TYPE 2CA/1, Mk 1 and 2 and TYPE 2CA/2 Mk 1, 2, 3 and 4 EJECTION SEATS

CONTENTS

ILLUSTRATIONS

Introduction

1 The Type 2CA ejection seats are installed in Canberra B Mk 2, PR3, PR7, T17 and TT18 aircraft. The Type 2CA/1 occupying the forward position in the aircraft and the 2CA/2 the rear positions. One Type 2CA/2 ejection seat is also installed in the Canberra T Mk 4 aircraft. It is to be noted that the seat installations are dependent upon the aircraft being to the appropriate modification standard.

2 The principle differences between the Type 2CA/1 and 2CA/2 Mk 1 seats (Ref No 27L/50123 and 50124 respectively) is that the Type 2CA/1, Mk 1 has a bifurcated firing cable, one end of which is connected to the trip lever and the other to the sear of the firing unit of a canopy jettison and time-delayed firing unit. The canopy jettison firing unit using the normal canopy jettison unit cartridge, provides the power to operate the control column snatch unit and NOT canopy jettison, the seat and occupant ejecting through the canopy.

3 The Type 2CA/2 Mk 1 has a single firing cable connected directly to the sear of the ejection gun firing unit together with the seat pan firing cable. It is essential in this installation to jettison the hatch prior to ejection. The Type 2CA/2 (post modification ES 2661) has the harness release cable routed forward of the emergency oxygen cylinder lower mounting bracket and the auxiliary tube support bracket (see fig 4 inset), whereas the Type 2CA/1 seat has the cable routed aft of these brackets (fig 4).

4 The Type CA/1, Mk 2 and Types 2CA/2 Mk 2, 3 and 4 ejection seats are variants of the Mk 1 seats and information on these seats will be found in their respective paragraphs. As all the Type 2CA seats are basically similar in

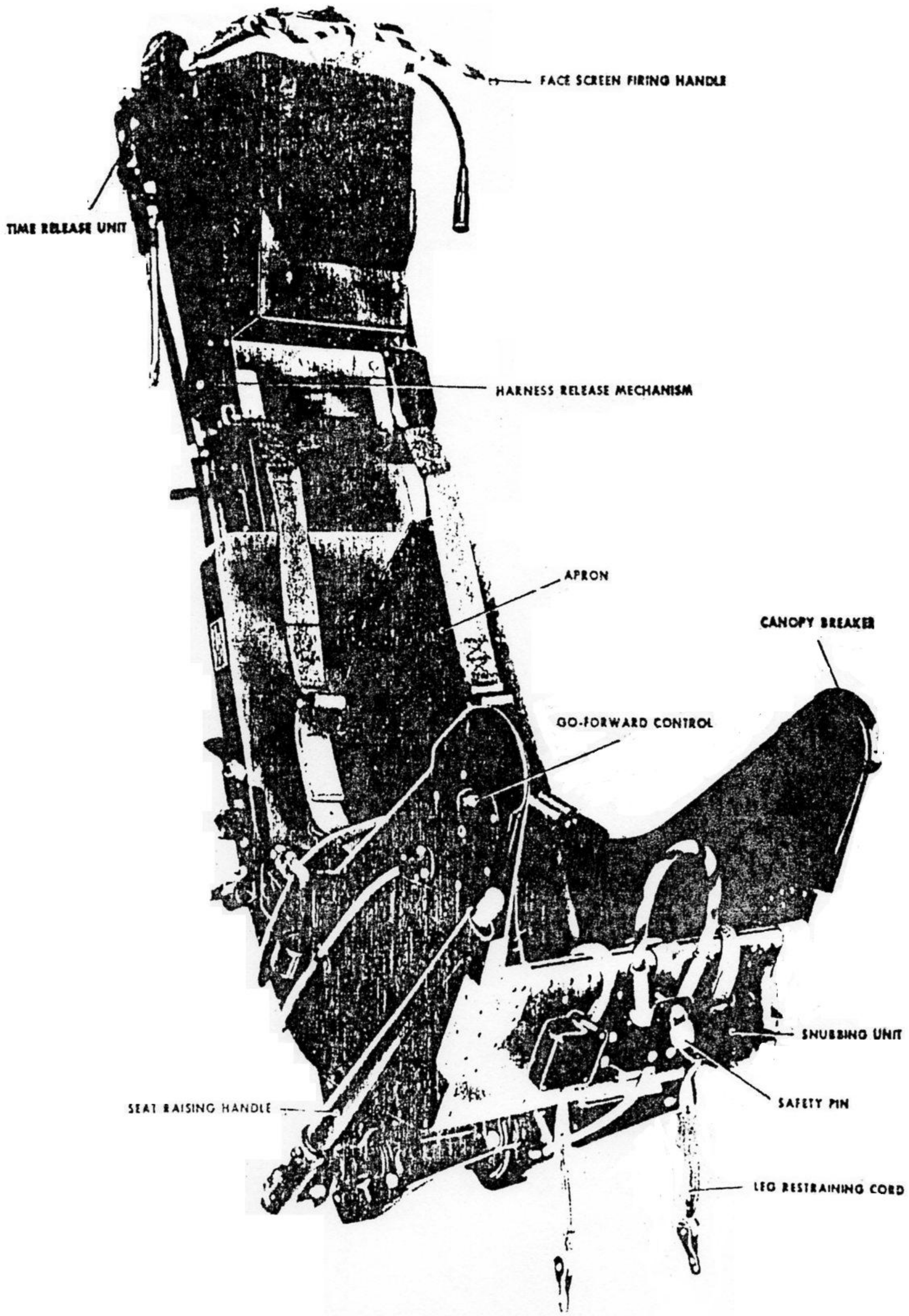


Fig 1 Details of 2CA/1, Mk 1 seat (starboard view)

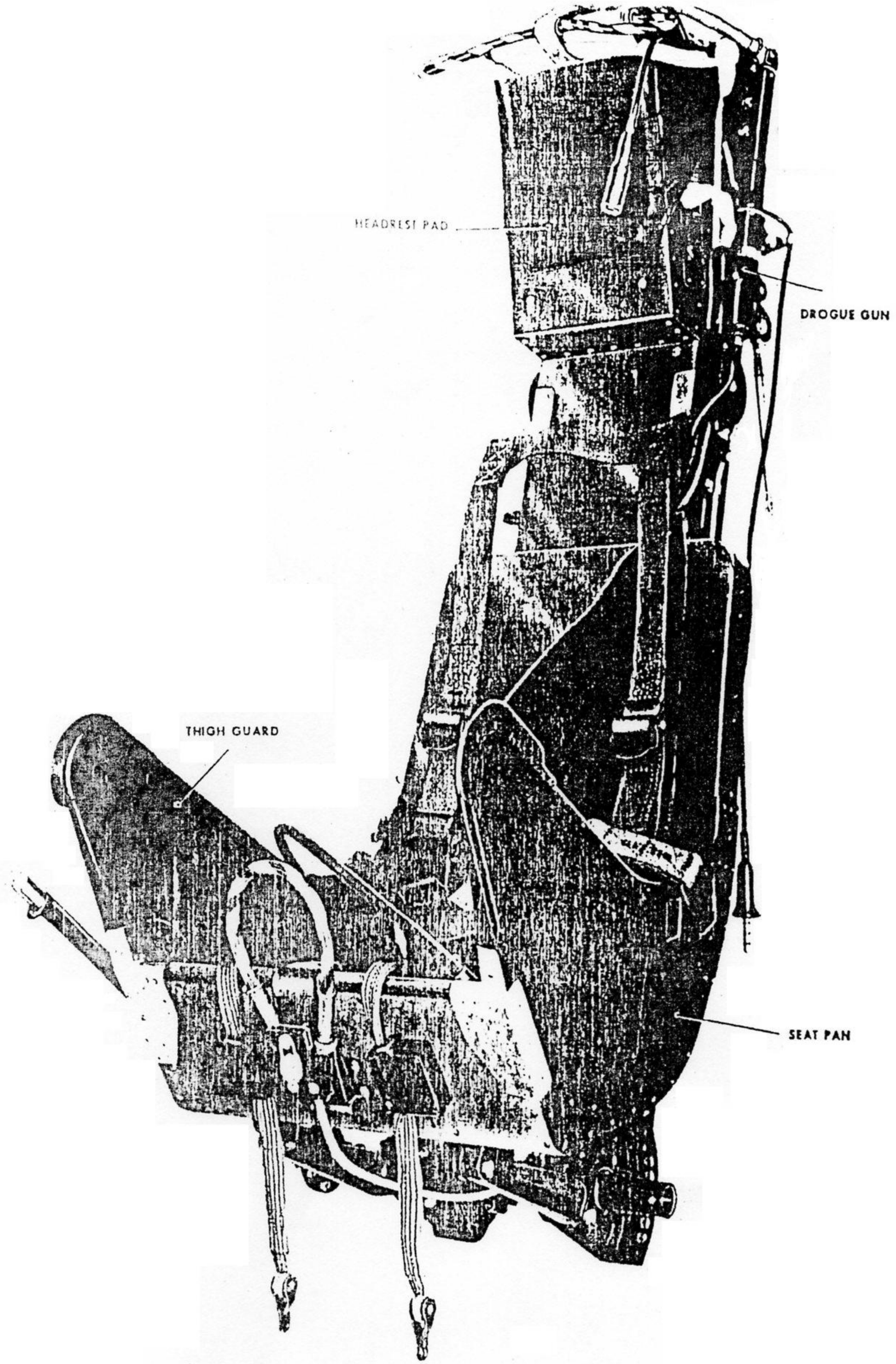


Fig 2 Details of 2CA/1 Mk 1 seat (port view)

publication.

