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Fig.1 Fuselage construction

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DESCRIPTION AND OPERATION

General

1. The fuselage (fig. 1), is a semi-monocoque structure of balsa sandwiched between an inner and outer plywood skin. The radome, light-alloy engine cowlings and jet pipe fairing are separate assemblies.

2. The fuselage is built in half-shells which are joined together at the top and bottom centre lines. The balsa packing is replaced by spruce multiply at the centre-line joints and by laminated spruce at the bulkhead attachment and areas requiring reinforcement. The outer skin is covered with madapollam, repair and replacement details of which are given in Vol. 6. Main constructional features are illustrated in fig. 1.

3. Locations of the various drain holes in the fuselage are shown in Sect. 2, Chapter 4.

Radome (fig. 2)

4. The radome houses a radar set and is of plastic construction. It is hinged to the top of the front fuselage frame and secured to the fuselage by five toggle fasteners. The following is the sequence of operations for opening the radome :-

(1) Open the two nose access doors (para. 5) and secure them by fitting the support struts to the front bulkhead.

(2) Unlock the five radome toggle fasteners and pull the radome forward until it automatically locks in this position.

(3) Lift the radome to hinge upwards until it is automatically locked and supported by the two support struts.

To close the radome, proceed as follows :-

(1) Supporting the radome, operate each support strut release lever and lower the radome.

(2) Operate the radome hinge lock release handle (starboard side) and push the radome aft against the fuselage. Lock five toggle fasteners.

(3) Close the two nose access doors and lock all fasteners.

Nose access doors

5. These are positioned on either side of the fuselage, between the front frame and No. 1 bulkhead, and each is hinged at the top of its door frame. Each door is fitted with a side-strut for the fully open position and four toggle fasteners for locking to the fuselage in the closed position.

Cabin

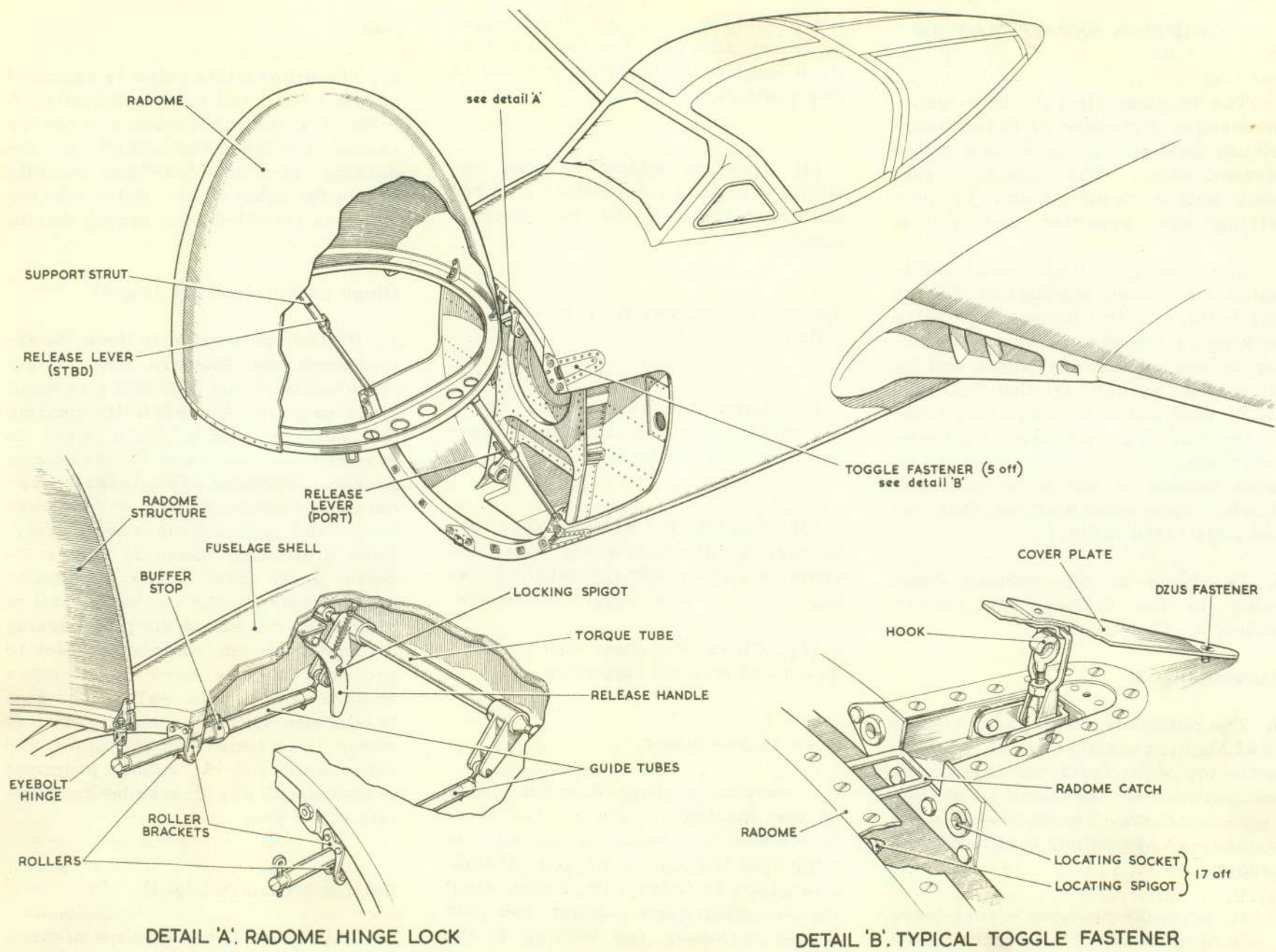
6. The pressurized cabin is enclosed between No. 1 and No. 2 bulkheads. A metal-framed windscreen and canopy enclose the top of the cockpit, and the decking over the four gun barrels forms the cabin floor. Entry into the cabin is provided by a canopy hatch.

Hinge pocket drainage (fig. 4)

7. Provision is made to drain to atmosphere any moisture which might accumulate in the port and starboard hinge pockets. A banjo bolt, locating the banjo end of a drain pipe, is screwed into the base of each hinge pocket. Washers are interposed between bolt head and banjo and between banjo and pocket base respectively. Each drain pipe connects into a T-piece joint, from which a common pipe is routed to the starboard wall of the cabin, the end of the pipe passing through a wooden reinforcing block to protrude slightly beyond the outer surface of the cabin wall. The pipe is sleeved within a rubber grommet where it is housed in the block and cabin wall, and the rubber grommet is sealed with Bostik in order to maintain cabin pressure.

