Group A.2

REMOVAL OF JUNCTION BOXES, PANELS AND SHELVES

◀ (All relevant Mods included up to Mod. 1381) ▶

LIST OF CONTENTS

LIST OF ILLUSTRATIONS

Introduction

1. The majority of the junction boxes, equipment panels and a part of the cabin port shelf are designed for quick removal to facilitate servicing. This group describes, with illustrations where necessary, the removal of these units. The electrical disconnections required prior to engine removal are also included. For the location of all access doors and panels quoted in this group, reference should be made to Group A.3.

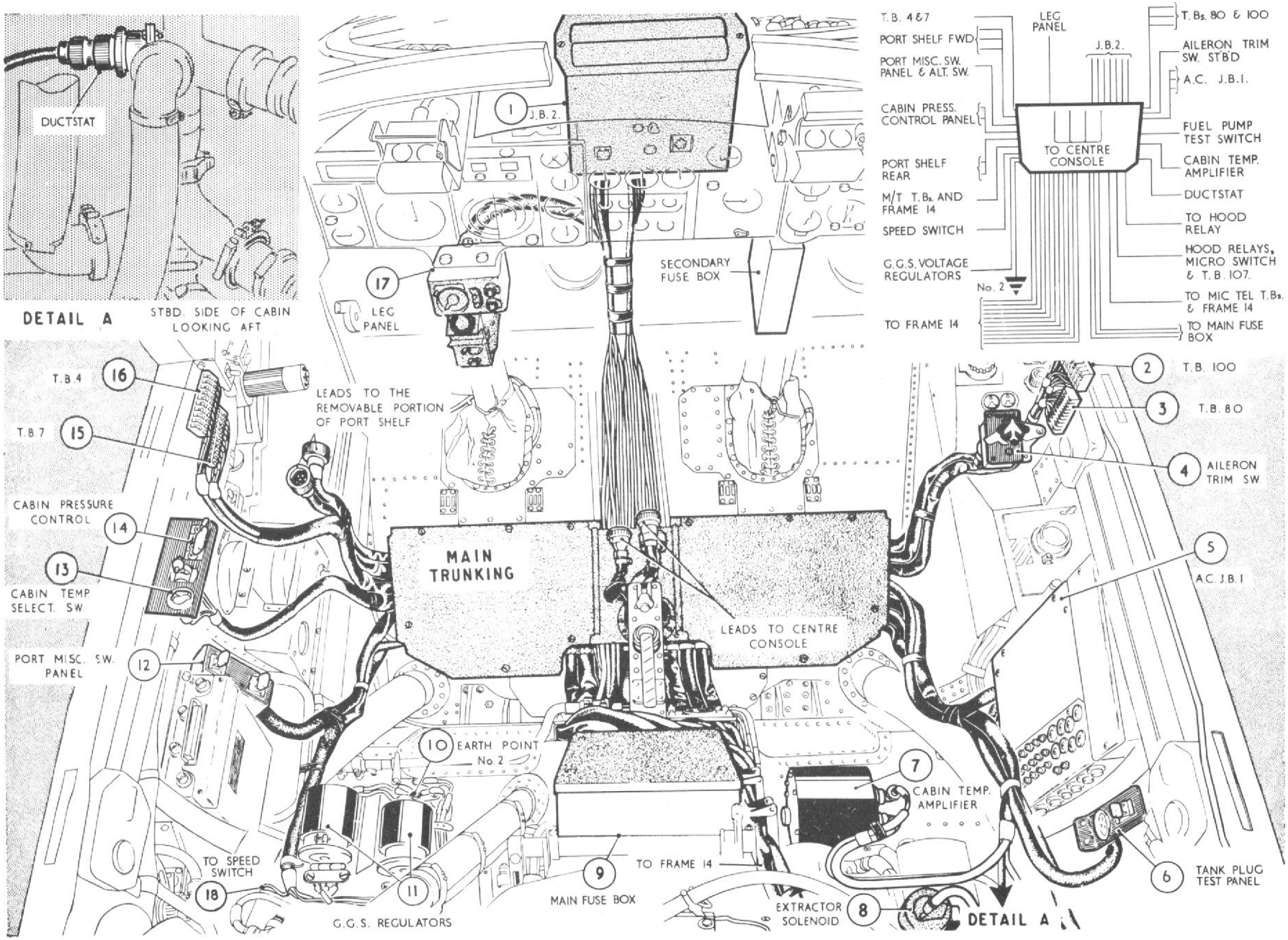

Fig. 1 Removal of main trunking

REMOVAL

General

2. Before removing any item of equipment the following precautions must be observed:–

(1) Render the aircraft electrically safe, as described in Group A.1.

(2) All bared ends of electrical cables must be insulated from each other and from the airframe by binding with insulating tape, coiled back and stowed clear to prevent damage.

