Chapter 11

EMERGENCY EQUIPMENT

(Completely revised-Mod. 1550)

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LIST OF ILLUSTRATIONS

SAFETY PRECAUTIONS

1. The emergency equipment incorporates several explosive cartridges and a high-pressure compressed air bottle. Inadvertent firing of any of these may result in death or serious injury to any persons leaning over or standing near the pilot's or observer's cockpit; the positions in which the safety devices ahould be placed are shown in fig. 1. The following safety precautions must therefore be strictly observed.

Note . . .

The numbers after the items in paras. 2 *to* 5 *refer to the ballooned location in fig.* 1.

Pilot's cockpit

2. Before entering the pilot's cockpit, ensure that safety pins are fitted at the following locations:—

(1) In the face blind firing handle safety lock (2).

(2) In the alternative firing handle (5).

(3) In the hood jettison handle (3).

(4) In the sear of the guillotine firing unit (6).

3. Before any servicing is commenced in the vicinity of the cockpit, ensure that the safety pins are fitted at the following locations:—

(1) In the sear of the hood jettison primary unit (2).

(2) In the sear of the ejection gun firing unit (1).

(3) In the safety lock of the drogue gun time-delay mechanism (move the drogue gun static rod pin from the cross beam fork end) (4).

(4) In the alternative firing handle (5).

(5) In the sear of the guillotine firing unit (6).

Observer's cockpit

4. Before entering the observer's cockpit, ensure that safety devices are fitted at the following locations:—

(1) In the face blind firing handle safety lock (2).

(2) In the alternative firing handle (5).

(3) On the push-rod of the hatch jettison air bottle (7).

(5) In the sear of the guillotine firing unit (6).

5. Before any servicing is commenced in the vicinity of the observer's cockpit, ensure that the safety devices are fitted at the following locations:—

(1) In the sear of the ejection gun firing unit (1).

(2) In the safety lock of the drogue gun time-delay mechanism (move the drogue gun static rod pin from the cross-beam fork end) (4).

(3) In the alternative firing handle (5).

(4) On the push-rod of the hatch jettison air bottle (7).

(5) In the sear of the guillotine firing unit (6).

Note . . .

Hold the push-rod forward when fitting or removing safety clip.

DESCRIPTION AND OPERATION

Introduction

6. This chapter describes the installation of the following items of emergency equipment:—

(1) The ejection seats Type 4DS1 or 4DSA1 (pre Mod. 1333), or Type 4DSA1 Mk. 2 (Mod. 1333), and similar seats Type 4DS2, 4DSA2 or 4DSA Mk. 2 seats for the observer.

(2) The mechanism to jettison the pilot's hood by cartridges, and manually from inside and outside the cockpit.

(3) The mechanism to jettison the observer's hatch by compressed air, or manually from inside the cockpit.

7. Details of all other emergency equipment are given in Sect. 1, Chap. 3 and details of the fire protection equipment are given in Sect. 4, Chap. 5.

8. The hood and hatch can be power jettisoned in all conditions of flight and under water. When power jettisoned from a stationary position on the ground both the hood and the hatch will be thrown fully clear of the crew compartments.

PILOT'S EJECTION SEAT (fig. 1)

9. The Type 4DS and 4DSA series seats are fully described in A.P.4288 (Naval), Vol. 1. The seats are basically similar, being lightweight fully automatic units mounted on a combined guide rail and telescopic ejection gun secured to the aircraft structure. The seats embody a personal equipment connector (P.E.C.), and electrical seat raising. The Mk. 2 seats incorporate a self-contained emergency oxygen system, and a guillotine firing unit to sever the parachute withdrawal line. On earlier seats the emergency oxygen system is controlled by an excess pressure valve on the seat and a remote manual control.

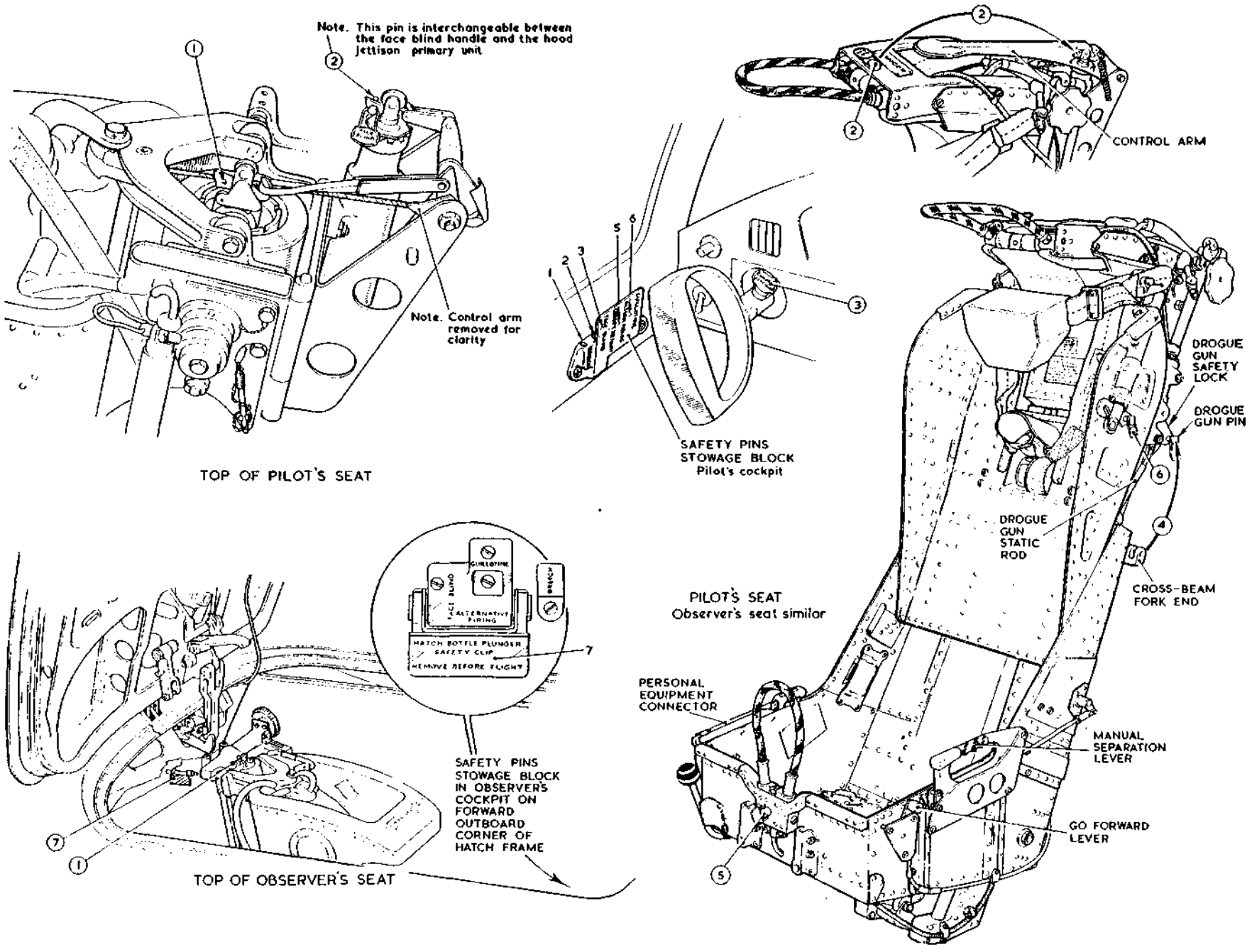


Fig. 1. Ejection seat safety devices

10. The seat has two firing handles; one positioned above the pilot's head, is attached to a face blind; the second, alternative firing handle, is located at the front of the seat pan for use if the normal firing handle cannot be reached. When either of the firing handles is pulled, the hood or hatch is first jettisoned, and after one second delay, the seat is ejected. Half a second after ejection a drogue gun is fired, which withdraws two drogues to stabilize and slow the seat, and also positions it in the best attitude. The pilot is retained in the seat for 1¼ seconds, or until tolerable conditions of speed and height are attained. He is then released from the seat, and his parachute is opened. On Mk. 2 seats, if the automatic release fails, the occupant pulls the manual separation lever which releases the harness, leg restraining cords and P.E.C.; as the occupant falls forward the guillotine firing unit severs the parachute withdrawal line, and the occupant is then free, but must open his parachute using the 'D' ring. Emergency oxygen is supplied to the seat occupant while he is attached to the seat; the bottle is operated either by the release cable, or, on Mk. 2 seats, by a trip lever (Sect. 3, Chap. 10).

11. The standard equipment for the seat is as follows:—

(1) Combined parachute and harness assembly, Mk. 29A or Mk. 44A (post Mod. 1333).

(2) Personal survival pack, Type P, or Type R modified for Naval use (Mod. 1197).

Personal equipment connector

12. A personal equipment connector (P.E.C.) which is described in A.P.4288 (NAVAL), Vol. 1, Part 1, Sect. 8, is bolted to the starboard side of each seat pan and provides attachment for the following services:—

(1) Tel/mic.

(2) Anti-g suit supply.

(3) Air ventilated suit supply (not used).

(4) Main oxygen supply

(5) Emergency oxygen supply.

The P.E.C. is designed to couple and uncouple service lines to the above mentioned equipment by a single movement of a lever. When disconnected, the services, except the emergency oxygen, are sealed off. During ejection, the aircraft portion of the pilot's P.E.C. is released by the lever being pulled by a steel cable which passes round a pulley and joins a coiled spring attached to the airframe. The spring keeps the cable taut when the seat is raised and lowered. The observer's P.E.C. pull-off cable passes round two pulleys which are close together, and to obviate kinking a nylon cable is used on post Mod. 1081 aircraft.

13. When the seats are removed, the aircraft portion of the pilot's P.E.C. is stowed under panel 'L', between the P.E.C. pull-off and the centre console structure, and is secured by an elastic cord the end of which is hooked round an Oddie stud. The aircraft portion of the observer's P.E.C. is stowed against frame 131 on the starboard side of the cockpit, and is secured by an elastic cord which is hooked on to two lugs.

PILOT'S HOOD JETTISON MECHANISM (fig. 2)

WARNING . . .

A ground supply must be plugged in when the pilot's hood is electrically opened and closed. If, in an emergency, the hood has been operated several times using the aircraft battery, an electrical tradesman must be informed in order that the battery is tested before the next flight.

14. The hood is cartridge-jettisoned by the initial movement of either the face blind or the alternative firing handle. It may also be cartridge-jettisoned (without seat ejection) by pulling the hood manual jettison handle (fig. 2) on the pilot's port instrument panel (Sect. 1, Chap. 3); should the cartridge fail to operate, a further pull on he handle will release the hood and allow it to be thrown clear by the airstream. The hood can also be released by an external release handle fitted to the port side of the fuselage.

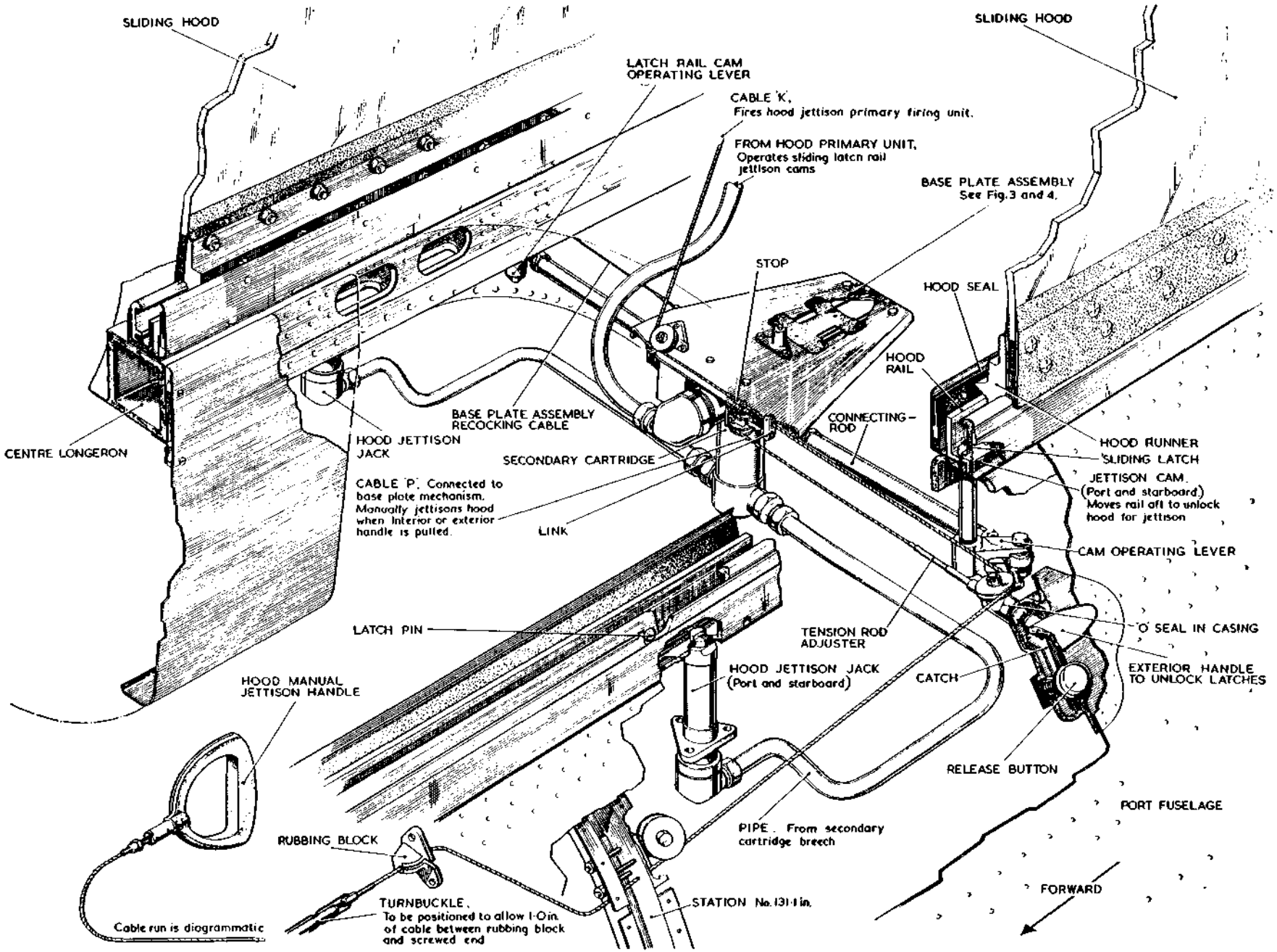
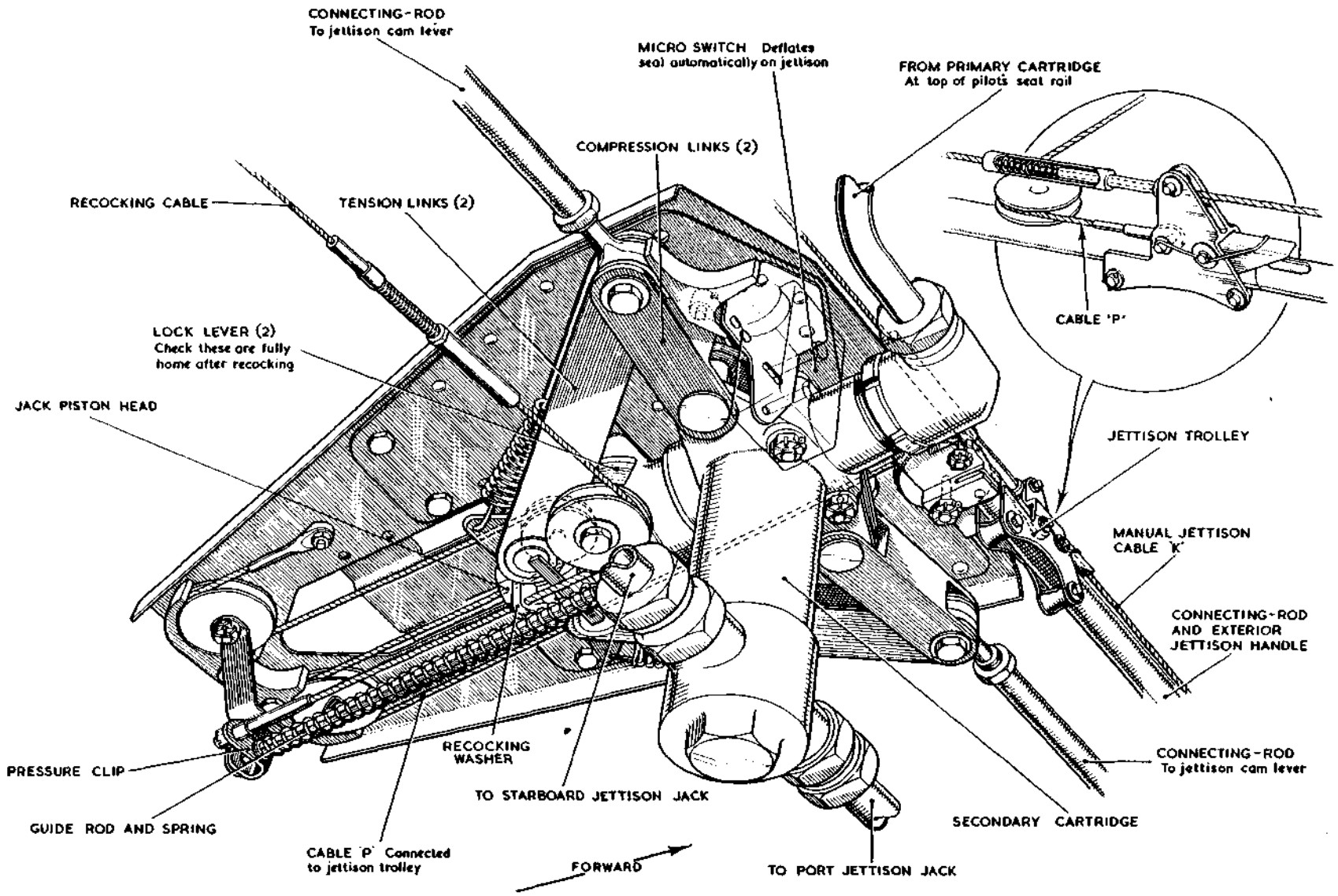
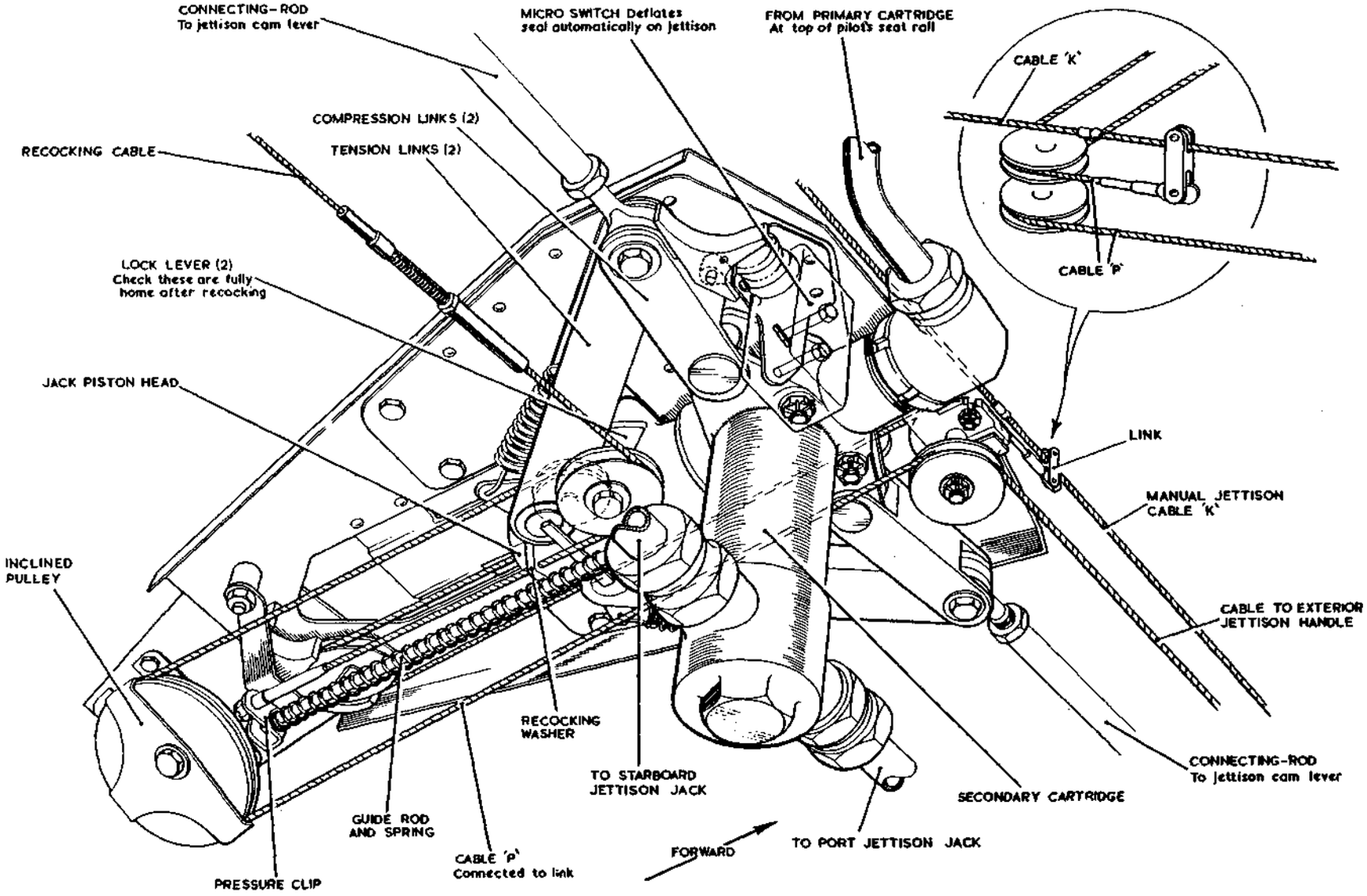


