

which is bolted and doweled to the steam chest cover through bracket (736). The lower connection of the governor lever to pilot valve (741) is made through block (746) which is pinned to the pilot valve. Block (746) is held in place in the end of the pilot valve by pin (745). Spring (740) is provided to take up any lost motion in the pilot valve attachment to the governor lever. The governor valve and stem is secured to piston (742) by nut (747), jam nut (946), and set screw (748). The valve stem is threaded into nut (747) which in turn is threaded into the end of piston (742).

As the turbine comes up to speed, the governor weight assemblies are forced outward by centrifugal force against the compression of the governor spring. As the governor weights move out, the governor spindle is moved out. This movement is transmitted through the governor lever to the central pilot valve (741). Oil under pressure is admitted continuously to the inside of hollow piston (742) from a gear oil pump (driven by worm and gear from the turbine shaft on direct connected turbines or from the idle end of the low speed gear shaft on geared turbine units). The relief valve in the oil system is adjusted so that a pressure of 30 to 40 pounds per square inch is maintained on the governor. As the turbine comes up to speed, pilot valve (741) moves to the left and admits oil to the outer end of the oil cylinder (737) and allows oil to be discharged from the inner end of the cylinder. The resulting excess of oil pressure at the outer end of the cylinder causes the oil piston to follow the pilot valve simultaneously to the left, moving the governor valve toward the valve seat, until the proper speed is obtained and the governor valve passes the amount of steam required to carry the existing load. Slots are provided in piston (742) to allow the pilot valve and governor lever to move relative to the piston.

ADJUSTMENTS

The governor, the oil pilot mechanism, and the governor valve are adjusted and set at the factory to give the desired speed and these settings should not be changed unless absolutely necessary.

The construction and the adjustment of the governor and the governor linkage is described in Section II and III under "*Constant Speed Governor and Linkage*." It may, at times, be necessary to adjust the governor with the governor spring adjusting nut to meet some particular operating condition. It should be noted that such adjustment should be made to take care of comparatively small speed changes only, say, 10 percent to 15 percent. Should greater speed variations be required, consult Elliott Company, since sometimes changes in governor weights and springs are necessary.

Adjustment of the governor valve is secured by loosening jam nut (946) and turning the valve stem in or out of nut (747) with a small wrench on the squared part of the valve stem. Jam nut (946) must be tightened after adjust-

ing the valve.

To check the setting of the governor proper, as received from the factory, or after any change in valve setting has been made, proceed as follows:

With the turbine shut down and the governor weights in their innermost position remove oil cylinder cover (738). Move oil piston (742) by hand until the inner edge of the slotted discharge port at the outer end of the piston is in line with the inner edge of the narrow enlarged part of the pilot valve. This position is shown in Figure 12 and corresponds to the full open position of the governor valve.

Measure and record the distance from the end of governor spring adjusting nut to the outer face of the governor lever, at a point opposite the centerline extension of the governor spindle. Next remove pin (672) and crescent retaining ring (673) and move the governor valve to its closed position, again lining up the pilot valve and piston as directed above.

Again measure the record the distance from the end of the governor spring adjusting nut to the outer face of the governor lever as before. The difference between these two measurements gives the governor spindle travel required to move the governor valve from its open or full load position to its closed or no load position. This spindle travel must not exceed $\frac{1}{2}$ " in any case. Should the spindle travel exceed, $\frac{1}{2}$ " the full load valve opening must be decreased by backing the governor valve stem out of nut (747) and the governor spindle travel must be rechecked. Replace oil cylinder cover (738).

In case it is determined by trial that the full valve opening is not required to carry full load with normal steam conditions, it is sometimes advantageous to utilize the outer range of the total swing of the governor weights, rather than the inner range. In order to adjust the governor to use the outer range, swing the governor lever out of the way by removing pins (672 and 675). Loosen jam nut (946) on the governor spindle and turn connection (655) further onto the threaded governor spindle by the required amount. Tighten jam nut (946) and replace governor lever and pins. Recheck the governor setting as described above to make sure that the limiting total spindle travel has not been exceeded and that the governor does not come up against the governor stop screws before the governor valve is entirely closed. Also oil piston (742) should not come in against the bottom of the oil cylinder before the governor valve is closed.

Improper or erratic governor operation is usually caused by lost motion due to worn parts or by sticking or binding in the steam chest, pilot valve, oil piston, or in the governor itself. If such operation is encountered, shut the turbine down and look for worn pins and