(3) All disconnected plugs and sockets must be fitted with approved caps and covers to prevent entry of foreign matter.

(4) All bonding and earthing strips disconnected must be retained with the airframe and re-assembled when the component is re-installed.

Engine removal disconnection points

3. The full procedure for removing the engine is contained in Book 1, Sect.4, Chap.1. The electrical disconnections necessary when carrying out this operation, are repeated, however, in this group for the guidance of electrical servicing personnel:–

(1) Prior to preparing to remove the engine render the aircraft electrically safe, as described in Group A.1.

(2) To remove the engine, it is first necessary to break down the aircraft at the rear transport joint. The action necessary to break down the electrical system at this point, consists of disconnecting cable assemblies C10, C11, C12, C84, PC14 and the U.H.F. tele-briefing connector TS4 from their associated cable assemblies R1, R2, R3, R36, PC15 and TS5. All these breakdown points are located between the transport joint frames and access may be gained after removal of the transport joint butt-strap. It is also necessary to disconnect the gyro compass connector at its break-down connection, located in the spine member adjacent to the transport joint.

(3) The action necessary to break down the electrical services to the engine, consists of disconnecting cable assemblies C3 and C6 from the plugs mounted on the bottom starboard side of the engine compressor, access being obtained via the engine access door located just forward of the transport joint.

(4) It is also necessary to disconnect the H.T. leads from the igniter plugs on the engine, These are located in No.3 and 6 combustion chambers and access to them is obtained via the doors located one on each side of the centre fuselage just forward of the transport joint.

Note . . .

Extreme care must be taken to ensure that the insulators of the H.T. leads are not damaged in any way and action must be taken to protect these parts while the engine is being removed. It is also essential to seal the end connections of the H.T. leads and igniter plugs to prevent the entry of dirt or other foreign matter.

(5) If it is required to remove the jet pipe from from the rear fuselage, the additional action necessary to break down the electrical services consists of removing the thermocouples from the jet pipe. Access to these may be gained after the removal of the tailcone.

Note . . .

The bonding strips removed must be retained with the airframe, in readiness for refitting when the engine is re-installed.

Main trunking *(fig.1 and 2)*

4. The main trunking junction box is in the form of a shallow tray, which is provided with three lids and extends across the cabin below the ejection seats. The unit is designed to be readily removable, as a complete assembly, together with all attached cable assemblies. The following procedure, although apparently lengthly, will if followed, result in a quick and easy removal of the assembly.

CAUTION . . .

Refer to LETHAL WARNING in Introduction of this A.P. and to relevant seat removal A.P. before starting this operation.

(1) Render the aircraft electrically safe, as described in Group A.1.

(2) Remove both ejection seats.

(3) Remove the centre console, as described in para.5, and the removable portion of the cabin port shelf as described in para. 20.

(4) All the cable assemblies attached to the trunking should now be disconnected at their remote terminations as detailed below and the cable runs unclipped from

the aircraft's structure in preparation for their removal with the trunking:–

(a) Cable assemblies F.1A, F.3A, F.8A, F.10, F.14A, F.17A and A.12 from junction box number 2, (1) in fig.1, and cable assembly F.6A from the leg panel (17).

(b) Cable assemblies F.44 and F.84 from the equipment on the cabin pressurization switch panel (13 and 14).

(c) Cable assembly F.88 from terminal blocks 4 and 7 (15 and 16) on the port side of the cabin between frames 9 and 10, together with cable assembly F.85 from the equipment on the port miscellaneous switch panel (12) and from the altitude switch at the rear of the cabin port shelf.

(d) Cable assembly F.94 from the speed switch, (18), the gyro gun sight voltage regulators (11), and earth point number 2 (10).

(e) Cable assemblies F.74 and F.86 from terminal block 80 (3) and the trim switch (4). Cable assembly F.87 from terminal block 100 (2). These terminal blocks are located on the starboard side of the cabin between frames 9 and 10.

(f) Cable assembly F.25, with ends A and D of F.33 from a.c. junction box No.1 (5) and earth point No.1; disconnect end B of F.33 from the fuel pump test switch.

(g) Cable assembly F.151 from the port shelf plug and socket break and assembly F.51 from the engine re-light switch.

(h) Cable assemblies F.43 and F.80 from the cabin temperature control magnetic amplifier (7) and the ductstat *(Detail A)*.

(i) Cable assemblies F.89, F.90, and F.91 from the main fuse box (9).

(j) Cable assembly F.106 from the extractor valve solenoid (8), and ends B, C, E and F of F.146 from the hood microswitch, the hood light relay. T.B.107. and the hood relay respectively.