Fig. 2. Hood jettison mechanism



UNDERSIDE VIEW

Fig. 3. Base plate assembly, hood jettison (pre-Mod. 878)



UNDERSIDE VIEW

Fig. 4. Base plate assembly, hood jettison (post-Mod. 878)

15. Two cartridges are used in the jettison mechanism. The primary cartridge is used to slide the hood latches into the unlocked (jettison) position; the gases then operate a firing pin to fire the secondary cartridge. This cartridge operates two jettison jacks, one beneath each guide rail, which raise the hood into the airstream. An extending strut (called the optimum angle release strut) allows the front of the hood to rise approximately 15 deg. before the rear end is released. This ensures that the hood will be thrown clear of the aircraft (fig. 7).

Hood rails and latches (fig. 5)

16. The hood slides on rollers within guide rails positioned on the top of the fuselage structure (Sect. 3, Chap. 1). The guide rail assemblies each consist of an inner and an outer fixed rail, bolted to the aircraft structure, and a latch, which is in the form of a further rail sliding between the two fixed rails and engaging over the hood rollers at the top. On its lower edge a series of tongues and slots engage with matching tongues on the lower edge of the inner fixed rail, thereby locking the hood to the guide rails. When the jettison mechanism slides the latches aft, the tongues disengage leaving the latches and the hood free to be jettisoned from the aircraft.

Base plate mechanism (fig. 3 and 4)

17. The mechanism, which unlocks the latches to allow the hood to be jettisoned and also fires the secondary cartridge to jettison it, is situated beneath the top decking immediately aft of the pilot's ejection seat guide rail. All the parts are suspended from a base plate. At the front a rigid pipe from the primary firing unit at the top of the pilot's seat is connected to the head of a jack, which lies fore-and-aft. The piston-rod of the jack is attached to two tension links, which point outwards and forwards. Two compression links are pivoted on fixed points on the jack casing and point outwards. Each pair of links (i.e. one tension and one compression) meet at their outboard ends and are joined by a bolt; from each of these bolts a connecting-rod runs outboard to the jettison cam operating lever in each canopy guide rail assembly. Pivoted on the inboard hinge point of each tension link is a spring-loaded lock lever, which catches on a bush at the rear of the jack casing.

18. The secondary cartridge is mounted on the jack between the pivot points of the two compression links. When the primary cartridge is fired, the jack piston extends, pulling the tension links aft and rotating the compression links about their fixed ends. The connecting-rods are pulled inwards and the cams are rotated, moving the latches into the unlocked position. As the piston reaches the end of its travel, the breech of the secondary cartridge is exposed and the gases operate a striker pin and fire the cartridge. The gases from this cartridge are discharged through rigid pipes to two jettison jacks which extend upwards and lift the hood into the airstream. The canopy seal is automatically deflated by the action of a micro switch when the base plate mechanism operates.

19. On pre Mod. 878 aircraft a pulley is mounted on the piston-rod of the jack in the base plate mechanism between the two tension links. Three pulleys are mounted on the base plate; one at the front, to port of the jack, and two at the rear, one port and one starboard. A cable (cable P, fig. 3) from a jettison trolley (para. 26) comes from the port side around the front pulley, aft to the port rear trolley, forward to the pulley on the piston-rod, aft again to the starboard rear pulley and forward again to be anchored to the base plate. When this cable is pulled it causes the piston-rod to extend with subsequent unlocking of the latches.

20. On post Mod. 878 aircraft, four pulleys are mounted on the base plate (fig. 4), two at the front on the port side of the jack, and two at the rear, one being larger and inclined to the base plate. A cable (P, fig. 4) from the exterior hood jettison handle passes round the lower pulley of the pair at the front of the base plate, round the larger inclined pulley and forward to go round the pulley on the piston-rod. The cable then runs rearwards to the smaller rear pulley and forward and round the upper pulley at the front of the base plate. The cable terminates in an end fitting which is attached to a link; the end fitting butts on the pulley block mounting, thus, when the exterior handle is pulled, the piston-rod is extended and the rail latches are unlocked as described in para. 18, when the piston-rod is extended by gas pressure.

21. A guide rod (fig. 3 and 4) runs fore-and-aft between fixed points on the jack casing and a support bracket mounted on the pivot bolts of the two rear pulleys (pre Mod. 878). When Mod. 878 is embodied the bracket is in the same position, but a distance bush takes the place of the redundant pulley. A pressure clip rides on the guide rod and is held at the aft end by a light coil spring, which is coaxial with the rod. The pressure clip is connected to a recocking cable which runs forward from the clip and passes round a pulley mounted on the starboard after end of the jack casing. The cable terminates in a ring on the observer's port shoulder guard. When the base plate mechanism has been used to unlock the latches, it can be recocked by a pull on the ring; the pull is transmitted by the cable and pressure clip to a recocking washer on the end of the piston-rod. The rod is thus returned to its original position and is retained there by the two lock levers engaging on the bushes at the end of the jack casing.

Hood jettison jacks (fig. 5)

22. Martin Baker hood jettison jacks are fitted beneath the port and starboard guide rails. They are operated by gases from the secondary cartridge on the base plate mech-

anism (para. 18). The jack piston has a stroke of 5·00 in. and serves to throw the hood clear of the aircraft. When tested by air pressure the stroke is limited by a shear pin to 1·5 in.

Hood and seat jettison control mechanism (fig. 6)

23. A safety interlock mechanism is mounted on the top of the pilot's seat guide rail to prevent the seat being ejected whilst the hood is still in position. The mechanism comprises a control arm mounted on the port end of a transverse shaft, on which are also mounted four levers, which are positioned as follows:—

(1) At the starboard end is a single action lever pointing downwards and aft, and connected to the hood jettison cable, which is held on the lever by a spring-loaded trap link. (The link is so designed that when the cable and the lever are approximately in the same straight line, a pull on the cable disengages it from the lever).

(2) Inboard of the single action lever is a vertical lever or hood jettison firing arm, which is connected to the sear of the hood jettison primary firing unit by a short link.

(3) In the centre of the transverse shaft is a double action lever pointing downwards and aft which is connected to the cable from the two seat firing handles; this cable is also attached to the lever by a spring-loaded trap link.

(4) The fourth lever (the seat firing arm) is enclosed within the control arm and points upwards and forwards; it is connected by a long link (the seat firing link) to the sear of the ejection gun. The link is attached to the lever by a pin which passes through a slot in the lever, thus permitting a certain amount of travel before moving the link. A light spring, anchored to the structure which supports the shaft, is attached to

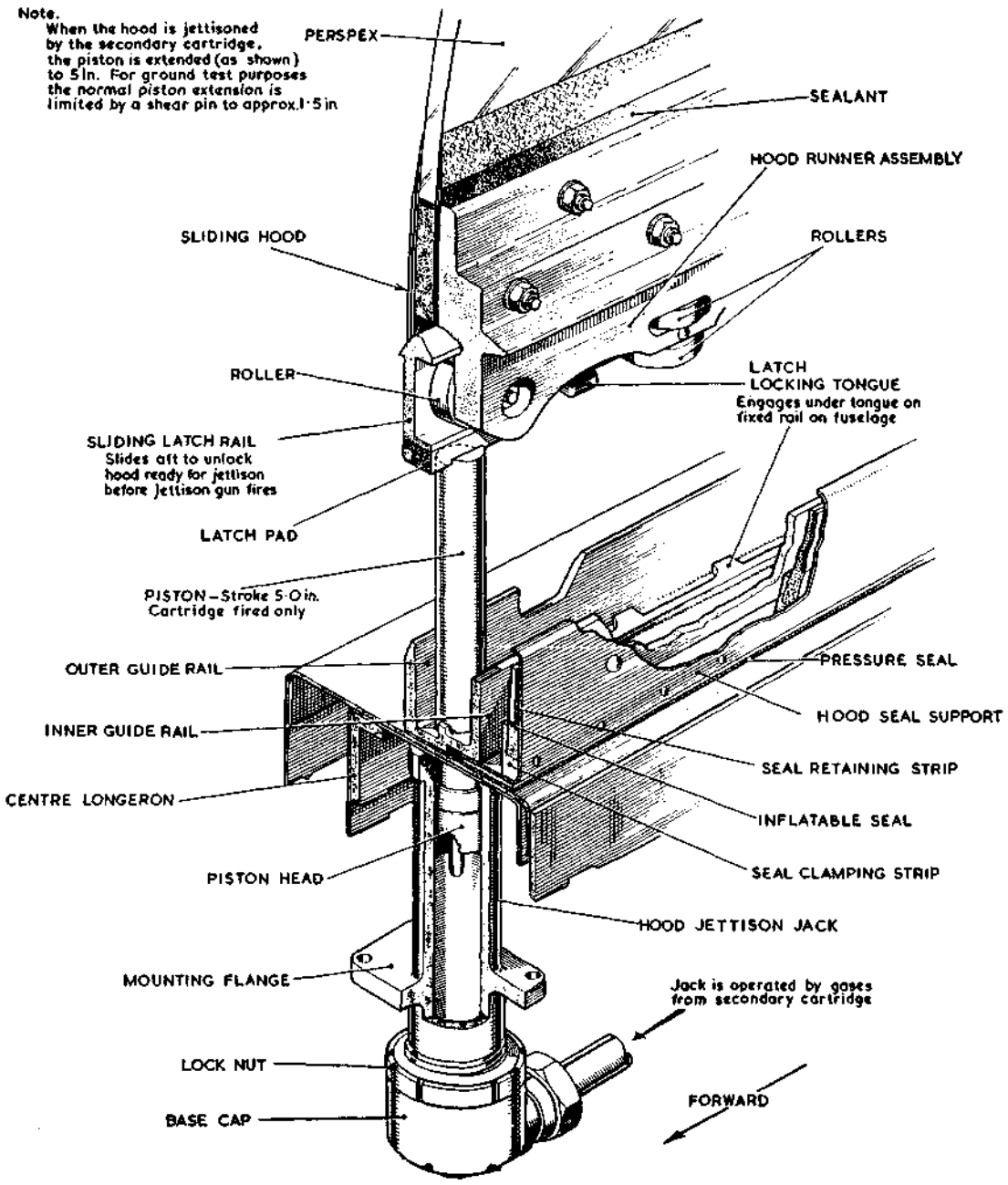


Fig. 5. Hood, jettison jack, starboard

a pin passing through the control arm and tends to keep the arm in an approximately horizontal position. The spring post is extended by Mod. 1106, thus forming a stop which prevents the seat firing link taking a position which could cause a geometric lock.

Hood jettison with seat ejection (fig. 6)

24. When either of the seat firing handles is pulled, the cable rotates the transverse shaft anti-clockwise (looking from the starboard side) and the sear is withdrawn from the hood jettison primary firing unit. The rear face of the seat firing arm butts against the pin in the control arm and rotates the control arm anti-clockwise against the pull of the spring, until it touches the hood and further rotation of the control arm and the shaft is prevented. When the hood has been jettisoned, the control arm, and thus the shaft, are free to continue rotation and, when the slack due to the slot in the seat firing arm has been taken up, the sear is withdrawn from the ejection seat gun and the firing cable disconnects from the lever.

Hood jettison without seat ejection (fig. 6)

25. When the hood manual jettison handle is pulled, the hood jettison cable rotates the transverse shaft until the cable and the single action lever on the shaft are in a straight line; the cable then disengages from the lever and rotation of the shaft ceases. The limited amount of rotation thus given to the shaft is sufficient to withdraw the sear of the hood jettison primary firing unit but not the sear of the seat ejection gun.

Hood jettison from inside the cockpit

26. On pre Mod. 878 aircraft should the hood jettison cartridge fail to operate, the hood can be jettisoned manually from inside the cockpit up to an air speed of 300-350 knots, by a continued pull on the manual jettison handle. The cable (cable K, fig. 2) from the handle is routed through a jettison trolley which is free to slide over a guide rail (part of the exterior jettison mechanism, para. 28). The normal travel of the cable required to withdraw the hood gun sear does not move the trolley, but, when the cable is released from the lever (para. 25) and a continued pull is exerted on it, a spring-loaded plunger, which is mounted on the cable, seats on the trolley and moves it along the guide tube. A second cable (cable P, fig. 3) is attached to the trolley and to the base plate mechanism. As this cable is moved by the trolley, it pulls the spring-loaded links on the base plate over centre and the connecting-rods rotate the cams in the latch slots, unlocking the latches. The hood is now free to be jettisoned.

