Chapter 3

FLOW DISTRIBUTOR, TYPE FD.26 SERIES

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Introduction

1. The flow distributor meters the fuel evenly under all conditions on engines employing multiple burners, and it can be used with any type of burner.

2. When used with Simplex and Duplex 2 burners it functions essentially as a flow equaliser; the effects of manifold head on Simplex type burners being overcome by the fact that each burner is connected directly

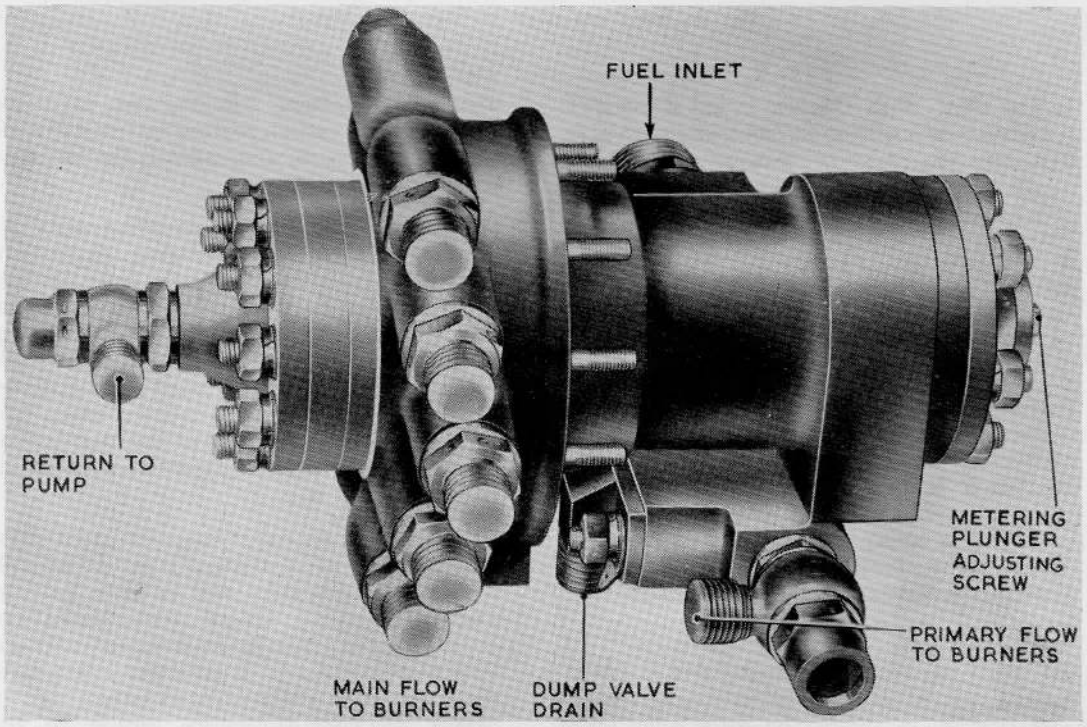

Fig. 1. Flow distributor

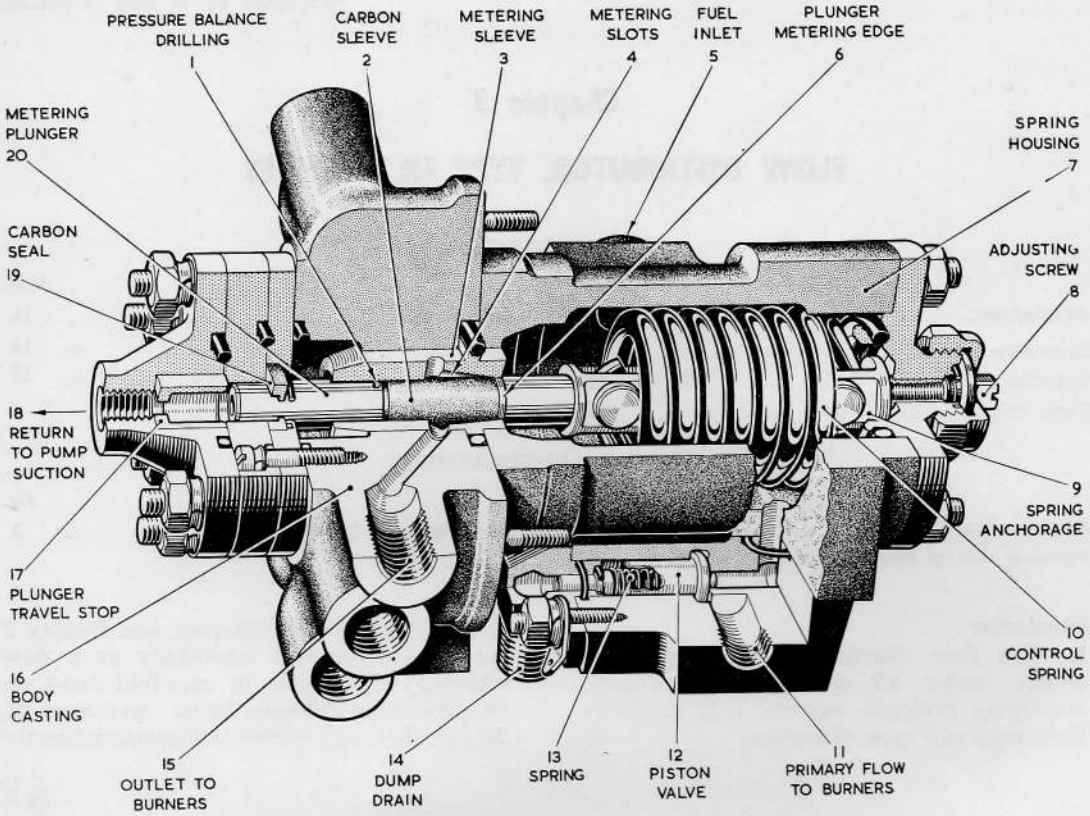

Fig. 2. Cut-away view of Flow distributor

to the unit. With Duplex 1 and 3 burners it operates as a splitter or (pressurizing) valve and corrects recovery pressure variations, as all main flow passages are separate, the primary flow being tapped off the inlet supply.

3. On systems employing air/fuel ratio controls it can be arranged to produce a flow to any burner which is very nearly proportional to pressure.

4. The unit incorporates a built-in, automatic dump valve to ensure complete draining of excess fuel from the burners and manifolds each time the engine is stopped. In view of this it is desirable to mount the unit as low as possible on the engine. A typical unit in this series is designated FD.26/29P, FD.26 being the basic type, '29' being the installation code and 'P' the calibration code.

Description (*fig. 1*)

5. The unit, consists essentially of a spring-loaded plunger (20), operating in a cylindrical metering sleeve (3) in the distributor body (16). A carbon sleeve (2) is cemented to the plunger to reduce stiction and minimise hysteresis, the carbon portion extremity forms a metering edge (6) and controls the fuel flow to the burners.

6. The specially-shaped tapering slots (4) in the walls of the metering sleeve are uncovered progressively by the plunger metering-edge as the plunger moves under the influence of fuel pressure. The metering slots terminate in drillings through the walls of the sleeve and communicate with drillings which transfer the fuel to delivery ports (15) connected to the burners, the number of metering slots depending upon the number of burners in the engine.

7. Each slot therefore, supplies an individual burner with a metered flow of fuel and, if desired, differentiation in flow can be supplied to suit special requirements of certain burner positions; such differentiation is obtained either by calibrating the appropriate metering slots during manufacture or by fitting specially calibrated unions to the appropriate distributor outlet ports.