Associated equipment

5 The Type 2CA/1 and 2CA/2, Mk 1 seats embody the following items of equipment, full details of which will be found in their respective publications as shown:

(1) Type 3C, Mk 1 ejection gun	AP 109C-0103-1
(2) Type 9 drogue gun	AP 109D-0203-1
(3) Type 1, Mk 1 barostatic time-release unit	AP 109E-0101-1
(4) Canopy jettison and time-delayed firing units (2CA/1 seat only)	AP 109C-0201-1

General description

6 The seat (fig 1 and 2) slides during ejection on four rollers which engage in a guide rail bolted to the aircraft structure. It is propelled by the gases developed from the cartridge operated ejection gun located in the hollow guide rail.

7 The ejection gun is fired by the action of pulling the face screen firing handle right down over the face. This handle draws out from its stowage a flexible screen which covers the occupant's face and protects it from the effects of the airstream. It also holds his head back against the headrest pad and prevents it from jerking forward during ejection. Spring-loaded plungers prevent the face screen from being drawn out of its compartment by the airstream should the canopy be jettisoned in flight. Attached to the face screen is a bifurcated cable connected to the canopy jettison and time-delayed firing unit. When the face screen is pulled down over the face, the cable withdraws the sear from the canopy jettison firing body, the cartridge is fired and the gases produced operate the control column snatch unit; at the same time the cable operates the time-delay mechanism trip lever and after approximately 1 sec. the ejection gun is fired. The delay time is reduced to 0.35 second ± 0.10 second for Type 2CA/1 seats when the canopy jettison and time-delayed firing unit embodies Mod CJ 135. The face screen and firing cable are proportioned ◀ in such a manner that the canopy jettison and time-delay firing unit will be operated whether the occupant is wearing a protective helmet or not.

8 The seat pan accommodates a seat type parachute assembly and a personal survival pack containing a liferaft and other items of survival equipment. The seat pan can be adjusted for height by means of a handle on the starboard side of the seat structure. The seat pan moves relative to the headrest and can thus accommodate different body lengths, at the same time ensuring that the occupant's head will always be correctly located on the headrest pad whatever the position of the seat pan.

9 To provide restraint in adverse G conditions, a negative-g strap is fitted to the seat pan. The lower end of the strap is bolted to the front face of the pan and the upper end terminates in a loop which locates over the lug of the port lap strap of the safety harness.

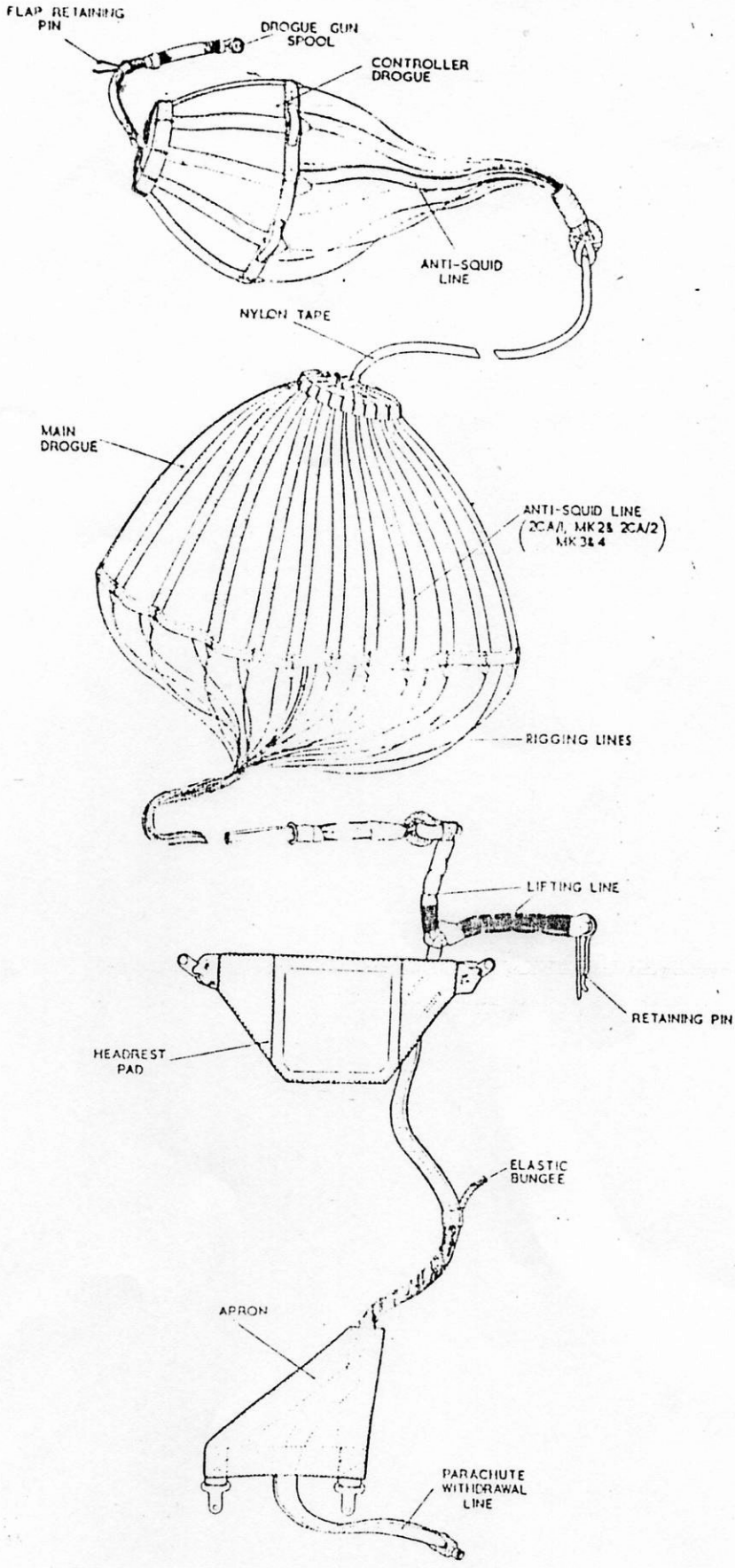


Fig 3 Duplex anti-squid drogue assembly

10 A seat pan firing handle is fitted to the front of the seat pan and is for use as an alternative method of initiating ejection. The firing cable is routed in a conduit to the top of the drogue container where it is attached, by means of the eye-end to the bifurcated portion of the face screen firing cable connected to the time-delayed trip lever.

11 A leg restraining device is incorporated to ensure that the occupant's legs are drawn back automatically and restrained close to the seat pan, this provides leg clearance during ejection and also prevents the legs from being blown apart by the airstream after the seat has left the aircraft.

12 The seat is provided with a Type 4, Mk 2 safety harness having two shoulder straps attached to spring-loaded release units on the seat beams and the lower pair of straps secured to the sides of the seat pan. The harness release units may be freed by the action of the go-forward control mounted on the starboard thigh guard, thus permitting the occupant to lean forward in the seat when necessary. The units lock automatically when the go-forward control is released.

13 Incorporated in the seat is a duplex anti-squid drogue assembly (fig 3) consisting of two drogues, a controller drogue and a main drogue with diameters, in the developed state, of 22in and 5ft respectively. The controller drogue is connected to the main drogue by a nylon tape and the main drogue is connected to the lifting lines by nylon shroud lines and the drogue shackle.

