



e.

d

r-

Standard nuts, bolts, washers, etc., indicated by (\*) on parts list, are usually purchased locally.

# OPERATING INSTRUCTIONS FOR CRAFTSMAN LATHE

Model Number 109.20630

This lathe has been carefully checked and tested at the factory. All set screws, nuts, etc., have been tightened to prevent loss in shipment. Be sure to make the adjustments as mentioned below before operating this lathe.

## ADJUSTMENTS

Get acquainted with your lathe before you use it. Every mechanic knows that each design of lathe has slightly different characteristics and adjustments. We suggest you check the following points:

**Leveling:** This tool is designed and built to do accurate work. However, it is absolutely essential that it be level if it is to be accurate. The feet of this lathe are ground parallel to the ways. Care must be taken to see that the bench upon which it is placed is flat and firm. A sensitive spirit level should be placed across and down the length of the ways to check leveling. Place thin shims of metal under the proper feet around the bolts to make the bed perfectly level.

**Lubrication:** It is absolutely necessary that all moving parts be thoroughly oiled before and after adjustments are made, and every time your lathe is used. Use good grade, light motor oil.

Loosen slightly the two set screws, Part No. SP-714, on the compound cross-slide and oil the ways so that the cross-slide travels smoothly on slide-rest saddle. Do not set it too loosely as this will cause chatter.

Loosen slightly the three set screws, Part No. SP-709, on the upper unit of the compound and oil ways so that the travel is free. Here again, there should be no play or looseness in any gib after the adjustment is made.

Adjust wing nut at back of saddle for free movement of compound. This may be tightened to lock the compound for facing operations.

Be sure that the two chrome nuts, Part No. SP-242, on the compound swivel are tightened firmly after setting the angle for work. For most straight turning, this should be about 30 degrees away from a line at right angles to the bed.

The square headed screw, Part No. SP-724, on each side of the tail stock, are for a horizontal adjustment of the center. This makes tapered cuts possible and also assures perfect alignment between centers. Be sure tail stock is tightened down securely when operating. Turning hand crank to the left automatically ejects tail stock center from the ram.

The head stock is equipped with two bronze bearings. Over a long period of time, the front bearing may show wear. Tightening the large nut, Part No. A-3525, ahead of pulley will take up any such wear.

If the face plate is slightly out of true, a light facing cut should be taken. This is customary lathe procedure on any lathe and serves to fit the face plate to your particular lathe.

Be sure the four fillister head screws, Parts No. SP-675 and SP-677, counterbored into top side of the bottom plate of the compound (slide rest saddle), are tight.

**Motor Requirements:** A 1/4 or 1/3 horse power, 1725 or 1750 R.P.M. motor is recommended to drive the lathe. The 4-step, 1/2" bore pulley should be used on the motor shaft. The 3/8" V-belt, included, or one to fit your set-up should be used.

**Speeds:** Use of the proper speed is very important. Metalworking speeds are much slower than wood-working speeds. Remember that the larger the diameter of the work being turned, the slower the speed should be. Slower speeds will give more power.

**Back Gears:** This lathe is equipped with back gears which provide slower speeds and a greater range of speeds. There are two controls.

(1) **To secure free belt drive (high speed).** The knurled nut provided on the drum next to the pulley is to lock the drum to the pulley. Loosen knurled nut and slide down slot toward the spindle, turning pulley slightly until nut drops into the slot; then tighten.

(2) **To secure back gear drive (slow speed).** Be sure that knurled nut is at outer end of slot. The plunger at front of headstock locks the drum to the headstock. Turn the drum until 1/4" hole lines up; push in plunger.

**Important:** The knurled nut must not be engaged (must be at outer end of slot) for back gear drive. Never attempt to run lathe with both knurled nut in (at lower end of slot) and plunger pushed in.

Cold rolled steel should be turned at approximately 850 R.P.M. on work up to 1/2" in diameter. The proper speed for 1" is 265 R.P.M., for 1 1/2" is 174 R.P.M. These speeds are only approximate. In general the speed in R.P.M. is dependent on the proper surface-cutting speed of the metal. For various grades of steel this surface speed varies from 70 to 120 ft. per min.; cast iron at 120 R.P.M.; such metals as brass or aluminum should be turned at higher speeds.

$$\text{R.P.M.} = \frac{\text{S.P.M.} \times 3.28}{D}$$

R.P.M. = Spindle speed in R.P.M.

S.P.M. = Correct surface speed in feet per minute of metal being cut.

D = Diameter of work in inches.

Metalworking speeds available on this lathe commence at 120 R.P.M. and may be run up to 265 R.P.M., using back gear, without backgear they commence at 600 R.P.M. and may be run up to 1325 R.P.M., depending on the diameter and the kind of metal or wood being turned, as stated before.