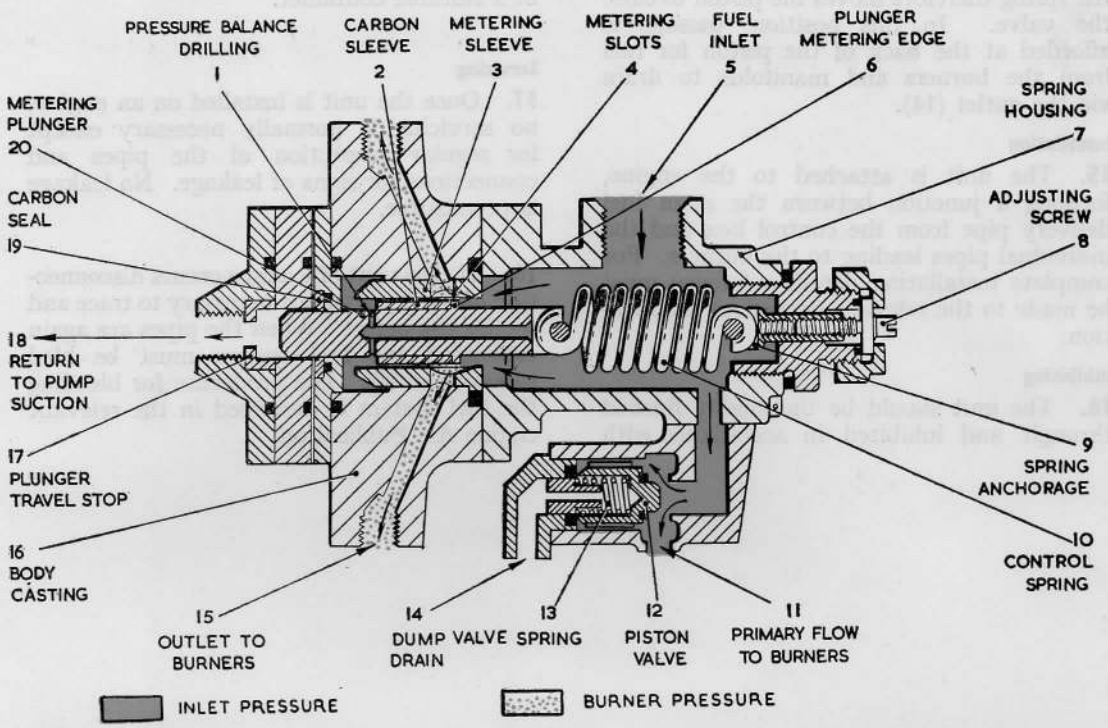

Fig. 3. Flow distributor (functional diagram)

8. The tail of the metering plunger is reduced in diameter to form a pilot and operates in a carbon sealing bush (19) which guides the plunger tail and also seals against leakage from the pressure-balancing chamber below the carbon portion of the plunger. A small cross drilling (1) through the plunger pilot communicates with an axial drilling; this pressure-balances the plunger and prevents 'hydraulicing' by any fuel leaking between the plunger and metering sleeve wall.

9. Any leakage past the carbon seal is conducted through the plunger travel stop (17) to the drain outlet or pump suction return.

10. An adjustment screw (8) proportions the fuel flow relative to fuel pressure.

Operation

11. At low throttle valve delivery pressures the plunger uncovers only a small portion of the metering slots and at these low flows the pressure drop across the slots is sufficient to overcome all other effects, thus equalising the flow to each individual burner. Increased inlet pressures will move the plunger further up the cylinder until the slots become fully uncovered, when the pressure drop across the slots is less, and with any type of burner equalisation of flow will be dependent then upon the accuracy with which the burner sets are matched.

Dump valve

12. The dump valve body houses a piston type non-return valve (12) loaded by a spring (13). The piston head is designed with two different areas which are subjected to the fuel delivery during its operation.

13. When the engine is started, fuel pressure acts upon the smaller area of the piston to overcome the spring pressure. The valve partially opens, admitting fuel to the extra area of the piston whereon the valve snaps fully open, the outlet to the dump valve (14) is now sealed off and fuel passes to the burners via the outlet (11).

14. When the engine is stopped, pressure in the delivery line drops to practically zero, the spring therefore moves the piston to close the valve. In this position, passage is afforded at the back of the piston for fuel from the burners and manifolds to drain via the outlet (14).

Installation

15. The unit is attached to the engine, forming a junction between the main fuel delivery pipe from the control box and the individual pipes leading to the burners. For complete installation details reference must be made to the relevant engine Air Publication.

Inhibiting

16. The unit should be thoroughly flushed through and inhibited in accordance with detailed information contained in A.P.4471A. Fit dust caps to all connections and pack in a suitable container.

Servicing

17. Once the unit is installed on an engine, no servicing is normally necessary except for regular inspection of the pipes and connections for signs of leakage. No leakage is permissible.

18. If the event of leakage occurs disconnection of the pipes will be necessary to trace and rectify the defect. When the pipes are again connected the fuel system must be bled to expel all air. The prodecure for bleeding the fuel system is described in the relevant engine Air Publication.