This is Amendment List No. 10 to Air Publication 4282, Volume I Section 3. List of Chapters: *delete* "*(to be issued later)*" after the title of Chapter 1, and *write* "(A.L.10)" in the outer margin against the deletion. *Insert* this Chapter 1 to follow the List of Chapters. *Record* the incorporation of this A.L. in the Amendment Record Sheet.

Chapter I

OVERSPEED GOVERNOR Mk. 4

Note.—*This chapter applies to Goblin Mk. 2 aero-engines*

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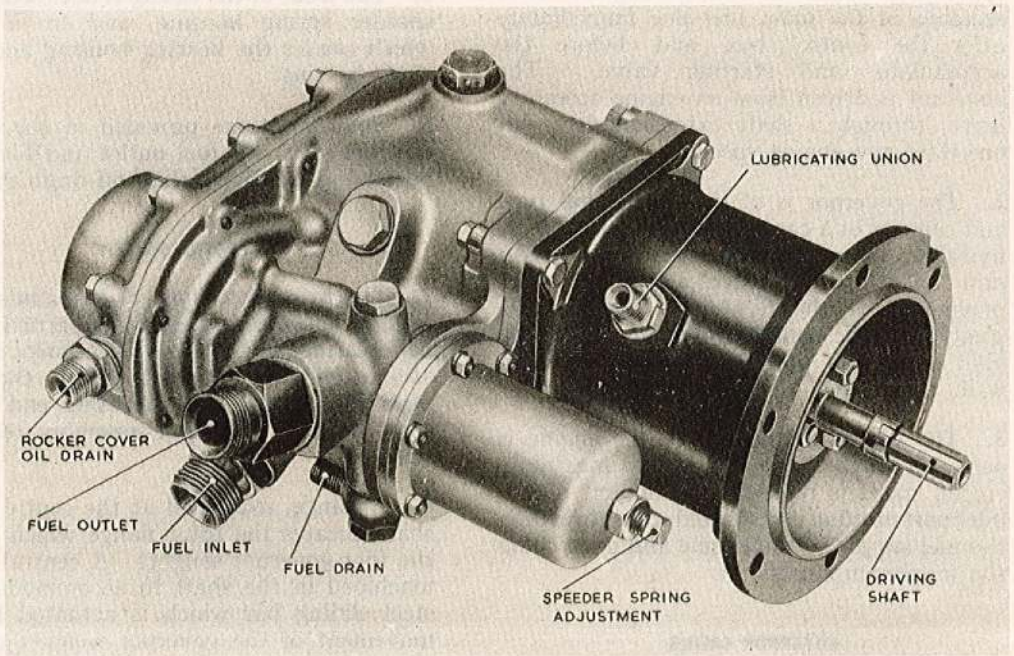

Fig. 1. Overspeed governor Mk. 4

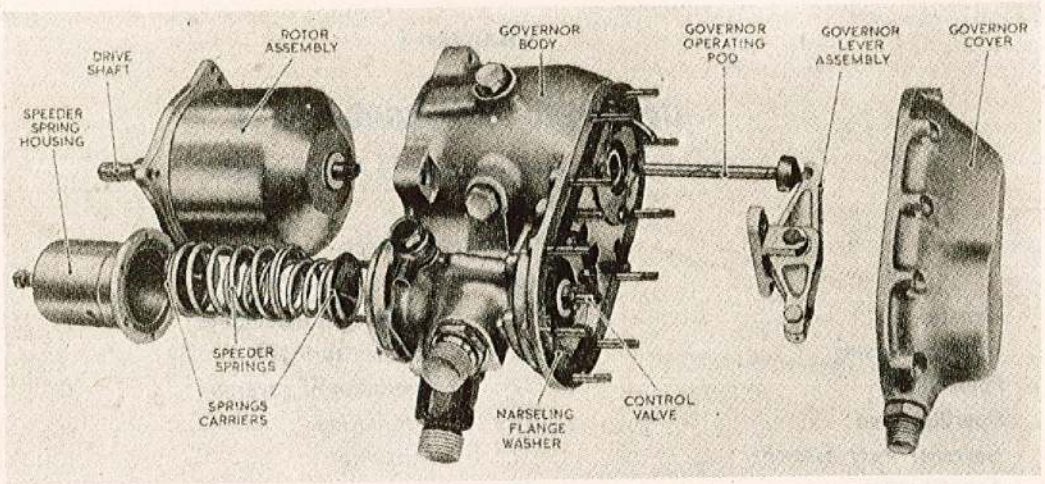

Fig. 2. Exploded view of governor unit

GENERAL

1. The overspeed governor Mk. 4 (*fig.* 1) described in this chapter is fitted to the de Havilland Goblin Mk. 2 aero-engine. It is situated in the main fuel line immediately after the control box and before the accumulator and starting valve. The governor is driven from an engine accessory drive, through a shaft extension drive, at one-third the engine speed.

