Chapter 6

FUEL CONTROL UNIT

Types BA.27683, BA.43893, BA.60351, BA.61075, BA.61076, BA.62403, BA.73323, BA.81149

LIST OF CONTENTS

LIST OF ILLUSTRATIONS

Introduction

1. The fuel control units listed in the heading of this chapter are basically the same and differ only in such minor items as the run of exterior pipes, unions, and the angular settings of levers. The basic unit consists of the barometric pressure control (B.P.C.), the combined pressurizing valve, high pressure cock and throttle valve, and the low pressure fuel filter. The B.P.C. is described in A.P.4282A, Vol. 1, Sect. 3.

2. The operation of the fuel control unit in relation to the complete fuel system is described in Vol. 1, Part 1, Sect. 1, Chap. 2 of the relevant engine Air Publication.

3. The pressurizing valve, high pressure cock and throttle valve are combined to form one component which distributes fuel and controls the flow in conjunction with the B.P.C.

4. The throttle valve provides manual control of the flow of fuel to the engine, and therefore of engine r.p.m. The high pressure cock is used to stop the engine by cutting off fuel flow to the burners. The pressurizing valve proportions the fuel flow between the burner primary and main lines according to the fuel pressure in the primary line.

5. The fuel flows of secondary importance in the functioning of the units are as follows:—

(1) Internal leakage past the component plungers, and fuel from the throttle valve when the H.P. cock is closed, is returned to filter outlet, the passages from each component converging into a collection chamber at the end of the H.P. cock spindle.

(2) Residual fuel in the burner lines, when the H.P. cock is closed, is directed to atmosphere through a multiple connection point for all fuel component drains on the engine.

(3) Throttle inlet pressure is directed through an external connection to the B.P.C. This connection incorporates an attenuator consisting of orifice plates and distance washers to damp out pressure fluctuations. Annular sealing rings between the mating faces prevent fuel leakage at transfer points.

Throttle valve

6. The throttle valve is a rack and pinion operated, profiled plunger, controlling the flow of high pressure fuel through a fixed orifice.

7. To permit setting of the rate and range of throttle valve movement, the throttle valve lever on the end of the pinion spindle has a serrated eccentric hub or a slot in the

