

**OPERATING INSTRUCTIONS
AND PARTS LIST FOR**

Craftsman Lathe

Model Number 109-21270

This is the Model Number of 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.

HOW TO ORDER REPAIR PARTS

All parts listed herein may be ordered through Sears, Roebuck and Co. When ordering parts by mail from the mail order house which serves the territory in which you live, selling prices will be furnished on request or parts will be shipped at prevailing prices and you will be billed accordingly.

WHEN ORDERING REPAIR PARTS, ALWAYS GIVE THE FOLLOWING INFORMATION AS SHOWN IN THIS LIST:

1. The PART NUMBER.
2. The PART NAME.
3. The MODEL NUMBER.
4. The DESCRIPTION of item.

IMPORTANT

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

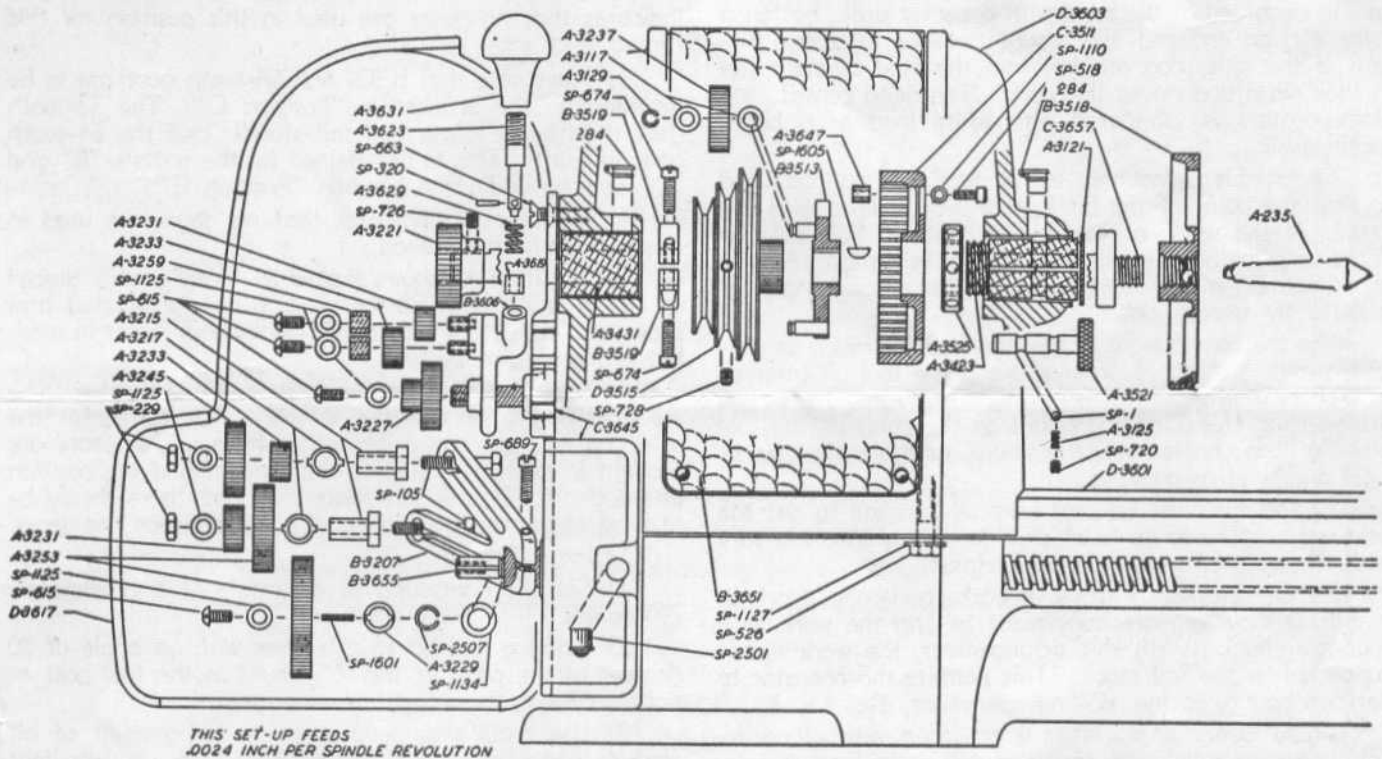
**SEARS, ROEBUCK AND CO. - U. S. A.
SIMPSON-SEARS LIMITED - CANADA**

PARTS LIST FOR MODEL 109.21270 CRAFTSMAN LATHE

PART NUMBER	DESCRIPTION	PART NUMBER	DESCRIPTION
A-226	Swivel Base Gib	B-3611	Compound Swivel Base
A-227	Tool Post Slide Gib	B-3613	Tool Post Slide
A-254	Feed Screw Collar	B-3615	Tool Post Slide Swivel
A-261	Tool Post	D-3617	Gear Cover
A-263	Tool Post Wedge	A-3619	Reverse Lever Collar
284	Oil Cup	A-3621	Carriage Gib Block
A-3117	Thrust Washer	A-3623	Reverse Lever Plunger
A-3121	Thrust Washer	A-3625	Hand Wheel — Lead Screw
A-3125	Plunger Retaining Spring	A-3627	Compound Rest Handle
A-3129	Retaining Ring	A-3629	Reverse Lever Spring
B-3207	Change Gear Spider	A-3631	Reverse Lever Knob
A-3215	Collared Shaft	A-3635	Tool Post Slide Nut
A-3217	Keyed Bushing	A-3636	Tool Post Slide Feed Screw
A-3221	Spindle Gear	A-3639	Ejection-Retraction Screw
A-3227	Spindle Stud Gear	A-3641	Swivel Base Feed Screw
A-3229	Keyed Spacer	A-3643	Swivel Locking Pin
A-3231	20-Tooth Gear	C-3645	Mounting Plate
A-3233	24-Tooth Gear	A-3647	Planetary Gear Lock Nut
A-3235	32-Tooth Gear	A-3649	Ball Crank Handle
A-3237	36-Tooth Gear	B-3651	Decorative Panel
A-3239	40-Tooth Gear	A-3653	Lock Handle
A-3241	44-Tooth Gear	B-3655	Lead Screw
A-3243	46-Tooth Gear	C-3657	Headstock Spindle 1/2 x 20
A-3245	48-Tooth Gear	A-3663	Thread Dial Spring
A-3247	52-Tooth Gear	A-3667	Feed Lever Knob
A-3249	54-Tooth Gear	SP-1	*5/32 Dia. Finished Ball
A-3251	56-Tooth Gear	SP-2	*5/16 Dia. Finished Ball
A-3253	64-Tooth Gear	SP-105	*Sq. Hd. Mach. Bolt 1/4-20 x 1-1/2