27. On post Mod. 878 aircraft, the cable (cable K, fig. 4) from the hood manual jettison handle is routed through a link. The initial movement of the cable withdraws the sear from the hood jettison primary unit, the cable running through the link, but if the cartridge fails, a continued pull on the handle will bring a stop on the cable into contact with the link which is attached to the end of the cable from the exterior handle (para 20). A pull on the cable P from this end will extend the base plate mechanism piston rod in the same manner as pulling the exterior handle; the hood rail latches will be unlocked, and the hood will be released.

Hood jettison from outside the cockpit

28. A handle is provided on the fuselage port side to enable the hood to be manually jettisoned from outside the aircraft, the same handle and mechanism are also used when it is desired to remove the hood completely for ground servicing. The handle normally lies flush with the fuselage skin but springs clear when a release button below the handle is pressed. On pre Mod. 878 aircraft a telescopic tube assembly connects the handle to the base plate mechanism and the jettison trolley rides on the tube. A cable is connected to the trolley and to the base plate mechanism. When the exterior jettison handle is pulled, a catch on the trolley engages a slot in the tube and the trolley is pulled outboard. The cable then operates the base plate mechanism as described in para 19, bringing the latches into the unlocked position. The hood is now free and can be manually lifted from the aircraft. Except in an emergency, the hood must be handled with great care, preferably by at least three men, as damage can cause catastrophic failure in flight.

29. On post Mod. 878 aircraft, the exterior hood jettison handle is connected to a turnbuckle which is connected directly to the cable which runs round the base plate pulleys (fig. 4), and a pull on the handle will release the hood as described in para. 20.

Optimum angle release strut (fig. 7)

30. This strut controls the release of the hood, when it is jettisoned during flight, by allowing the forward end to rise approximately 15 deg. before the aft end is released. The strut is telescopic to allow the hood to slide backwards and forwards during normal opening and closing, and the forward end is pivoted in a pressure sealed housing on the canopy pressure bulkhead. The strut runs through a guide bracket, fixed on the fuselage structure, to the rear of the sliding hood.

OBSERVER'S EJECTION SEAT

31. The observer's seat and equipment are basically the same as the pilot's described in para. 9, but have the following differences:—

(1) The seat firing cable is connected to an ejection control assembly which ensures that the hatch is jettisoned before the seat is ejected.

(2) The guide rail has a double hinged bottom attachment (fig. 8), which allows the seat to be tilted forward to provide access to the rear of the seat.

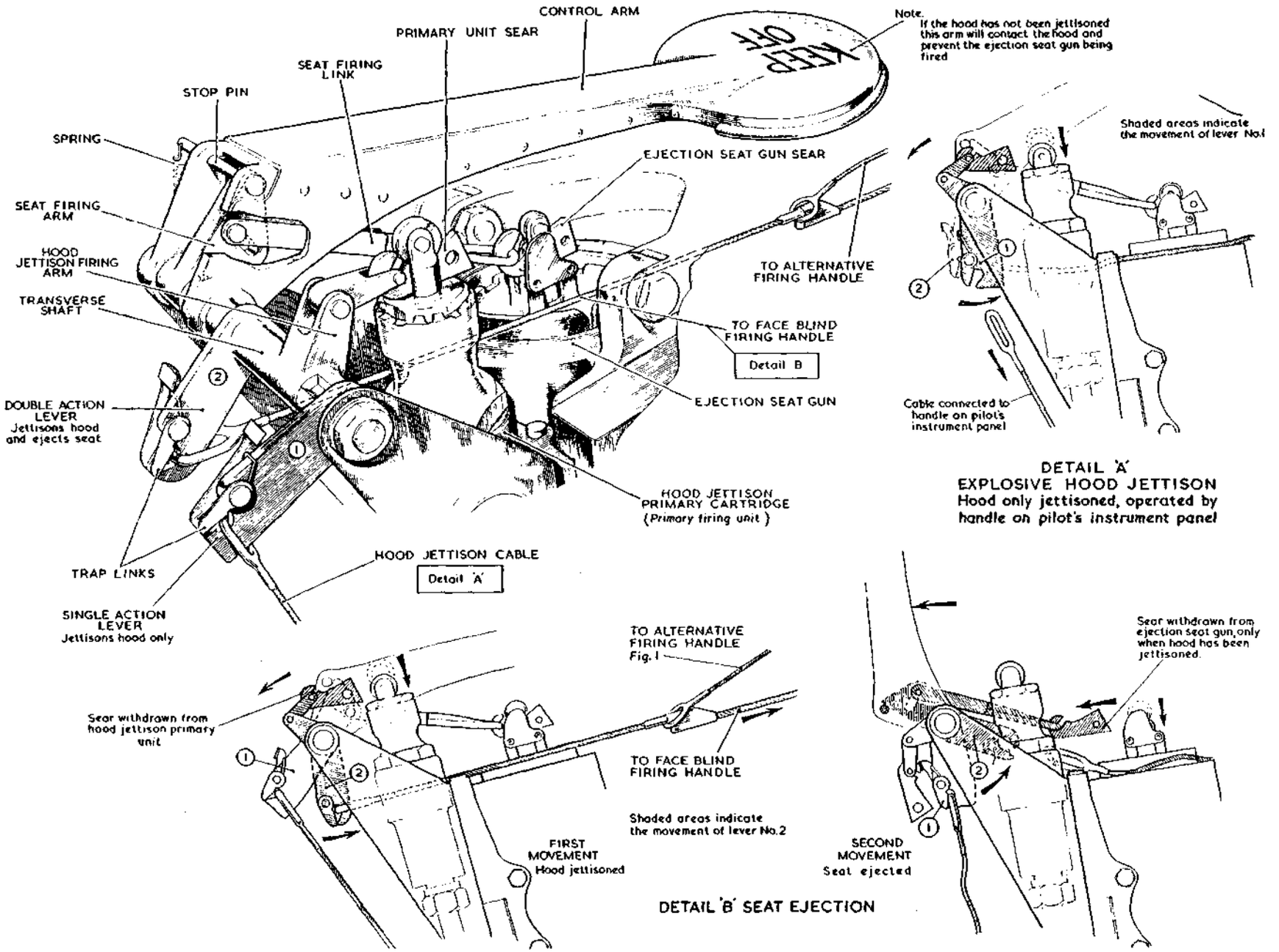


Fig. 6. Hood jettison and seat ejection control mechanism

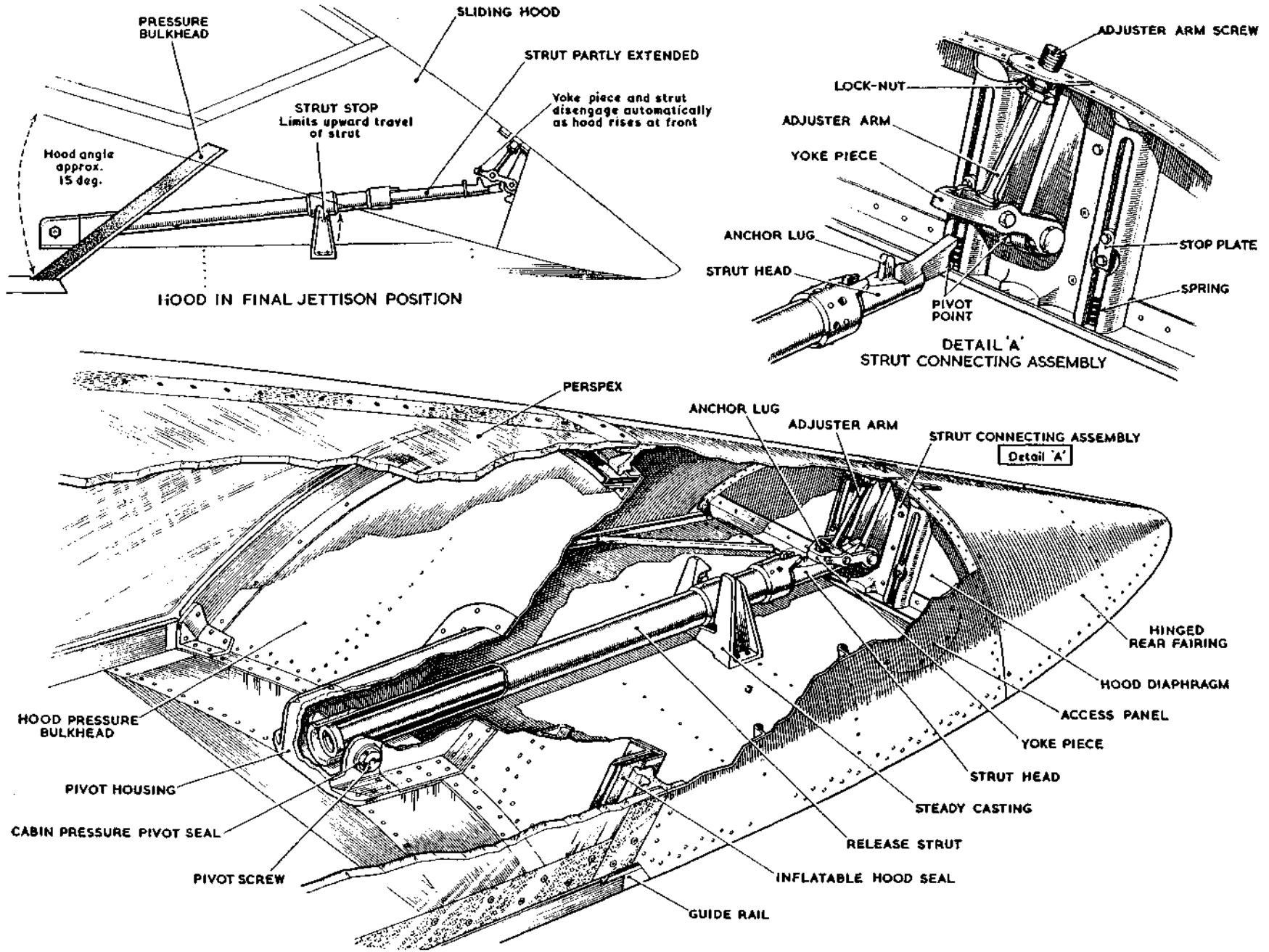


Fig. 7. Optimum angle release strut

(3) The seat raising and lowering switch is on the aft face of the pilot's centre rear console.

(4) The emergency oxygen selector knob is at the starboard side of the seat pan, or on the seat pan on Mk. 2 seats.

OBSERVER'S HATCH MECHANISM

32. The complete mechanism is shown diagrammatically in fig. 9 and the aft part of the mechanism is shown in fig. 10. Part of the mechanism is mounted on the hatch structure and part on the fuselage structure. The hatch is attached to the fuselage by two rear hinges and locked in the closed position by two forward latches. The jettison mechanism has to unlock the latches, push the hatch up into the airstream and release the hinges. The mechanism is operated by compressed air released from an air bottle to a jettison jack.

Interior operating handle

33. The latches are operated by eccentrics mounted on a latch shaft; when the latches are closed the eccentrics are 5 deg. over centre. A lever on the latch shaft is connected by a link to a lever on another shaft mounted above and aft of the latch shaft. An interior operating handle is mounted on this second shaft on the port side of the hatch. When the handle is pulled down, it revolves the shaft, pulling the link and revolving the latch shaft, and thus opening the latches. The handle is fitted with a handgrip which is attached to a spring-loaded lock lever. When the latches are fully closed, the lever engages a spigot on the hatch structure and acts as an additional safeguard to maintain the latches closed; if the hatch is not properly locked, the lever also operates a microswitch which functions in conjunction with the wing fold and radome 'unlocked' circuits to give an indication on the pilot's centralized warning panel. To release the interior handle, the handgrip must first be twisted to release the lever.

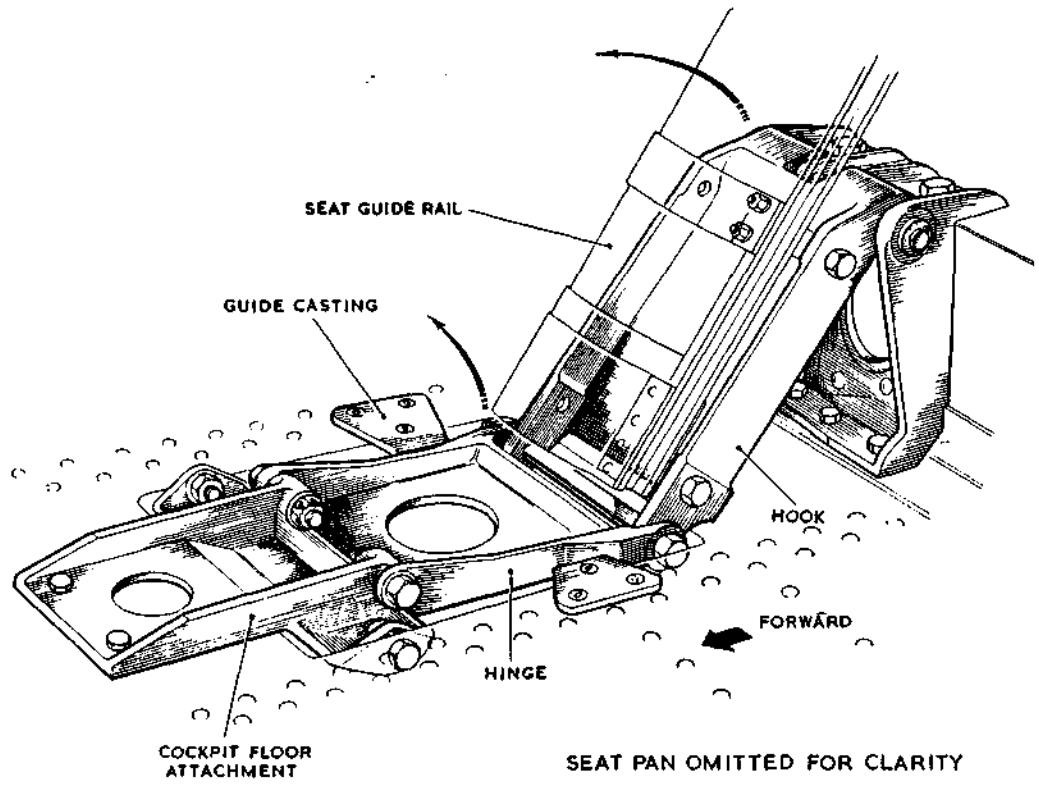


Fig. 8. Observer's seat hinged bottom attachment

Exterior operating handle

34. A lever mounted on the interior handle at its pivot point on the shaft is connected by a forward connecting-rod to one arm of a triple-armed lever mounted vertically on the hatch structure aft of the interior handle. Another arm of this lever is attached to a spring which helps to maintain the latches in either the open or closed position. The third arm of the lever is attached to an intermediate connecting-rod which runs aft to a bell-crank lever mounted horizontally on the hatch structure. From the bell-crank lever a transverse connecting-rod runs to an arm on a hand operating bush which is part of an exterior operating handle mechanism. This mechanism carries a handle mounted flush with the exterior profile of the hatch and which springs clear when a button in the handle is depressed. When the handle lies flush with the skin it is disengaged from the bush but when it is raised, it is directly connected to the bush and, when it is turned anti-clockwise, the bush is revolved pulling the connecting-rods. The forward connecting-rod has approximately $\frac{1}{8}$in. of telescopic movement, which is sufficient to allow a small spigot, mounted on the after part of the rod to release the lock lever on the interior operating handle before the forward part of the rod is moved and the latches are opened.