(k) Cable assemblies A.8, F.1B, F.3B, F.6B, F.8B, F.14, F.17, F.19, F.22, F.24A and F.128 from the plug and socket break-down points on frame 14 and mic/tel T.B.'s. Disconnect cable assembly F.24B from the hood relay, cable assembly F.183 at centre instrument panel break and F.209 from the tail plane relay box.

(5) Remove the lids from the trunking. Release the trunking from the aircraft's structure by removing the ten internal attachment bolts and replace the lids on the trunking.

(6) Coil the cable assemblies disconnected from junction box number 2 and from the leg panel back to the trunking, fold

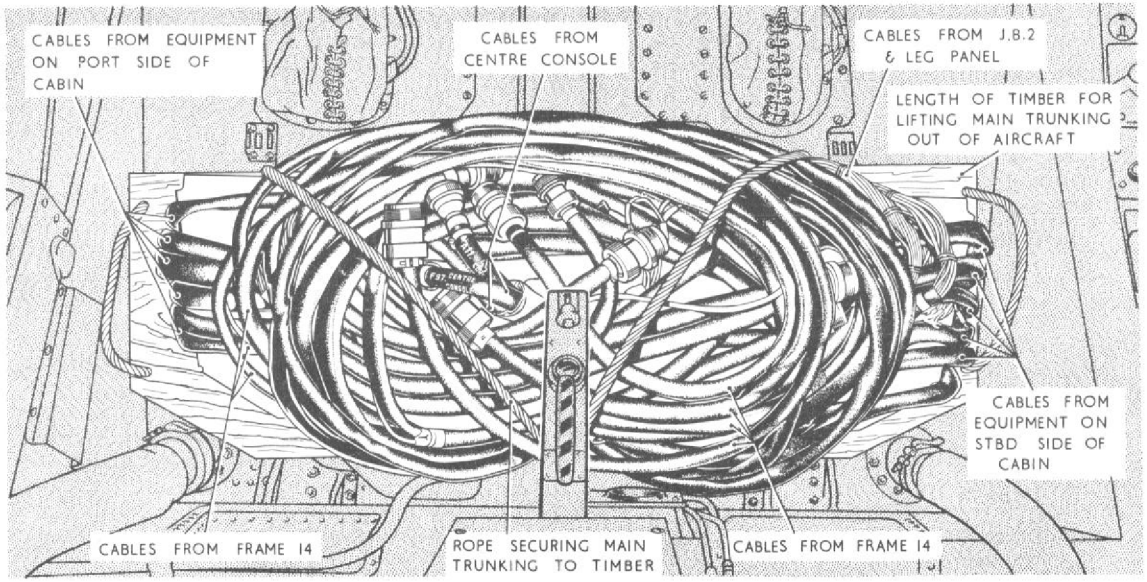

Fig. 2 Main trunking ready for removal

these assemblies across the top of the trunking and secure in position with lengths of suitable cord, to prevent them slipping off when the trunking is lifted out of the cabin.

(7) Fold the cable assemblies disconnected from the equipment on each side of the cabin; on to those already in position on the top of the trunking and secure in place with cord.

(8) Coil the cable assemblies disconnected from frame 14 and those from the equipment at the rear of the cabin back to the trunking, fold the assemblies over the trunking and secure to those already in position.

(9) The trunking, complete with its cable assemblies *(fig.2)* may now be removed from the aircraft as a complete unit by two men positioned one on each side of the cabin.

Note . . .

When lifting the trunking assembly, care must be taken to support the centre or the weight of cable will tend to distort the trunking's structure. It is suggested that when the trunking is free from the aircraft's structure, a length of timber, approximately one inch thick and a little longer and wider than the trunking, be slipped between the trunking and cabin floor and used as a support during removal.