3255	Threading Chart	SP-135	*Step Bolt 3/8-16 x 2-3/4
A-3259	Gear Bushing	SP-229	*Hex. Nut Plated-Jam 1/4-20
A-3262	Thread Dial Body	SP-261	*Hex. Jam Nut Light 5/16-24
A-3263	Thread Dial	SP-262	*Acorn Nut 5/16-24
A-3265	Thread Dial Shaft	SP-270	*Hex. Nut Cad. Pl. 3/8 x 16
A-3267	Thread Dial Gear	SP-320	*No. 0000 Taper Pin
A-3415	Feed Lever Catch Spring	SP-518	*Soc. Cap. Sc. 8-32 x 5/8
B-3417	Feed Lever	SP-526	*Hex. Hd. Cap. Sc. 5/16-18 x 1-1/8
A-3420	Tailstock Lock Block	SP-615	*Rd. Hd. Mach. Sc. 1/4-20 x 3/8
A-3423	Front Spindle Taper Bearing	SP-663	*Flat Hd. Mach. Sc. 1/4-20 x 1/2
A-3431	Front Spindle Sleeve Bearing	SP-674	*Fill. Hd. Mach. Sc. 8-32 x 5/8
A-3435	Tail Stock Spindle	SP-675	*Fill. Hd. Mach. Sc. 8-32 x 7/8
A-3443	Left Side — Carriage Front Gib	SP-688	*Fill. Hd. Mach. Sc. 1/4-20 x 1
A-3444	Right Side — Carriage Front Gib	SP-689	*Fill. Hd. Mach. Sc. 1/4-20 x 1-1/4
A-3445	Feed Lever Bushing	SP-697	*Oval Hd. Mach. Sc. 1/4-20 x 7/8
A-3447	Ejection-Retraction Screw Collar	SP-709	*Headless Set Sc. Cone Pt. 8-32 x 1/4
A-3451	Tool Post Collar	SP-714	*Headless Set Sc. Cone Pt. 8-32 x 3/8
A-3452	Compound Swivel Nut	SP-720	*Headless Set Sc. 10-32 x 3/16
A-3454	Tailstock Spindle Lock Collar	SP-724	*Sq. Hd. Set Screw 10-24 x 1
A-3455	Tailstock Spindle Lock Nut	SP-726	*Soc. Hd. Set Sc. 1/4-20 x 1/4
A-3456	Tailstock Spindle Key Screw	SP-727	*Soc. Hd. Set Sc. 1/4-20 x 5/8
A-3511	Internal Gear Drum — Back Gear	SP-728	*Headless Set Sc. 1/4-20 x 1/4
B-3513	Back Gear Spider	SP-740	*Headless Set Sc. 1/4-20 x 3/4
D-3515	Lathe Drive Pulley — Back Gear	SP-749	*Full Dog Point Sq. Hd. Set Sc. 1/4-20x1-1/4
B-3518	Face Plate — 4" — 1/2-20 Thread	SP-1110	*Std No. 8 Washer Cad. Pl.
B-3519	Collar — 2 Halves With Screws	SP-1125	*S.A.E. Washer 1/2"
A-3521	Gear Drum Plunger	SP-1127	*S.A.E. Washer 5/16"
A-3525	Bearing Adj. Nut	SP-1134	*S.A.E. Washer 3/8"
A-3543	Lead Screw Collar	SP-1250	*Hex. Key 1/8"
A-3539	Lock Block Clearance Spring	SP-1601	*Key 1/8 x 1/8 x 5/8
D-3601	Lathe Bed	SP-1605	*Key-Woodruff No. 1-1/2 x 1/16
D-3603	Headstock	SP-2501	*Spring Ball Catch 3/8"
B-3605	Tailstock	SP-2507	*Std. Sq. Sect. Ret. Ring 1/2"
B-3606	Forward & Reverse Lever	A-235	*"O" Morse Taper 60° Center
B-3607	Riser Block	681	*V-Belt, 3/8-36
C-3609	Carriage	11026	Motor Pulley 3 Step 1-9/16 - 2-1/8 - 2-11/16 5/8 Dia. Keyed Bore