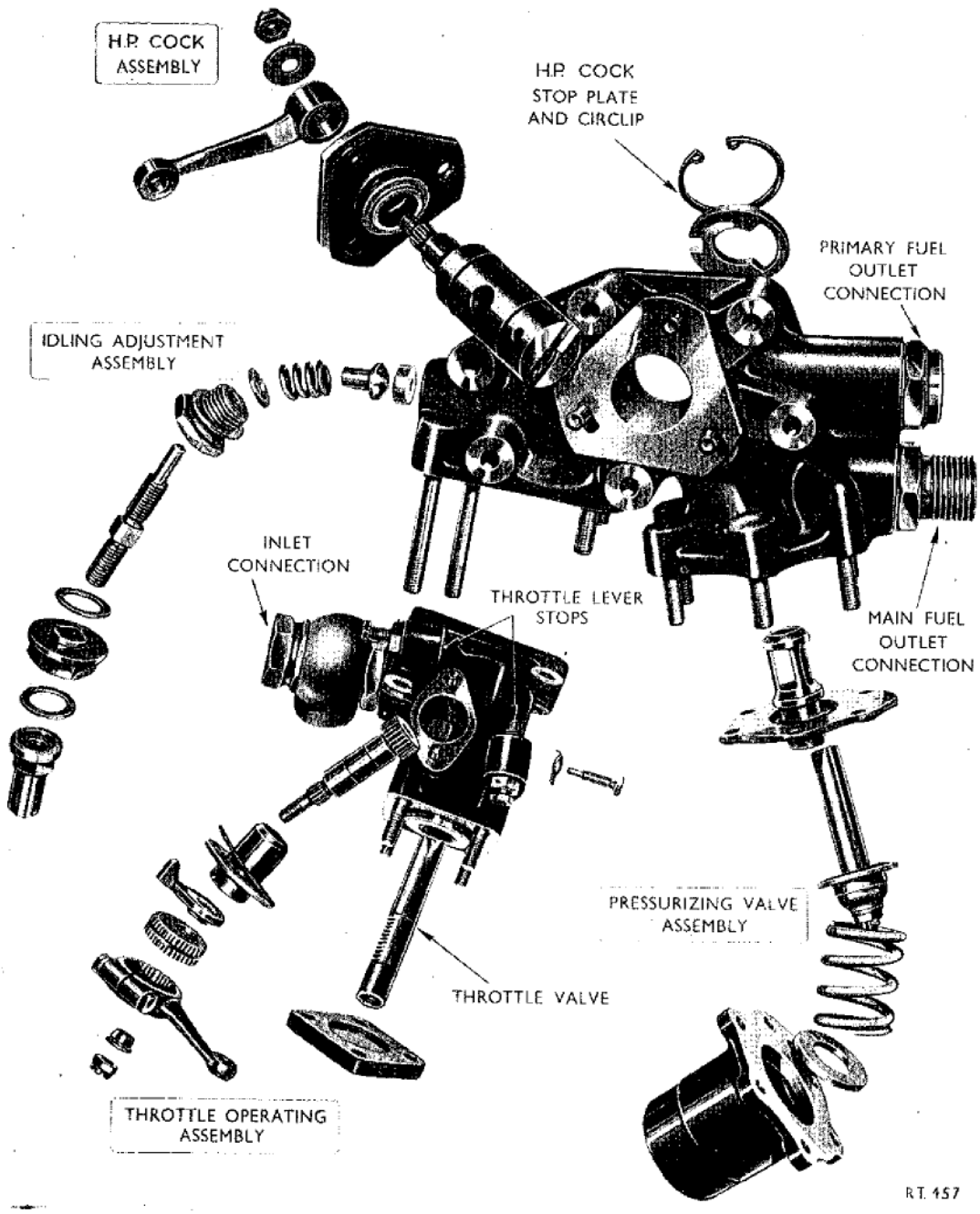

Fig. 1. Pressurizing valve, high pressure cock and throttle valve

end of the lever. In the former type the eccentric hub also provides vernier adjustment of the lever angle on the spindle, and in the latter type a worm drive adjustment for lever angle is incorporated.

8. Stop screws on the throttle valve assembly casing provide adjustment for the throttle valve open and closed positions.

9. To maintain consistent meshing of the rack and pinion a locating screw prevents plunger rotation.

10. Throttle control loading is reduced by balancing the fluid pressures through the bore of the plunger. The bore is also threaded to facilitate extraction of the plunger.

11. The rack and pinion are lubricated by L.P. fuel from the filter and a seal is fitted in the sleeve to prevent external fuel leakage from the pinion shaft.

12. The throttle by-pass provides a means of adjusting the flow of fuel from the throttle valve inlet to the inlet side of the high pressure cock independently of throttle position. The by-pass, in conjunction with throttle lever position and travel stops (*para. 7 and 8*), permits the adjustment of engine idling r.p.m. after throttle synchronization.

13. Fuel flow through the by-pass can be varied by turning the adjuster. This moves a small plunger axially inside the orifice body and so alters the effective slot area through which the fuel flows. The adjuster is an internally squared hexagon engaging with a square on the adjusting screw, which is locked by a cap-nut. Fuel leakage is prevented by washers interposed between mating faces.

14. To synchronize the engine speed on multi-engine aircraft certain units incorporate a connection for receiving high pressure fuel from a corrector unit (fig. 4). The fuel is conveyed through ports in the sleeve and plunger and through the fine bore of the plunger, thus by-passing the throttle orifice and increasing the total flow to the burner manifolds.

15. The slot in the base of the plunger does not mate with the slot in the base of the sleeve until the throttle valve opens approximately 10 deg.; this ensures that the synchronizing system is inoperative below approach idling r.p.m.

16. The slot in the base of the plunger incorporates a tapered flat; this provides a gradually increasing orifice through which the fuel from the corrector unit must pass. The tapered flat reaches its maximum size when the throttle valve has opened 42 degrees and after this point it ceases to have any affect on fuel flow.

High pressure cock

17. The high pressure cock provides the means of cutting off the fuel supply to the burners by interrupting the flow from the throttle outlet. To recirculate fuel when the cock is closed a passage in the cock spindle aligns with the throttle outlet passage and directs the fuel back to the L.P. filter outlet.

18. Except in the earliest type a relief valve is incorporated in the L.P. filter casing to prevent the L.P. fuel pressure exceeding 30 lb. per sq. in. above atmospheric pressure. This valve is only liable to lift when the H.P. cock is closed and fuel is diverted into the L.P. filter; the valve can not relieve fuel pressure when the H.P. cock is open, because its corresponding passage in the H.P. cock is blanked off.

