Chapter I

HOBSON PRESSURE LIMITING VALVE Mk. 4/1

(Goblin Mk. 2 aero-engine)

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DESCRIPTION

1. The Hobson pressure limiting valve (*fig.* 1) has been designed for use on the Goblin and Ghost aero-engines. This chapter deals with the Mk. 4/1 valves, as fitted to Goblin Mk. 2 aero-engines.

2. The purpose of the pressure limiting valve is to ensure that the fuel pressure in the burner manifold does not fall below the safe minimum operating figure, thereby providing a safeguard against the possibility of the flame being extinguished if the throttle is closed quickly at extreme altitude.

3. The unit operates in conjunction with the throttle control box and functions only when the pressure in the burner manifold falls below a specified pressure. In this event the by-pass valve in the unit is opened by spring pressure, thus permitting a sufficient amount of fuel to by-pass the throttle control needle to enable the appropriate idling speed for that altitude to be maintained. By this means, a safe minimum fuel pressure at the burners is ensured irrespective of the position of the needle which, in effect, is the engine throttle control.

4. The main body of the type Mk. 4/1 valve, as fitted to the Goblin Mk. 2 engine consists of two cast-aluminium sections, dowelled and bolted together. A spring retainer, housing a strong coil spring, is secured in the outer section. The spring is accommodated in a plunger to the inner

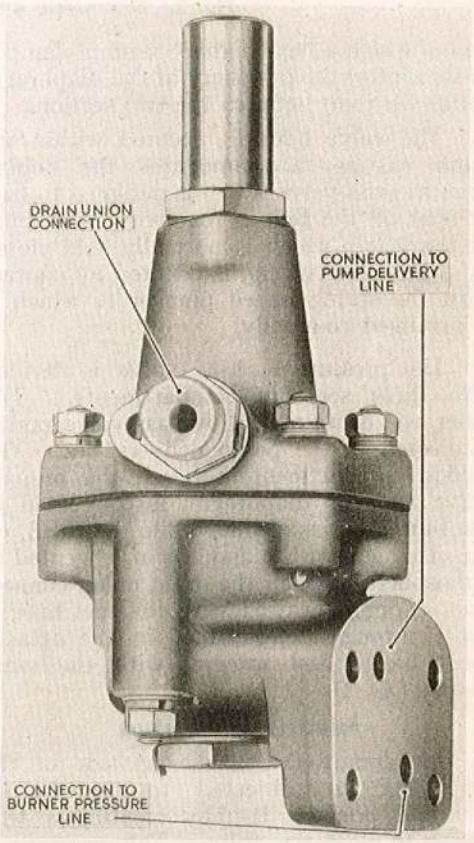

Fig. 1. The Hobson pressure limiting valve, Type Mk. 4/1

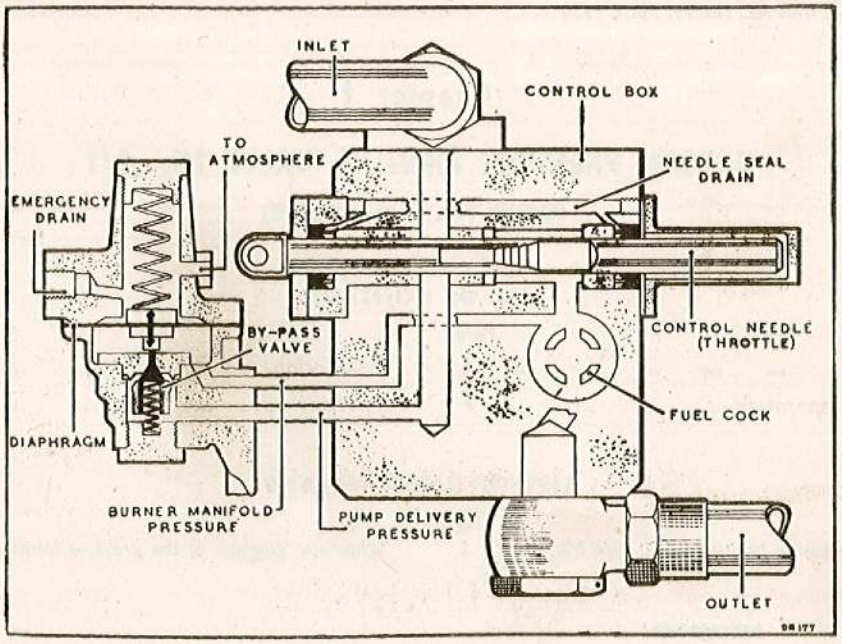

Fig. 2. Schematic diagram of the pressure limiting valve

end of which a flexible diaphragm is clamped at its centre; the periphery of the diaphragm forms the joint between the two sections.

5. The valve housing, secured within the main casting, accommodates the poppet type by-pass valve which is designed to pass or shut off the fuel as required. Movement of the valve, which is normally held closed by a light coil spring, is effected by contact with the spring-loaded plunger to which it is arranged co-axially.

6. The pressure limiting valve is divided into three separate compartments. The inner one contains the by-pass valve and is connected to the pump delivery line. The second compartment, between the by-pass valve and the diaphragm, is connected to the burner pressure line, while the third, on the other side of the diaphragm, is vented to atmosphere through the drain union connection. Communication with the fuel lines is made through holes drilled in the attachment flange cast integral with the main casting (*fig.* 1).

PRINCIPLE OF OPERATION

7. As already described, one side of the diaphragm is subjected to the burner manifold pressure thereby creating a tendency to close the valve. This pressure is opposed, on the other side of the diaphragm, by a force imparted by the plunger spring, tending to open the valve.

8. Under normal conditions, the burner manifold pressure will be sufficient to overcome the load produced by the spring, so that the valve will remain closed. When the supply pressure is low, as at altitude, sudden closing of the throttle needle will result in a burner manifold pressure so low as to cause unsteady combustion and even extinction of the flame. In such circumstances, the load exerted by the plunger spring is sufficient to open the valve and permit fuel to flow directly from the pump to the burners irrespective of the throttle needle position. The area of the diaphragm and adjustment of the spring load is such as will maintain steady combustion under all conditions.

INSTALLATION

9. The type Mk. 4/1 pressure limiting valve, as fitted to the Goblin Mk. 2 engine, is attached directly to the appropriate control box joint face.

SERVICING

10. Servicing of the pressure limiting valve, after installation on the engine, is not permissible. In the event of the pressure limiting valve becoming defective it must be completely removed, the ports suitably blanked off, and the valve returned to an approved Repair Depot for the necessary rectification and testing.