*Standard hardware item. May be purchased locally.

POWER FEED & HEADSTOCK ASSEMBLY



THREADING CHART

A-B-C ARE GEAR STUD POSITIONS
S = SPACER
— = NO GEARS

R=REAR POSITION-TOWARD HEADSTOCK
F=FRONT POSITION-AWAY FROM HEADSTOCK

FIG. 1
SPINDLE STUD GEARS
A
SET-UP FOR 8 TO 16 THREADS
C
LEAD SCREW

FIG. 2
SPINDLE
B
SET-UP FOR 18 TO 32 THREADS
C
LEAD SCREW

FIG. 3
SPINDLE
A
SET-UP FOR 36 TO 64 THREADS
C
LEAD SCREW

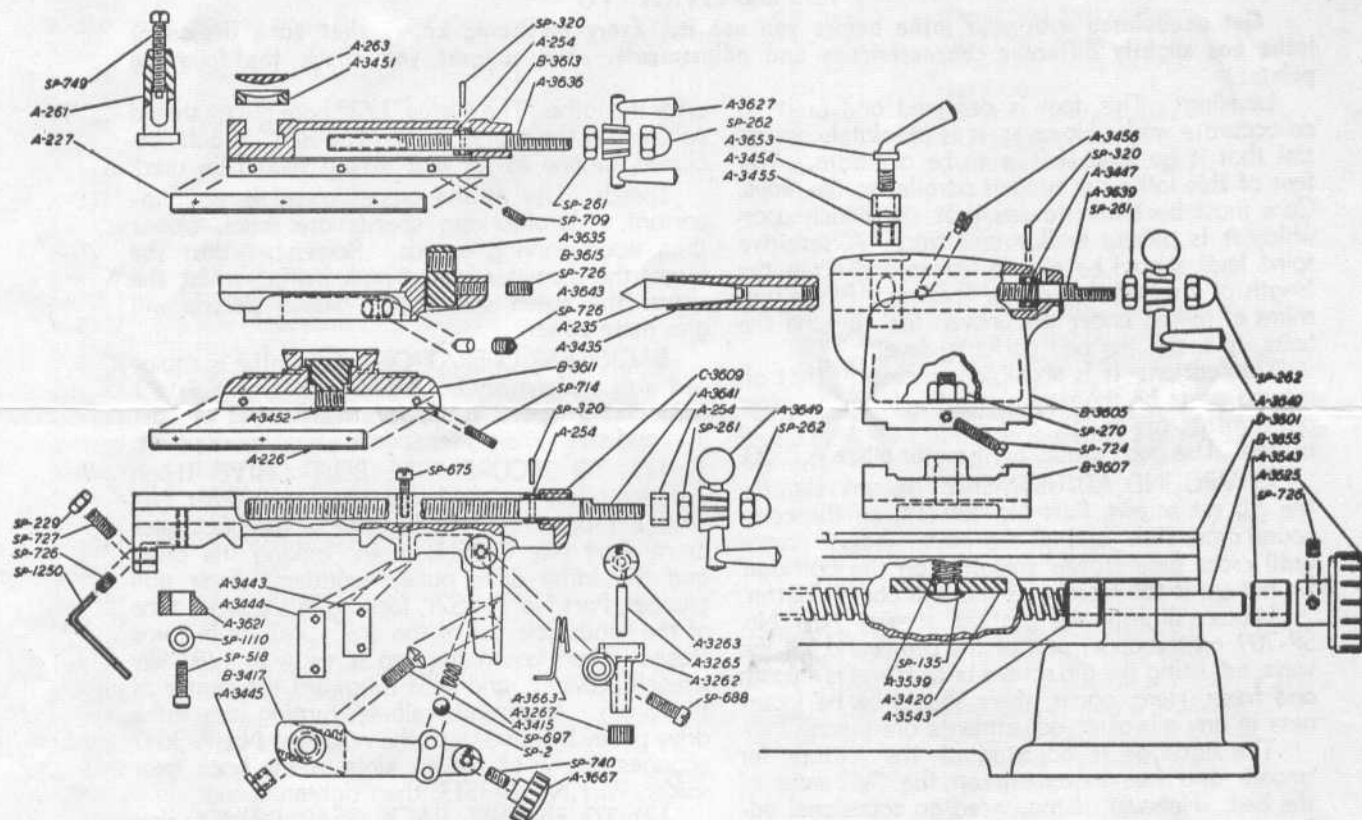
FIG. 4
SPINDLE
A
SET-UP FOR 72 TO 96 THREADS
C
LEAD SCREW

FIG. 5
SPINDLE
A
SET-UP FOR FINE FEEDS
C
LEAD SCREW

FIG. 6
SPINDLE
A
SET-UP FOR COARSE FEEDS
C
LEAD SCREW

THREADS PER INCH	GEAR ON SCREW	POSITION						SPINDLE STUD GEAR	FIG.	THREADS PER INCH	GEAR ON SCREW	POSITION						SPINDLE STUD GEAR	FIG.
		A	F	B	F	R	F					A	F	B	F	R	F		
8	32F	64	S	—	—	32	64	32	1	36	36F	S	64	—	—	20S	32	16	3
9	36	64	S	—	—	32	64	32	1	40	40	S	64	—	—	20S	32	16	3