14 The drogue withdrawal line is secured to the apex of the controller drogue canopy and its free end is connected to the drogue gun piston. Part way along the line is a securing pin which retains the four flaps of the drogue container in the closed position.

15 In the centre of the controller drogue is an anti-squid line which is made slightly shorter than the shroud lines. This arrangement relieves the shroud lines of the initial shock, so enabling the canopy to develop fully without the danger of "squidding" (a condition in which a canopy is fully deployed by will not develop).

16 The headrest is attached to the upper end of an apron and secured in position on the seat by two pins attached to the apron lifting line. At the lower end of the apron are two clips which retain the assembly to the seat pan. The apron is designed to pitch the seat occupant forward and then to open his parachute by means of an attached withdrawal line. After the occupant has left the seat and the apron has straightened, the weight of the seat frees the clips and the seat drops clear.

17 The lifting lines and the parachute withdrawal line are sewn to the rear of the apron. The lifting lines are attached to the drogue nylon rope by a shackle, thus forming a continuous line from the drogue gun connection to the parachute withdrawal line.

18 Secured at the end of the parachute withdrawal line is a quick-release fitting. This connection can be by-passed when necessary by means of a slide-disconnect pin operated by the first D-ring on the parachute harness thus isolating the seat occupant from the withdrawal line and allowing him to make a manual controlled descent should the automatic facilities fail.

19 The drogue gun is fitted to the port side of the seat structure and is operated by means of a telescopic static rod, one end of which is connected to the sear of the firing mechanism and the other end attached to a bracket which is secured to the guide rail. When the seat commences to rise, the static rod withdraws the sear, and after the delay mechanism has completed its run the gun is fired and the piston ejected which, in so doing, withdraws the flap securing pin and then the controller drogue from the container. The controller drogue in turn extracts the main drogue, and the two combine to stabilize and retard the seat until safe separation from the seat by the occupant is possible.

20 A neoprene friction bush is fitted to the drogue gun static rod to prevent a ▶ possible "hair trigger" condition and subsequent risk of the gun being inadvertently operated, through the sear being partially withdrawn by the downward movement of the outer tube, when the static rod is disconnected from its bracket. ◀

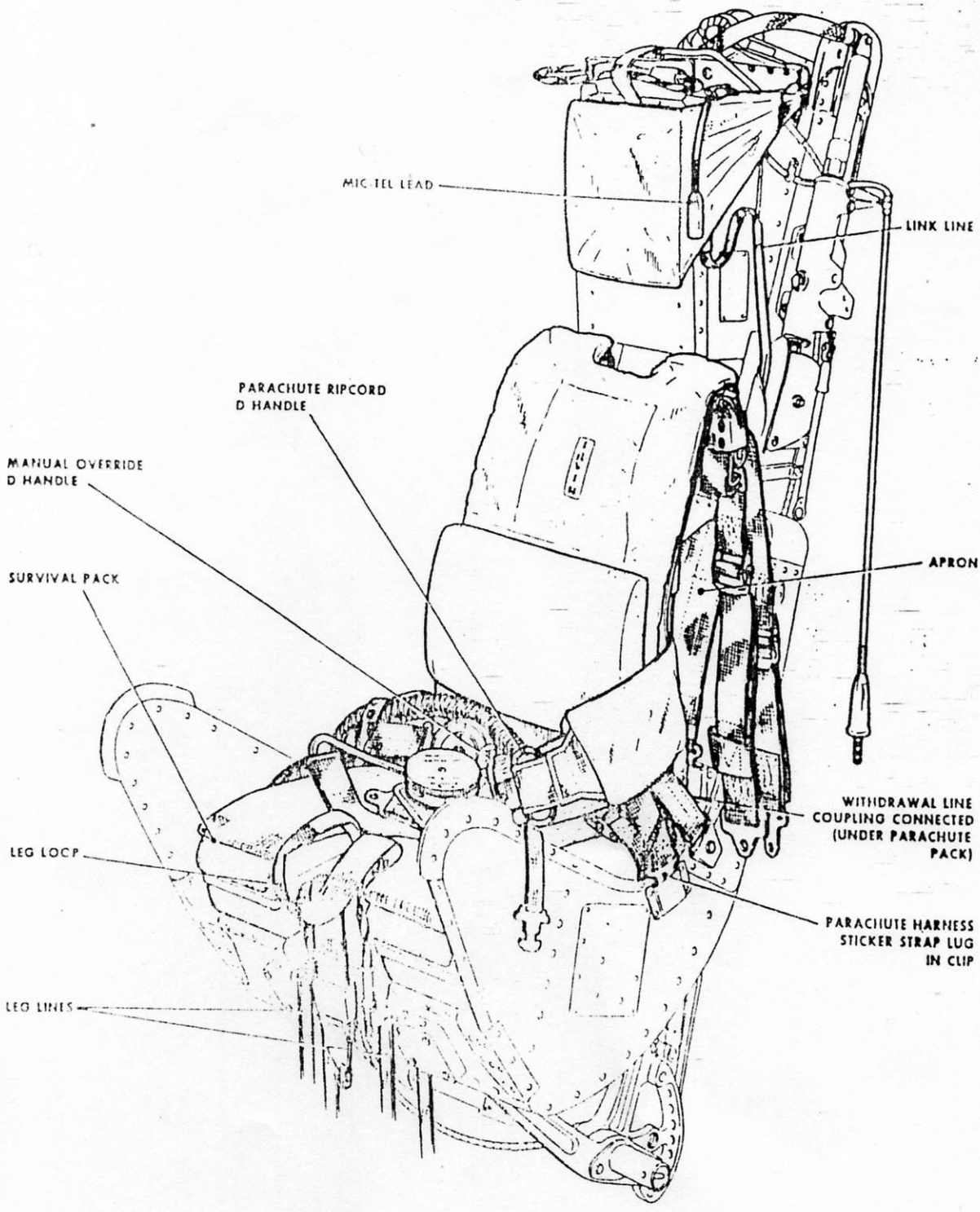


Fig 5 The seat equipped, Mk 18 parachute assembly (port)
(Type ZM PSP fitted)

21. Secured to the starboard side of the seat structure is a barostatic time-release unit, which is provided to afford the automatic release of the drogues from the scissor shackle and the freeing of the safety harness at altitudes of 10 000ft. and below. Above this height, the unit is prevented from functioning by means of a barostat. For ejections at high speed, a G-controller switch fitted to the unit will prevent the mechanism from operating until the forward speed of the seat, and occupant, has been sufficiently reduced to ensure safe parachute deployment. The release unit is operated by a static rod which is similar in construction to that used with the drogue gun.

22. An emergency oxygen set is mounted on the starboard seat beam and the main oxygen supply and Mic/Tel lead are connected to the aircraft services by quick-release connections. When the seat is ejected, the main oxygen and Mic/Tel services disconnect automatically, and further quick-release connections are provided for disconnecting these services when the occupant leaves the seat subsequent to ejection. A further quick-release connection is provided to operate the emergency oxygen bottle and then to disengage automatically.

Safety precautions

23. Safety pins, with integral red labels, are provided for rendering safe the face screen firing handle, canopy jettison sear, time-delay trip lever and the seat pan firing handle. A further safety pin is provided to prevent inadvertent operation of the emergency oxygen bottle. These pins must be removed before flight.

24. Before entering the cockpit or before any servicing is commenced on or near the seat, the seat is to be made safe in accordance with current authorized procedures.

Seat structure

25. The seat structure (fig. 4) is made almost entirely of light alloy. The main frame is built up from a pair of side beams connected at the top by a cross-beam which receives the thrust of the ejection gun piston tube, and at the bottom by a cross-shaft through which passes the countershaft carrying the seat raising handle. Each side beam carries at its lower end two of the rollers which engage with the guide rail. The upper rollers leave the top of the guide rail at the moment that the piston tube emerges from the cylinder tube at the end of the ejection stroke. The upper ends of the side beams have been extended to form canopy breakers. The seat structure is secured to the ejection gun piston by a spring-loaded latch and the gun itself is secured to the bottom mounting block within the guide rail by a second spring-loaded latch.

IMPORTANT . . .

It is most important to ensure that both spring-loaded latches are fully home when the seat is installed otherwise, during certain manoeuvres, the seat and occupant would move up the guide rail with possibly disastrous results.

26. The seat pan is supported on two seat raising levers and restrained at its upper corners by two spring-loaded plungers which slide in guides machined in the side beams. When adjusting the height of the seat pan, the weight of the occupant is counterbalanced by two seat reaction springs. The sides of the pan are shaped to form thigh guards and canopy breakers.

