



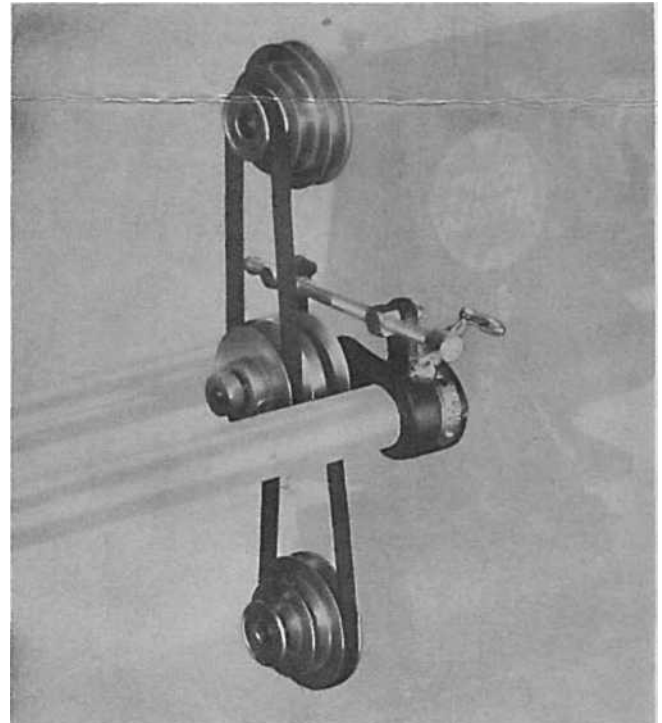
# instructions for installation and operation

## VARIABLE SPEED CHANGER

The SHOPS MITH Speed Changer is designed to give slow speeds for turning large pieces and for metal drilling; and to give high speeds for operations such as shaping and routing. Use of the Speed Changer introduces an additional belt and additional pulleys and, therefore, it will introduce a slight power loss. This power loss will be minimized if belts are properly aligned and adjusted as described below. If you have an occasional job that requires considerable power, such as cutting 2 x 4's or a heavy piece of hardwood, feed work slowly and Speed Changer will provide sufficient power. If you have a large job, such as cutting many 2 x 4's for building studs, we recommend that you use the standard SHOPS MITH belt. This you can do, without removing the complete Speed Changer, by taking off the idler pulley, reversing the motor pulley, and installing the standard belt.

- 1 Remove standard belt.
- 2 Remove motor bracket set screw on left side of headstock. Insert in its place the longer motor bracket set screw included with the Speed Changer, and leave slightly loose. Front Allen set screw if tight, will temporarily support motor.
- 3 Remove tie bar (C 2267) from tubular ways.
- 4 Place Speed Changer on the ways, handle and scale toward the front, and slide along the ways to a position against the headstock.
- 5 Place knurled jam nut over motor bracket set screw inserted in Step 2 and leave loose.
- 6 Replace tie bar. Tighten set screws.
- 7 Remove **MOTOR** pulley, reverse it, and replace with large step near motor with about  $\frac{3}{4}$ " clearance to facilitate alignment.
- 8 Remove knob from Speed Changer spindle.
- 9 Remove Speed Changer pulley assembly.
- 10 Place one belt over each Speed Changer pulley.
- 11 Replace pulley assembly on spindle with longer belt nearer headstock.
- 12 Replace and tighten knob removed in Step 8
- 13 Place longer belt over largest motor pulley.
- 14 Place shorter belt over smallest headstock pulley.
- 15 Loosen headstock pulley (do not reverse) and move pulley directly over Speed Changer pulley so that upper belt appears vertical when FLOATING Speed Changer pulley sheave is **CENTERED**.
- 16 Outer face of all three pulleys, motor, Speed Changer and headstock must be in vertical alignment. Check with square or straight edge. Minor adjustments can be made by moving motor or headstock pulleys out or in. Be sure pulleys are retightened before starting machine.
- 17 By turning Speed Changer crank handle counterclockwise, tighten upper belt. Pinch it easily between thumb and forefinger.

