Explanation of the Shifting Cycle and Adjustments for No. 4 Universal Turret Lathe. Refer to appropriate machine wiring diagram.

With the spindle running and the clutch engaged:

I. Initiate shift cycle - close switch SW-1-b momentarily.

A. Energize CR - S1 which will be held in.

Note - CR-1 is engaged at this time because the transmission is driving the zero speed switch to operate contacts. Electric clutch disengaged and electric brake is engaged. Transmission slows down to speed at which zero speed switch contacts are operated, then

II. A. Shift solenoid is energized causing flow of oil to shifting cylinders according to pattern determined by preselector valve.
B. Brake is de-energized.
C. TDR-1 and TDR-2 are energized.
Transmission will coast (assuming zero speed switch is set to operate at some speed above zero) until TDR-2 timed contact operates. Then

III. A. TDR-3 is energized.
B. Clutch is energized.
Transmission will be driven until TDR-3 timed contact is energized. Then

IV. A. TDR-3 is de-energized.
B. TDR-2 is energized.
C. Clutch is de-energized.
D. Brake is energized.
Transmission is braked until TDR-2 timed contact is energized, then

V.& VI. III and IV are repeated until TDR-1 timed contact operates, then

VII. A. CR-S1 drops out, de-energizing TDR-2 and or TDR-3, de-energizing shift solenoid, and TDR-1 is de-energized.

B. Brake is de-energized and clutch is energized and transmission will pick up to full speed as determined by preselector valve.

When the shift cycle is initiated the transmission is slowed down to a speed satisfactory for shifting before actual shifting is started. The jog then brake cycles insure that the various gears are in rotary movement while sliding from one position to another.

To observe and analyze the steps in shifting, run the spindle at any speed, leave the speed selector at that speed and then initiate the shifting cycle. Try this at several speeds. Here it is well to note that the zero speed switch operates at four speeds while the spindle runs at sixteen speeds. The overall time of the shifting cycle, obtained by setting of TDR-1, must be sufficient to shift all the gears sometimes. Between speeds 8 and 9, all the gears are shifted. Any major load on the spindle such as a chuck will have an effect on the shifting as opposed to a bare spindle.

If upon observation it is concluded that the speed at the start of the actual gear shifting is too high or low the zero speed switch may be adjusted. Facing the switch, which is located adjacent to the drive motor, the screw on the left is the one to adjust. Screwing the screw out will increase the speed at which the switch operates, and vice versa.

Carefully observe the jog and brake part of the shifting cycle. If it seems necessary adjust TDR-2 and or TDR-3.