27. The snubbing units which are mounted on the front of the seat pan are both similar in construction but handed. Each unit consists of a casing which incorporates a slot through which passes one of the leg restraining cords. The casing houses a snub lever, a spring tube and a release button. The object of the snubbing unit is to allow the cord to pass freely down through the unit, but to lock the cord against any upward movement. Thus, during ejection the cords, which are anchored to the aircraft floor, become taut and pull the seat occupant's legs backwards and together. The lower ends of the cords are anchored by means of rollers and brackets; the rollers being held in the brackets by light alloy rivets and the brackets are attached to the cockpit floor by quick-release pins. The upper ends of the cords are in the form of a loop which passes over the lugs of the safety harness shoulder straps. Since the cords cannot pass upwards through the snubbing units, the occupant's legs are prevented from flailing in the airstream and are restrained in this position until the safety harness is released by the time-release unit. When this occurs, the upper loops of the cords are pulled through the leg D-rings, so freeing the legs. The release button is provided to allow the occupant to adjust the cords to give comfortable leg movement during flight.

28. The seat raising mechanism (fig. 5) is operated by the handle on the starboard side of the seat. The trigger control, by means of the sear and the roller, displaces axially the sear bar which in turn withdraws the pair of spring-loaded plungers from engagement with the quadrants and allows the seat raising levers attached to the countershaft to be rotated by the seat raising handle. On releasing the trigger control the two plungers, under the action of their return springs, engage adjacent holes in the quadrants to lock the seat in the new position. Seven positions are provided with a total adjustment of 6 in.

29. The drogue container is a riveted sheet metal box mounted at the top of the seat frame. A headrest pad, which forms part of the drogue and apron assembly, is secured to the container by

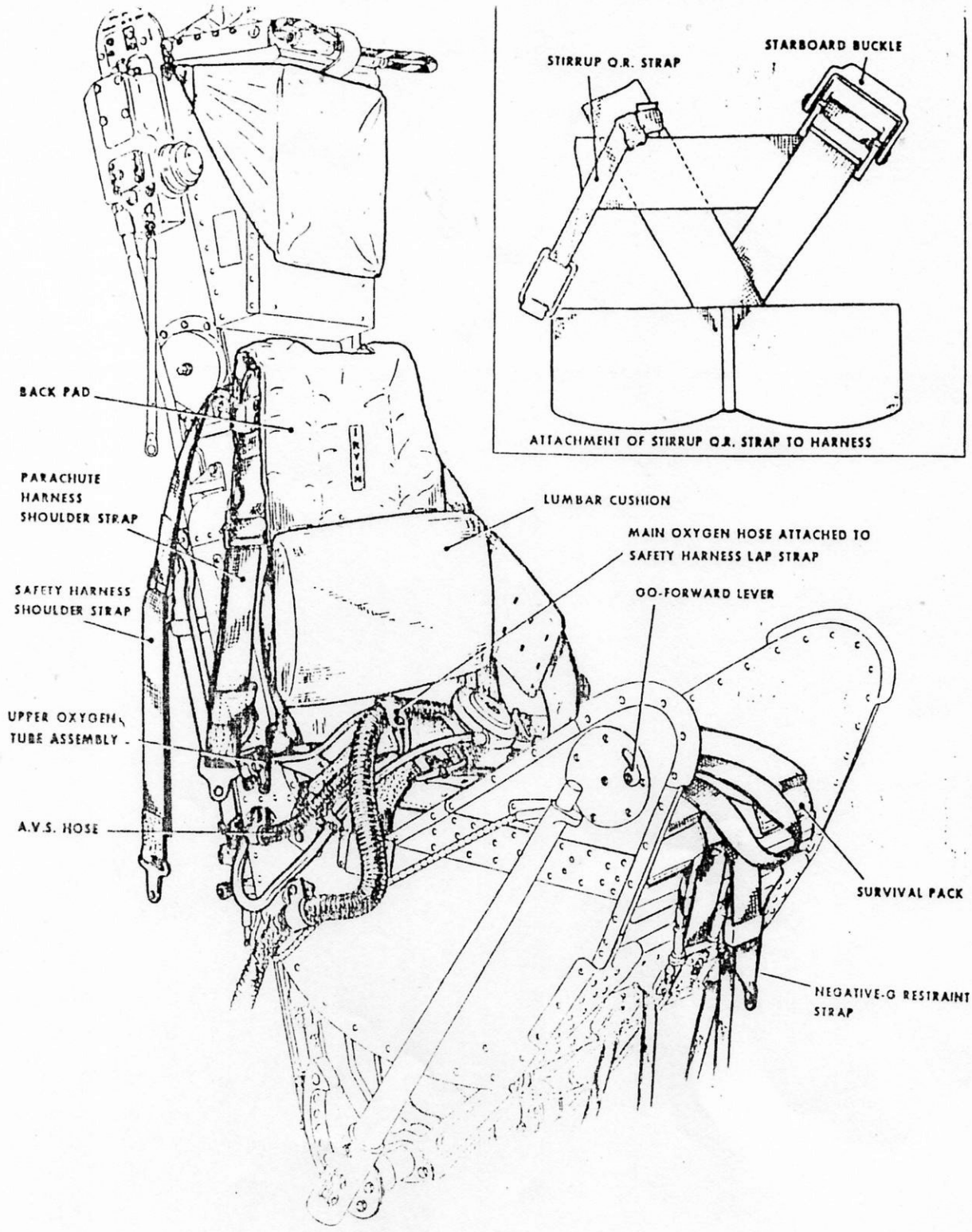


Fig 6 The seat equipped, Mk 18 parachute assembly (starboard)
(Type ZM PSP fitted)

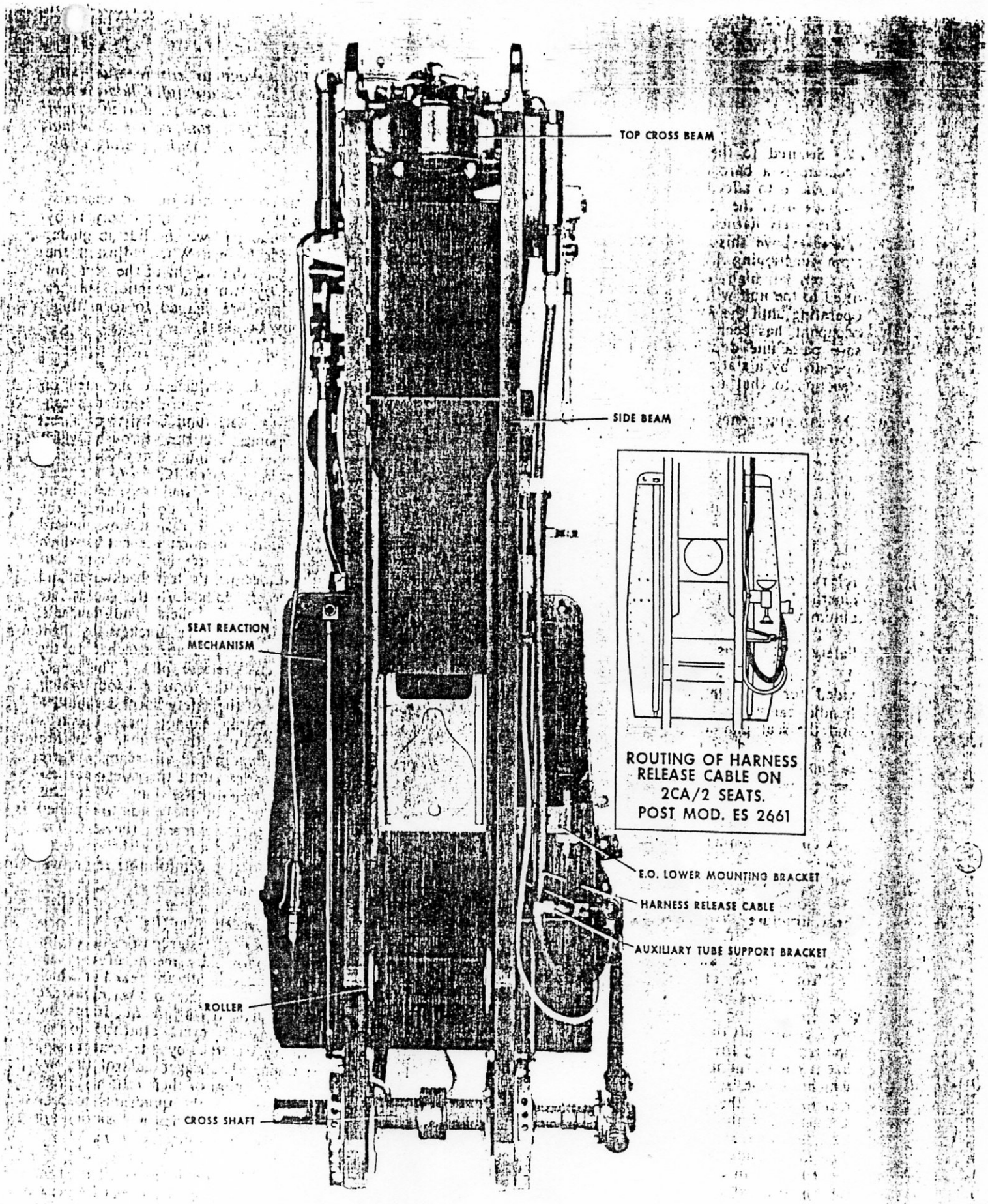


Fig.4 Seat Structure, Type 2CA/1
(Inset Type 2CA/2)