10	40	64	S	—	—	32	64	32	1	44	44	S	64	—	—	20S	32	16	3
11	44	64	S	—	—	20	40	32	1	48	48	S	64	—	—	20S	32	16	3
11.5	46	64	S	—	—	20	40	32	1	56	56	S	64	—	—	20S	32	16	3
12	48	64	S	—	—	20	40	32	1	64	64	S	64	—	—	20S	32	16	3
13	52	64	S	—	—	20	40	32	1	72	36R	32	64	—	—	56	S	16	4
14	56	64	S	—	—	20	40	32	1	80	40	32	64	—	—	56	S	16	4
16	64	64	S	—	—	20	40	32	1	96	48	32	64	—	—	56	S	16	4
18	36R	—	—	64	S	—	—	32	2	FEED PER REV. OF SPINDLE									
20	40	—	—	64	S	—	—	32	2	.0024	64F	24	48	—	—	64	20	16	5
22	44	—	—	64	S	—	—	32	2	.0039	64	24	48	—	—	64	32	16	5
24	48	—	—	64	S	—	—	32	2	.0048	64R	48	24	—	—	20	64	32	6
27	54	—	—	64	S	—	—	32	2	.0078	64	48	24	—	—	32	64	32	6
28	56	—	—	64	S	—	—	32	2	WHEN TWO GEARS ARE USED IN COMBINATION, R, REAR INDICATES THE POSITION NEAREST THE HEADSTOCK, F, FRONT INDICATES THE POSITION AWAY FROM HEADSTOCK									
32	64	—	—	64	S	—	—	32	2										