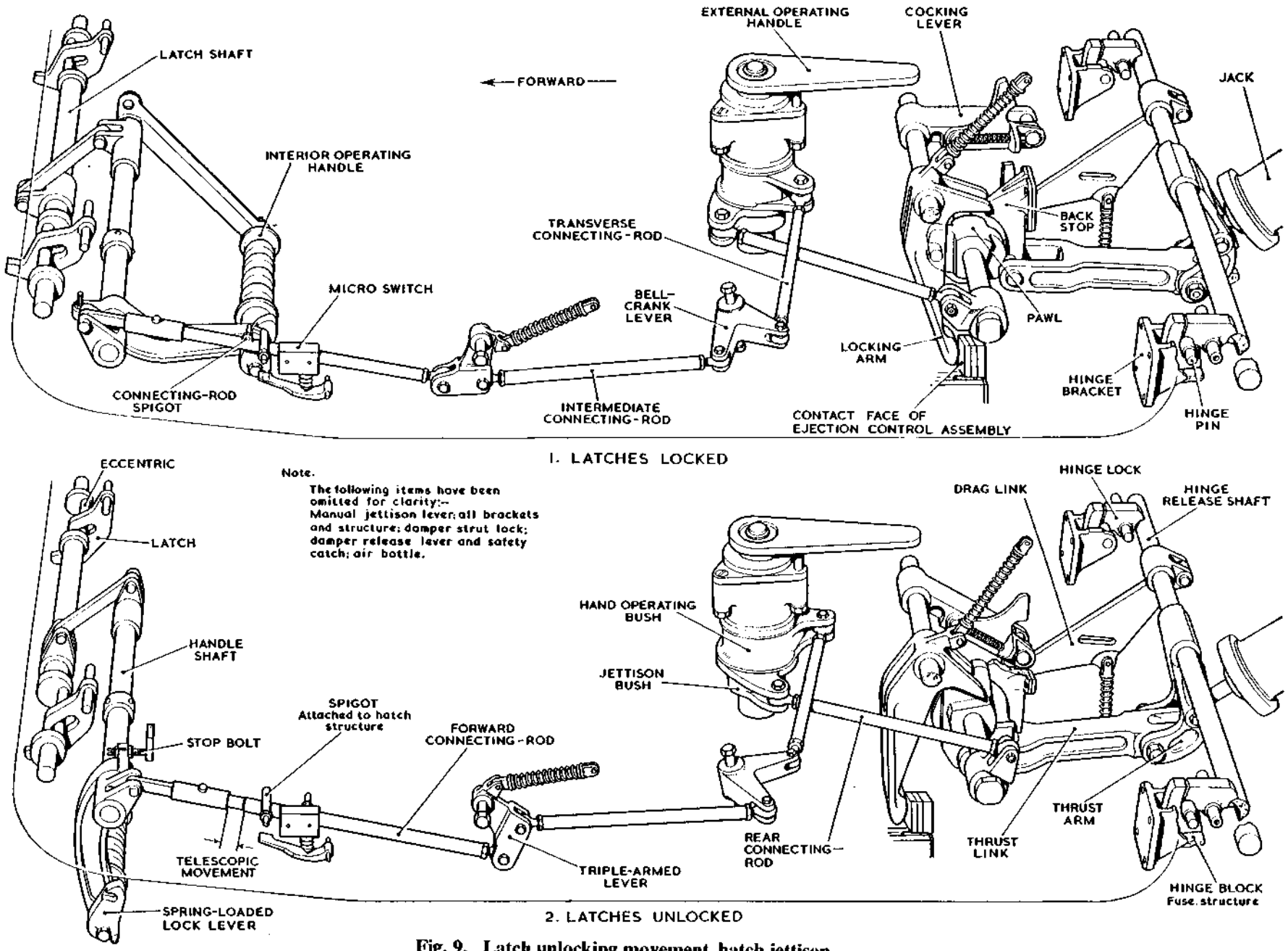


Fig. 9. Latch unlocking movement, hatch jettison

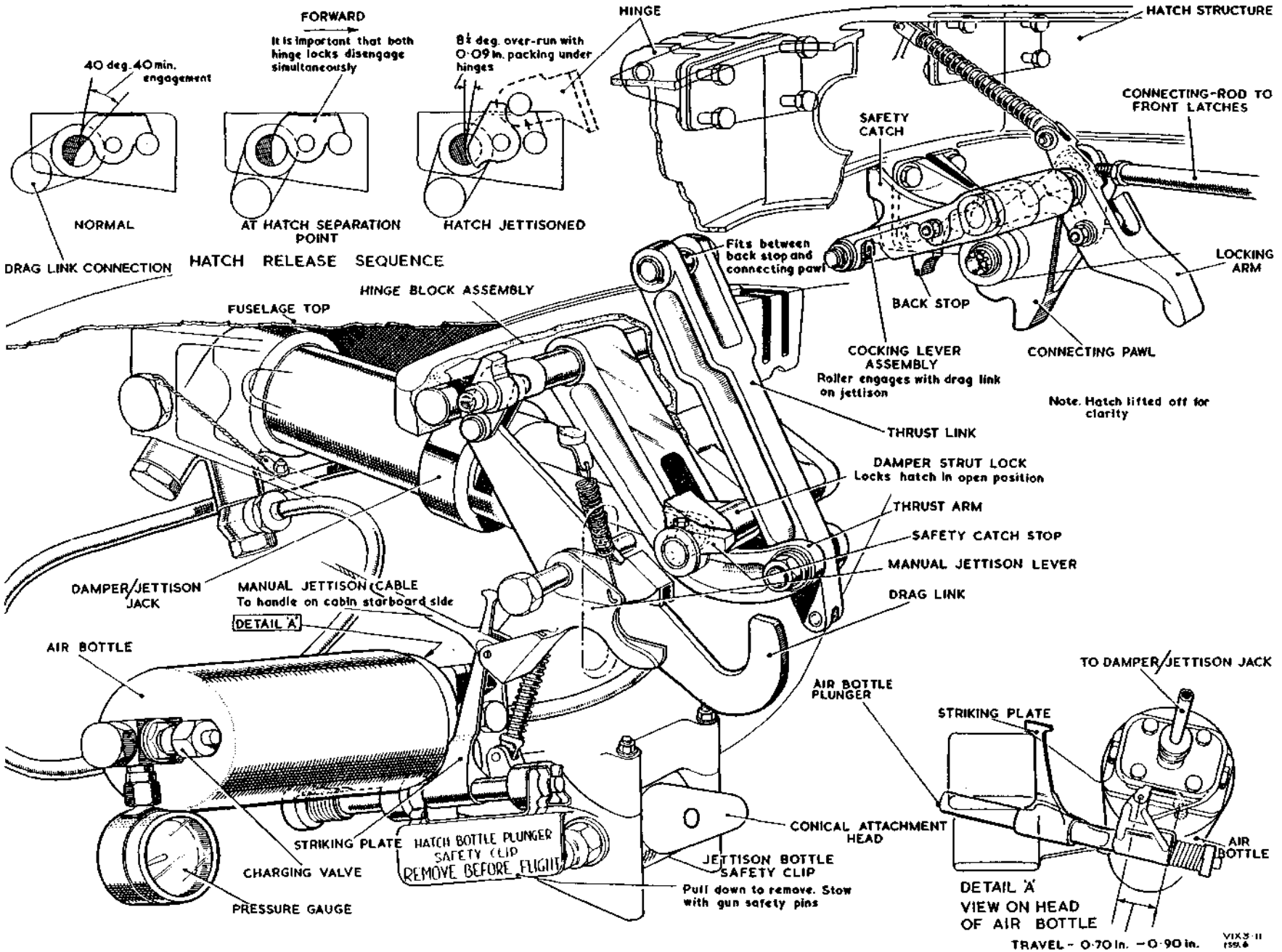


Fig. 10. Hatch jettison mechanism

35. Mounted below the hand operating bush on the exterior handle mechanism is a jettison bush. Both bushes have dogs on their mating surfaces so arranged that, when the exterior handle is moved anti-clockwise, the jettison bush remains stationary. An arm on the jettison bush is connected by a rear connecting-rod to a lever mounted on a shaft at the rear of the hatch. When jettisoning takes place this connecting-rod is moved aft, rotating the jettison bush, the dogs engage with the hand operating bush and the latches are opened.

Pawl, locking arm and back stop

36. Mounted on the same shaft as the lever to which the rear connecting-rod is attached, is a pawl, and mounted on a shaft above the pawl is a locking arm, which, when the hatch is locked, encloses the forward part of the pawl, and a spigot in the arm then engages a slot in the pawl and locks it. A projection on the top of the arm is connected to a spring, the other end of which is attached to the hatch structure. When the arm is pulled away from the pawl, the spring passes over centre and keeps the arm free of the pawl. A back stop is fixed to the hatch structure just aft of the pawl; the pawl and the back stop are so shaped that, when the pawl is locked, a $\frac{3}{8}$ in. diameter hole is left between it and the stop.

Cocking lever and safety catch

37. Mounted to starboard of the locking arm, and on the same shaft, is a cocking lever which points aft. When the hatch is open, a spring-loaded safety catch on the cocking lever engages with part of the hatch structure and prevents rotation of either the cocking lever or the locking arm. When the hatch is closed the safety catch is held clear of the hatch structure by a safety catch stop mounted on a shaft in the fuselage structure.

Hinges and release mechanism

38. Each hatch hinge consists of a pin held between hinge brackets at the rear of the hatch. Each hinge pin passes through a circular space left between a hinge lock and a rigid part of the fuselage structure. The lock is pivoted just aft of the hinge pin and has two short arms, the forward arm resting on the pin and the rear arm resting on a hinge release shaft. When the release shaft is turned a slot cut in the shaft lines up with the rear arm of the lock and allows it to fall; the front arm rises and frees the hinge pin. The release shaft is common to both hinges and both are freed at the same time.

Thrust arm, thrust link and jettison jack

39. Freely pivoted on the centre of the release shaft is the top of a thrust arm which hangs downwards. Approximately two-thirds of the way down, the arm is connected to the piston-rod of the jettison jack which lies to the rear of the arm. Pivoted at the bottom of the thrust arm is a thrust link, the other end of which carries a $\frac{3}{8}$ in. dia pin. The link runs forward from the arm and the pin passes through the hole left between the pawl and the back stop (para 36).

Drag link and manual jettison lever

40. A lever, which is fixed rigidly to the hinge release shaft between the thrust arm and starboard hinge, points aft and slightly down. The aft end of this lever is connected to the drag link, which is supported by a compression spring attached to the fuselage below the link. The lower end of the drag link is in the form of a hook, which is normally positioned below the aft end of the cocking lever. A bolt, secured to the fuselage, passes through a slot in the drag link, and also forms a pivot for the manual jettison lever, which is shaped to fit over the drag link and to engage the end of the cocking lever. A lug on the starboard side of the manual jettison lever is connected by a spring to the structure above the lever, and the lower end of the lever is connected to the manual jettison cable which runs to the manual jettison handle located on the starboard side of the observer's cockpit (fig. 14). A striking plate, attached to the air bottle firing plunger, passes through the fork-end of the manual jettison cable.

Ejection control assembly

41. An ejection control assembly is bolted to the port side of the seat. The assembly comprises a casting with a partially slotted bore, and a release shaft with a contact face at the aft end and a cable connection at the forward end. The shaft slides in the bore, and is restricted in its forward movement by the end of the slot, and in its aft movement by a closure plate. The shaft is restrained in the aft position by a spring-loaded plunger. One leg of the bifurcated cable, operated by either of the seat firing handles, is connected to the release shaft and the other leg is connected to the sear of the ejection gun firing unit. The cable connected to the shaft is automatically released when the shaft is moved fully forward.

Hatch release lever

42. During manual opening and closing of the hatch, the jettison jack acts as a damper but the hatch must always be supported when being closed. When the hatch is fully open, the piston-rod of the jack is fully extended and is locked in this position by a damper strut lock which is mounted on the same shaft as the safety catch. On the port end of this shaft is a spring-loaded lever (fig. 14), which is connected by a cable to a hatch release lever on the starboard side of the observer's cockpit. When this lever is pulled aft, the shaft is rotated, freeing the damper piston-rod and allowing the hatch to be closed; when the lever is released the spring returns the shaft to its original position.

Hatch jettison with seat ejection (fig. 12)

43. When either the face blind or seat pan firing handle is pulled, the shaft of the ejection

control assembly is moved forward causing the contact face of the shaft to pull locking arm 'A' forward to the unlocked position. The shaft is prevented from moving fully forward by the locking arm, and the cable is still trapped in the shaft. The sequence of operations until the hatch is jettisoned is shown on fig. 12. When the hatch separates the shaft is no longer restrained by the locking arm, and a continued pull on the cable moves the shaft forward to allow the cable to release, take up the lost motion between the twin cables, and withdraw the sear from the ejection gun firing unit. The seat cannot therefore be ejected before the hatch is jettisoned.

Hatch jettison without seat ejection (fig. 13)

44. The hatch is jettisoned without ejecting the seat by pulling the manual jettison handle in the observer's cockpit. This action rotates the manual jettison lever, which depresses the cocking lever to engage the roller in the hook of the drag link. Simultaneously the cocking lever shaft rotates and moves the locking arm clear of the connecting pawl. The sequence of operations until the hatch is jettisoned is shown in fig. 13. Because the seat firing handles have not been pulled, the seat is not ejected. If it is necessary to eject subsequent to the hatch jettison, pulling either seat handle will fire the seat, since there is no restraint to the ejection control release shaft, with the hatch, and therefore the locking arm, removed.

Hatch jettison (air bottle failure)

45. Should the hatch fail to be jettisoned by either of the above methods due to failure of the air bottle, it can be manually pushed up into the air stream (up to a speed of 300-350 knots) after the latches have been unlocked by means of the normal interior operating handle. As the act of pulling the seat firing handle or the manual jettison handle will already have engaged the cocking lever with the drag link the hinges will be released when the air stream has lifted the hatch approximately 15 deg. and the hatch will then be carried clear.

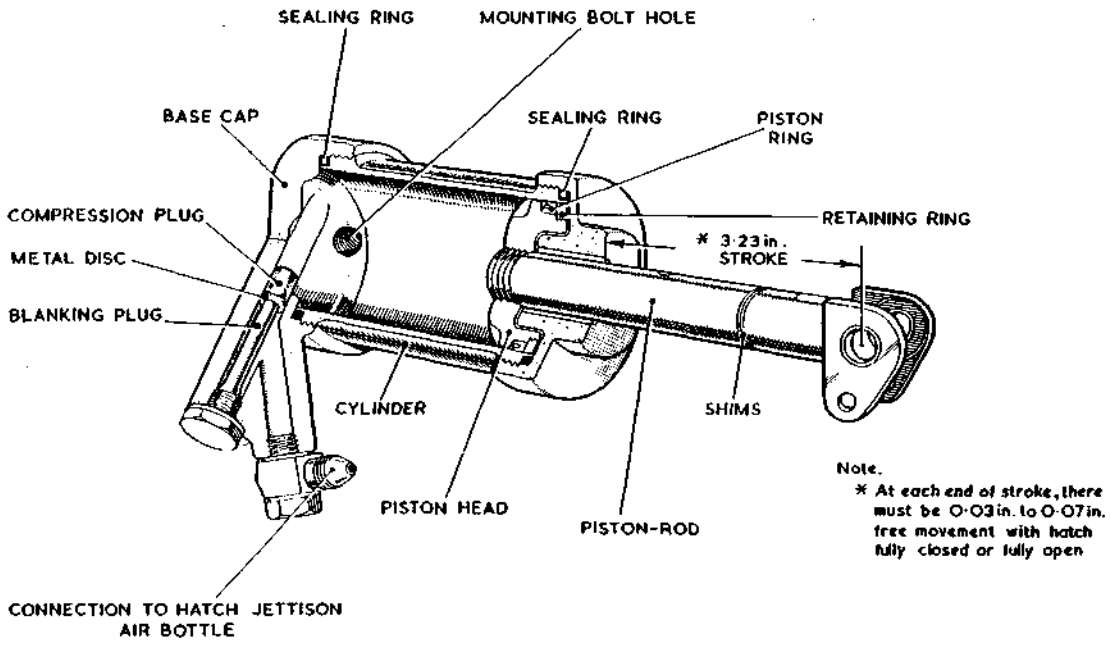


Fig. 11. Hatch jettison/damper jack

WARNING . . .

(1) Before any servicing is commenced, it must be ensured that the safety precautions given at the front of this Chapter have been carried out. If servicing is to be prolonged, it is advisable to remove all explosive cartridges, other than the secondary cartridges in each seat, and to reduce the pressure in the hatch jettison air bottle to zero. No attempt must be made to remove the seats until they have been unloaded by the responsible personnel.

(2) If the cartridges are fired, the entire cartridge system must be dismantled for the renewal of damaged parts and the thorough removal of combustion products. Boiling water will clean the parts if done within 3 hours, but if delayed, a C.T.C. vapour bath followed by boiling will be required. After boiling, dry the parts and oil with OX-13.

(3) Before opening the sliding hood:—

(a) Close the port electrical wing-deck panel to avoid fouling.

(b) To prevent damage to the hood diaphragm, either connect the optimum angle release strut or ensure that the strut is fully closed.

(4) Pressure must not be applied downwards on the control arm. If the pilot's seat is removed and the seat gun is still fitted lift the control arm to the raised position to avoid possible damage to the spring post extension.

SERVICING

General

46. Instructions for servicing the Type 4D/1 and 2 4DS/1 and 2 and 4DS/MK.2 ejection seats are given in A.P.4288 (Naval), Vol. 1 and the instructions for servicing the survival equipment and cartridges are given in A.P.1182E and A.P.1661F respectively.

HOOD JETTISON MECHANISM

Cocking the base plate mechanism

47. Re-cock the hood jettison base plate mechanism by pulling the ring mounted at the top of the observer's port shoulder guard. The ring is released by unlocking the Dzus fastener which secures the retaining clamp. Check that the lock levers (fig. 3) are fully home and that the cocking ring is secured in the mounting.

WARNING . . .

Take up the slack in the manual operating cables when re-cocking, and ensure that all cables are correctly routed around pulleys.

Checks and adjustments

48. Before the hood jettison mechanism is checked, the seat primary cartridge and the hood jettison primary and secondary cartridges must be removed. The following adjustment and checks may then be made:—

(1) Check that the gap between the top of each jettison jack piston rod and the bottom of the latch pad is 0·010 in. If this gap is incorrect, disconnect the pipeline from the base cap of the jack, and slacken the lock nut (fig. 5). Screw up the base cap until the piston touches the latch pad, and then unscrew the base cap a maximum of one turn to line up the base cap connection with the pipeline. Tighten the lock nut and check the gap. If further adjustment is necessary, fit shims between the jack mounting flange and the support casting. Finally reconnect the pipeline and wirelock.

(2) Cock the base plate mechanism and check that :—

(a) The latch levers are fully home.

(b) The latch pins are fully forward (detail 'C' fig. 15).