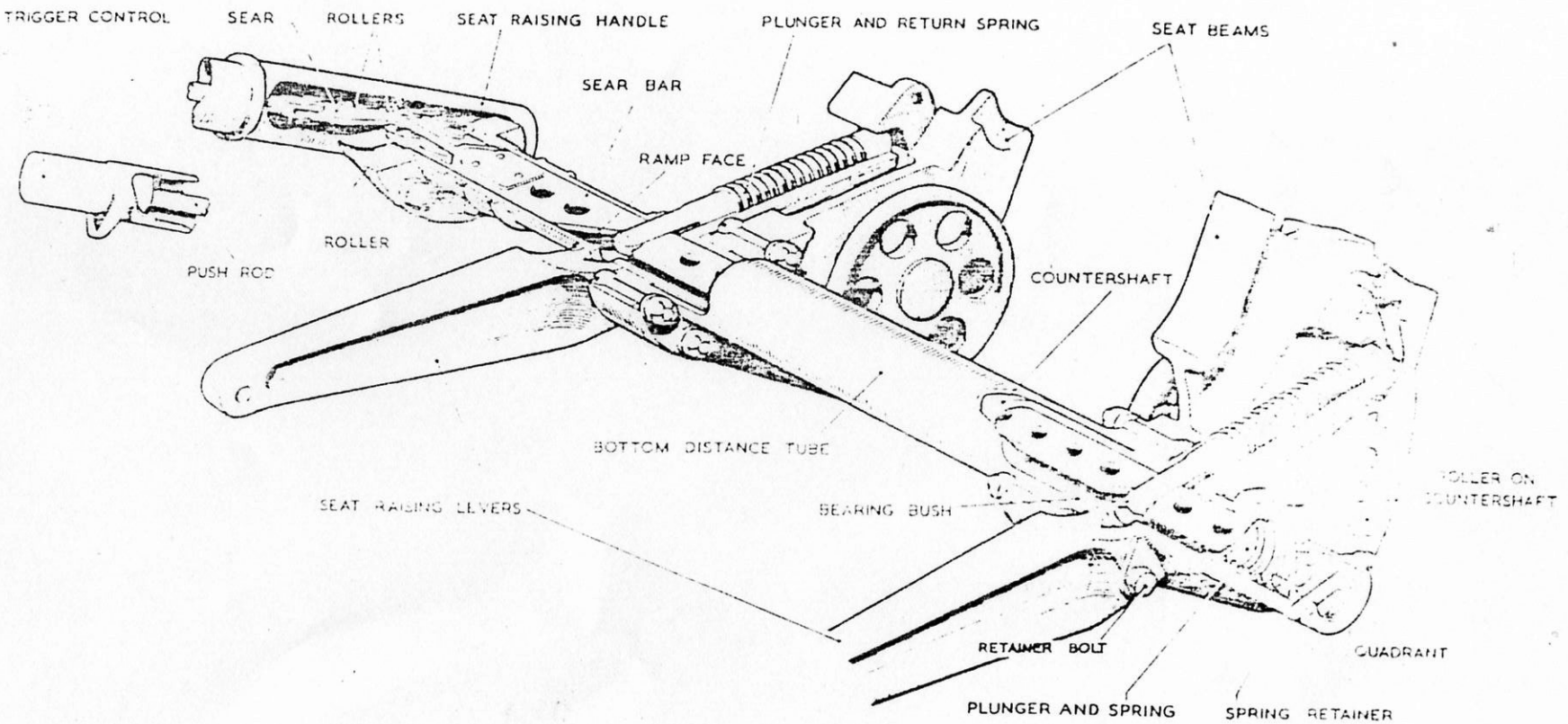


Fig. ◂5.▸ Seat raising mechanism

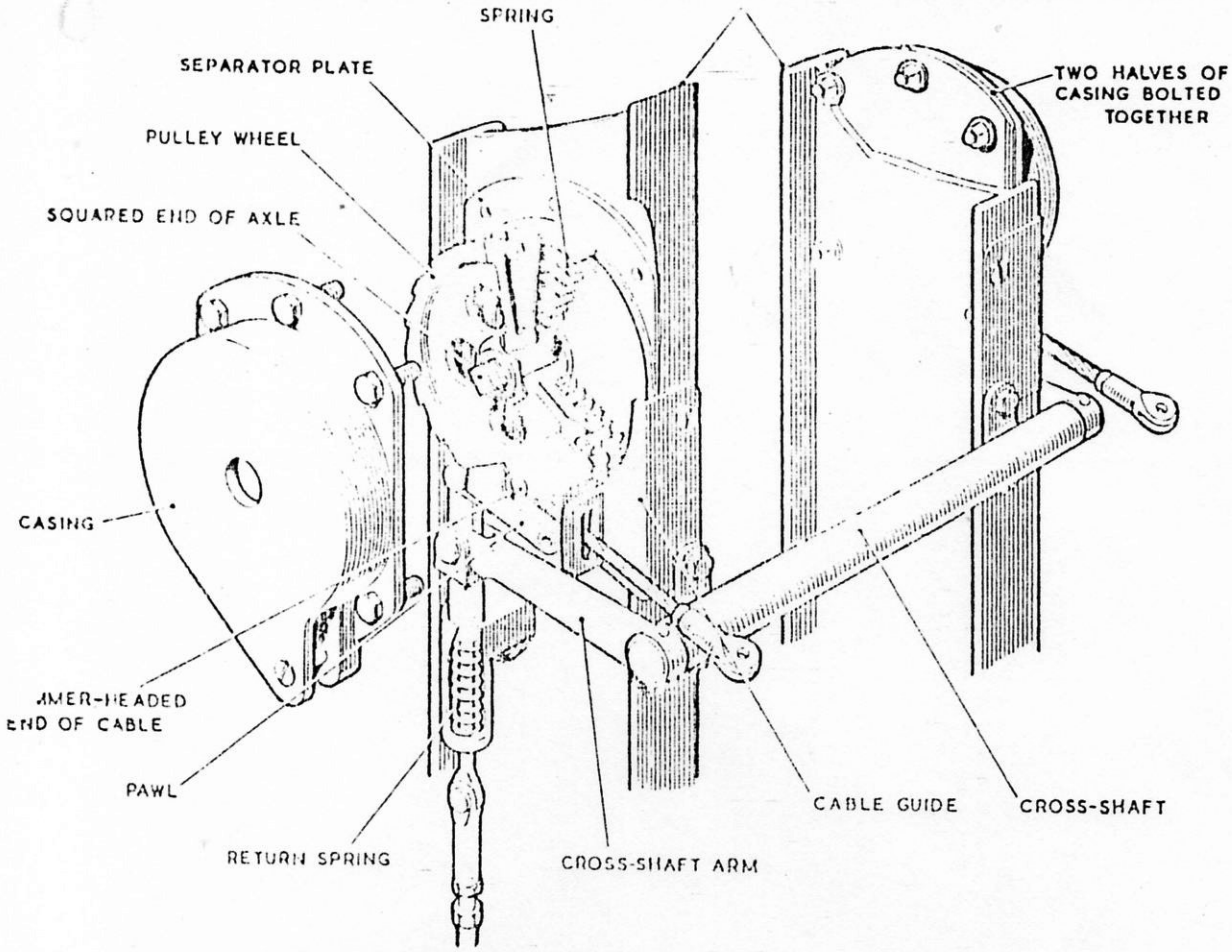


Fig.◄6► Go-forward mechanism

two pins which are withdrawn by the lifting lines after the scissor shackle has opened. The face screen firing handle is fitted to the front edge of the face screen and is retained by two spring-loaded plungers. The face screen, contained in the front compartment of the drogue container, is attached to the container by nylon tapes which are retained by the pins which secure the headrest pad. A firing cable is attached to the centre of the face screen by a sewn nylon loop and ...sed through a conduit where it divides in two. One leg of the cable is connected to the canopy jettison gun sear and the other leg to the time-delay trip lever. The drogue assembly is stowed in a separate compartment at the rear of the face screen stowage. The drogue compartment contains a nylon sleeve for the protection of the main drogue and the top of the container is closed by four retaining flaps.