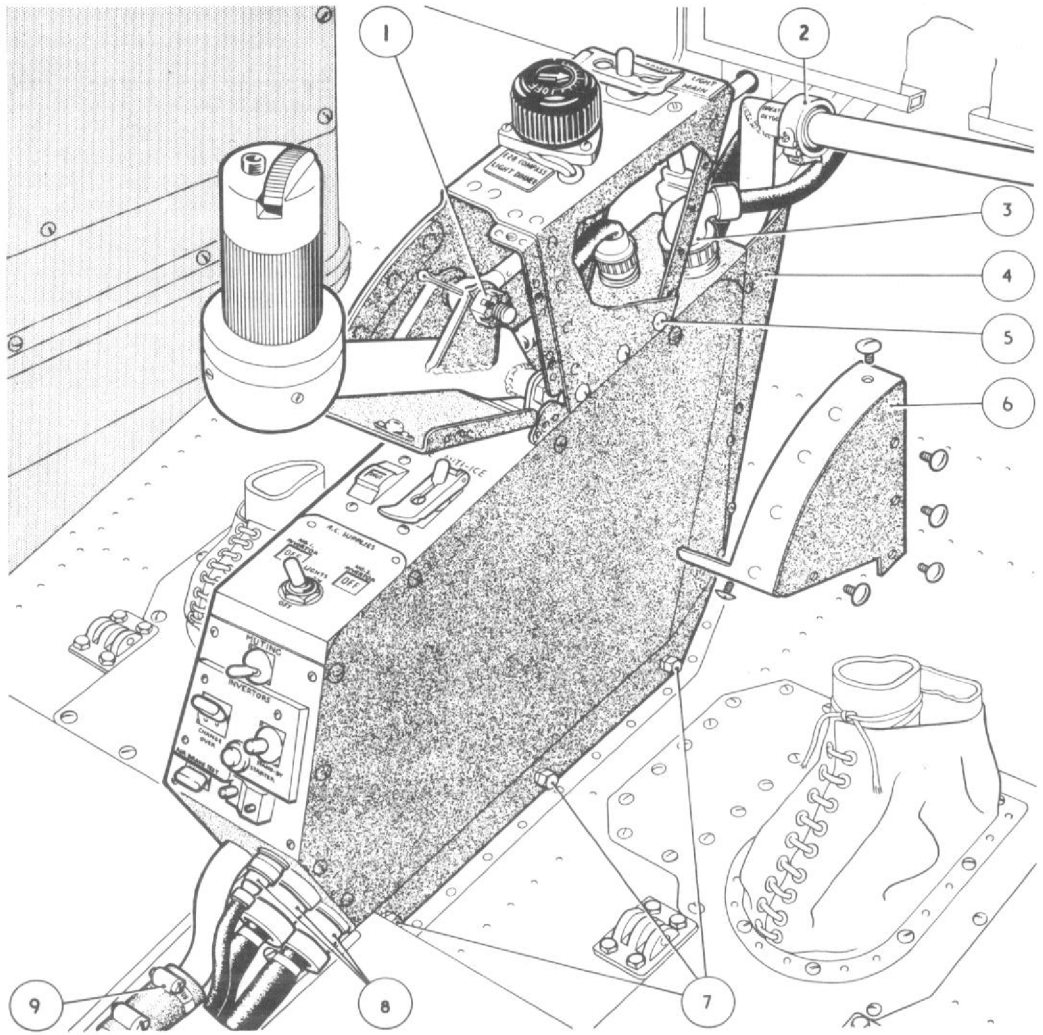

Fig. 3 Removal of centre console and throttle box

Centre console and throttle box *(fig.3)*

5. The centre console, which is in the form of a box, is bolted to the cabin floor on the centre line of the aircraft. To remove the console, proceed as follows:–

(1) Render the aircraft electrically safe, as described in Group A.1.

(2) Remove the access door (6) from the starboard side of the throttle box on the top of the console, by removing the six screws.

(3) Remove the split pin and nut from the bolt (1) securing the throttle control rod to the throttle lever. Disengage the throttle box from the console, by removing the seven screws along its lower edges (5), to allow the bolt securing the control rod to the throttle lever to be removed.

(4) After the throttle control lever attachment bolt has been removed, secure the throttle-box to the centre console to prevent damage to the box etc.

(5) Disconnect the oxygen feed pipe, which passes through the console, at the clamp type coupling below the oxygen regulator (2) and at the rubber hose coupling just aft of the console (9). Blank off all pipe ends to prevent the entry of foreign matter.

(6) Disconnect cable assemblies A.11, F.95, F.97, F.98 (8) and F.67 (3) from the top and rear faces of the console. Seal off the plugs and sockets with approved caps and covers to prevent the entry of foreign matter. Stow the cables clear of the console.

(7) Disengage the cable guard (4) from the forward end of the console by removing the six screws. Remove this guard from the aircraft.

(8) Release the console from the aircraft's structure by removing the attachment bolts (7) passing through the base of the console and the side of the cable trough.

(9) The console and throttle box may now be removed from the cabin by dexterous movement to clear adjacent structure paying particular attention to the throttle control rod and oxygen pipe.

Main fuse box

6. This box is supported on quick-release mountings on the forward face of the flying control casing in the cabin. The method of removing the box is as follows:—

(1) Render the aircraft electrically safe as described in Group A.1.

(2) Disconnect cable assemblies F.89, F.90, F.91 and F.92 from the bottom face of the fuse box, seal off the plugs and sockets with approved caps and covers and stow the cables away from the box.

(3) Remove the two attachment bolts from the top of the box and slide the box upwards to disengage the lower mounting spigots.

(4) Remove the fuse box from the cabin.