2. The governor is of the centrifugal type and consists of a casing containing a rotor or flyweight assembly, connected by a rocker arm to a control valve assembly. The movement of the flyweights controls the position of the control valve in relation to inlet and outlet ports in the valve cylinder wall.

3. The whole fuel supply to the engine is passed through this valve, and as maximum engine speed is reached the amount of the inlet port opening is restricted, thus throttling the fuel supply to the engine and controlling the maximum r.p.m.

GOVERNOR CASING

4. The governor casing (*fig.* 2) is an aluminium-alloy casting with two chambers. An upper chamber which houses the rotor assembly, and a lower chamber which houses the control valve assembly. Provision is made at the rear of the casing to mount the governor lever assembly and bracket, which is enclosed by the casing cover.

5. The front of the casing is enclosed by the speeder spring housing, and by a flange which carries the bearing housing and rotor shaft bearing.

6. Four ports are provided in the casing, the fuel inlet, the fuel outlet and fuel drain ports, and the lubricating oil drain port.

ROTOR SHAFT

7. The rotor shaft (*fig.* 3) is manufactured from nickel chrome steel and is carried in two ball bearings in the governor casing. Splines at one end of the shaft receive the drive from the engine, and the other end of the shaft receives the rotor assembly retaining nut.

8. A flange, machined at the centre of the shaft, locates the rotor flange which carries the four governor weights. A central slot is machined in the shaft to accommodate the steel sliding bar which is actuated by the movement of the governor weights upon a sliding spring carrier and its bush; these two light-alloy components, together with a fixed steel spring carrier screwed on to the rear end of the rotor shaft, support the governor spring, the whole being enclosed by a steel casing.

9. The four "L" shaped steel governor weights are identical, each being balanced to within 0·25 grms. of one another. Each governor weight pivots on 30 needle rollers which surround small steel spindles carried by the rotor flange.

OPERATING ROD

10. A steel operating rod is housed in the centre of the rotor shaft, its lower end resting upon the sliding bar. The head of the rod carries a small thrust bearing over which is spun a carbon steel housing which retains a nickel chrome steel thrust pad. The rod is channelled for lubrication purposes.

GOVERNOR LEVER ASSEMBLY

11. The aluminium-alloy governor lever is supported in a bracket, mounted on the main casing, by a short steel spindle. The bore in the centre of the lever is bushed with a nickel chrome steel bush, which forms the bearing housing for fifteen 2 mm. × 15·8 mm. needle rollers.

12. A $\frac{1}{4}$ in. × $\frac{1}{4}$ in. roller is pressed into one end of the lever to take the thrust from the operating rod. The other end of the lever is split and threaded to accommodate the adjusting screw which is firmly held in position by a bolt, castellated nut, and split pin.

CONTROL VALVE (*fig. 4*)

13. The control valve is manufactured from S.14 steel, it is housed in a steel sleeve or barrel in the lower chamber of the casing. A waisted centre portion allows the free passage of fuel. At either end the valve is extended to carry the two diaphragm assemblies (*fig. 4*), each being retained by a castellated nut, which screws on to the two threaded portions provided. The plain extension at one end of the valve abuts on to the governor lever adjusting screw. The other end plain portion, the end of which is conical, supports a speeder spring carrier plate.

14. The control valve barrel or sleeve is contained within the lower chamber of the casing. It contains a number of fuel inlet and outlet ports which align with two annular grooves formed in the main casing.

DIAPHRAGM ASSEMBLIES (*fig. 4*)

15. To prevent leakage of fuel from either end of the control valve two diaphragm assemblies each containing two Neoprene sealing discs are employed, two at either end of the valve. The sealing discs are supported at their outer edges by aluminium alloy recessed fixing rings, and at their centres by small aluminium washers. As stated in the previous paragraph the two diaphragm assemblies are carried on the extended portions at either end of the control valve.