Canopy structure (fig. 3)

8. The canopy is constructed in three units and comprises light-alloy



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Fig. 2 Radome
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frames secured by special attachment bolts to the fuselage. The glass front and Perspex side panels of the windscreen, and the light-alloy centre panel and Perspex side panels of the aft portion of the canopy, are mounted in the alloy frames. The hatch is hinged to the rear top frame of the canopy.

Direct vision window (fig. 5)

9. The D.V. window comprises a triangular frame which is hinged on two ball-ended hinge pins and is locked at the top by a clamp screw. A spring on the front hinge pin keeps the ball-end pressed into its housing, and a locking plate on the rear hinge pin prevents the window from fouling the gun-sight when open. A handle, on the inner face of the side frame, is provided to open the window after the clamp screw has been released.

Hatch (fig. 6)

10. The hatch comprises a light-alloy frame in which two Perspex panels are mounted. An internal handle is interlinked with an external handle for opening and closing the hatch. A rubber tube pressurizing seal, secured by Bostik around the periphery of the hatch, is inflated by a pressure supply from the air reservoir when the hatch is locked. The hatch may be jettisoned in an emergency.

11. The hatch is CLOSED from inside the cabin as follows :-

(1) Pull forward the hatchbalance arm release lever on the starboard side of the cockpit (fig. 7). The hatch is now supported only by the balance arm.

(2) Pull on the central beam to close the hatch.

(3) Pull the internal handle back up to secure the hatch by engaging the two latches.

(4) If the lock lever does not automatically snap down on the handle, it must be pressed manually since the air seal valve will not otherwise inflate the hatch seal.

12. The hatch is OPENED from inside the cabin as follows :-

(1) Pull the lock lever back to deflate the hatch seal, then pull the internal handle down and forward to release the latches.

(2) Push the hatch up until the balance arm is locked. The hatch will remain locked OPEN until the balance arm release lever (fig. 7) is pulled as in para. 11 above.

Note

It is essential that the hatch should be locked OPEN before exit from the cabin.

13. The hatch is OPENED from outside as follows :-

(1) Depress the release spigot to raise the external handle from its housing.

(2) Turn the handle anti-clockwise to disengage the latches.

(3) Open the hatch as detailed in para. 12 above.

14. The hatch is CLOSED from outside as follows :-

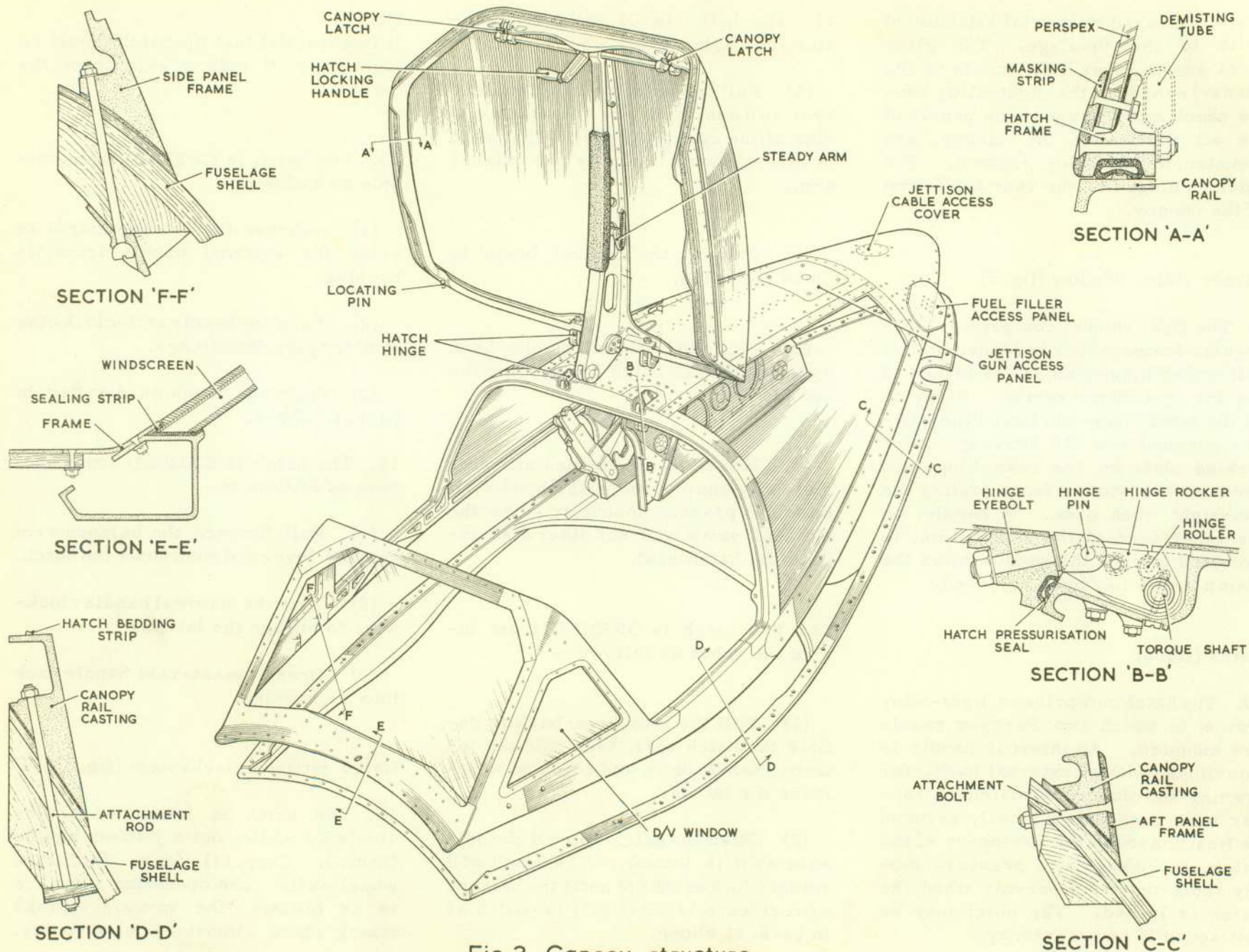
(1) Pull forward the balance arm release lever and push down the hatch.