19. Further passages in the cock align with the passages to the burners to direct fuel remaining in the primary and main burner supply lines to a combined drain connection situated on the low pressure fuel filter casing.

20. To ensure correct angular positioning of the cock relative to the casing passages, a lug on the end face of the cock moves in a limiting slot in the stop plate located on the end of the cock sleeve.

21. Except in the earliest type, a non-return valve is fitted in the L.P. filter casing adjacent to the H.P. cock so that if the cock is left partly open the valve will prevent fuel draining right through from the fuel tanks.

22. To provide for radial pressure balance of the cock two grooves are formed on its outside periphery, and to assist freedom of rotation of the cock in the sleeve, the bore in the cock retaining plate, through which the cock operating spindle passes, is spherically formed to give line contact at the seal on the spindle. This seal, together with the seal in the retaining plate spigot prevents external fuel leakage from the cock.

Pressurizing valve

23. The pressurizing valve is a calibrated spring loaded plunger operating in an orifice connecting the primary and main burner passages.

24. At low fuel pressure the valve remains closed and fuel flows to the primary passage only.

25. With increasing fuel pressure in the primary passage the valve progressively opens against spring pressure to allow fuel to flow into the main passage.

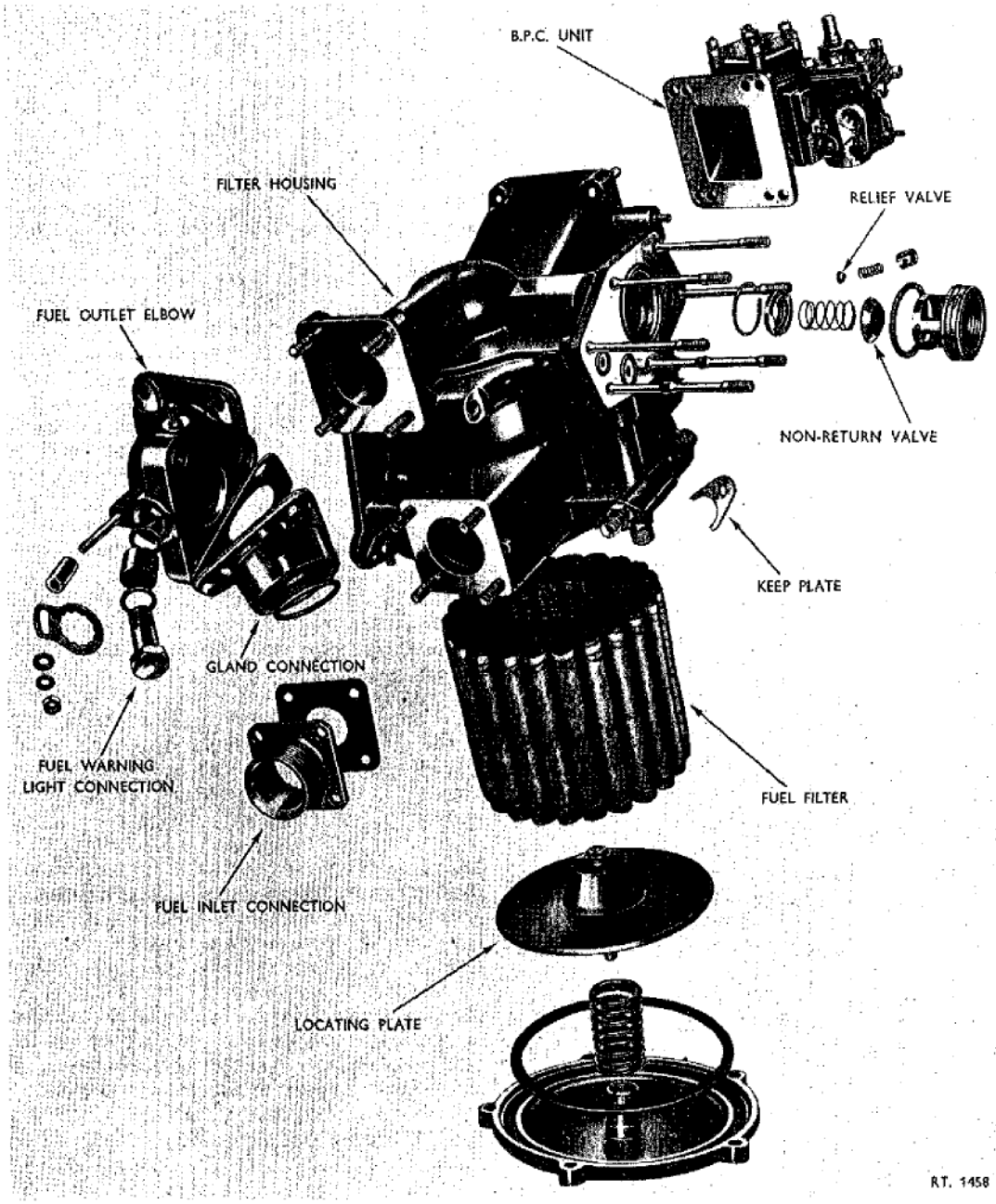

Fig. 2. Low pressure filter

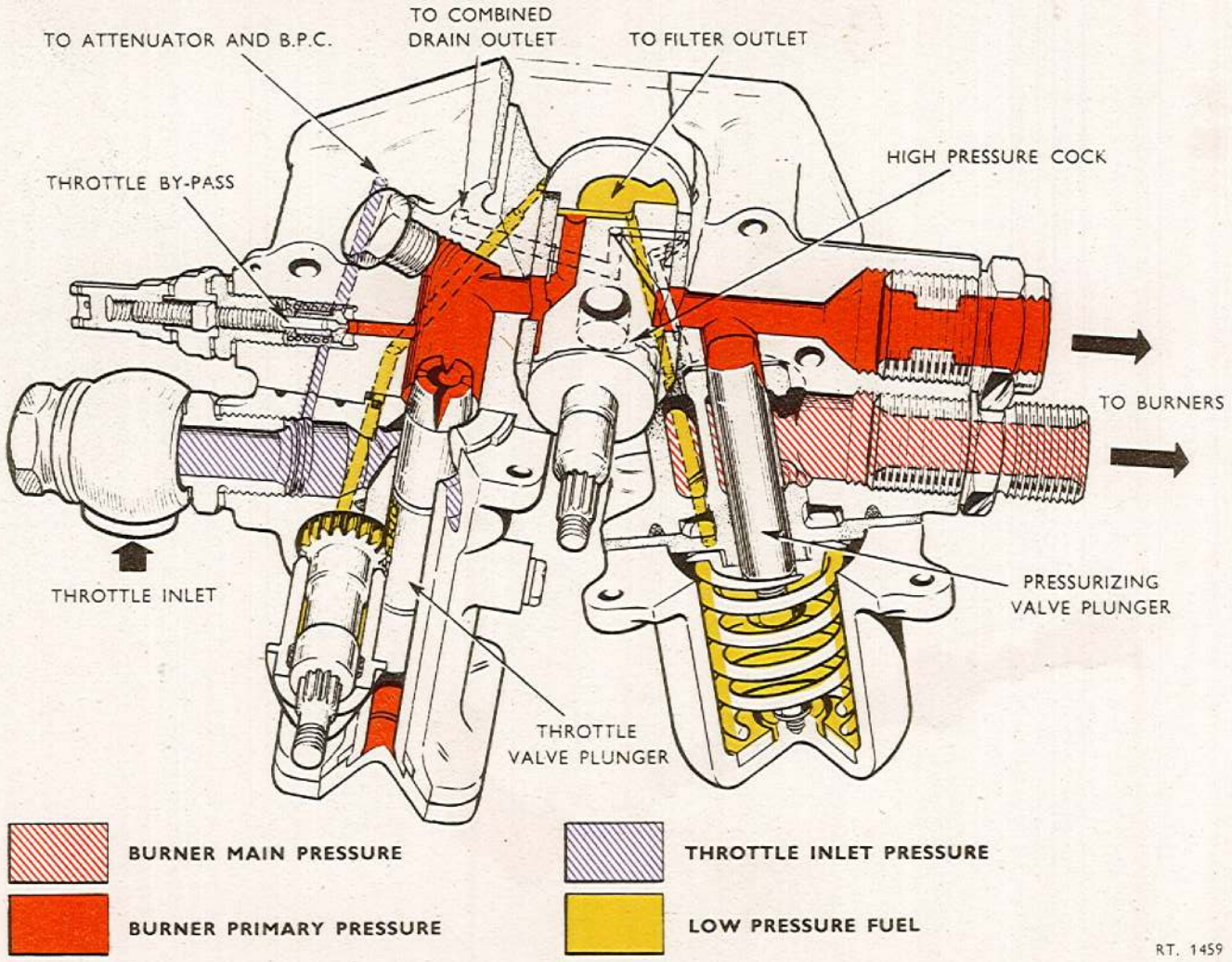

Fig. 3. Pressurizing valve, H.P. cock and throttle valve

PP8052 160994 5227 13/56 1750 C & P Grp. 949 (1)