30. The go-forward mechanism (fig.◄6►) consists of two similar but handed harness release units mounted one on each side beam. Each unit receives a steel cable attached to the shoulder straps of the safety harness. The cable passes three times round a pulley wheel which is carried in plain-bearings in the two halves of the casing, and spring loaded by the spiral spring, the ends of which engage with slots in the wheel axle and outer casing. A separator plate is interposed between the spiral spring and the pulley wheel. About one-third of the periphery of each wheel is provided with ratchet teeth. The pawls which engage the ratchet teeth are controlled by the cross-shaft arms which are attached one at either end of a cross-shaft. The starboard cross-shaft arm is connected via a plunger, spring and cable to the go-forward control on the starboard thigh guard. Each pulley axle has a squared end which projects from the outer casing to enable the spiral springs to be pre-loaded. The cables pass through fairleads mounted on the side beams to enable the harness to provide a reasonable degree of sideways restraint.

Guide rail

31. The guide rail consists of a single extrusion attached to the aircraft structure and normally it should not be necessary to remove it. Built into it towards the lower end is a block which receives the thrust of the ejection gun cylinder and incorporates the bottom latch which retains the cylinder tube. Slots in the upper end of the guide rail receive the top cross-beam of the seat structure and restrain the forward impulse of the seat in the event of a crash landing.

32. Bolted to the rear of the guide rail are two brackets to which the static rods for the time release unit and the drogue gun are attached by quick-release pins.

TYPE 2CA/1, Mk. 2 EJECTION SEAT

Introduction

33. The Type 2CA/1, Mk. 2 ejection seat (Ref. No. 27L/1445201) is similar to the Type 2CA/1, Mk. 1 except for the incorporation of Mods. No. ESA9, ESA10 and ESA11 which introduce a dummy cartridge in one of the upper secondary cartridge housings of the ejection gun together with the use of a reduced power cartridge set, a 1·5 second barostatic time-release unit and a 1 second delay drouge gun respectively. These modifications have been introduced to minimize the possibility of back injuries on ejection.

34. The main drouge has also been modified to include an anti-squid line (see fig. 3) similar in function to that of the controller drogue, and the method of folding this type of drogue for packing purposes differs from that for main drogues not equipped with an anti-squid line.

Associated equipment

35. The seat embodies the following items of equipment, full details of which will be found in their relevant publications as shown below:-

(1) Type 10, Mk. 2 ejection gun AP109C-0103-1

(2) Type 18, drogue gun, AP109D-0203-1

(3) Type 16, Mk. 1 barostatic time-release unit AP109E-0101-1

TYPE 2CA/2, Mk. 2 EJECTION SEAT

Introduction

36. The Type 2CA/2, Mk. 2 ejection seat (Ref. No. 27l/50157) is similar to the Type 2CA/2, Mk. 1 except that it has been modified to incorporate single lever ejection. This has been achieved by the fitting of a bifurcated face screen firing cable; one leg of the cable is connected to the sear of a micro-switch assembly fitted to the cockpit rear bulkhead, and the other is connected to the sear of the breech time-delayed firing unit fitted in the ejection gun. The breech time-delayed firing unit embodies a restrictor, the safety catch of which is connected to the hatch by a cable. The canopy breaker extensions have been omitted from the upper ends of the seat side beams

Operation

37. When either the face screen or seat pan firing control is operated the sear is extracted from the canopy jettison system and further movement of the firing control is then arrested by the interdictor mechanism. Immediately the canopy hatch leaves the aircraft, extracting the safety pin from the interdictor mechanism, continued pressure on the firing control will then remove the sear from the breech time delay firing unit and, after a delay of 0·50 second, the ejection gun primary cartridge is fired to initiate the ejection sequence (Post Mod. No. ESA.47).

Associated equipment

38. The following items of equipment are embodied in the seat and full details of these items will be found in their relevant publications as shown:-

(1) Type 3B, Mk. 1 ejection gun AP109C-0103-1

(2) Type 5, Mk. 2 breech time delay firing unit AP109C-0206-1

(3) Type 9 drogue gun AP109D-0203-1

(4) Type 1, Mk. 1 barostatic time-release unit AP109E-0101-1

TYPE 2CA/2, Mk. 3 &4 EJECTION SEATS

Introduction

39. The Type 2CA/2, Mk. 3 and 4 ejection seats (Ref. No. 27L/1445203 and 1445205) are similar to the Type 2CA/2, Mk. 1 and 2 seats respectively except for the embodiment of Mods. No. ESA 9, ESA 10 and ESA 11 as referred to in para. 33 and the inclusion of an anti-squid line to the main drogue (para. 34 refers).

Associated equipment

40. The seats embody the items of equipment as

TABLE 1

Equipment	Mk. 3 seat	Mk. 4 seat	Air publication
Ejection gun	Type 10, Mk. 2	Type 12, Mk. 1	109C-0103-1
Breech time-delay firing unit	N/A	Type 5, Mk. 2	109C-0206-1
Drogue gun	Type 18, Mk. 2	Type 18, Mk. 2	109D-0203-1
Barostatic time- release unit	Type 16, Mk. 1	Type 16, Mk. 1	109E-0101-1

sho... in Table 1, together with their respective publications.

SERVICING

Servicing the seat structure

To remove the seat pan

41. (1) Adjust the pan to its top position whilst sitting in the seat to counter-balance the load of the seat reaction springs.

(2) Remove the go-forward control cable from the bracket on the side beam by unscrewing the two 2.B.A. bolts; detach the cable from the go-forward mechanism.

(3) Remove the starboard thigh strap from the seat pan and release the harness release cable from the sticker strap fabric loop by undoing the press stud fitting.

(4) Remove the two special nuts, front bracket and the rear bracket complete with spring-loaded plunger, seat pan firing handle and cable conduit from the front of the seat pan.

(5) Press the seat pan back to relieve the reaction spring load and slide outwards simultaneously the two spring-loaded plungers. Allow the seat pan to hinge forward until the reaction springs are relaxed. Remove the seat reaction springs.

(6) Remove the bolts from the ends of the seat raising levers and remove the seat pan.

Note . . .

These bolts must NOT be removed until the seat reaction springs have been removed.

To remove and dismantle the harness release units

42. (1) First remove the starboard unit. Remove the bolts holding the fairlead and the pin attaching the cross-shaft arm to the pawl and spring; remove the harness from the cables.

(2) Remove the five 2 B.A. bolts from the flange of the unit and lift off the unit without allowing the halves of the casing to separate.

(3) Lightly grip the casing flange between fibre blocks in the vice jaws (fig. 7). Pull out the cable to its full extent against the spring and prevent the spring from unwinding by holding the squared end of the wheel axle with the special box spanner (Ref. No. 27L/97). The hammer-headed end of the cable can now be lifted out of engagement with the slot in the pulley wheel and the cable withdrawn. Relieve the spring tension gradually by use of the box spanner.

(4) Separate the two halves of the casing, remove the wheel and separator plate and disengage the spring from the slot in the casing.

(5) Dismantle the pawl return spring by unscrewing the lower eye end whilst holding the top fork end.

(6) The port unit, which has no return spring, is dismantled in a similar manner.

To assemble the harness release units

43. (1) Insert the pulley wheel and separator plate into the outer casing. Ensure correct type of pulley wheel for outer casing as both items are handed.

(2) Insert the spring with its outer hooked end on the same side as the pawl pivot, engage the hooked end of the spring with the slot in the casing and the inner coil end with one of the slots in the wheeled axle.

(3) Place the back plate in position but do not insert the bolts.

(4) Grip the flange of the casing lightly between fibre blocks in a vice, and using a special box spanner, rotate the wheel axle

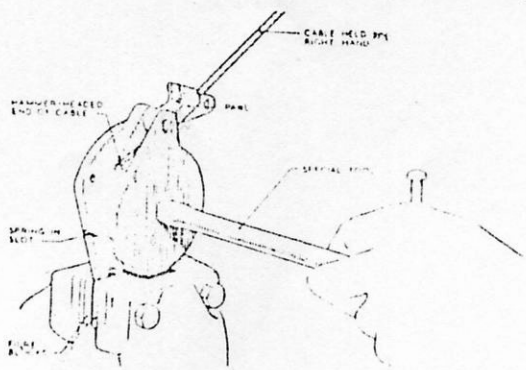


Fig. 7 Dismantling harness release unit

Note...