(2) Turn the external handle clockwise to engage the latches.

(3) Press the external handle back into its housing.

Hatch jettison mechanism (fig. 8 & 9)

15. The hatch is jettisoned explosively by pulling out a jettison handle (Sect. 3, Chap. 11) from the nose wheel well. The operating sequence is as follows, the various actions taking place almost simultaneously.



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Fig.3 Canopy structure

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(1) Pulling the jettison handle causes the jettison gun lever arm (47) to turn, taking with it the mechanical jettison lever arm (46) and thus rotating the torque shaft (24).

(2) Rotation of the torque shaft (24) moves the actuating cam (26) and triggers (25 and 22) which, in turn, actuates the micro switch, push rod (28) and trigger lever (23) respectively.

(3) The final movement of the jettison gun cable will break the wirelocking of the firing trigger (16) and fire the jettison gun (19), forcing the thrust plate (21) forwards.

(4) Movement of the thrust plate (21) actuates the rocker lever (38) to turn the releasing rocker (4) via the releasing rocker connecting lever (39). The releasing rocker turns the beam rocker (33), this movement being transmitted, via connecting rod 'B' (34), to the internal handle torsion shaft (fig. 5) to disengage the shaft from the hatch latches.

(5) The thrust plate pillar (42) strikes the push rod (28), forcing the rod forwards and, thereby, rotating the claw operating lever (48) which, in turn, opens the spring-loaded claws (41) to release the beam heel pivot (31).

(6) Movement of the thrust plate (21) also actuates the bell crank link (27); forward movement of the link

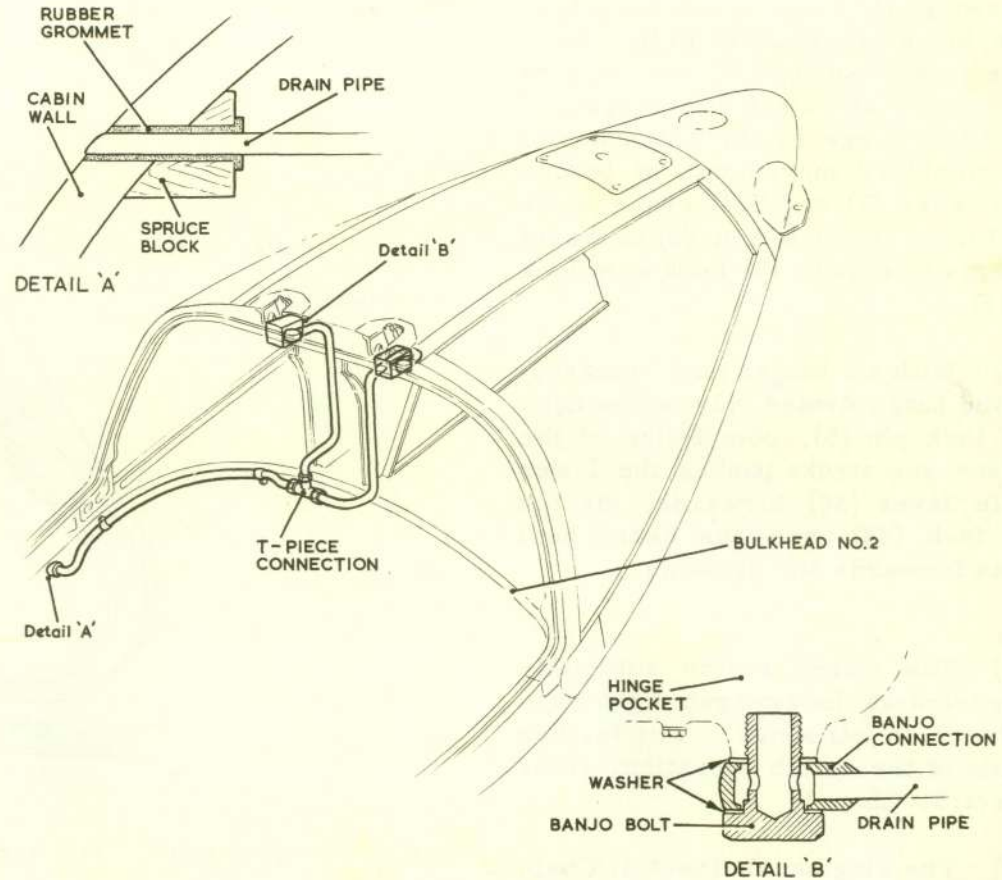


Fig. 4 Hinge pocket drainage

rotates the bell crank lever (29) and disengages the lever from the torque shaft lever (7). On disengagement of lever (7), the torque shaft (3) rotates and swings the hinge rollers (35) free from the hinge rockers (37). Each hinge rocker spring (36) now rotates its hinge rocker clear of the respective hatch hinge on the hatch beam. The combined movements of torque shaft lever (7) and bell crank lever (29) forces the hook arm (6) to travel upwards to engage the hook arm lock pin (5).

(7) With all hinges now released, and the hatch pivoted only on the hook arm lock pin (5), completion of the jettison gun stroke pushes the lower toggle lever (30) forwards, via the gun fork (44), and the beam heel pivots forwards and upwards.

Note

(1) The micro switch automatically retracts the gyro gun sight when the hatch is jettisoned. For further details of the switch operation, refer to Sect.5, Chap.1.

(2) The ring handle (Sect.3, Chap.11), located at the top of No.2 bulk-head, is provided for ground servicing purposes only.