COMPOUND & TAILSTOCK ASSEMBLY



Model Number 109.21270

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.

4

OPERATING INSTRUCTIONS FOR CRAFTSMAN LATHE

Model Number 109.21270

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 uneven 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. S.A.E. 20.

COMPOUND ADJUSTMENT: loosen, slightly, the gib set screws, Part No. SP-714, on the compound cross slide, and oil the ways. Adjust screws until cross slide travels smoothly on the carriage. Do not set it too loosely, as this will cause chatter.

Loosen slightly the gib set screws, Part No. SP-709, on the upper unit of the compound, oil the ways, adjusting the gib screws until travel is smooth and free. Here, again, there should be no looseness in any gib after adjustments are made.

The carriage is adjusted at the factory for smooth and free movement on the "V" ways of the bed. However, it may need an occasional adjustment. The gibs for making this adjustment will be found on the under side of the carriage and against the bed under cut. Adjustment is made by loosening carriage lock nut, Part No. SP-229, and loosening or tightening the socket set screws, Part No. SP-726 and SP-727. Screw No. SP-727 with nut No. SP-229 are used to lock the carriage to the bed at any point of travel.

Be sure the four fillister head screws, Parts No. SP-675 counter-bored into top side of carriage (part of the compound resting directly on the bed) are tight before starting to cut.

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, screwed to the back of this bearing 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.

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 GEAR OPERATION: This lathe is equipped with a planetary back gear providing a 5 to 1 reduction in speed ratio, for the turning of cast iron and steel; the slower speeds giving more power.

(1) **TO SECURE FREE BELT DRIVE (High Speeds):** The socket head cap screw, Part No. SP-518, projecting from the face of the back gear drum, Part No. C-3511, is for locking the drum and the lathe drive pulley together. First pull plunger, Part No. A-3521, located in the front face of the headstock, out of the drum until drum turns freely. Then loosen the cap screw with 1/8" key wrench provided, and slide it toward the center of the drum. Meanwhile, slowly turning the lathe drive pulley by hand until the nut, Part No. A-3647 engages in one of the six slots in the back gear spider, Part No. B-3513, then tighten.

(2) **TO ENGAGE BACK GEAR DRIVE (Slow Speeds):** Be sure that socket cap screw, Part No. SP-518, is tightened in the outer end away from the center of the slot in the gear drum, disengaging lathe drive pulley. Then push plunger, Part No. A-3521, through the headstock and into 1/4" hole provided in the gear drum, preventing drum from turning. The lathe is now ready to run in back gear.

IMPORTANT: The socket cap screw must be at outside end, away from the center of slot for back gear drive. Never attempt to run the lathe with cap screw at inner end of slot and plunger pushed in at the same time.

"CUTTING SPEEDS"

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. Cast iron at 120 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 surface ft. per min. 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 to 265 R.P.M., using back gear, without back gear 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 headstock, controls the direction (clockwise or counter-clockwise) of the lead screw. The direction may be reversed at any time by pulling the lever up, and moving it to the desired position. Lower position is counter-clockwise, upper position, clockwise, center position is neutral.

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 is indicated in column 7 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 to work.

(5) Assuming that we are cutting eight threads, watch the thread dial and as it rotates, engage the Power Feed lever on carriage 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 feed 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.