

## Chapter 3.—COMBUSTION CHAMBERS

**Note.**—This chapter applies to Avon Mk. 10701, 10901, 11301, 11501, 12101 and 12201 Engine Change Units and Associated Jet Pipes

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## COMBUSTION CHAMBERS

### Removal

1. The following instructions cover the removal of a complete set of combustion chambers. Chambers 2, 4, 5 and 7 may be removed individually if necessary.

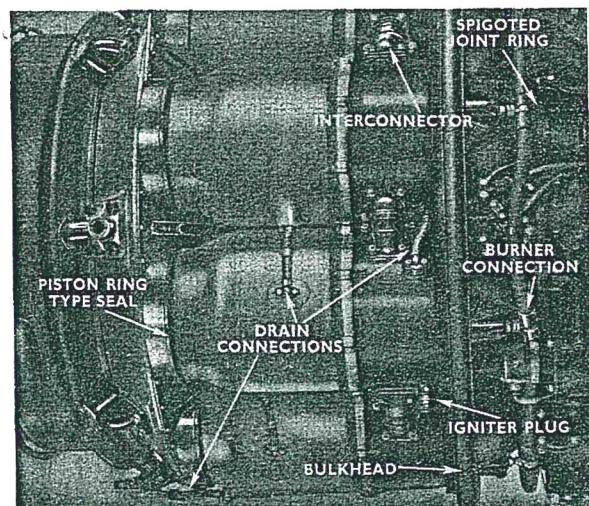
2. Before handling the high-tension leads to the igniter plugs, attention is directed to the WARNING given in Chap. 8 under the heading 'Igniter plugs'. Detach the high-tension cables from the igniter plugs and disconnect the fire extinguisher pipe from both sides of the bulkhead.

3. Remove the rubber sealing ring from the bulkhead channel and detach each section of the bulkhead in turn by unscrewing the retaining setscrews or nuts.

4. Disconnect both fuel pipes from each burner, and the drain pipes connecting No. 4 and 5 chambers to the drain connection mounted on the nozzle box.

5. Remove the setscrews or nuts from both ends of each of the interconnectors, part the joints and remove the interconnectors. Also remove the setscrews or nuts from the drain connections between the various chambers, part the joints and remove the pipes completely.

6. Numbers 2 and 7 combustion chambers must be removed first to gain access to the fuel drain pipes linking No. 1 and 3 and No. 6 and 8 combustion chambers. Remove the two bolts securing each expansion chamber to the compressor outlet casing. Grasp the expansion chamber in both hands and push it vigorously towards the turbine, causing the combustion chamber to slide into the nozzle box sufficiently to enable the expansion chamber to clear the



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Fig. 1 Combustion chambers

spherical joint ring. Pull the chamber outwards past the compressor outlet and withdraw it from the nozzle box. Remove the spherical joint ring from the compressor outlet elbow, and blank off all apertures as soon as the combustion chamber has been removed.

7. Remove the setscrews from the drain connections revealed by the removal of No. 2 and 7 combustion chambers. The other chambers may then be removed in a similar manner, in any convenient order. The tachometer generator must be removed to facilitate withdrawal of No. 6 combustion chamber.

#### *Replacement*

8. Clean the interconnector joint faces, using hot water (*nearly boiling*) to remove the old jointing compound.

9. Lubricate the sealing ring at the discharge end of each combustion chamber with anti-seize grease, ZX-13 (Ref. No. 34B/9100528), and apply similar grease to the mating faces of the nozzle box.

10. The combustion chambers may be fitted in any convenient order, except that No. 2 and 7 must be left until last.

11. To fit a combustion chamber, remove all blanks, insert the discharge end into the nozzle box and push it in as far as possible. Line up the other end with the compressor outlet and, after inserting the spherical joint ring (*spigot into compressor outlet duct*), move the chamber forward to complete the joint.

12. Place a spigoted washer on each of the two spherically faced retaining bolts (*hollow side towards the bolt head*), insert the bolt from the front of the engine, then fit a second spigoted washer (*hollow side towards the nut*) and the spherically faced castellated nut.

13. To ensure positive bedding of the combustion chamber on its spherical seating, nip the two retaining nuts evenly and then slacken off and retighten to finger tightness only. Turn the nuts a further castellation and fit the split pin. Undue tightness of these nuts may cause a fracture of the combustion chamber mounting flange under running conditions.

14. Having fitted all except No. 2 and 7 combustion chambers, fit the drain pipes between

No. 1 and 3 chambers and No. 6 and 8 chambers, then fit the remaining chambers to the engine.

15. Assemble the interconnectors to the combustion chambers, making sure that all the inner flanged tubes are fitted. Use the special high-temperature jointing compound Sq.2 (D.T.D.900/4344) manufactured by Rolls-Royce Limited to seal all the face joints. Fit the remaining drain pipes between the combustion chambers and those to the drain on the nozzle box.

16. Assemble the bulkhead, equalizing the gaps between the bulkhead panels; before fitting the bulkhead sealing ring, ensure that the vent holes are clear.

17. Connect up both fuel pipes to each burner, and the fire extinguisher pipes to the bulkhead. Fit the igniter plugs, and reconnect the l.t. and h.t. leads.

#### *Serviceability check*

18. Run the engine up to maximum rev/min to check that the jet pipe temperature is within the permissible limits, and examine the combustion chambers externally for signs of local overheating and blowing joints.