Access Panels

16. The positions and functions of the various access panels are illustrated

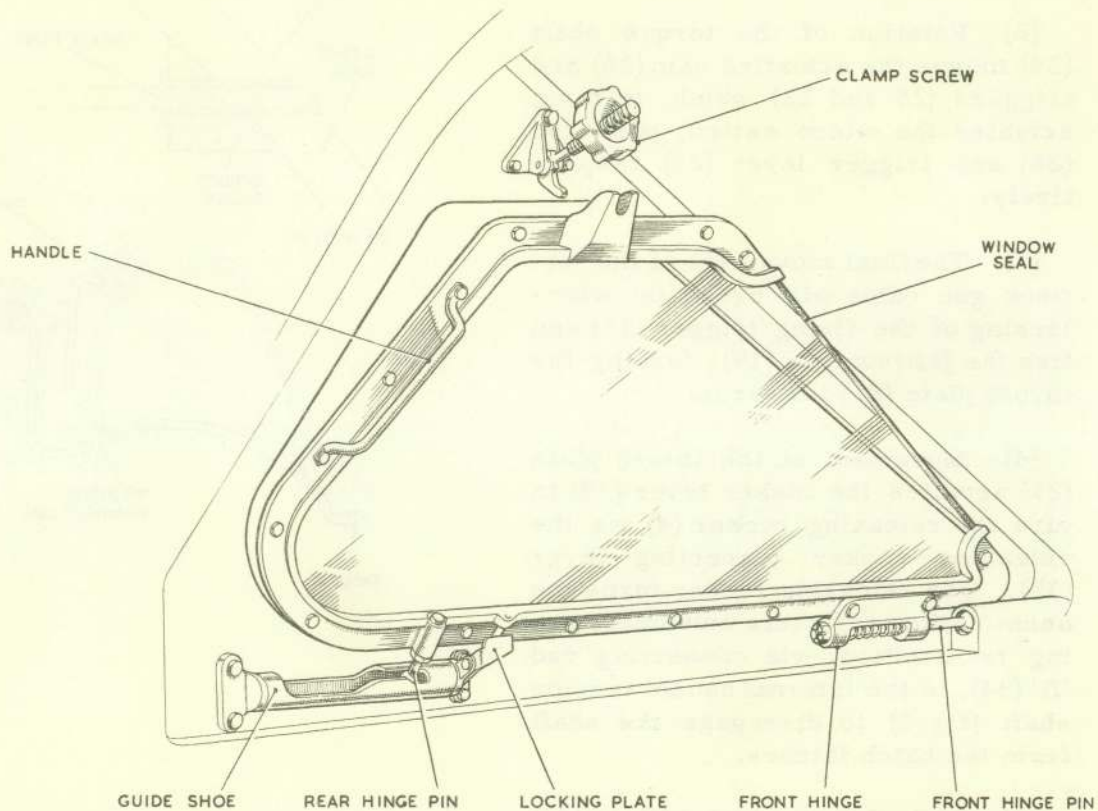


Fig. 5 Direct vision window

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in Sect. 2, Chap. 4. The canopy hatch is the only access panel which is subjected to cabin pressurization.

SERVICING

Trestling

17. The method of trestling the fuselage after the main planes and engine have been removed, is shown in fig. 8.

Protective treatment of external surfaces

18. The processes for the protective treatment of all wooden and metal surfaces are described in A.P. 2656A, Vol. 1.

Cabin sealing

19. The Bostik sealing process, which is described in A.P. 1464B, Vol. 1 Part 2, has been applied to all possible sources of air leakage in the interior of the pressurized cabin.

Adjustment of hatch locking mechanism

20. The hatch locking mechanism must be adjusted as follows :-

(1) Close the hatch and lock the internal and external handles.

(2) Adjust the connecting-rods 'A' and 'B' (fig. 6) until the hatch latches engage and disengage fully under the action of either release handle.

Note

A clearance of 0.20 in. must be obtained between the steady arm on the port side of the hatch beam (fig. 6) and the Perspex panel of the hatch, with the latches disengaged.

(3) Push the lock lever forward and check that the forward end of the connecting-rod 'A' slides forward into the telescopic connection. Ensure that the valve operating cam arm, at the rear end of the connecting-rod 'B', presses the air seal valve open. It should be noted that the movement of rod 'B' is transferred, via the rear linkage, to the cam arm in the external handle housing, which directly operates the air seal valve.

(4) Press the lock lever to the rear, push the internal handle forward and check that the end of connecting-rod 'A' slides back over the slide pin.

Note

It is essential that the slide pin in the telescopic connection, should have full travel in the slot of connecting-rod 'A' to avoid any possible jamming of the hatch.

Manual test of hatch jettison mechanism (fig. 8)

WARNING

The gun cartridge must be removed before any of the following tests are carried out. If testing is done by inserting a very small explosive charge in the breech of the gun, the canopy arch starboard hatch hinge drain pipe (Part No. 12.21S.3953) must first be removed to avoid damage during operation of the gun. Also the gun-sight must be fully retracted (Sect. 5, Chap. 1) to prevent automatic retraction.

21. Before carrying out Tests 1 or 2 as detailed below, ensure that :-

(1) The hatch is closed with latches fully locked.

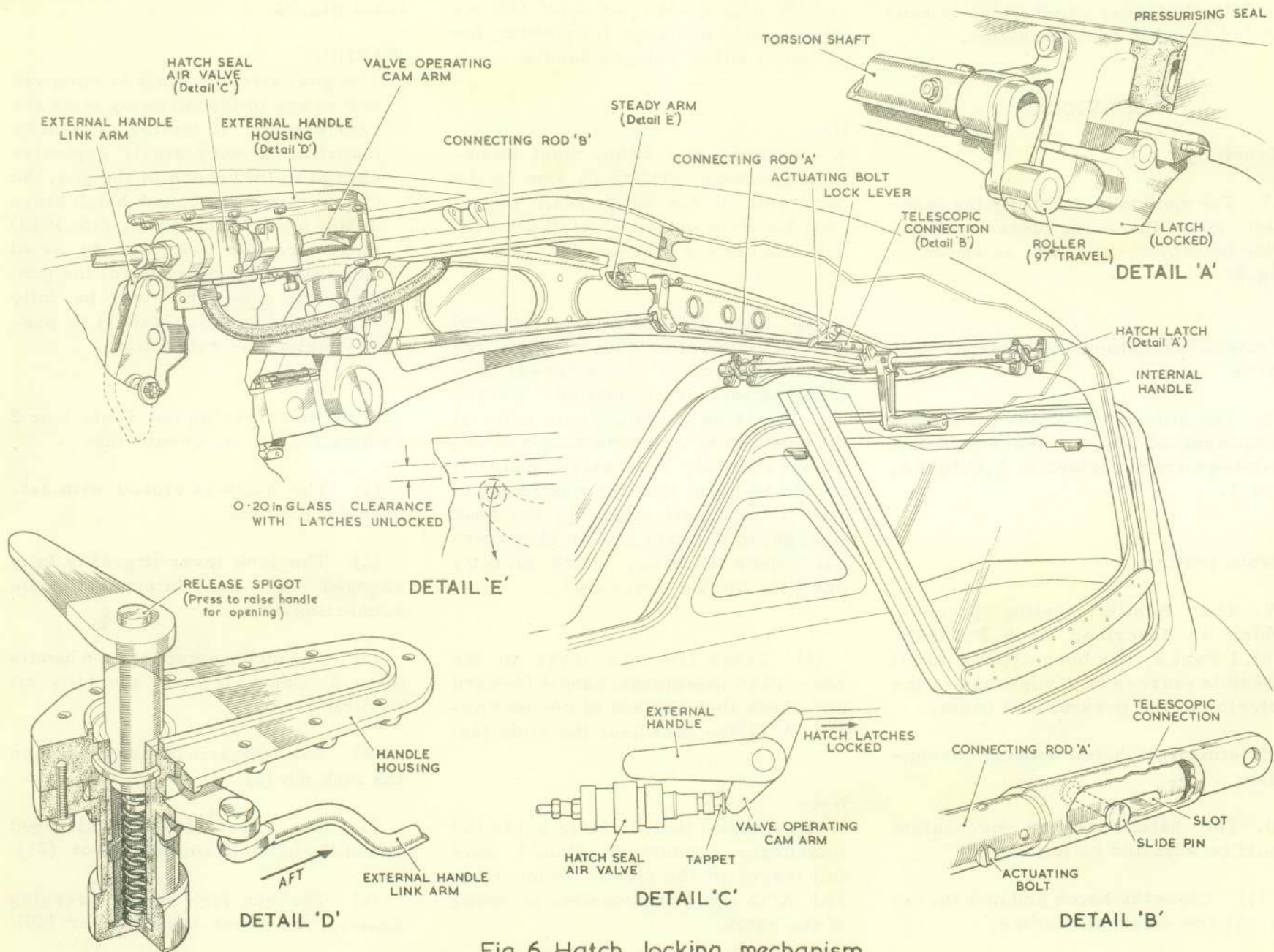
(2) The lock lever (fig. 6) is fully engaged on the internal handle connecting-rod.