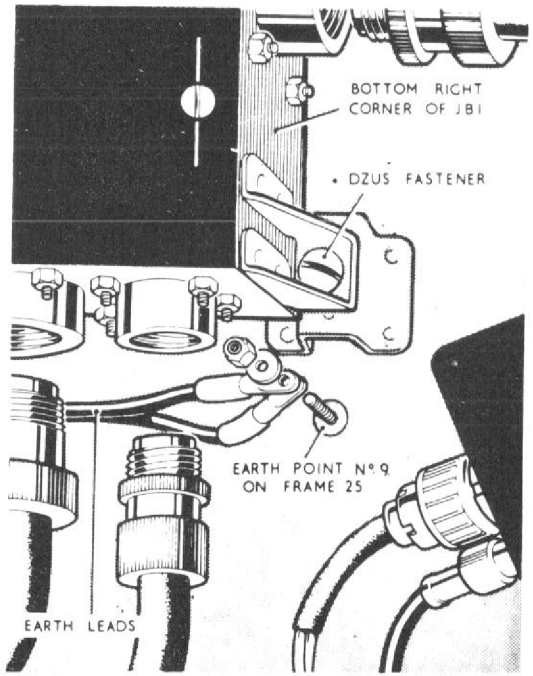

Fig. 4 J.B.1 lower attachments and earth point No. 9

Secondary fuse box *(fig. 5)*

7. The secondary fuse box is secured to the top of the suppressor mounting on the cabin floor below the starboard instrument panel, and is clamped to the lower instrument panel mounting tube. It can be removed as follows:—

(1) Render the aircraft electrically safe, as described in Group A.1.

(2) Slacken the four screws at the top of the suppressor mounting sufficiently to clear the slots at the bottom of the fuse box.

(3) At the top of the fuse box, unscrew and remove the wing-nut (10) from the clamping fork assembly.

(4) Lift and withdraw the box sufficiently to enable the three connectors of the cable assemblies on the forward face of the box to be disconnected.

(5) Fit approved caps and covers to the plugs and sockets, stow the cables clear, and remove the box from the aircraft.

Junction box 1

8. This junction box is mounted on the rear face of the main spar frame in the centre fuselage and access to it may be gained via the engine starter access door in the underside of

the centre fuselage. The recommended procedure for removing the box is as follows:–

(1) Render the aircraft electrically safe, as described in Group A.1.

(2) Open the engine starter access door.

(3) Disconnect the earth lead EA9 from earth point 9 located adjacent to the lower right hand corner J.B.1. *(fig.4).*

(4) Disconnect all the plugs and sockets on the cable assemblies at J.B.1. Seal off the plugs and sockets with approved caps and covers and stow the cable assemblies away from the box.

(5) Release the two Dzus fasteners at the lower corners of the box *(fig.4)* and lift the box upwards to disengage the two top mountings.

(6) Lower the box and remove it from the aircraft, complete with earth lead EA9.

Junction box 2 *(fig.5)*

9. This junction box is mounted in the cabin just forward of the instrument panels and although access for general servicing may be obtained from above the instrument panels, the removal of the box necessitates the removal of the flying instrument panels. The method of removing the box is as follows:–

(1) Render the aircraft electrically safe, as described in Group A.1.

(2) Gain access to the junction box by removing the Instructor's and Pupil's flying instrument panels as described in Sect.5, Chap.2. Also disconnect and remove the throttle control rod (9) from between the bellcrank levers forward of the instrument panels.

(3) Unclip the tubes of the windscreen air driers (1) from the saddles on the lid of the junction box (3). Remove the air driers from their mountings on the lid of the junction box by releasing the wing bolts and sliding the air driers out of their mountings. Stow the air driers clear of the junction box.

Note . . .

The air driers must not be disconnected from the windscreen.

(4) Disconnect cable assembly F.5 from the leg panel (7) and F.170 from the secondary fuse box, cable assembly F.67 from the centre console (6) and the earth cable from earth point number 4 (8). Seal off the plugs and sockets with approved caps and covers. Unclip the cable assemblies from the aircraft's structure and coil these back to the junction box in readiness for their removal with the box.

(5) Disconnect all the remaining cable assemblies attached to J.B.2 at the plugs and sockets on the box (2) and (4). Seal off the plugs and sockets. Release the cables from the cable clamp (5) on the underside of the box and stow the cables clear of the box.

(6) Release the box from the aircraft's structure by removing the attachment bolts that pass through the mounting angle at the forward face of the box and those through the lower port side of the box.

(7) Remove the box, complete with cable assemblies F.5, F.67, F.170 and the earth cable, by withdrawing the box downwards, to starboard and aft into the cabin.

A.C. junction box No.1

10. This box is mounted in the cabin on the starboard side between frames 11 and 12 just aft of the cabin shelf. The recommended method of removing the box is as follows:–

(1) Render the aircraft electrically safe, as described in Group A.1.