(3) Close the hood, pull the internal hood jettison handle and check that:—

(a) The load to remove the hood jettison primary unit sear is 30-40 lb.

(b) A continued pull disengages the cable and operates the base plate mechanism.

(c) The latches are freed simultaneously.

Note . . .

If the cable disconnects from the lever before the sear is fully withdrawn, the probable cause, on pre Mod. 662 aircraft is wear on the lever hook, and the lever hook must be renewed.

(4) Recock the base plate mechanism and refit the primary unit sear.

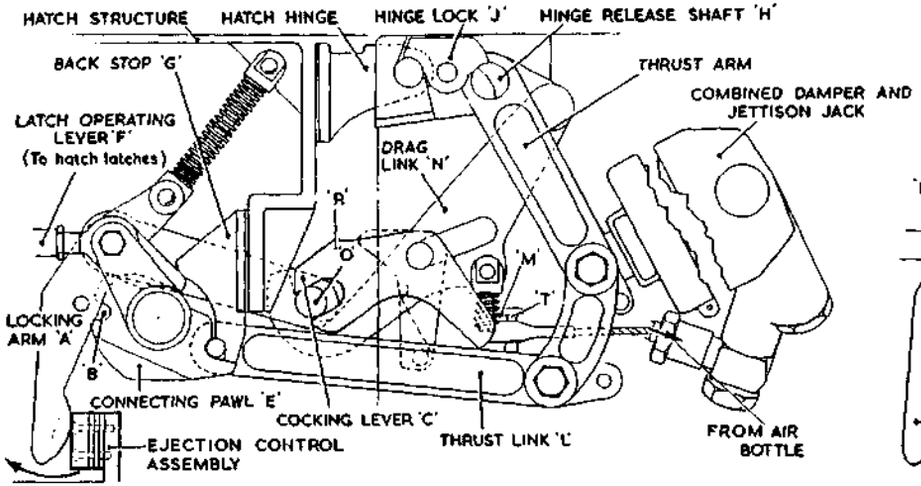
(5) Close the hood, pull the external hood jettison handle and check that:—

(a) The base plate mechanism operates.

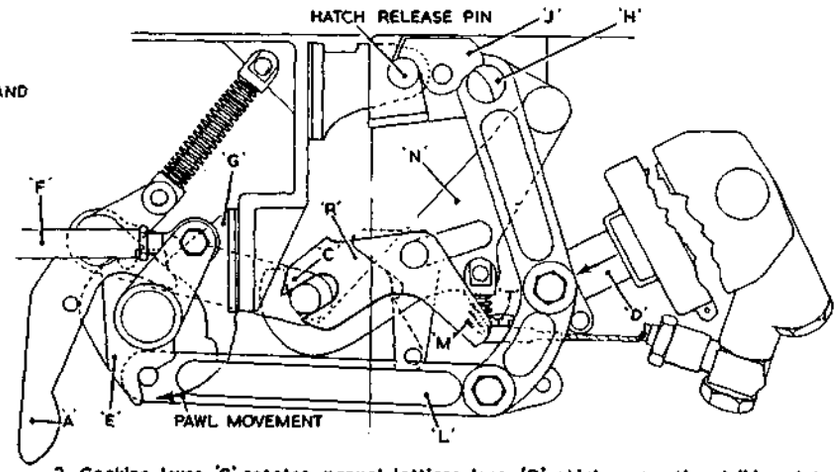
(b) The primary unit sear is NOT withdrawn.

(c) The maximum load is 40 lb.

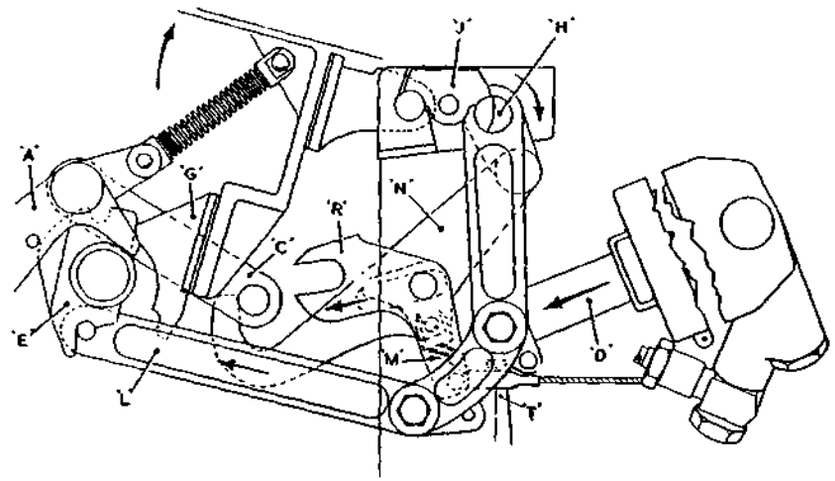
(6) Re-cock the base plate mechanism fit the seat with parachute and survival



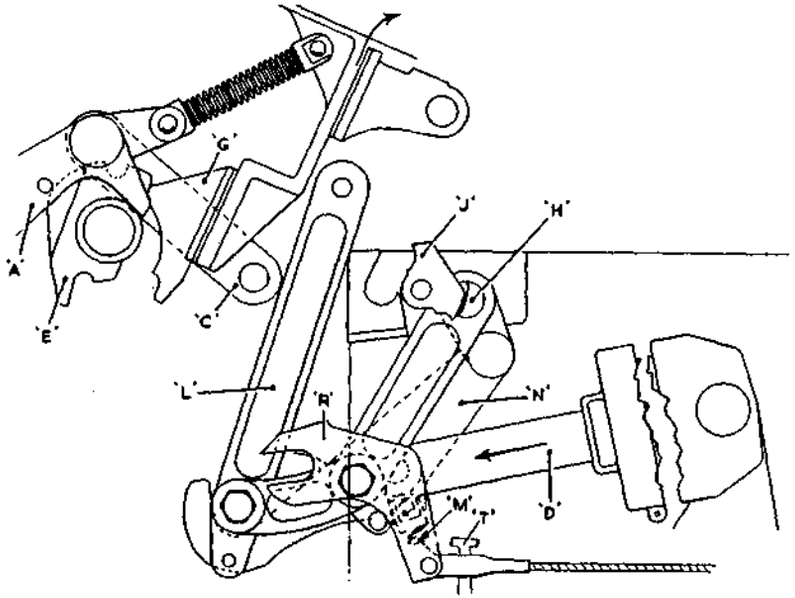
1. Cocking: initial movement of face blind operates ejection control assembly to actuate locking arm 'A' freeing connecting pawl 'E' at point 'B' and moving cocking lever 'C' to engage roller in drag link 'N' at point 'O'.



2. Cocking lever 'C' rotates manual jettison lever 'R', which moves the striking plate 'T' aft to operate the bottle firing arm, and releases bottle pressure which extends the damper piston rod 'D', the connecting pawl 'E' is rotated and takes the operating lever 'F' with it, thus unlocking the front latches. Pawl stops on back stop 'G', no movement of hatch yet.

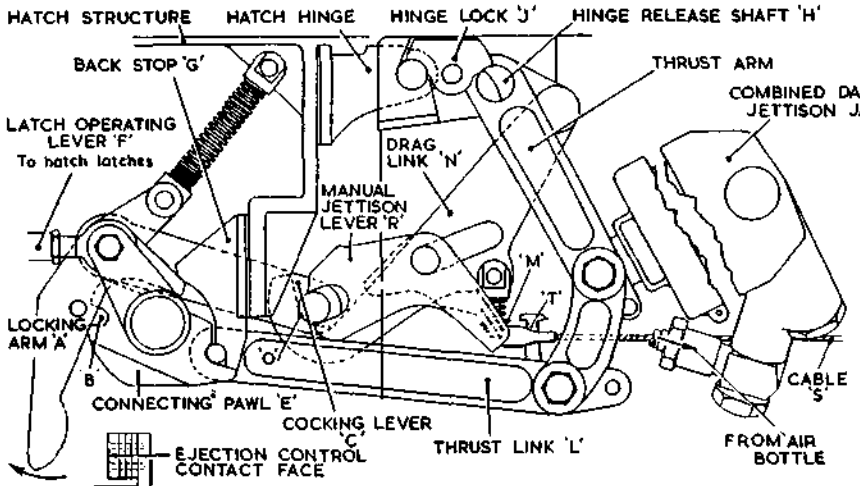


3. With pawl 'E' on back stop 'G', continued extension of piston-rod 'D' is transmitted to hatch, now free to open after latches unlocked in movement 2. The first 15 deg. of hatch movement causes cocking lever 'C' to take drag link 'N' to position shown, which rotates the hinge release shaft 'H'; this disengages the hinge locks 'J', and the hatch is now free to separate.

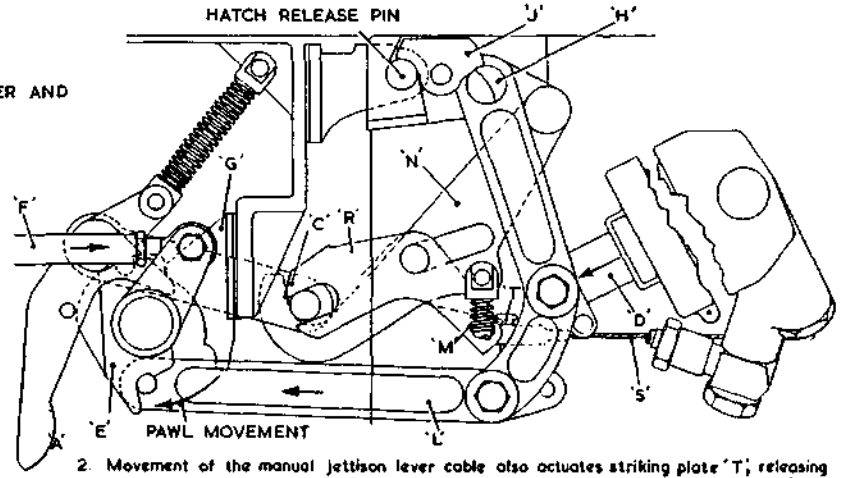


4. Hatch is separated by aerodynamic load; the drag link is prevented from moving back-and fouling the hinge lock—by spring 'M'.

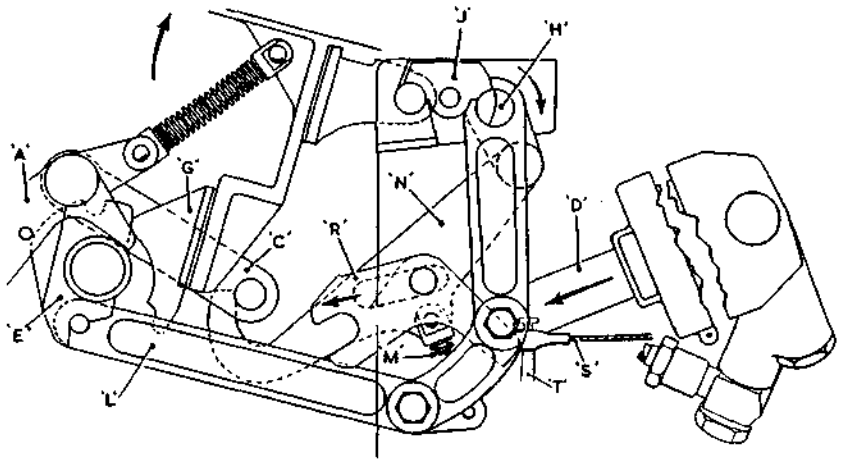
Fig. 12. Hatch jettison sequence diagram, with ejection



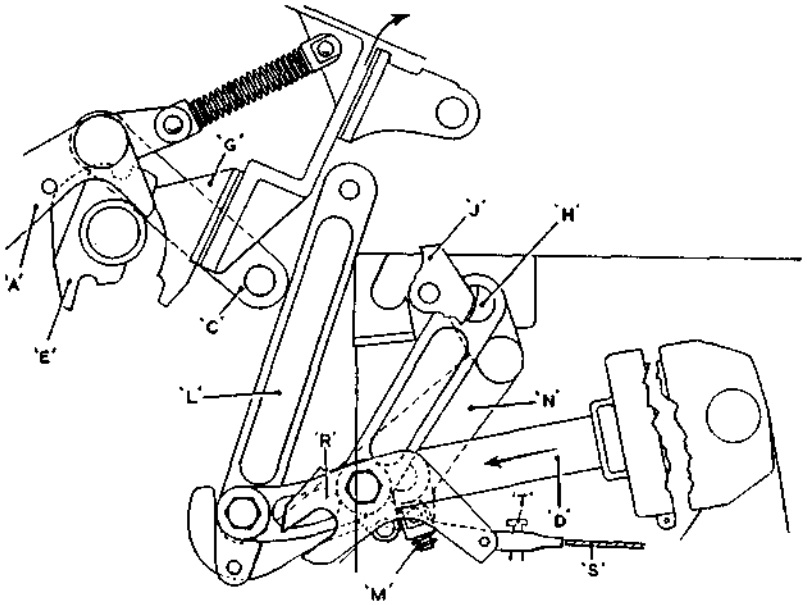
1. Cocking: movement of the manual jettison cable 'S' operates manual jettison lever 'R', and actuates cocking lever 'C', the roller engaging in drag link 'N' at point 'O'; the connecting pawl 'E' is freed at point 'B' by the movement of locking arm 'A'.



2. Movement of the manual jettison lever cable also actuates striking plate 'T', releasing bottle pressure which extends the damper piston-rod 'D'. The connecting pawl 'E' is rotated and takes the operating lever 'F' with it, thus unlocking the front latches. Pawl stops on back stop 'G', no movement of hatch yet.



3. With pawl 'E' on back stop 'G', continued extension of piston-rod 'D' is transmitted to hatch, now free to open after latches unlocked in movement 2. The first 15 deg. of hatch movement causes cocking lever 'C' to take drag link 'N' to position shown, which rotates the hinge release shaft 'H'; this disengages the locks 'J', and the hatch is now free to separate.



4. Hatch is separated by aerodynamic load; and the drag link 'N' is prevented from moving back and fouling the hinge locks by spring 'M'.

Fig. 13. Hatch jettison sequence diagram, without ejection

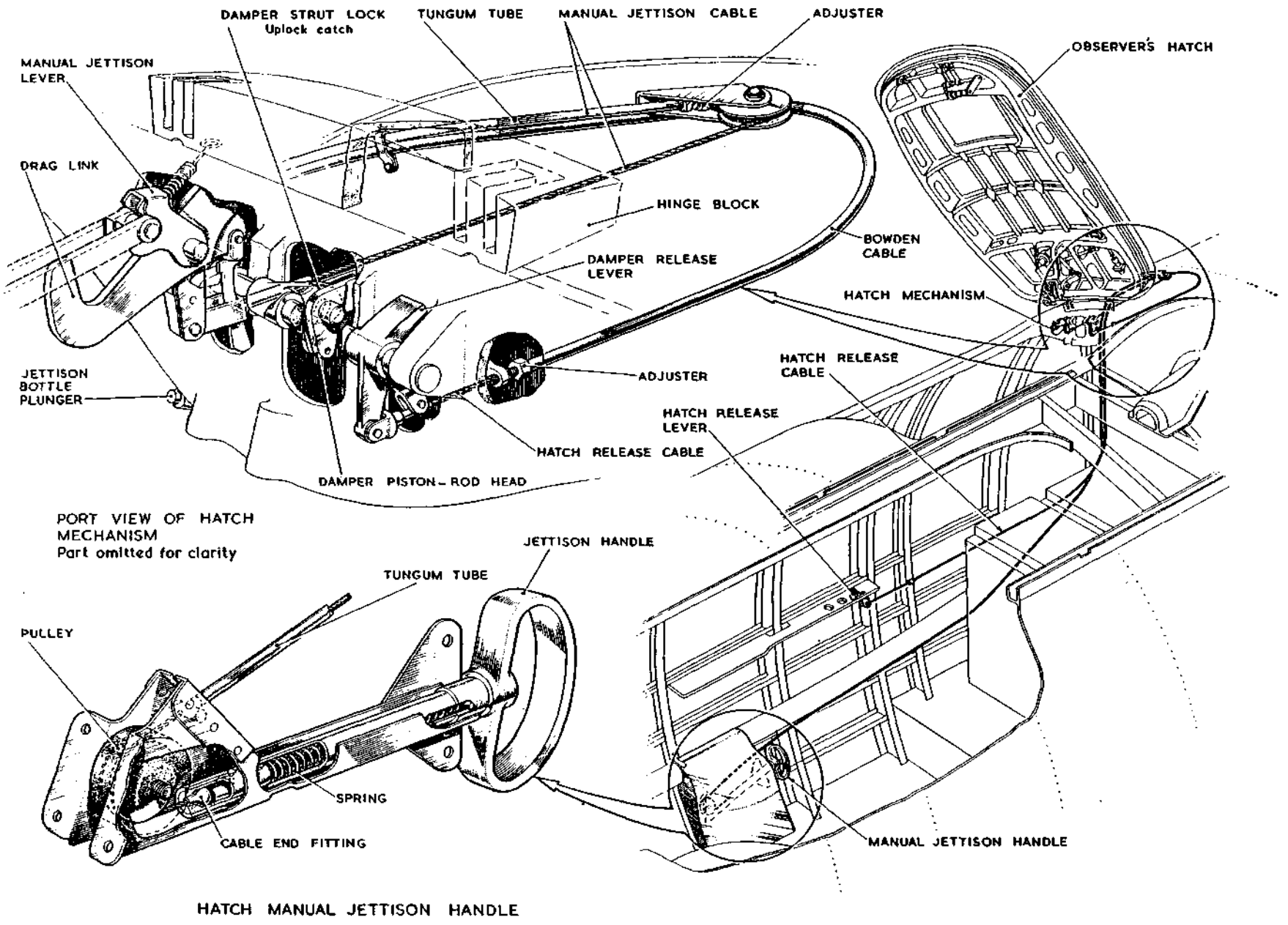


Fig. 14. Manual jettison and damper release

pack, close the hood and pull the face blind handle over a protective flying helmet (bone-dome), and check that:—

(a) The load to pull the face blind from its housing is 40-50 lb.