(3) The mechanical jettison handle (Sect. 3, Chap. 11) is in the fully aft position.

(4) The hook arm (6) is engaged on the lock pin (5).

(5) The claws (41) are clamped round the hatch beam heel pivot (31).

(6) The gun fork (44) is pressing against the lower toggle lever (30).



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Fig. 6 Hatch locking mechanism

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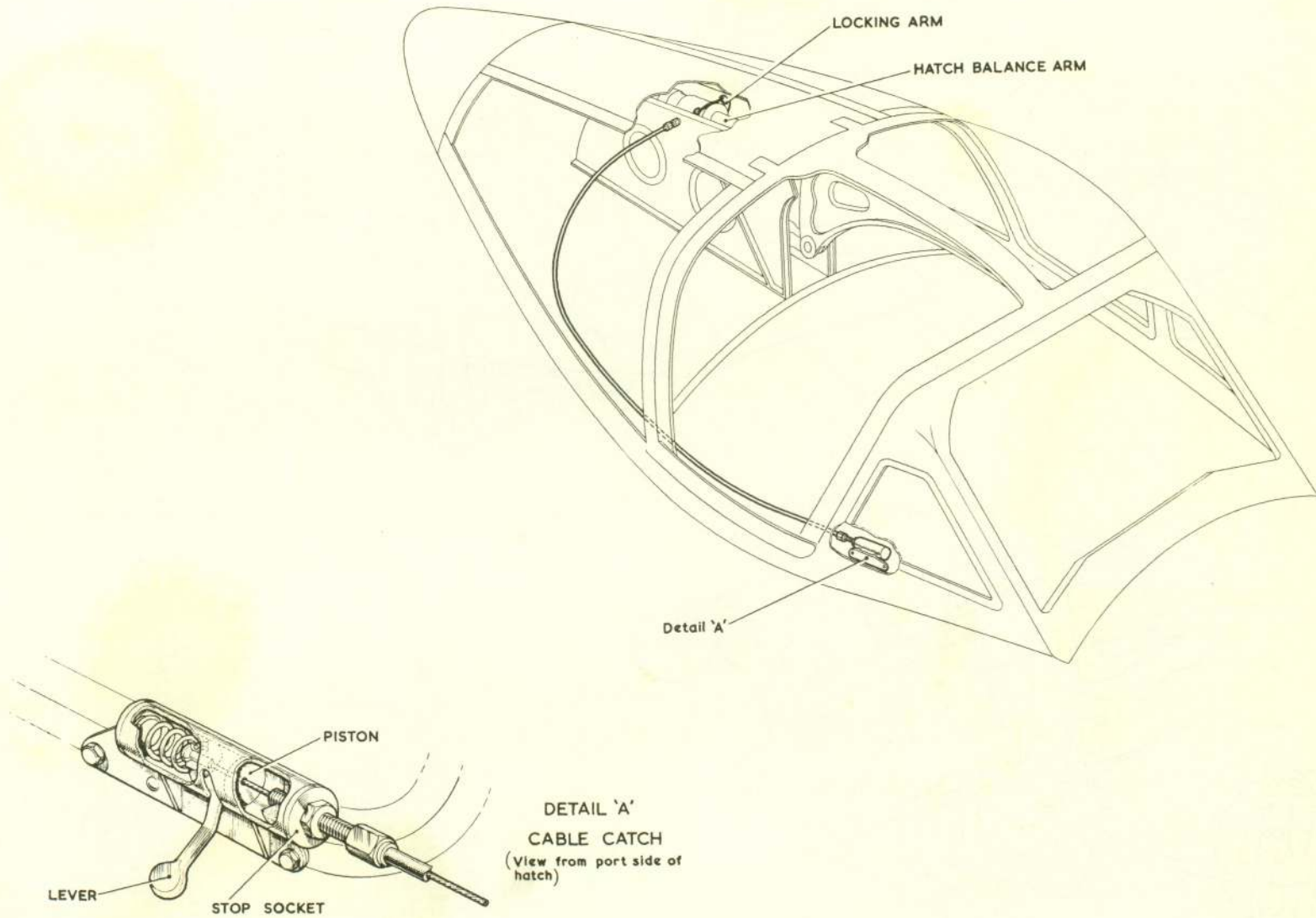