(2) Disconnect all the cable assemblies at the plugs and sockets on the bottom of the junction box. Seal off the plugs and sockets with approved caps and covers and stow the assemblies away from the box.

(3) Release the junction box from the aircraft's structure by removing the mounting bolts and withdraw the box from the cabin.

A.C. junction box No.2

11. The a.c. junction box No.2 is bolted to the forward face of frame 3, on the port side of the nose wheel bay. To remove the box, proceed as follows:–

(1) Render the aircraft electrically safe, as described in Group A.1.

(2) Gain access to the nose wheel bay and disconnect the cable assemblies at the connectors on the front of the box. Fit approved caps and covers to the plugs and sockets and stow the cables clear of the junction box.

(3) Disconnect the two earth leads from the earth point on frame 3.

(4) Release the junction box from the mounting structure by removing the four fixing bolts.

(5) The box can now be removed from the aircraft, complete with the earth leads.

ARM junction box 1

12. This junction box is mounted on the starboard fuel tank access door on the forward face of frame 19 and access to it may be obtained via the radio access door in the undersurface of the fuselage. The procedure for removing the box is as follows:–

(1) Render the aircraft electrically safe, as described in Group A.1.

(2) Remove the radio access door.

(3) Remove the lid of the box and disconnect all the leads of cable assemblies A.3 and A.4 from the terminals in the box. Withdraw the cables assemblies through the ferrules, insulate the cable ends, and stow. Replace the lid on the box.

(4) Disconnect cable assemblies A.5, A.6 and A.7 from the top of the box, seal off the plugs and sockets with approved caps and stow the cable assemblies away from the box.

(5) Disconnect the ARM earth lead from the earth studs located below the box.

(6) Release the box from its mounting by removing the two bolts, located one at each end of the box.

(7) The box may now be removed from the aircraft, complete with the ARM earth lead.

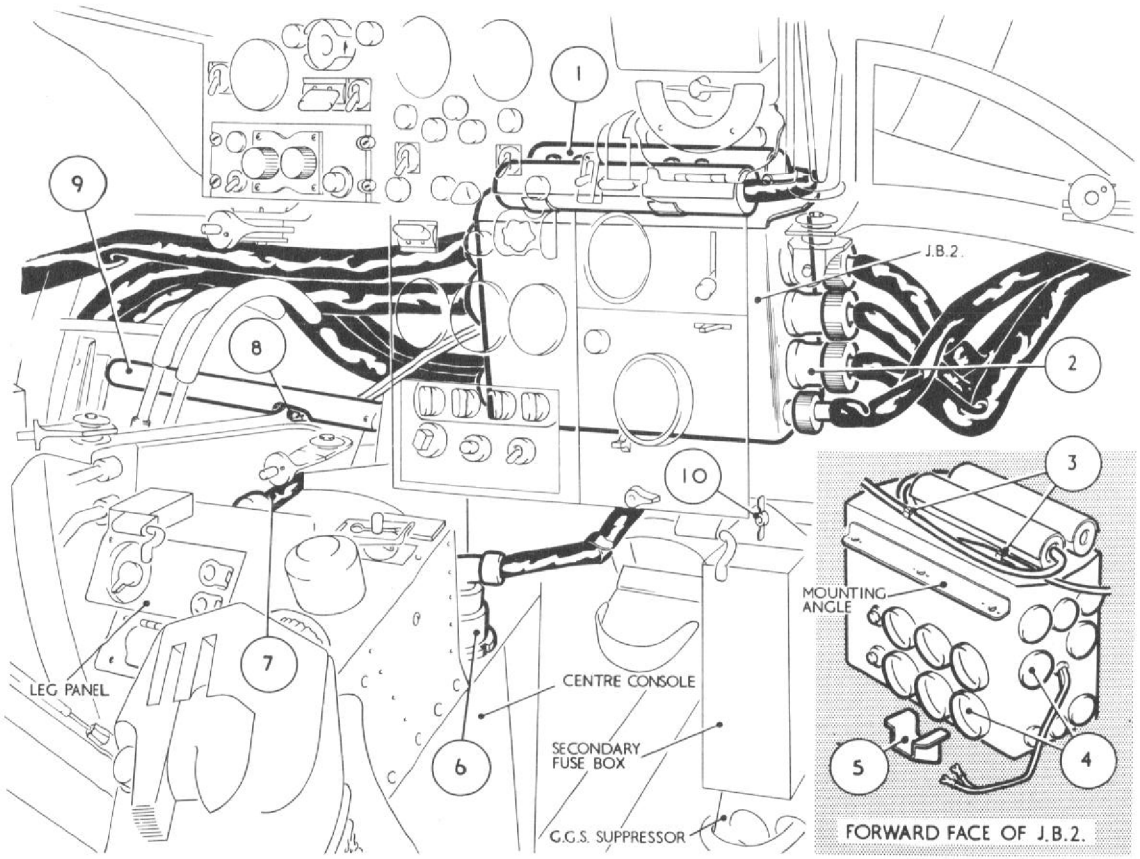

Fig. 5 Removal of J.B.2

ARM junction boxes 3 and 5

13. These two junction boxes, ARM J.B.3 *(port)* and ARM J.B.5 *(starboard)*, are located in the wheel-bays, forward of the undercarriage girder and just inboard of the undercarriage pivot castings. The removal of either of these boxes is as follows:–

(1) Render the aircraft electrically safe, as described in Group A.1.