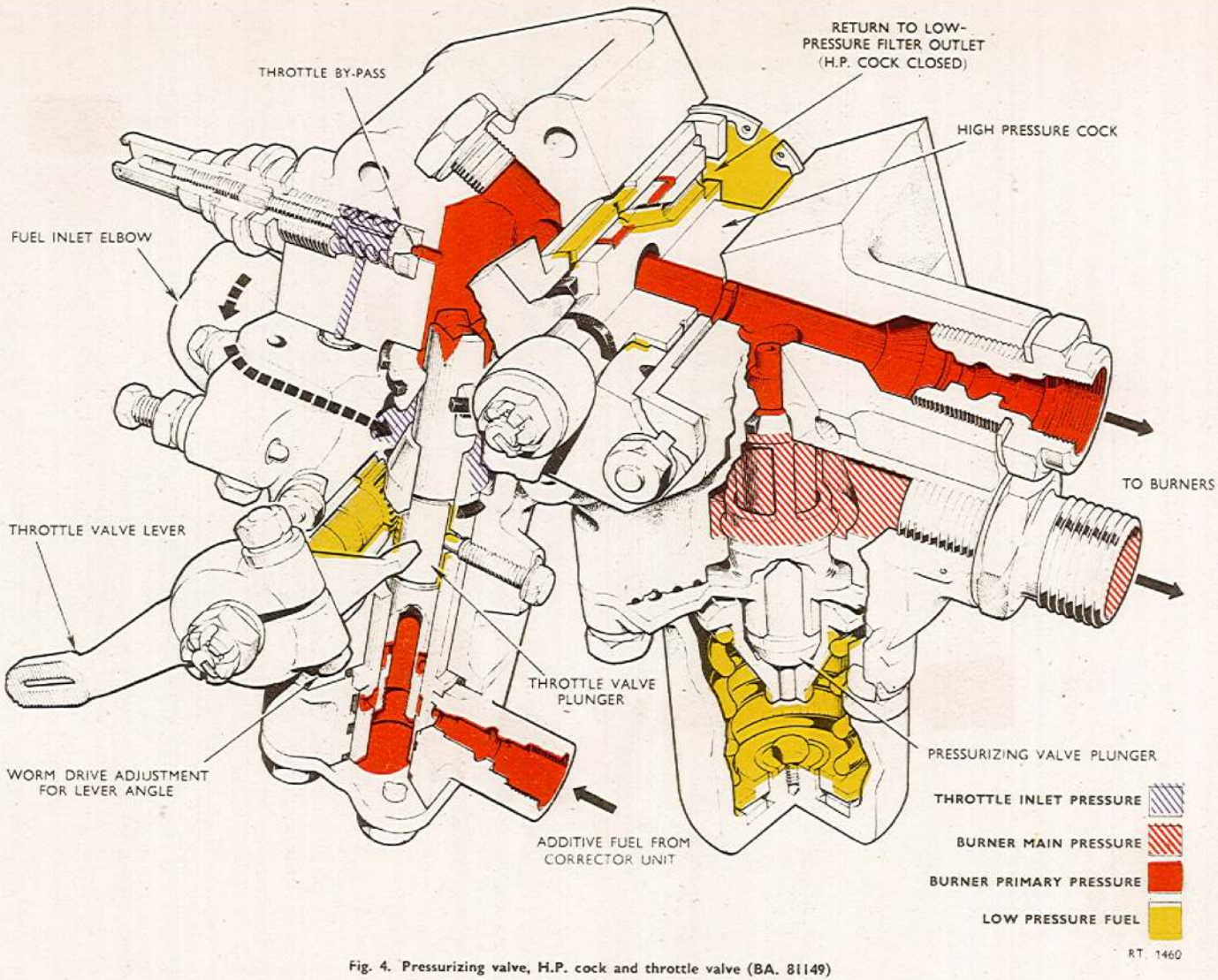

Fig. 4. Pressurizing valve, H.P. cock and throttle valve (BA. 81149)