(b) The load to remove the hood jettison primary unit sear is a maximum of 50 lb.

(c) The ejection gun sear in NOT withdrawn.

(d) With the hood half and fully open, the control arm prevents the withdrawal of the ejection gun sear.

(7) Remove the hood by lifting at forward end and checking that the aft end is released by the optimum angle release strut when the hood is at an angle of approximately 15 deg.

(8) Pull the face blind handle over the protective flying helmet, and check that the maximum load to remove the ejection gun sear is 50 lb. and that the cable disengages from the lever.

(9) Refit the primary unit and ejection gun sear.

Note . . .

The primary unit sear has the larger safety pin hole.

(10) Pull the alternative firing handle when sitting in the seat, and check that both sears are withdrawn in the correct sequence and that the cable disengages from the lever.

Hood release functional check (fig. 16)

49. Check the functioning of the base plate and the hood unlatching mechanism as follows:—

(1) Ensure that the hood jettison secondary cartridge is removed.

(2) Disconnect the pipelines from the hood jettison primary unit at the latch unlocking jack.

(3) Disconnect the pipelines to the hood jettison jacks.

(4) Connect a dry air supply (80 p.s.i. maximum) to the latch jack.

(5) Close the hood, apply air pressure and check that the base plate mechanism operates, the rail latches are unlocked and that the hood is free to lift.

(6) Disconnect air supply, reconnect pipelines and wire-lock unions.

(7) Cock the base plate mechanism.

HATCH MECHANISM

Safety precautions

50. The following safety precautions must be observed during hatch servicing. The letters in inverted commas refer to fig. 18:—

(1) Ensure that the ejection control release shaft is fully aft before closing the hatch.

(2) The safety clip must be fitted to the air bottle push-rod except when flight is imminent. The push-rod must be held forward when fitting or removing the safety clip, which is stowed on the safety pin stowage. Before the clip is removed for any servicing requirement, the air bottle pressure must be reduced to zero.

(3) The connection of the firing cable must be checked by holding back the release shaft 'E' and pulling the cable, which must have a small amount of slack.

(4) The air bottle must be discharged at the charging point before it is removed from the aircraft.

(5) Before flight, it must be ensured that the air bottle has been charged to the pressure given in the Leading Particulars.

Adjustments

WARNING . . .

A full combined jettison check, using seat and manual jettison handles, must be made whenever the hatch or seat fittings are disturbed, adjusted, or when items are replaced, except that this need not be done for simple removals / replacements provided that the same hatch is refitted.

Note . . .

(1) *New hatches are supplied with a* 0·1 *in. trim allowance, and must be trimmed to give a minimum clearance of* 0·005 *in. and a maximum of* 0·13 *in. along the outboard edge, and* 0·175 *in. along the other edges. When a hatch has been taken from another aircraft a maximum gap of* 0·25 *in. is permitted.*

(2) *To permit adjustment of the shims described in sub-para.* (1), *the latch bracket nuts are not locked on new hatches. After adjustment, lock the nuts by peening the studs.*

(3) *Pre and post Mod. 1183 hatches are not interchangeable unless the packing plate and shims on the hatch locking arm are changed to suit the appropriate modification state. Information about the pre and post packing plates and*

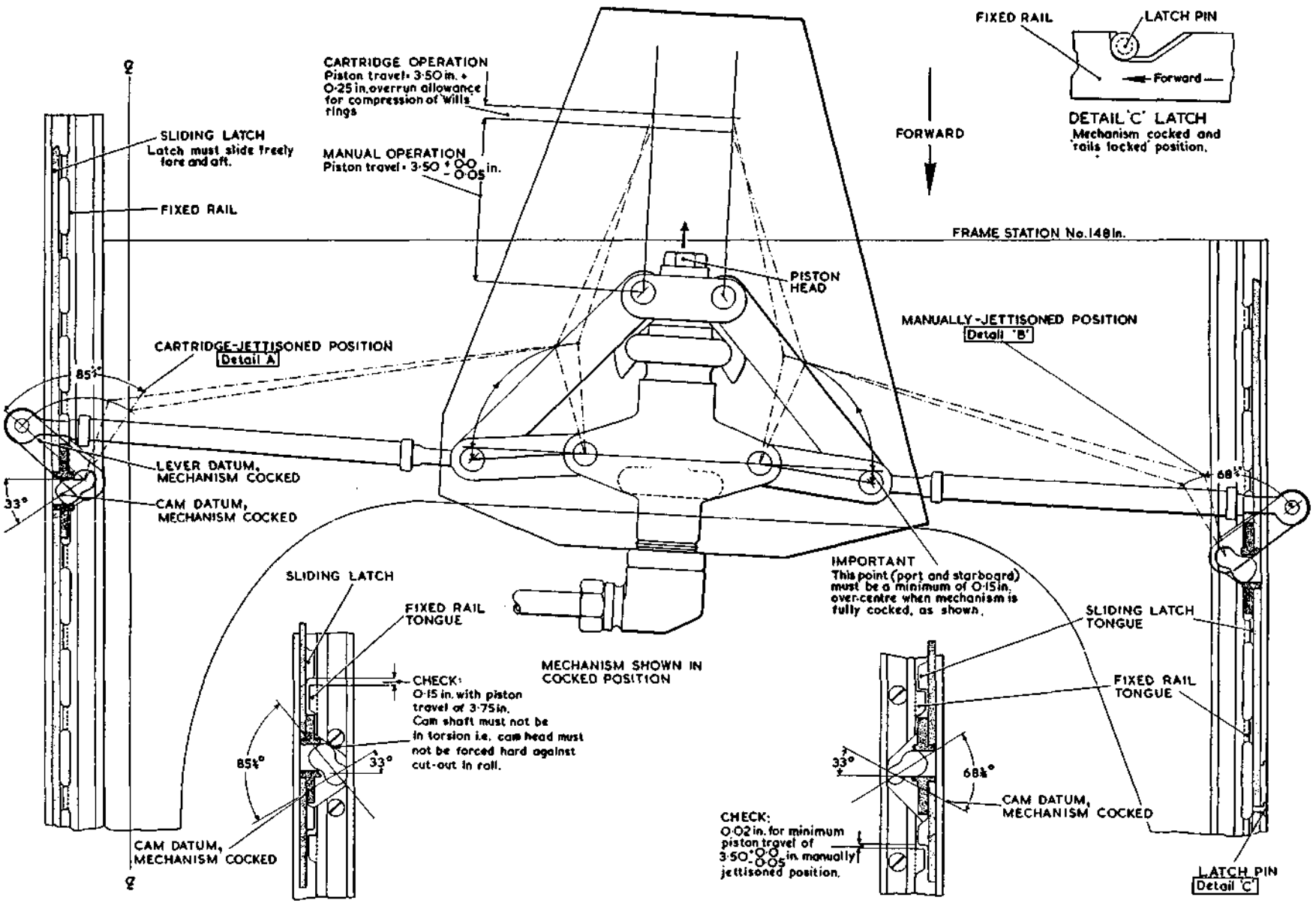


Fig. 15. Hood jettison mechanism settings

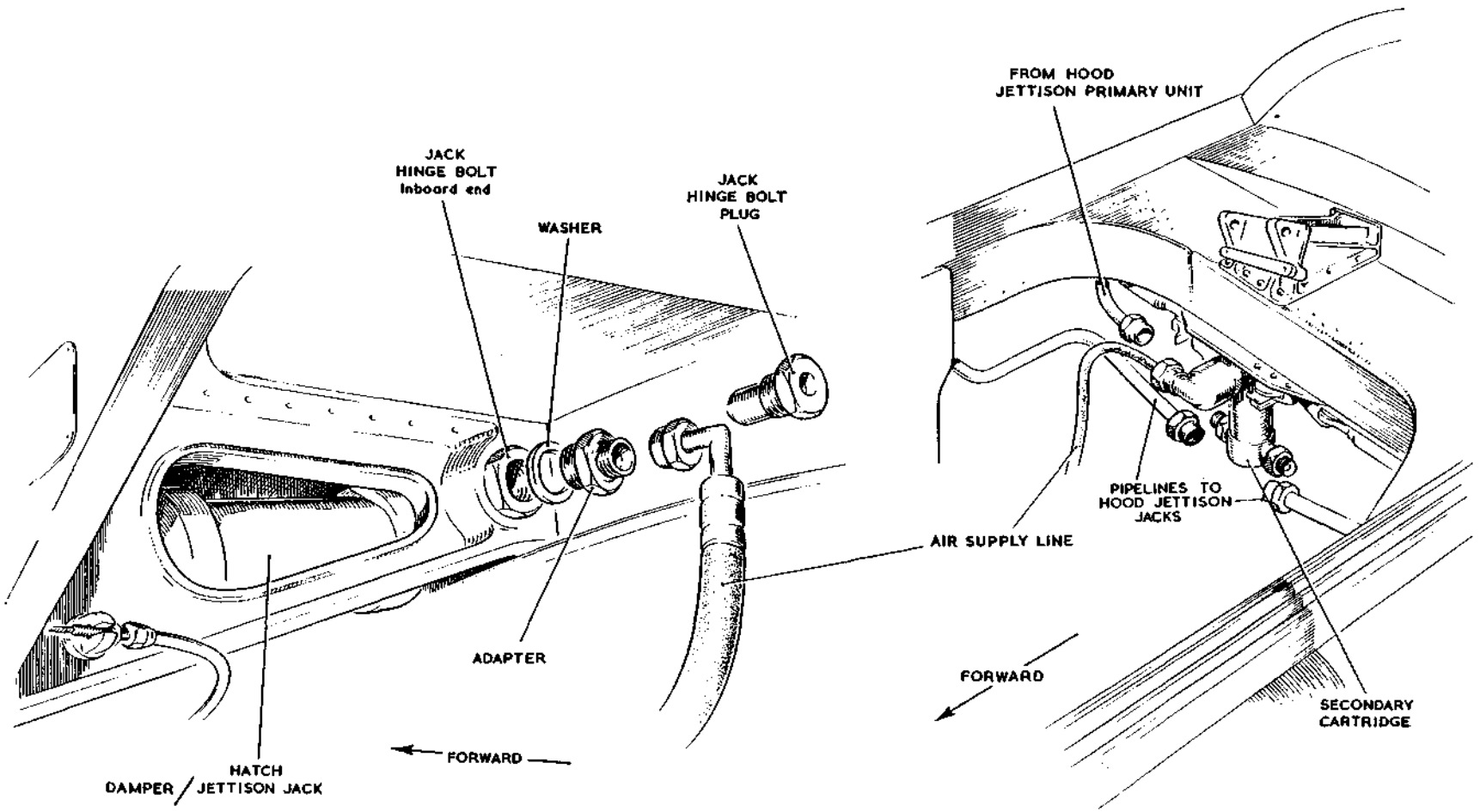


Fig. 16. Jettison check connection points

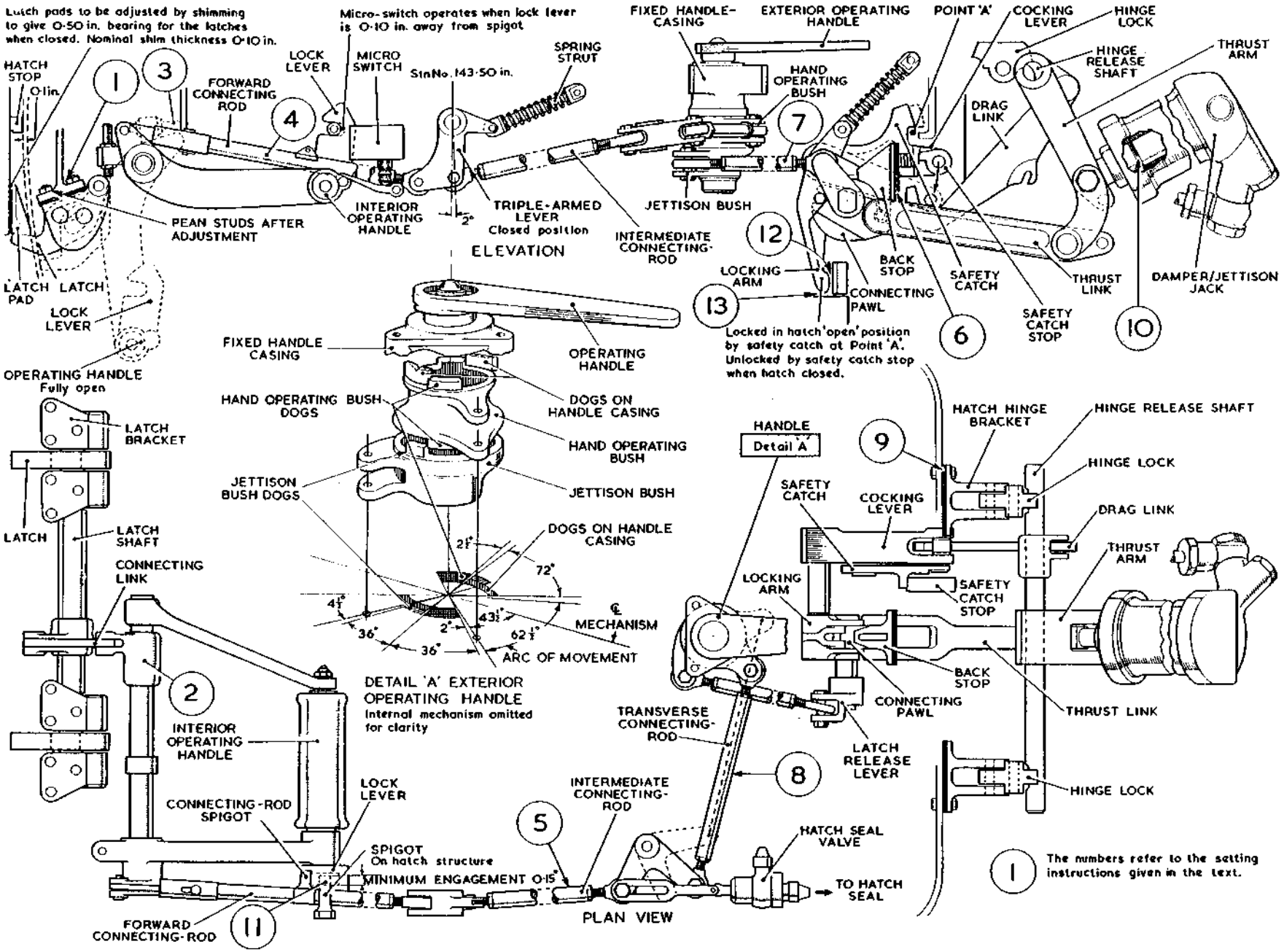
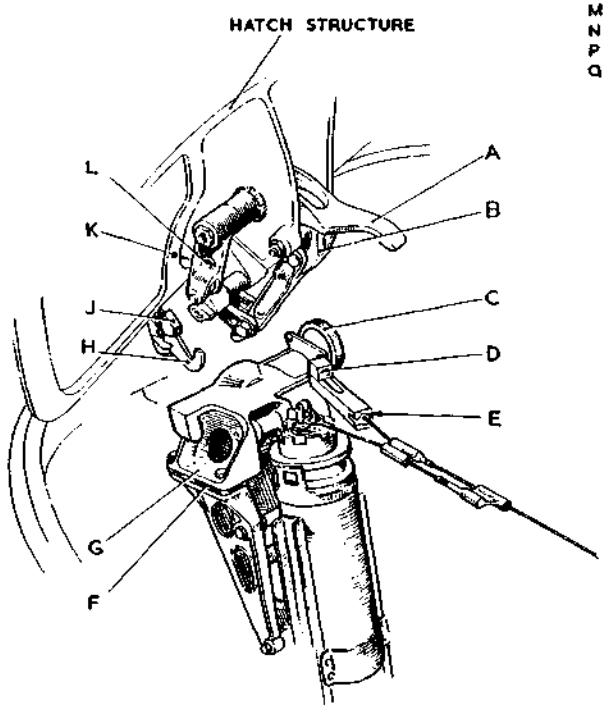
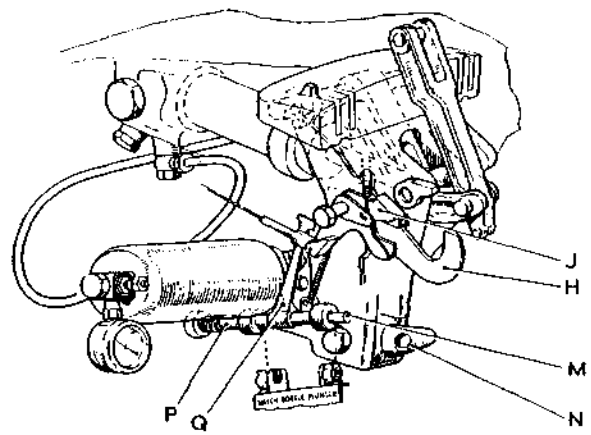