Fig.7 Hatch balance arm release cable

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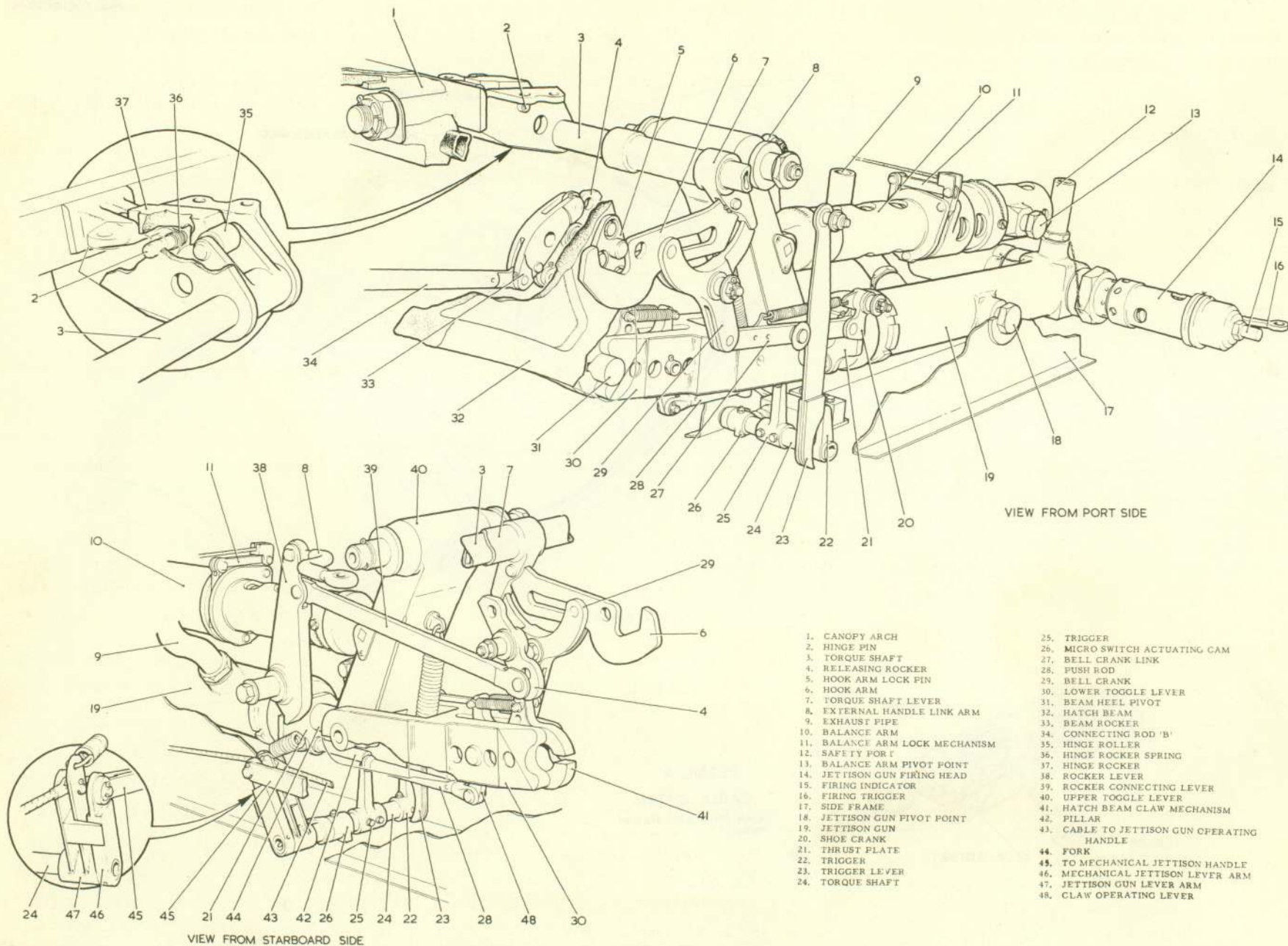


Fig.8 Hatch jettison mechanism

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(7) The gun firing trigger (Sect. 3, Chap. 11) is cocked, i. e., the indicator is protruding fully

(8) The shoe crank (20) is pressed against the thrust plate (21).

Test 1 - Release of rear hinges

Pull the mechanical jettison handle fully forward (Sect. 3, Chap. 11) and check that :-

- (1) The hook arm (6) rises and engages on the lock pin (5).
- (2) The claws (41) unclamp from the beam heel pivot (31), (fig. 4, stage 1).

Test 2 - Operation of complete jettison mechanism (without release of latches)

Pull the hatch jettison handle (Sect. 3, Chap. 11) and check that :-

- (1) The action as in Test 1 takes place.
- (2) The jettison gun trigger has fired.

Since the gun cartridge has been removed the gun itself cannot fire and the front latches will remain locked, consequently the following action must be carried out after operations (1) and (2) of Test

2 above :- Release the lock lever and rotate the internal handle to release the front latches (this must be done slowly and carefully since the rear of the hatch will tend to fall when the rear hinges are freed). Lift the hatch steadily and check that :-

The hook arm lock pin draws the hook arm forward until the hinge rockers snap up (the hatch should be at 18 ± 5 deg. and both rockers should free at approximately the same time).

Test 3 - Release of latches by the jettison gun

Remove the gun firing head and cartridge breech and fit the blanking caps 12-20X505 and 507 with washers 12-20 X509 and 511. Top up the gun with hydraulic fluid to the level of the blow out disc aperture. Withdraw the safety port and exhaust pipes with the blow out discs, attach a hydraulic line to the safety port aperture by an adapter (A.G.S. 1108/A) and sealing washer (D.H.S. 357E) and then seal off the exhaust port by a plug (A.G.S. 216/L) and gasket (A.G.S. 1138/E). Increase the hydrau-

lic pressure by hand pumping and check that :-

The gun releases the latches and starts to open the hatch.

For re-assembly of hatch, refer to "Removal and Assembly"

REMOVAL AND ASSEMBLY

Radome

22. Remove the radome as follows :-

- (1) Open the radome fully.
- (2) Support the radome on a trestle or other suitable means.
- (3) Withdraw the pins from the upper ends of the radome support struts and fold the struts back to their closed position.
- (4) Remove the nuts from the eye-bolt hinges at the forward ends of the guide tubes.
- (5) Lift the radome clear of the hinges and place it on felt or other protective material.

Assembly is the reverse of removal, noting that the radome must be firmly supported before offering up to the fuselage.