(2) Gain access through the wheel-bay.

(3) Remove the junction box cover by releasing the four screws.

(4) Disconnect all the leads from the terminal blocks, insulate the ends and stow.

(5) Unscrew the four pillars holding the terminal blocks to the platform, Remove the terminal blocks from the wheel-bay.

Note . . .

The platform is riveted to the upper skin of the wing and is, therefore, not readily removable.

ARM junction boxes 4 and 6

14. These two junction boxes, ARM J.B.4 *(port)* and ARM J.B.6 *(starboard)*, are positioned one in each outer wing and access to them may be obtained via access doors in the wing skin. The method of removing either of these boxes is as follows:–

(1) Render the aircraft electrically safe, as described in Group A.1.

(2) Release the appropriate access door.

(3) Remove the junction box cover by releasing the four screws.

(4) Disconnect all the leads from the terminal blocks, insulate the ends and stow.

(5) Unscrew the four pillars holding the terminal blocks to the platform. Remove the blocks through the access door.

Note . . .

The platform is riveted to the upper skin of the wing and is, therefore, not readily removable.

ARM junction boxes 7 and 8

15. These junction boxes are located side by side in the radio bay, being mounted on the starboard undersurface of the cross member adjacent to frame 18A. Once access has been obtained, by opening the radio access doors, the removal of the boxes should be obvious.

Supply panel

16. This panel is mounted in the radio bay on the starboard side between frames 16 and 19, and access to it may be gained via the radio access doors in the undersurface of the front fuselage. The panel is located behind the generator control panel and this latter panel must be removed before attempting to remove the supply panel. The procedure for removing the supply panel is as follows:–

(1) Render the aircraft electrically safe, as described in Group A.1.

(2) Open the radio access doors.

(3) Remove the generator control panel, as described in para.17.

(4) Disconnect cable assemblies C.1, C.2, C.4 and F.49 at the plugs located at the top and bottom of the panel. Seal off the plugs and sockets with approved caps and covers and stow the cables away from the panel.

(5) Disconnect cable assemblies F.2, F.4, F.7 and F.9 at the plug and socket break-down points on frame 14. Seal off the plugs and sockets, unclip the cable assemblies and coil them back to the supply panel in readiness for removal with the panel.

(6) Disconnect the two earth leads E.5A from earth point number 5, remove any straps and clips securing this lead and coil it back to the supply panel.

(7) Disconnect the cables extending between the circuit breakers and supply panel at the circuit breakers, and coil them back to the panel.

(8) Disconnect cable assemblies C.64, C.65 and F.72 from the terminals on the panel, unclip these cables and coil up away from the panel.

(9) All the remaining cable assemblies attached to the supply panel should now be disconnected at their terminations, as detailed below, and the cables unclipped from the aircraft's structure and coiled back to the panel in preparation for their removal with the panel:–

(a) Cable assembly A.7 from frame 14, ARM J.B.1 and ARM J.B.7.

(b) Cable assembly A.10 from ARM J.B.8.

◀ (c) Pre Mod.1376, remove cable assembly AS.5 from the autostabilizer magnetic amplifier. ▶

(d) Cable assembly PC.17 from cable assembly PC.13 at the standby battery box.

(e) Cable assembly F.21 from the service lamp, TB.108, top temperature control amplifier, upper inertia switch, fuel gauge amplifiers and the battery test socket.

(f) Cable assembly F.23 from frames 14 and 19 and from the radio relay box.

(g) Cable assembly F.81 from the top temperature amplifier.

(h) Cable assembly F.137 from the inertia switches, and from F.136 at frame 17B.

(i) Cable assembly C.5 from the external supply plug.

(j) Cable assembly C.90 at spine break and C.92 at engine access door break.

(k) IFF/SSR connector at frame 14.

(10) Disengage the panel from the aircraft's structure by removing the nuts, bolts and washers securing it to frames 17A and 17B and withdraw the panel from the radio bay, complete with the cable assemblies.