**Setting Up Work Between Centers:** Drill a 60 degree hole-in each end of the steel with a center drill. Fasten a lathe dog on one end and mount between centers. The arm of the lathe dog projects into the hold or open slot in face plate and drives the work. The dead center (tail stock center) is lubricated with white lead or a heavy machine oil.

The tool bit is mounted in the tool post and adjusted so that the point of the bit is nearly on a level with the center of the work, or just below center. This position varies with the hardness of the material being cut. A little experimenting will enable you to get the proper angle for a perfectly smooth cut.

Keep the compound over the bed ways as much as possible avoiding a long overhang. Keep the tool bit inserted to a short overhang. Remember that in cutting metal you are exerting tremendous pressure on the point of the tool bit. To keep chatter out, the whole assembly must be as rigid and solid as possible.

The tool bit must be kept carefully ground to get the best results. The forms to which it may be ground will vary with the types of work being undertaken.

**Use of Chucks:** On some work, generally short in length, it may be more convenient to grip the work in a four-jaw chuck. With this arrangement, the work is not supported by the tail stock. This permits the operator to perform boring, facing, drilling operations, etc.

**Thread Gears:** This lathe is equipped with all necessary gears for both power feed and cutting of threads from 8 to 96 threads to the inch.

The ball lever found to the left of the head stock, controls the direction (clockwise or counter-clockwise) of the lead screw. With power off, loosen ball and push lever to upper position for clockwise rotation of lead screw. Turn head stock pulley slightly by hand to allow gears to mesh. Lower position is counter-clockwise and center position is neutral. Be sure lever is tightened by turning ball after changing from one position to another.

**Setting Up Threading Gears:** The whole idea of the threading gears is to drive the lead screw at a definite speed with relation to the head stock spindle. The lead screw will then move the compound along the bed at the proper speed with relation to the work in order to cut a thread.

Threads are specified as "so many threads per inch." to get a variety of threads, it is necessary to use different gear combinations between the spindle and lead screw in order to get a different number of threads per inch.

The purpose of the gear chart is to enable you to set up the proper gear combination for the thread you wish to cut.

Refer to the gear chart inside the gear cover. Consider Figure 1. The gears may be placed in different positions on the bracket that carries them. These positions are identified by letters.

As a typical example, suppose you wish to cut 8 threads per inch. On the chart the first column reads, "Threads per inch," and under this locate "8." Also note that the

general scheme of setting for an 8 thread is illustrated in Figure 1. This comes from the last column of the chart.

(1) Assuming the gears from the previous set-up have been removed.

Under "Gears on Screw" opposite 8 is 32-F. Select the gear marked "32" and mount this on the end of the lead screw. Place spacer collar No. 3229 over keyed bushing, back of No. 32, to bring gear into forward position.

(2) Under "Position B" there are two lines, (=). This indicates that no gears are used in this position for this thread.

(3) Next note that a 32- and 64-tooth gear are to be mounted on the bracket in "Position C." The 32-tooth gear is in back (close to head stock), and the 64-tooth gear in front. This is determined by the initials "B" and "F," directly under the heading "Position C."

(4) "Position B" indicates that no gears are used in this position on this thread.

(5) "Position A" shows that a 64-tooth gear is placed on top of a 20-tooth at the position on the bracket arm shown as "A." Note that the 20-tooth gear is not in mesh but is a spacer gear(s).

(6) "Spindle Stud Gear" calls for a 32-tooth gear to be mounted on the end of the spindle. This completes the selection of the gear combination train. The gears are brought in mesh by adjusting the bracket and the position of the gears. Do not run gears too tight, there should be at least clearance for a piece of paper between the gears.

**Cutting a Thread:**

(1) Set the compound at an angle of approximately 29 degrees.

(2) Grind a tool bit to a V-form with an angle of 60 degrees at the point of the V. Mount in the tool post at right angles to the work.

(3) Use cross slide feed screw to bring point of bit close to end of work and in position to take a very light cut.

(4) Use slowest speed on drive pulley—apply lubricant.

(5) Assuming that we are cutting eight threads, watch the thread dial and as it rotates, engage the Power Feed lever on saddle when the stationary mark is in line with any one of the four dial marks. This applies when cutting all even number threads per inch. When cutting odd number threads per inch, use Dial Figures 1 and 2 only. The bit will now trace the form of the thread on the work.

(6) At the end of the thread, disengage the lever and use the cross-slide feed screw to pull the bit back, and return to original position.

(7) Use the compound to set the feed in deeper and repeat the process using the thread dial as before.

## TABLE OF SPINDLE SPEEDS

(Using Motor Pulley Directly on 1725 R.P.M. Motor)

Lathe Pulley	Motor Pulley	Without Back	
		Gears	With Back Gears
Large step 4	Small step 1	600	120
Large step 3	Small step 2	870	174
Large step 2	Small step 3	1325	265

Further reduction in spindle speeds may be obtained by use of a countershaft.

For more information on the general subject of lathe work, we suggest that you purchase a lathe manual. You will find such a book helpful.