Fig. 17. Hatch adjustments

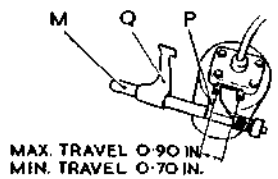
A LOCKING ARM
B CONNECTING PAWL
C ATTACHMENT BOLT
D CONTACT FACE
E EJECTION CONTROL SHAFT
F SHIMS
G SEAT GUN TOP FITTING
H DRAG LINK
J MANUAL JETTISON LEVER
K SAFETY CATCH
L COCKING LEVER
M AIR BOTTLE PLUNGER
N CONICAL ATTACHMENT HEAD
P FIRING ARM
Q STRIKING PLATE



VIEW WITH HATCH OPEN



VIEW WITH SKIN CUT AWAY, JETTISONED



AIR BOTTLE

Fig. 18. Hatch jettison mechanism adjustments

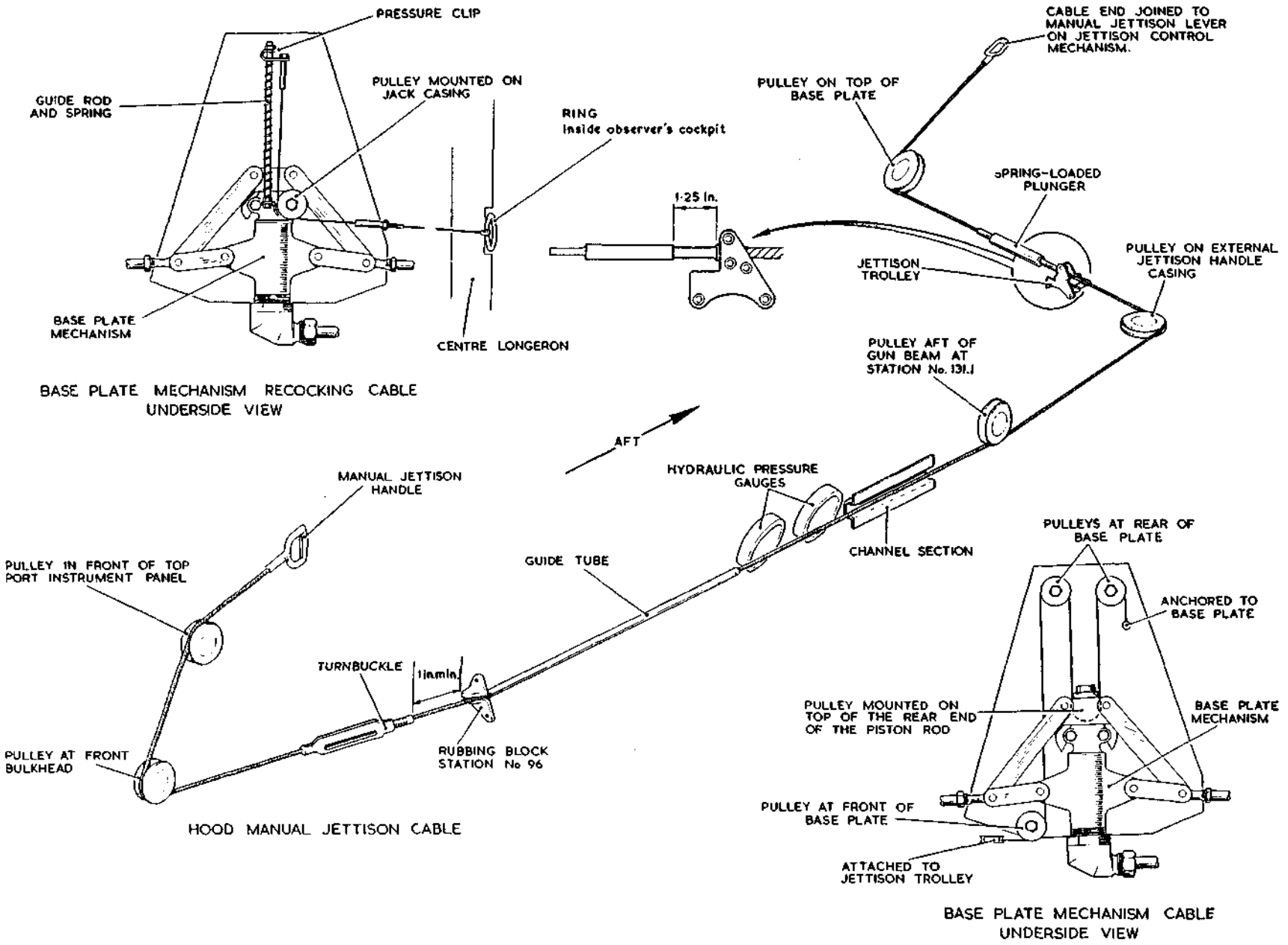


Fig. 19. Hood jettison cables (pre-Mod. 878)

shims is given in the modification leaflets for mod. 936. *and* 1183. *Post mod.* 1550 *hatches are not interchangeable with either pre or post mod.* 1183 *hatches, unless the appropriate locking arm in fitted.*

51. The hatch mechanism should be adjusted in the order of the following sub-paragraphs, the numbers of which are the same numbers shown ringed in fig. 17:—

(1) Adjust the latches by fitting shims under the latch brackets (nominal thickness of shims 0·10 in.), so that, when the eccentrics are 5 deg. over centre, the latches bite firmly on to the latch pads, but the load to pull down the interior, operating handle, after the lock lever is released, must not exceed 10 lb.

(2) Position the levers and connecting link.

(3) Adjust the stop bolt to give a clearance of 0·10 in. between the latches, and the latch pads and hatch stops, when the hatch is being opened.

(4) Adjust the forward connecting-rod so that the triple-armed lever is in the position shown in the illustration when the hatch is closed.

(5) Adjust the intermediate connecting rod to give 0·15 in. movement of the spindle of the hatch seal valve, when the hatch is closed and locked.

(6) Adjust the back stop by shimming (nominal shim thickness 0·10 in.) so that there is no backlash in the thrust link.

(7) Adjust the rear connecting-rod so that the positions of the jettison bush and of the latch release lever are as shown in the illustration.

(8) Adjust the transverse connecting-rod so that the position of the hand operating bush dogs is as shown and so that the intermediate connecting-rod remains as adjusted in sub-para. (5).

(9) Shim under the hinge brackets (nominal shim thickness 0·05 in.) so that, when the mechanism is cocked, the cocking lever engages with the drag link as shown, and check that the manual jettison lever does not foul the hatch casting when moved down to the jettison position. Relieve the casting if necessary.

(10) Adjust the damper/jettison jack piston-rod by shimming (nominal shim thickness 0·096 in.) to the tolerances shown in fig. 1, that is, with the hatch fully closed or fully open there should be 0·03 in. to 0·07 in. free movement.

(11) With the interior operating handle in the locked position, check the engagement of the spigot on the hatch structure with the lock lever. The minimum engagement is 0·15 in. If necessary, add shims under the spigot shoulder, ensuring that the flats on the spigot align with the forward connecting rod to avoid fouling.

(12) With the hatch closed and air bottle discharged, check that, when the locking arm and the ejection control release shaft are both fully aft, there is a clearance of 0·02 in. to 0·07 in. between the contact faces of the locking arm and shaft. This clearance is adjusted by shims under the contact face of the shaft.

(13) Check that there is a minimum clearance of 0·05 in. between the locking arm and the ejection control housing, If the clearance is less than 0·05 in., relieve the end of the locking arm, ensuring that the original profile is maintained, and that the clearance does not exceed 0·058 in. The maximum allowed to be removed from the locking arm is 0·10 in.

Seat top fitting adjustment (fig. 18)

52. Check that, with the hook fitting at the lower end of the ejection gun on the reaction pin on the step beam, the top fitting 'G' fits centrally on the conical attachment head 'N'. The height of the top fitting is adjusted by shims 'F'.

Note . . .

The attachment head 'N' is rubber bushed and care must be taken to ensure that the height is adjusted by the shims and not by the flexibility of the head.

Hatch operation checks

53. The checks, which should be carried out with the air bottle pressure zero and primary cartridge removed, are as follows; the letters in inverted commas refer to fig. 18:—

(1) Latch operation: Check the operation of the latches; if these are correctly fitted, it should be possible to feel the overcentring of the eccentrics by a hard spot approximately 5 deg. before the interior operating handle is fully closed.

(2) Microswitch: Check the operation as described in Book 2, Sect. 5, Chap. 1, Group C8. After the microswitch has operated the indicator on the centralized warning panel, the lock lever should move a further 0·19 in. before the interior operating handle can be moved down.

(3) Inflatable seal: This should inflate when the interior operating handle is closed and deflate when the handle is opened.

(4) Exterior operating handle: Repeat

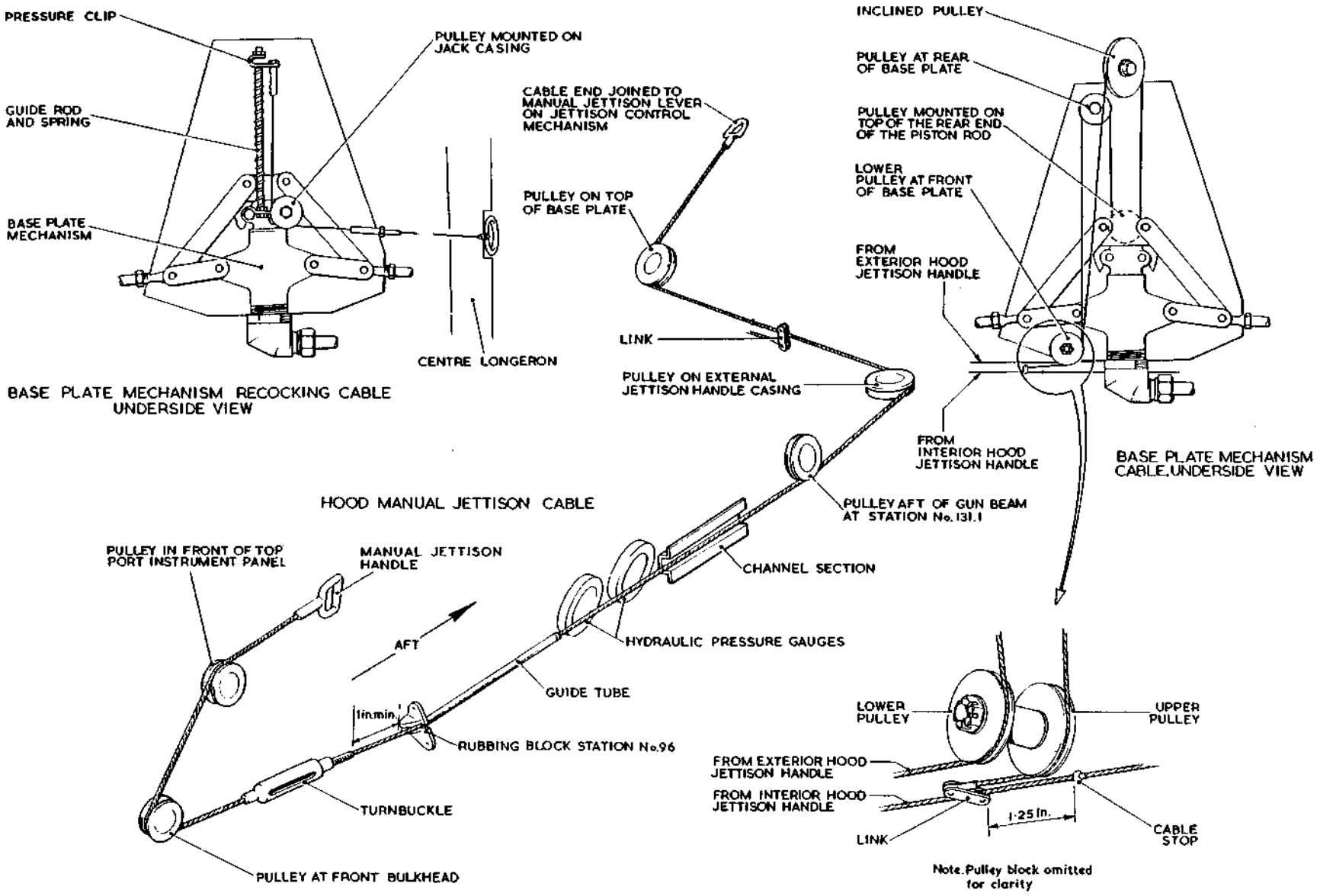


Fig. 20. Hood jettison cables (post-Mod. 878)

checks (1) to (3) using the exterior operating handle.

(5) Jettison mechanism: With the hatch open and the interior operating handle closed, take the weight of the hatch on one hand, release safety catch on cocking lever 'L' and push locking arm 'A' upwards. Lower the hatch and check that pawl 'B' is free to rotate and open latches.

(6) Hinge release: With the hatch closed and locked, move locking arm 'A' forward and check that it is locked by the safety catch moving aft under the spring pressure, and passing under the hatch casting. Slowly open hatch, and check that the hinges are released when the hatch opens 15 ± 2 deg.

Note . . .

It is permissible to relieve the hatch casting to allow the safety catch to return to the locked forward position, and to radius the forward edges of the drag link hook to obtain a clearance with the cocking lever.

(7) Firing circuit:—

(a) With the hatch open, check that 0·7 in. to 0·9 in. travel is obtained be the air bottle plunger 'M'

(b) When closing the hatch, check that any deflection of the manual jettison lever by the cocking lever does not move the plunger aft more than 0·2 in.

(c) With the seat and gun locked in position and the hatch closed, pull the face blind handle and check that:—

(i) The locking arm 'A' disengages from connecting pawl 'B', cocking lever 'L' rotates into drag link 'H' and actuates the manual jettison

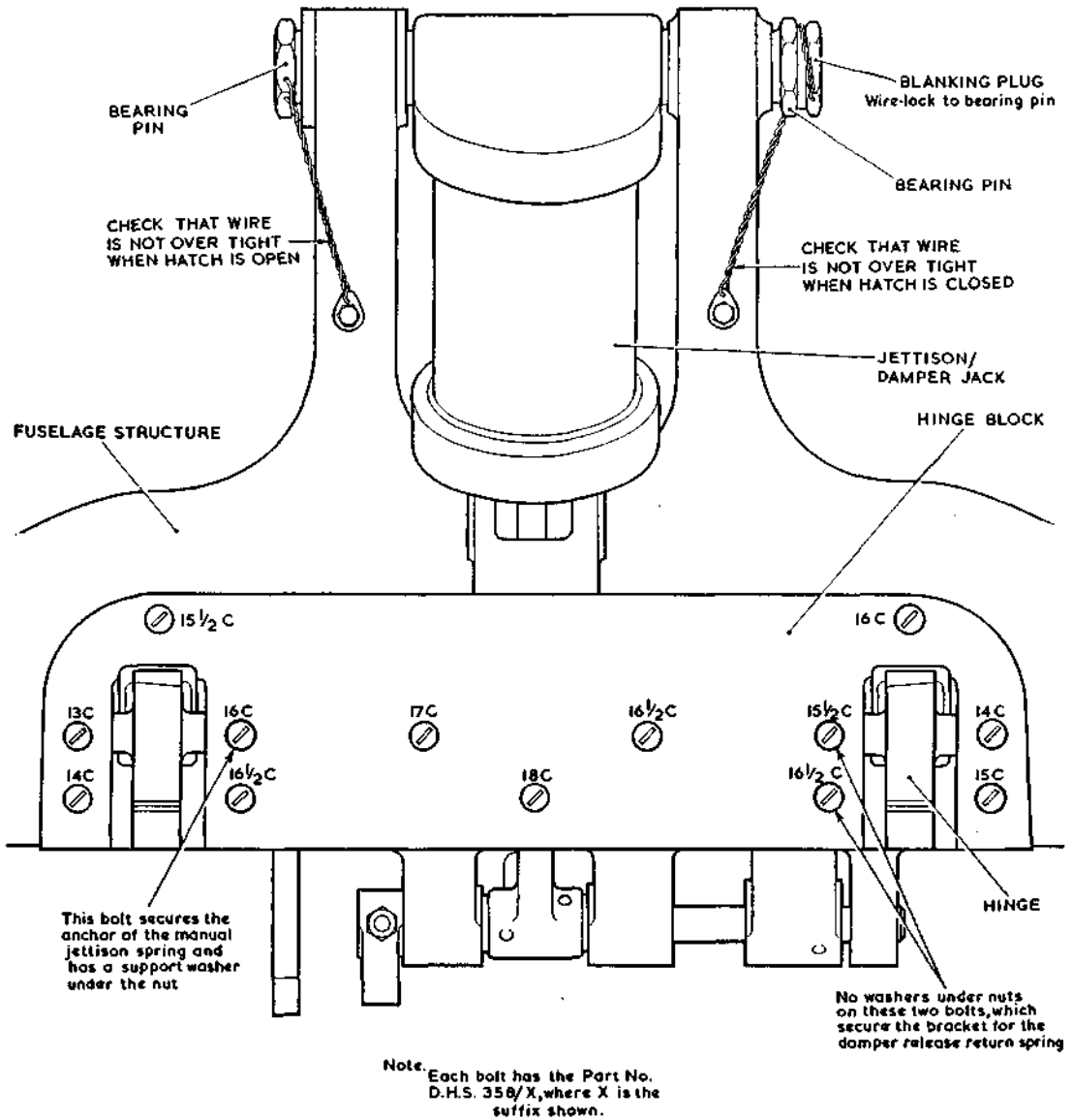


Fig. 21. Jettison jack and hinge block attachment

lever 'J', thus operating the air bottle through striking plate 'Q' and firing arm 'P'.