Generator control panel

17. This panel is mounted in front of the supply panel in the radio bay on the starboard side between frames 16 and 19. Access to it may be gained via the radio access doors in the undersurface of the front fuselage. To remove the panel, proceed as follows:–

(1) Render the aircraft electrically safe, as described in Group A.1.

(2) Open the radio access doors.

(3) Disconnect cable assembly F.49 from the plug located at the top of the supply panel. Seal off the plug and socket with an approved cap and cover.

(4) Disconnect cable assembly F.52 from the distribution circuit breakers and cable assembly F.136 from the plug and socket at frame 17B. Insulate the bare cable ends and coil the cable assemblies back to the panel.

(5) Disconnect cable assemblies C.37, C.38, AC.1, AC.3, and F.119 from the equipment on the control panel. Remove the straps and clips securing these cable assemblies, insulate the cable ends and stow the assemblies away from the panel.

(6) Disengage the four Dzus fasteners securing the bottom of the control panel to the supply panel and, with a second person supporting the control panel, withdraw the two top hinges pins.

(7) Lower the panel and remove it from the aircraft, complete with cable assemblies F.49, F.52 and F.136.

Note . . .

When replacing the generator control panel ensure that its retaining chain (Group A.1) is secured and undamaged.

Leg panel

18. The leg panel is bolted to the cabin floor, just forward of the pupil's control column and below the instrument panels. To remove the leg panel, proceed as follows:–

(1) Render the aircraft electrically safe, as described in Group A.1.

(2) Disconnect the Bowden cable from the rudder bar release lever at the top of the leg panel and stow it away from the panel.

(3) Disconnect cable assembly E3/A from earth point number 3, obtaining access via the door in the port side of the leg panel *(fig.6)*.

(4) Disconnect cable assemblies F.5, F.6, F.26A and F.64 from the leg panel. Seal off the plugs and sockets with approved caps and covers and stow assemblies away from the panel.

(5) Release the leg panel from the mountings by removing the bolts from around the bottom forward and side faces of the panel. Remove the leg panel from the cabin, complete with cable assembly E3/A.

Note . . .

Although it is possible to remove the leg panel without disturbing the pupil's flying instrument panel, access is easier if this latter panel is removed first.

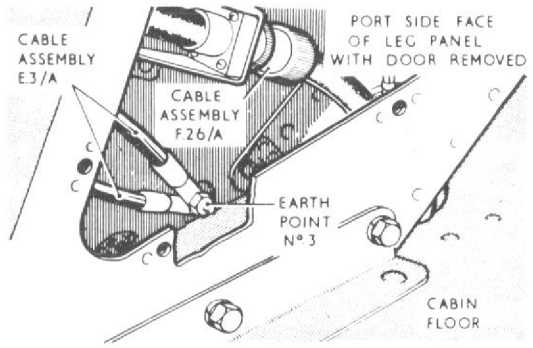

Fig.6 Earth point number 3

Bomb/R.P. control panel

19. This panel is situated adjacent to the glare shield above the port side of the instrument panels in the cabin. The right hand side of the panel is secured to a vertical support strut by two bolts; a further two bolts secure the base of the panel to the mounting structure, and a screw at the centre of the panel arch secures it to the glare shield. To remove the panel, proceed as follows:–

(1) Render the aircraft electrically safe, as described in Group A.1.

(2) Disconnect the connector of cable assembly A.13 from junction box 2.

(3) Remove the screw attaching the top of the panel to the glare shield, and unscrew the bolts securing the base and side from their respective anchor nuts.

(4) Remove the panel from the aircraft, complete with cable assembly A.13.

Cabin port shelf *(removable portion)*

20. The removable portion of the cabin port shelf extends from frame 17 to the instrument panel and the method of removing it is as follows:–

(1) Render the aircraft electrically safe, as described in Group A.1.

(2) Remove the screws from around the side wall, rear edge and outboard side of the top panel. Raise the shelf to gain access, and disconnect the connectors of cable assemblies F.28, F.70, F.206 and F.160 from the shelf, and F.172 from the F.13C connector.

(3) Remove the shelf from the cabin and seal off the plugs and sockets with approved caps and covers.

◀ **CAUTION**

When refitting port shelf ensure all cable assemblies are routed and secured clear of the throttle connecting rod. ▶

Cable assemblies

21. The majority of the cable assemblies are supported throughout their length by a number of plastic-covered metal clips and flexible plastic straps. The method of removing these assemblies is straightforward, if reasonable care is taken. When removing the cable assemblies which pass through the ducts at the bottom of the centre fuselage, it is essential to remove the outer threaded ring from the Mk.4 sockets, by disengaging the circlip as the socket will not pass through the ducts with these rings in position.

ASSEMBLY

General

22. In most instances, the assembly of the units is a reversal of the removal procedure, but where there is any special assembly feature this is covered by a note in the appropriate paragraph.