Ensure that the quick-release box is as low as possible to expose the parachute harness quick-release box and that the emergency oxygen supply tube (upper oxygen tube assembly) is routed over the parachute harness but under the safety harness.

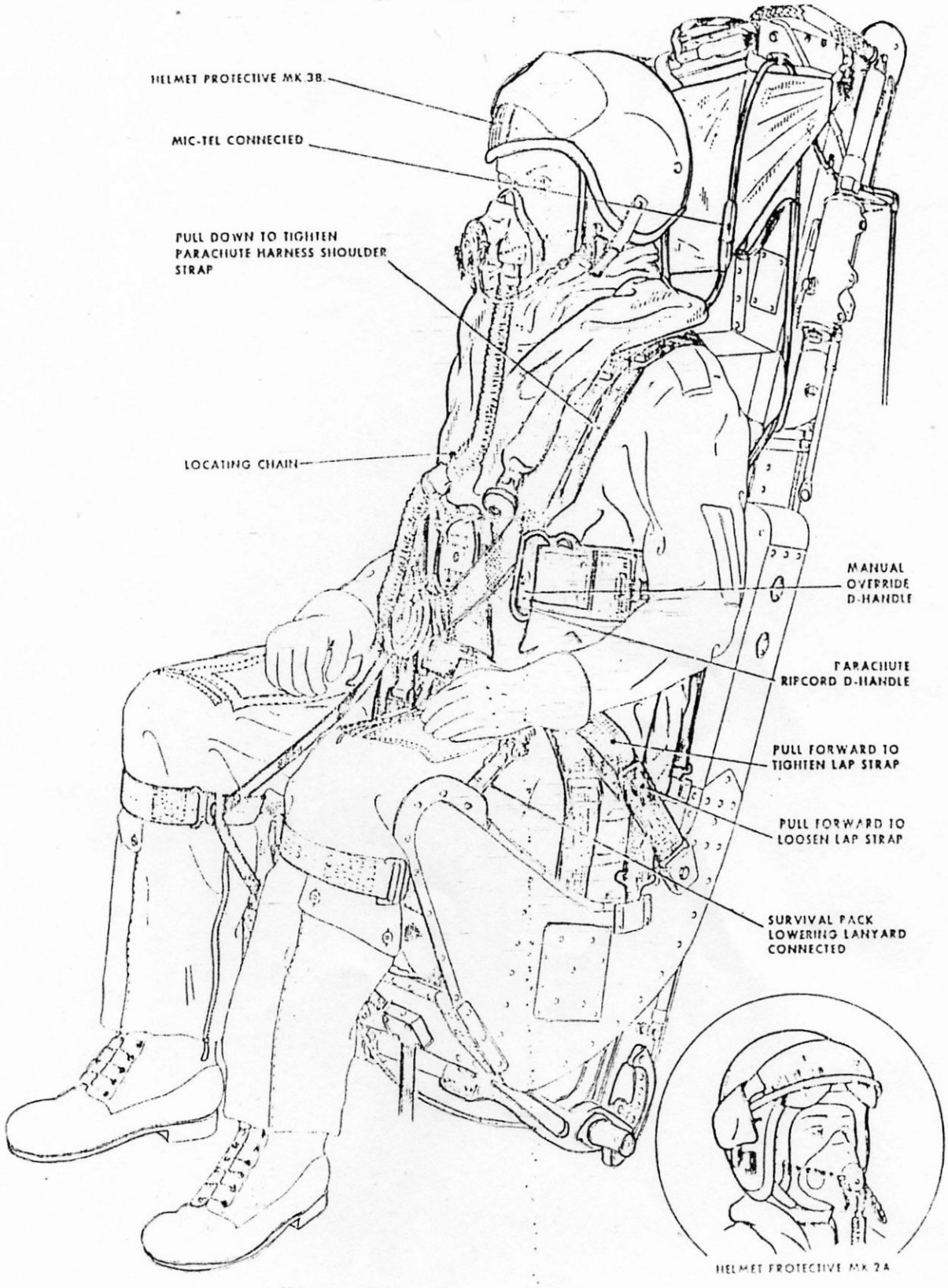


Fig 8 The seat occupied (port)
(Flying clothing)

until the spring is wound to its full extent, i.e., five revolutions approximately. The wheel axle is to be rotated anti-clockwise for the starboard unit and clockwise for the port unit. Allow the pulley wheel to return slowly, rotate the wheel axle again approximately three revolutions until the cable anchorage is accessible.

(5) Thread the harness cable between the pawl and the casing and engage the hammer-headed end of the cable in the slot in the pulley wheel.

(6) Allow the cable to be drawn slowly into the casing by the spring until the hammer-headed end engages with the slot in the pawl and press into full engagement with the fingers.

(7) Apply a spring balance to the end of the harness cable. The load recorded when the cable starts to extend is to be between 4 lbs and 5.1/2 lbs. If the recorded load is not within the limits the unit is to be dismantled, the inner coil end of the spring repositioned in one of the other two slots in the wheel axle and the load rechecked.

(8) Secure the unit to the side beams by the five 2 BA bolts. Replace the pins connecting the cross-shaft arm to the pawl and pawl spring and lock with a new split pin. Connect the safety harness to the cables.

(9) Adjustment is provided at the upper end of the operating cable on the starboard side of the seat. Adjustment is to be made to obtain full engagement of the pawls and approximately 1/16 inch of free movement at the control knob.

(10) Ensure that the harness cables retract fully past all seven ratchet positions.

To dismantle the seat raising mechanism

44. (1) Remove the 2 BA lock-nut and tap out the taper pin from the port end of the countershaft; remove spring retainer, spring and plunger.

(2) Remove the roller the countershaft fitting. Do not remove the 1/4in BSF bolts from the faces of the lower distance tube.

(3) Remove the two quadrants by removing the four lock-nuts on each quadrant and depressing the trigger control on the seat raising handle to free plunger as the quadrant is withdrawn; the four bolts remain in position.

(4) Remove the seat raising handle by removing the four 1/4in bolts securing it to the flange.

(5) Push up both plungers simultaneously and pull out the seat bar.

(6) Withdraw both plungers and springs and withdraw the countershaft out from the port seat raising lever and frame bearings.

To assemble the seat raising mechanism

45. (1) Pass the shaft with the starboard seat raising lever attached through the bearings in the side beams, and pass the port seat raising lever with the countershaft end fitting attached on the shaft. Assemble the roller and secure with a new 1/16in split pin.