(ii) The plunger 'M' completes its full stroke.

(iii) The face blind cable is retained in the ejection control shaft 'E'.

(iv) When the hatch is raised, the face blind cable will release from shaft 'E', thus allowing the seat to be fired.

(8) Manual jettison check: With the hatch closed and locked, pull the manual jettison handle, and check that:—

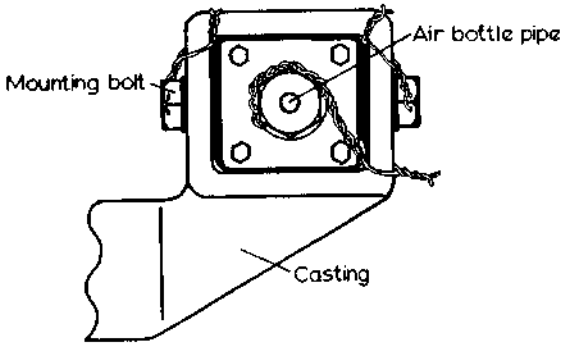
(a) The manual jettison lever 'J' actuates cocking lever 'L' to engage drag link 'H', and disengages locking arm 'A' from connecting pawl 'B' and also operates the air bottle through srtiking plate 'Q' and firing arm 'P'.

(b) The plunger 'M' completes its full stroke.

(c) The hinges are released when the hatch is opened 15 ± 2 deg.

(9) Reset the mechanism, and check that, with the hatch open, locking arm

End view of air bottle head



Correct locking of air pipe union.

Fig. 22. Air bottle locking

'A' cannot be moved forward unless the safety catch 'K' on cocking lever 'L' is released.

Firing handles load check

54. With no cartridges in system, and air bottle pressure zero, check the operation of the manual jettison, face blind, and seat pan handles as follows:—

Note . . .

It is assumed that the blind break-out and sear removal loads are correct as given in A.P.109A-0002—4.

(1) With a load of 4 lb. applied forwards to the end of the firing arm 'P' and hatch closed, check that the load required to pull the manual jettison handle is 35-65 lb.

(2) Repeat check (1) with a load of 5·75 lb. applied forwards to the end of the firing arm. The load required must be 35-65 lb.

(3) Reset the mechanism, and wth hatch closed and 5·75 lb applied forwards to the end of the firing arm, pull the face blind from its housing, and check that:—

(a) The load to pull the face blind from its housing and to unlock the hatch is 40-70 lb.

(b) The cable is still engaged in the ejection control shaft and that the seat gun sear is NOT withdrawn (the load to pull the seat gun sear is normally small, but must not exceed 70 lb.

(4) Reset the mechanism, pull the seat pan handle up and check that the hatch jettison mechanism operates with a load of 20–70 lb.

Jettison jack functional check

55. Check the functioning of the hatch jettison jack as follows:—

(1) Remove the blanking plug from the jettison jack inboard hinge pin (fig. 16).

(2) Connect a dry air supply (140 p.s.i. maximum) to the hinge connection.

(3) Arrange to have the hatch supported from outside, close and lock the hatch, then pull the manual jettison handle.

(4) Support the hatch and apply air pressure gradually until it separates after opening approximately 15 deg.

(5) Shut off the air supply, exhaust the damper/jack air pressure.

(6) Reset the mechanism and check that the firing arm is correctly connected to the air bottle, and that the striking plate is properly engaged in the fork of the manual jettison cable.

(7) Remove the air connection, refit and wirelock the blanking plug.

Jettison jack compression plug

56. If the rubber compression plug fitted in the air inlet to the damper/jettison jack is displaced by leakage or by operation of the air bottle, the effectiveness of the damper will be reduced and the operation of the jettison mechanism may be affected. The position of the plug can be checked as follows:—

(1) Fit the safety clip to the air bottle plunger.

(2) Disconnect the pipeline from the air bottle to the jack.

(3) From inside the cockpit, open and close the hatch.

(4) Check the open air connection for escaping air when the hatch is closing, this will indicate a displaced plug.

(5) If the plug is out of position, dismantle and clean the jack, and fit a new plug from inside the base cap assembly. Ensure that the metal disc on the compression plug is facing the blanking plug (fig. 11), and that the arrow on the cylinder points towards the base cap.

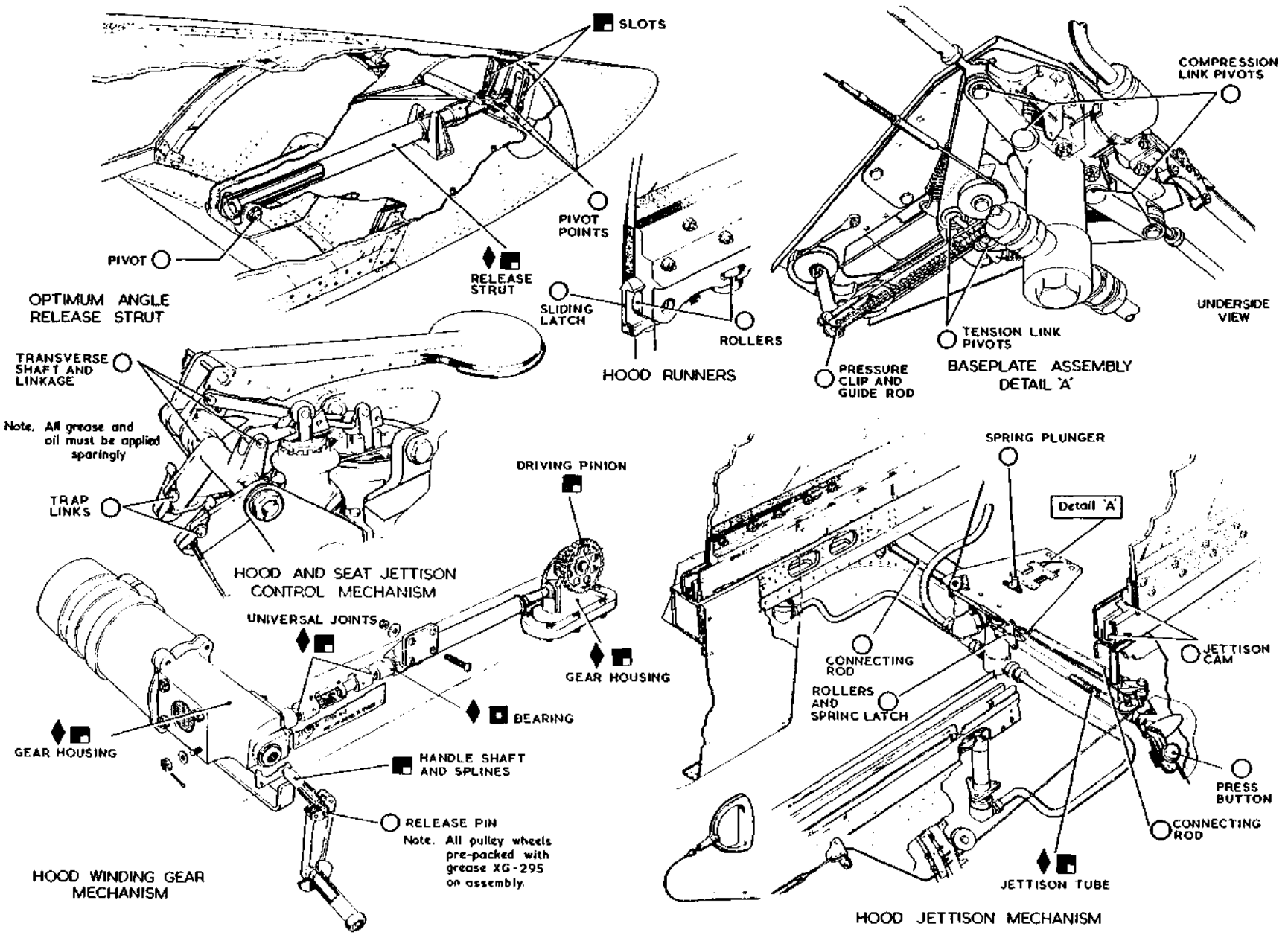


Fig. 23. Lubrication—hood jettison mechanism

(6) Connect pipeline and wire-lock.

Note . . .

The hatch must always be supported when being closed.

WARNING . . .

A full combined jettison check, using seat and manual jettison handles, must be made whenever the hood, hatch or seat fittings are disturbed, adjusted or when items are replaced, except that this need not be done for simple removals/replacements provided that the same hood/hatch is refitted.

PILOT'S AND OBSERVER'S SEATS

58. Instructions for removal and installation of the ejection seats are given in A.P.4647A, Vol. 5. Part 2.

PILOT'S HOOD

Optimum angle release strut

59. The procedure for removing and refitting the pilot's hood is given in Sect. 3, Chap. 1, but before the hood can be removed the optimum angle release strut must first be disconnected as follows:—

(1) Remove the access panel on the port side of the hood rear fairing.

(2) Slacken off the lock-nut at the head of the adjuster arm (fig. 7).

(3) Unscrew the adjuster arm from outside the hood until the yoke piece is clear of the lug on the strut head.

60. When the hood is being refitted the optimum angle release strut (fig. 7) must be connected as follows:—

(1) With the hood assembled in the fixed guide rails complete with the latches and with the base plate mechanism cocked, engage the bearing end of the strut head with the pivot point on the hood diaphragm.

(2) Screw down the adjuster arm from outside the hood until the yoke piece is engaged over the lug on the strut head; continue to screw down until the yoke is hard down at the base of the lug (do not use excessive force). Unscrew the adjuster arm half a turn and tighten the lock-nut inside the hood rear end.

(3) Ensure that the port electrical deck panel is closed and then test that the hood runs freely over its full length of travel. Refit the access panel on the port side of the rear end fairing.

Jettison cables

61. Figs. 19 and 20 show the diagrammatic cable runs in the hood jettison mechanism. After installation, the cables must be adjusted to operate correctly without undue slackness or tension. Check that there is 1·0 in. between the rubbing block at stn. No. 96 and the turnbuckle forward of stn. No. 96, and that the distance between the end of the spring-loaded plunger and the plunger stop which butts against the jettison trolley is 1·25 in. On post Mod. 878 aircraft, check that the distance between the cable stop and the link is 1·25 in.

62. On pre Mod. 662 aircraft, the manual jettison lever and cable are identified by white markings. On post Mod. 662 aircraft, the lever and cable end are modified to prevent the inadvertent fitting of the cable to the wrong lever. The cables should be fitted as shown in fig. 6.

OBSERVER'S HATCH

63. Instructions for removing and fitting the hatch are given in Sect. 3, Chap. 1. Note that pre and post mod. 1183 hatches are not interchangeable unless the packing plate and shims on the hatch locking arm are changed to suit the appropriate modification state. Information about the pre and post packing plates and shims is given in the modification leaflets for mod. 936 and 1183. Post mod. 1550 hatches are not interchangeable with either pre or post mod. 1183 hatches, unless the appropriate locking arm is fitted.

Air bottle

64. The air bottle pressure must be reduced to zero at the charging point before the bottle is removed from the aircraft. After fitting, wire-lock the two mounting bolts and the pipe union to the mounting casting as as shown on Fig. 22, ensuring that the locking wire is not looped round and other part of the mechanism.

PERSONAL EQUIPMENT CONNECTOR

Cable adjustments

57. With the seat raised to the top position:—

(1) The pilot's P.E.C. pull-off cable must be adjusted to give 0·35 in. slack.

(2) The observer's P.E.C. nylon pull-off cable must have 0·5 in. slack.

REMOVAL AND INSTALLATION

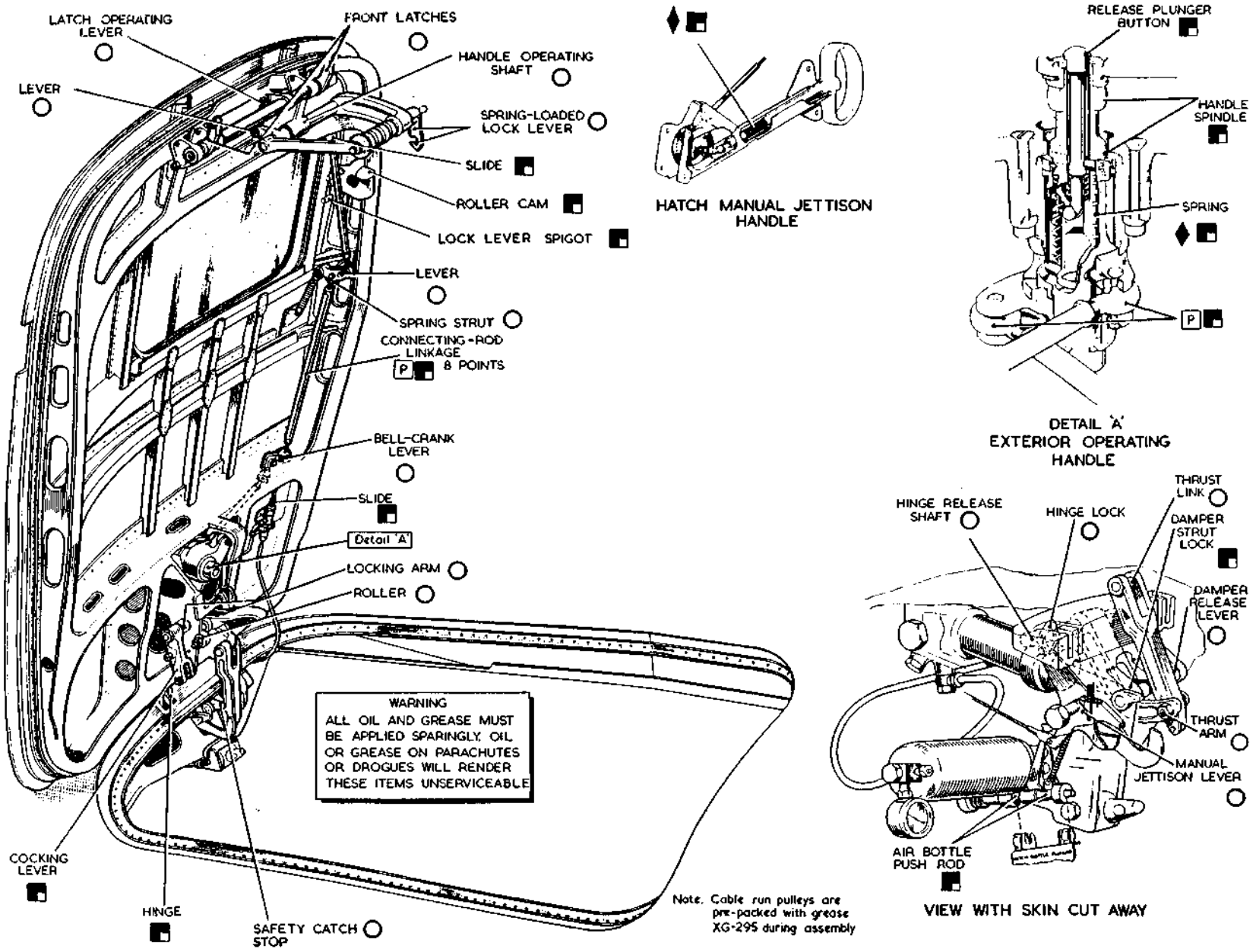


Fig. 24. Lubrication—hatch jettison mechanism

Jettison/damper jack

65. The jack is pivoted on two bearing pins which must be wire-locked after fitted as shown on fig. 21. On a new jack, lock the fork-end with a locking pin after adjusting the shims (para. 51 (10)).

Hinge block

66. If the hinge block is removed it must be re-assembled with Bostik. The attachment bolts must be tightened down evenly to prevent distortion of the block; the bolts are of different lengths and must be fitted as shown in fig. 21. After assembly the operation of the hinge release shaft should be checked (para. 53).

External handle

67. When refitting the observer's hatch external handle, ensure that the handle is fitted on the square shaft so that the locking and unlocking movement is towards the rear of the hatch, and that the arc of movement is approximately 90 deg. on each side of the hatch centre line. A transfer on the hatch shows the correct arc, and the OPEN and CLOSE positions. After assembly, using the external handle, close and lock the hatch, and press the handle into its recess. Then check that the hatch can be opened using the internal handle.

Air bottle firing arm

68. When installing air bottle firing arm and push-rod assembly, ensure that the flat on the push rod is towards the air bottle.

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