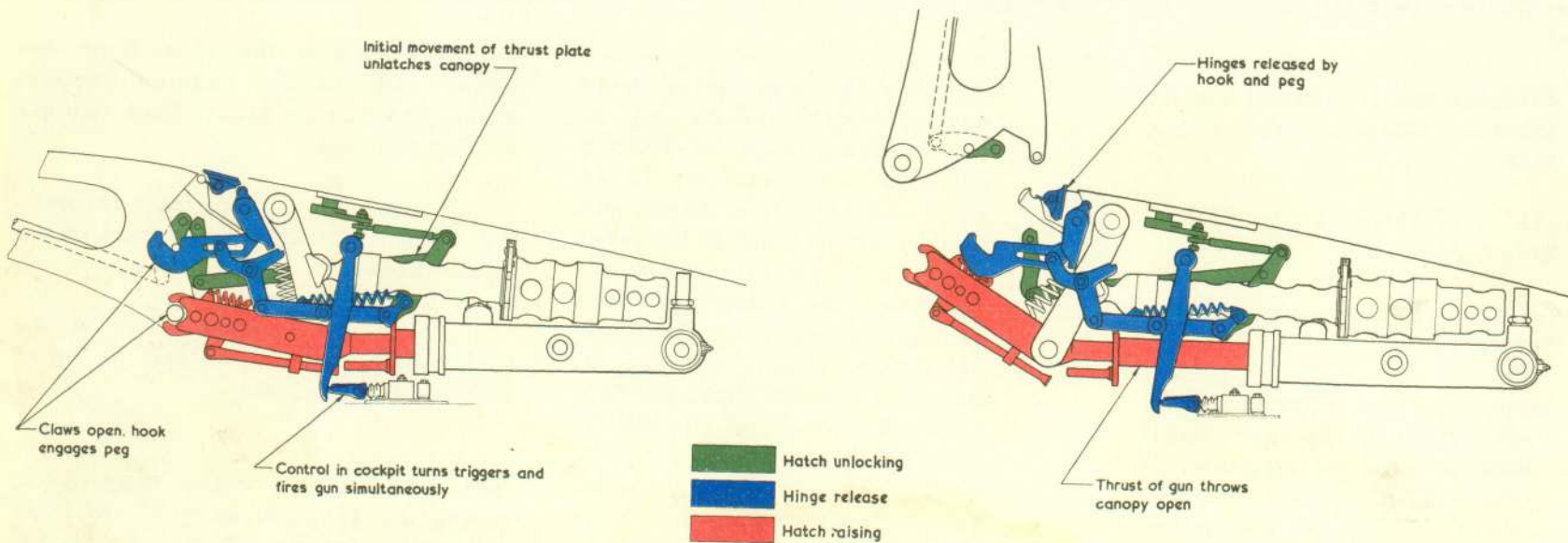
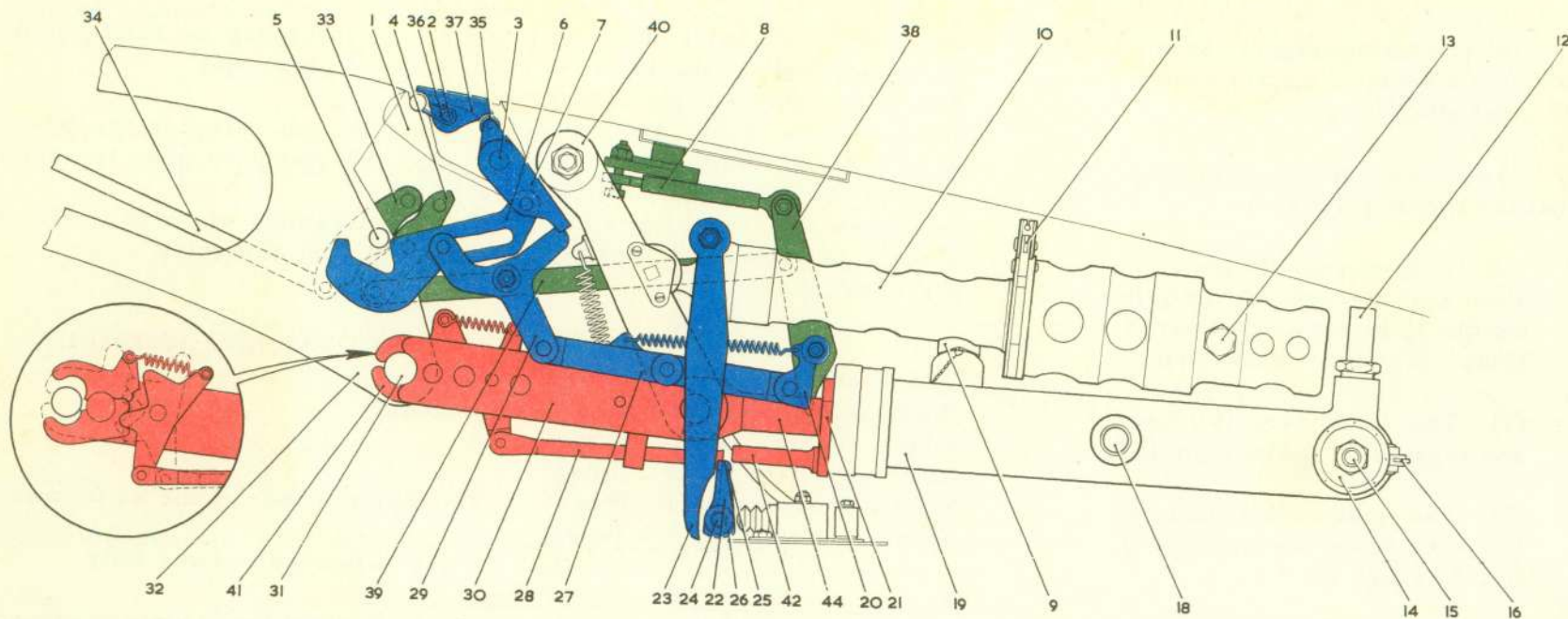


Fig.9 Hatch jettison mechanism operating diagram

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When a replacement radome or nose access doors have been fitted, it must be ensured that the four toggle fasteners on each access door engage fully with their respective catch brackets; if normal adjustment does not result in positive engagement, reference should be made to Vol. 6.

Direct vision window (fig. 5)

23. The D.V. window is removed as follows :-

- (1) Unscrew and push up the clamp screw.
- (2) Lower the window on to the locking plate.
- (3) Hold the window by the handle and pull aft until the rear ball-end slides into the wide channel of the guide shoe.
- (4) Lift out the window.