The opening between belts should be about  $1\frac{1}{4}$  inches. Loosen front motor support Allen set screw with right hand while supporting motor underneath with left hand. Lower motor carefully until tension on lower belt equals that on upper belt. Lock front Allen set screw securely.



**high speed range**

18 Turn on motor and run Speed Changer at this setting for a few moments to equalize belt pressures. Turn Speed Changer control handle clockwise until machine is running full speed. Turn off machine. Speed Changer pulley assembly will now be raised up far enough to tighten rear motor support Allen set screw installed in Step 2. **Be sure knurled Jam nut is only finger-tightened. Overtightening will cause the headstock to bind on the tubular ways. If binding occurs check the knurled jam nut for looseness. Forcing the headstock may result in breaking the bracket base.**

19 Speed Changer is now ready to operate in high speed range.

20 After some hours of use, belts will stretch, causing some power loss. Readjust, using same procedure used in original mounting. **NEVER try to change position of the Speed Changer by turning the control handle with the power off. This will only stretch the belts and might result in damage to the unit. Change speeds only with the machine running.**

**Note:** Do not operate saw blades, grinding wheels, sanding discs, face plates, etc. at greater than recommended speeds.

**Caution:** At maximum and minimum speed settings do not force the crank—it will cause excessive belt tension and damage to the machine.

## Care of your Speed Changer

**1** The bearing surface of your variable pitch pulley is a high speed bronze sleeve running on a polished, tool steel spindle. It is properly lubricated when you receive the unit, but should be re-lubricated periodically with a good grade of cup grease. (Magna-Lube is recommended for this.)

**2** The tolerance between the movable sheave in the center of the Speed Changer pulley and the shaft it runs on, back and forth, is very close. New bells shed a certain amount of rubber dust. If, after quite some use, you find that this sheave is sticking, and that speed doesn't change when you turn the control handle, take the following action:

Remove bells from both headstock and motor pulleys. Remove thumb knob from Speed Changer spindle and remove Speed Changer pulley assembly. Take off the belts. Soak pulley assembly in cleaning solvent or paint thinner. Work movable center sheave back and forth until it slides very freely. Thoroughly dry the pulley assembly blowing moisture out of the movable sheave bearings. Lubricate this sliding bearing surface with a light, non-gumming oil. Re-lubricate the spindle and reassemble pulley assembly on machine, re-tensioning belts as previously explained.

**3** The calibrated Speed Changer scale is slotted and movable. When screws are loosened, it can be adjusted. With Speed Changer in slowest speed, either high range or low, cast in pointer should be opposite zero on this scale.