SPEEDER SPRINGS

16. The inner and outer steel springs are carried between two steel spring carriers, one of which abuts on the conical end of the control valve, while the other is supported by a conical ended adjusting screw carried in the end wall of an aluminium housing which is secured to the main casting by six retaining nuts.

OPERATION OF GOVERNOR (*fig. 5*)

17. As the speed of the engine increases, the centrifugal loading on the governor weights gradually overcomes the action of the governor spring and moves outwards; in so doing the governor spring is compressed and the centre shaft of the flyweight system lifts. This movement is transmitted by the rocker arm to the control valve system, the valve is depressed and a metering shoulder of the valve moves, in sufficient restriction being offered to the fuel flow to limit the engine r.p.m. to the maximum calibrated setting permitted.

INSTALLATION

18. Before fitting the governor it is essential to see that the mounting flange on the engine,

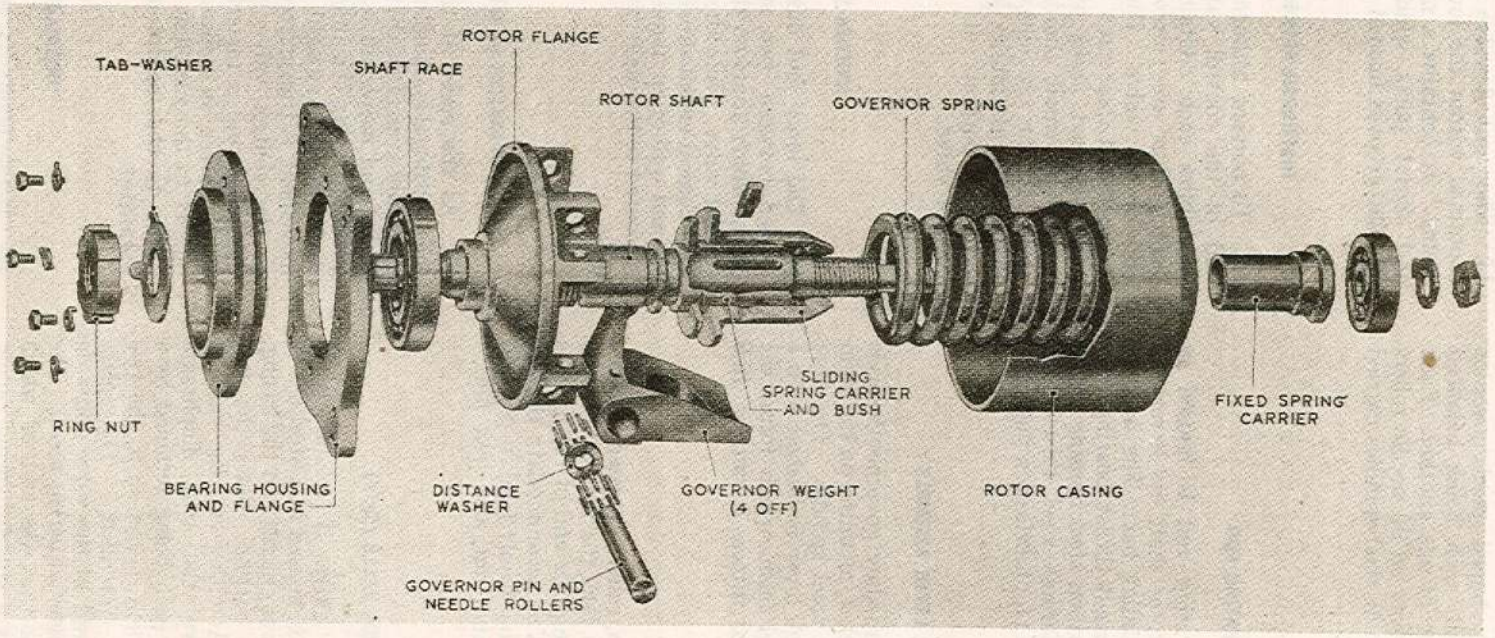

Fig. 3. Exploded view of rotor assembly

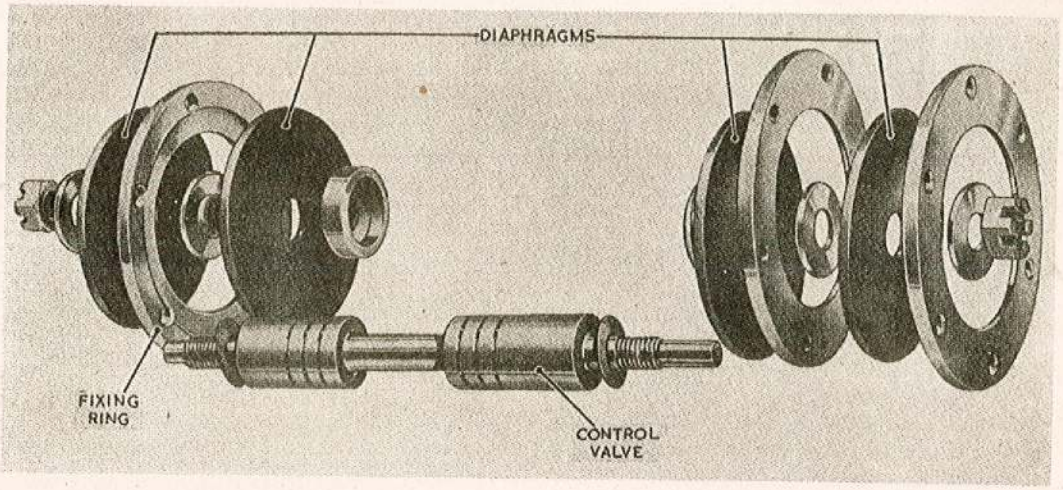

Fig. 4. Exploded view of control valve and diaphragm assembly

and the flange on the extension drive of the governor, are clean and undamaged. After cleaning, smear the joint faces with approved jointing compound, and align the splined shaft of the governor with the splined drive on the engine; then push the governor into position and secure with the six nuts, plain and spring washers.

SERVICING

19. Servicing the governor after installation, other than a periodic check of the nuts and unions for tightness, is not permissible. In the event of the governor being defective it must be removed, all ports suitably blanked, and the governor returned to the repair unit for rectification.

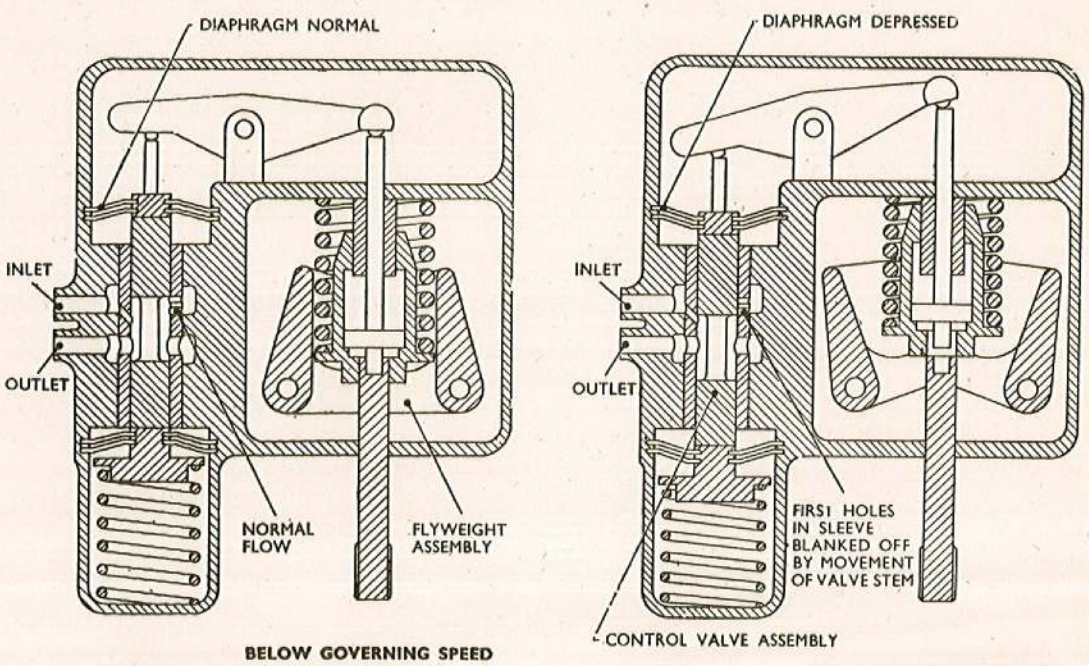

Fig. 5. Operation of governor