Assembly is the reverse of removal.

Canopy hatch

Note

Check that both ejection guns are safe and disconnect the three safety release cables as described in Sect. 3, Chap. 11.

24. Remove the canopy hatch as follows :-

- (1) Ensure that the locking pin (item G 12, Sect. 2, Chap. 4) has been inserted in the connecting-rod of the gun lock mechanism (Sect. 3, Chap. 11).
- (2) Remove the cartridge from the gun.
- (3) Unlock and open the hatch to its full extent.
- (4) Ensure that the manual jettison handle on No. 2 bulkhead is in the closed position.
- (5) Disconnect the flexible tube from the union on the air valve.

Refer to fig. 8

- (6) Press the end of the push-rod (28) to release the claws (41) from the beam heel pivot (31).
- (7) Pull the hook arm (6) up and out to free the hinge rockers (37).

Note

It may be necessary to press the hinge-rockers if the hinge rollers do not free immediately.

- (8) Lift the hatch from the canopy.

Assembly is the reverse of removal,

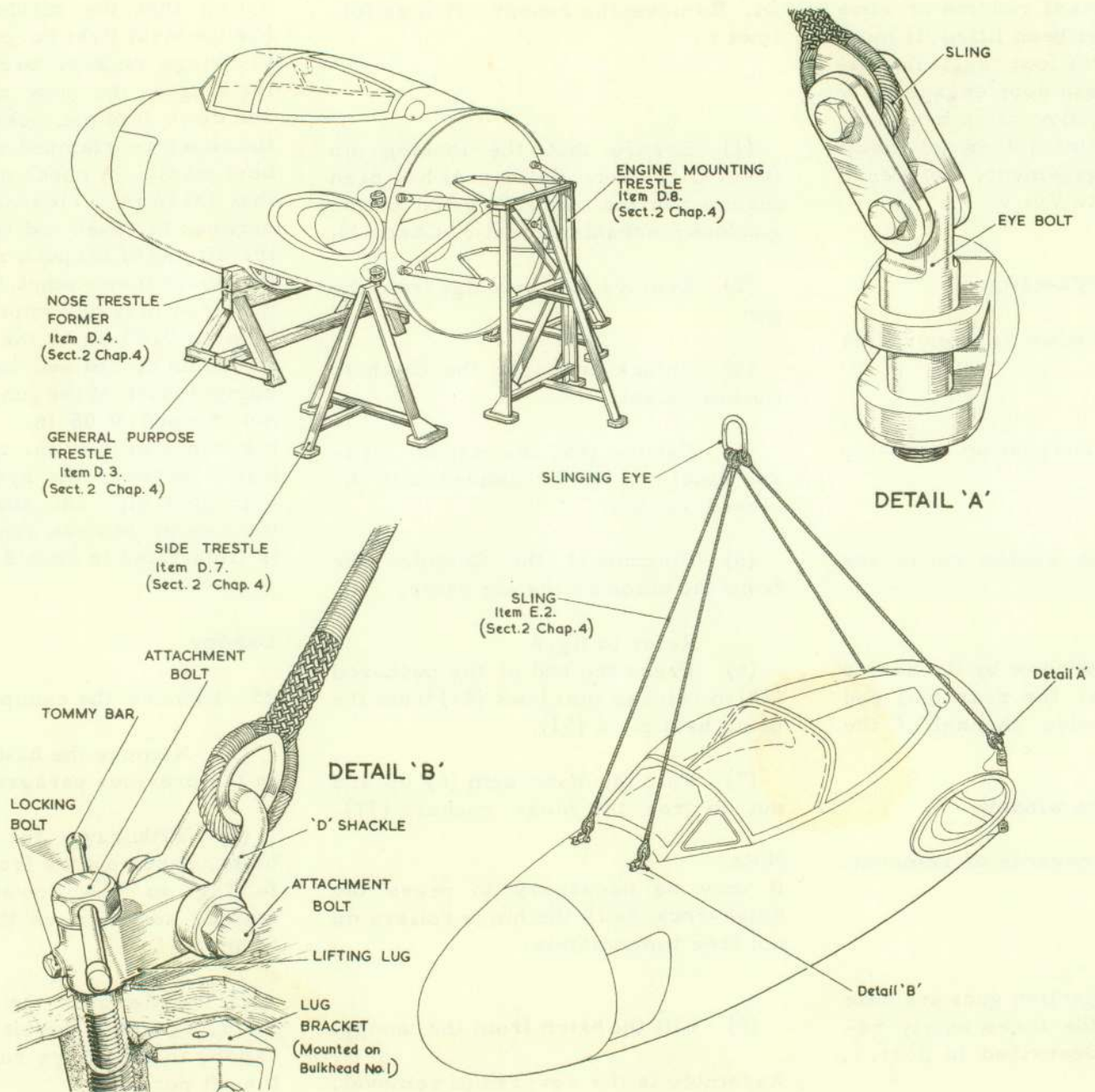
noting that the mechanical jettison handle must first be pushed fully aft, the hinge rockers pressed flat over the hinges, the hook arm pushed aft and down into the locked position and the claws re-clamped round the beam heel pivot. A check should be made that there is a clearance of 0.10 in. between the push rod trigger (25) and the aft end of the push rod (28). When this clearance cannot be obtained the push rod may be compressed a maximum of 0.05 in. by the trigger. With the hatch closed and locked down the compression of the gun fork (44) must not exceed 0.05 in. A minimum clearance of 0.40 in. must be maintained between the hydraulic reservoir vent pipe and the firing pin of the canopy jettison gun. This point is illustrated in Sect. 3, Chap. 6.

Canopy

25. Remove the canopy as follows :-

- (1) Remove the hatch as indicated in the previous paragraph.
- (2) Withdraw the countersunk bolts, securing the front windscreen fairing to the lower windscreen frame, and remove the windscreen frame.

- (3) Withdraw the countersunk bolts, securing the aft portion of the canopy to the canopy rail, and remove the aft portion.



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Fig. 10 Fuselage slinging and trestling

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Assembly of the three units of the canopy is classed as a repair and is described in Vol. 6.

Ejection seats

26. The procedure for the removal of the ejection seats is given in A.P. 4288N, Vol. 1, and the removal and assembly of the ejection seat guns is described in Sect. 3, Chap. 11.

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