## FLAME TUBES

#### *Removal*

19. Remove the combustion chamber from the engine as described earlier in this chapter.

20. Remove the bolts from the joint flange and separate the air casing from the expansion chamber. Detach the flanged interconnector tubes from the flame tube, then release and remove the locating tube from the expansion chamber, and withdraw the flame tube.

#### *Replacement*

21. The burner must be in position before the flame tube is fitted.

22. Stand the expansion chamber on its inlet end and insert the flame tube, locating it on the burner spigot.

23. Line up the interconnector and locating tube apertures in the flame tube with those in the expansion chamber, and insert and secure the locating tube.

24. A new rubber sealing ring must always be fitted to the air casing and expansion chamber waist joint; no lubricant should be applied to either the sealing ring or air casing spigot.

25. Fit the air casing to the expansion chamber as follows:—

- (1) Ensure that there are no burrs on the air casing chamfer.
- (2) Stretch the rubber sealing ring over the air casing spigot and push it down to the radius, taking care not to twist the rubber.
- (3) Fit the split sealing ring to the air casing spigot and, using a feeler, check for distortion between the sealing ring and spigot. The maximum limit is 0.005 in. provided that the distortion is over an arc of not less than six inches.
- (4) Remove the split sealing ring from the air casing spigot and insert it in the groove in the expansion chamber. Fit the air casing to the expansion chamber, lining up the bolt holes before pressing down into position; the

components must not be rotated relative to each other when the air casing is fully home, as this could damage the rubber sealing ring.

(5) Fit the joint flange securing bolts and, using the torque wrench listed in Sect. 1, torque load them to 25 lb in. direct or 20 lb in. using a three-inch extension. To ensure that the rubber sealing ring is correctly fitted, check that a 0.005 in. feeler will not enter between the air casing and expansion chamber flanges.

26. Refit the combustion chamber to the engine as described earlier in this chapter, then fit the flanged interconnectors to the flame tube and the elbows and sleeve to the expansion chamber, coating the joint faces with the special high-temperature jointing compound Sq.2.

#### *Serviceability check*

27. Run the engine up to the maximum rev/min to check that the jet pipe temperature is within the permissible limits, and afterwards examine the combustion chambers externally for signs of local overheating and blowing joints.

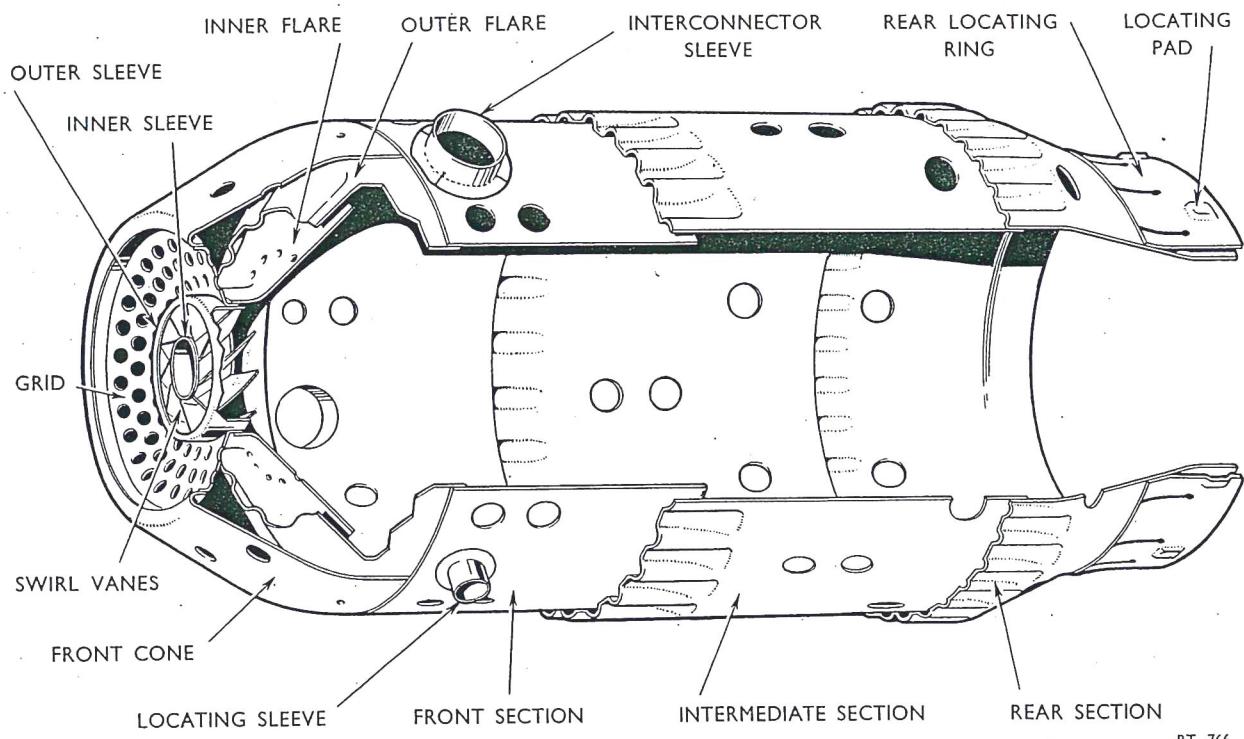


Fig. 2 Flame tube



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