**4** **Never** loosen special size set screws holding pulley sheaves. These are factory set **and** tightened.

**5** If replacement of bushings is needed, entire unit should be returned to factory.

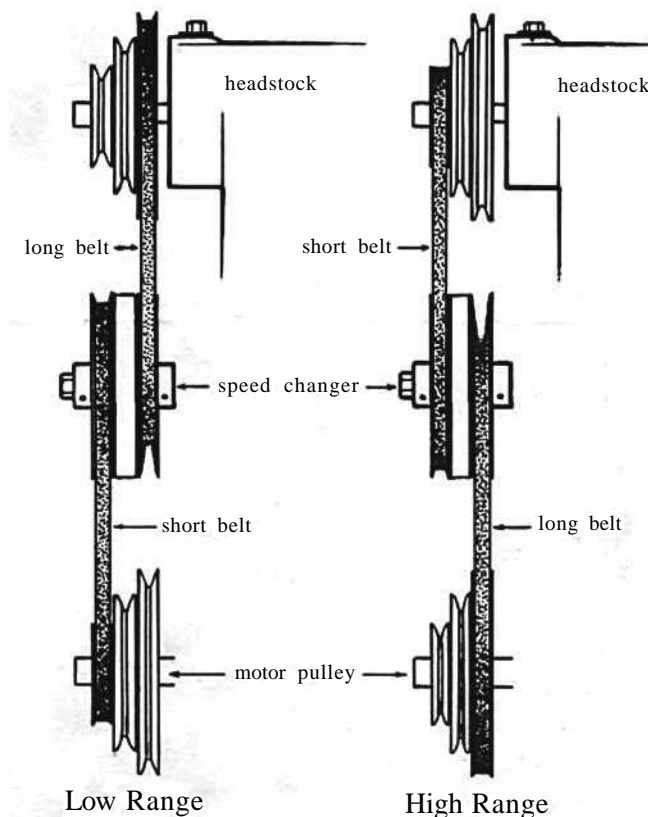


## To change speed ranges:

Slip belt off headstock pulley and off motor pulley.

**1 For low speed ranges:** Replace belts with long belt on headstock pulley and short belt on motor pulley. (See sketch)

**2 For high speed range:** Replace belts with short belt on headstock pulley and long belt on motor pulley. (See sketch)



## Speed Changer parts list

no.	description	price	shpg. wt.
			lbs. ozs.
113 110	Arm - Pulley	\$3.95	1 3
113 200	Floating Pulley Assem.	5.50	1 13
113 310	Screw Assem.	2.25	14
P 1013	Screw - Socket Set	.20	3
P 1308	Screw - Round Head	.05	3
P 1403	Nut - Elastic Stop	.05	3
P 1501	Washer	.05	3
P 1505	Washer	.05	3
P 1600	Ring - Retaining	.50	3
P 1701	Belt - Short <i>22 1/2 O.D.</i>	.95	5
P 1702	Belt - Long <i>25 1/2 O.D.</i>	.95	5
C 2249	Base - Bracket	2.25	1 3
A 2250	Lug - Guide	.60	5
A 2251	Spring - Compression	.05	3
A 2252	Knob - Shaft	.50	5
A 2253	Indicator - Speed	.25	4
A 2671	Nut - Knurled	.10	3

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## TROUBLE SHOOTING THE SPEED CHANGER

Things you should know about the SHOPSMITH Speed Changer:

High operating speeds and extra belts and pulleys cause the Speed Changer to get warm. Moreover, speeds higher than usual operation, without the Speed Changer, increase the audible pitch of belt and pulley noise. Additional belts and pulleys cause a slight loss of power. Some loss of power is inevitable, but this can be reduced considerably by carefully following the suggestions below:

### I. Loss of power.

- (1) Caused by misalignment of pulleys and improper belt tension. Go over mounting instructions step by step. Be sure that knurled knob of Speed Changer has beveled edge facing pulleys. Use carpenter square to align pulleys. Don't force crank. When Speed Changer belts are new, maximum or minimum speed is usually obtained before the dial pointer reaches the "5" or "0" setting. When new, the best method for checking maximum or minimum speed is to watch the belts on the Speed Changer pulley. When outside edge of one belt is level with the top edge of pulley sheaves, maximum or minimum speed is obtained. To force the dial to a "5" or "0" setting will only stretch belts and cause one belt to ground on Speed Changer shaft. This increases friction, loss of power, and wears the belt. As belts wear in through normal use, dial indicator becomes more accurate.

### II. Great loss of power.

- (1) Check the distance between outside pulley sheaves of Speed Changer. The distance should not exceed two inches. If it does, loosen set screws on pulley sheaves and reset at two inches.

### III. Maintenance.

- (1) Occasionally clean and lubricate the Speed Changer in accordance with instruction sheet #9005 July 52.

### IV. Motor won't clear bench.

- (1) Speed Changer is designed to be used with the 1/2 hp. and 3/4 hp. motors recommended for SHOPSMITH. When properly mounted, using one long and one short belt (supplied), motor clears bench. If motor is not a SHOPSMITH motor, then raise SHOPSMITH frame one inch above bench by inserting 1" stock under headrest and base plate.