(2) Insert the locking plungers and springs

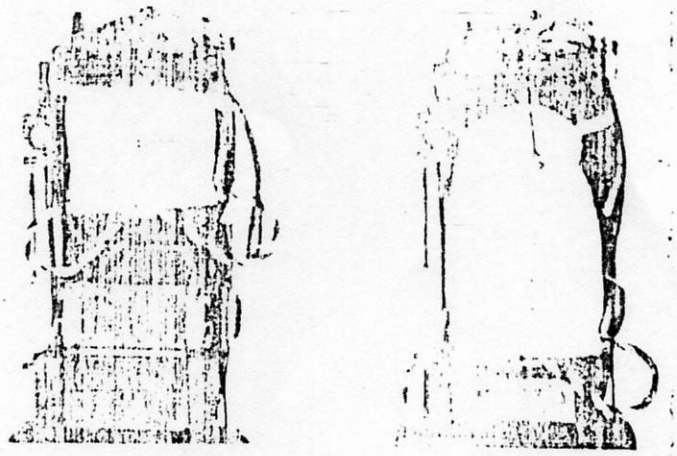


Fig. 8 Packing the face screen

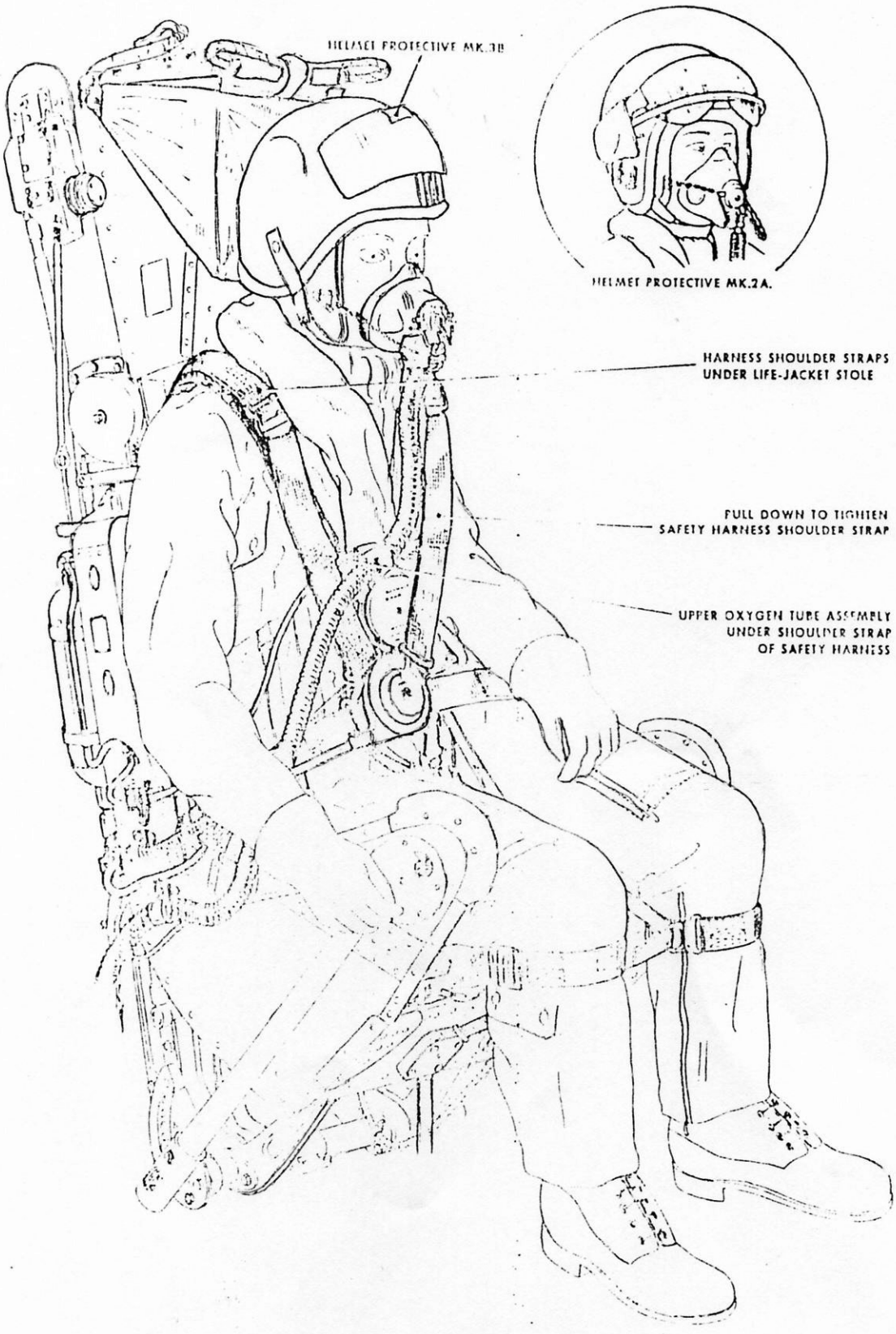


Fig 9 The seat occupied (starboard)
(Flying clothing)

into the seat raising levers and, while depressing each plunger in turn, insert the sear bar into the countershaft passing it through the slots in the locking plungers.

(3) Replace the plunger, spring and spring retainer into the end of the countershaft and insert the taper pin and lock nut.

(4) Replace the quadrants and seat raising handle.

Note . . .

The special bolt (Ref. No. 27L/1251) is to be placed in the top position when refitting the seat raising handle.

To fit the seat pan

46. (1) Position the seat raising levers in the top position, place the seat pan on the levers and secure it in position with the bolts.

(2) Insert the seat reaction springs and press the pan back against the side beam so compressing the springs. Operate the spring-loaded plungers to engage the guides in the side beams.

(3) Refit the seat pan firing handle and cable conduit to the seat pan.

(4) Refit the starboard thigh strap and the harness release cable to the seat pan.

(5) Refit the go-forward control cable to the go-forward mechanism.

Packing the face screen

47. (1) Stretch the face screen to its full extent and push the fulness up into the convex form (Right-hand diagram Fig. 8).

(2) Fold, the centre bulk to lie on the right edge of the screen and the edges of the screen under, so as to reduce the width to allow the fabric to pass through the slot in the front of drogue container (left-hand diagram fig 8).

(3) Insert the screen into the container and pack it into its compartment in a series of double folds, pressing well to the rear at all times. Ensure that the forward outer edges of the screen are pressed behind the plunger housings.

(4) Insert the firing handle into the spring-loaded plunger housings and press firmly home to lock in position.

(5) Ensure that the eye-ends of the nylon tapes are placed on top of those for the head-rest pad, and secured by the retaining pins.

WARNING . . .

WHENEVER A FACE SCREEN IS RE-PACKED (OR THE FIRING CABLE IS CONNECTED TO THE SEAR) ENSURE THAT THE EXPOSED FIRING CABLE IS KEPT AS SHORT AS POSSIBLE BE-TWEEN THE SEAR AND THE DROGUE CONTAINER, i.e., ONLY LEAVE SUFFICIENT CABLE TO REACH THE SEAR. IF NOT, THERE IS A SERIOUS DANGER OF SNAGGING OF THE CABLE WHEN THE FIRING HANDLE IS PULLED, POSSIBLY RESULTING IN NON-FIRING OF THE EJECTION GUN.

Renewing the drogue withdrawal and anti-squid lines

To remove the drogue withdrawal and anti-squid lines

48. (1) Remove the controller drogue from the container.

(2) Pass the drogue withdrawal line through the loop of the anti-squid line and remove the withdrawal line.

(3) Cutting the stitching remove the spool and slide off the length of armoured hose.

(4) Pass the anti-squid line down through the shroud lines and separate the anti-squid line from the loop of the controller drogue shroud lines.

To replace the drogue withdrawal and anti-squid lines

49. (1) Pass the large hoop of the anti-squid line through the loop at the lower end of the controller drogue shroud lines, pass the small loop at the other end of the anti-squid line through the large loop and form a knot as shown in fig 9 (action 1).

(2) Ensure that the length of armoured hose is free from damage and fraying. Using a suitable length of cord, pull the loop of the withdrawal line through the armoured hose.

(3) Insert the spool in the loop of the withdrawal line protruding from the armoured hose and secure the spool in position by hand, stitching the edges of the loop as close as possible to the spool using No. 35 parachute thread.

(4) Hold the five drogue apex shroud lines centrally to form two clear openings diametrically opposite. Pass the loop of the

withdrawal line through these openings and through the loop of the anti-squid line. Pass the spool end of the line back through the loop at the other end of the line and pull tight to form a knot. Secure the knot by stitching (fig 9, action 2, 3 and 4) using No 18 white cotton thread.

(5) Repack the drogue into the container. Route the drogue withdrawal line OVER all other lines and attach the spool end to the drogue gun piston.

ATTACHING THE MAIN DROGUE AND THE LIFTING LINES TO THE SHACKLE

50. Pass the drogue shackle through the end loop of the lifting line and the eye end of the main drogue. Fit a new bolt through the shackle with the head adjacent to the lifting line, ensuring that the nut will be uppermost when the scissor shackle is closed down on the drogue container flaps. Tighten a new nut onto the bolt and secure by centre punching in three places.

REPLACING THE MAIN DROGUE

51 To remove the main drogue proceed as follows:

(1) Remove the nut and bolt from the drogue shackle and remove the eye-end of the main drogue rigging lines from the shackle.

(2) Slacken the connecting strop at the eye end of the controller drogue rigging lines. Pass the controller drogue through the loop of the connecting strop. Remove the controller drogue.

(3) Pass the free end of the connecting strop through the loop at the apex of the main drogue. Remove the strop.

52 To assemble the main drogue proceed as follows:

(1) Hold the twelve apex lines of the main drogue centrally to form two diametrically opposed openings. Pass one loop of the connecting strop down through one opening and up through the other opening. Thread the other end of the connecting strop through the loop and pull tight.

(2) Pass the loop at the free end of the connecting strop through the eye end of the controller drogue rigging lines. Work the controller drogue through the loop in the strop and pull tight to form a knot.

(3) Pass the drogue shackle through the eye end of the main drogue rigging lines and secure as detailed in paragraph 50.

PACKING THE DROGUE ASSEMBLY

To pack the main drogue (Type 2CA/1, Mk 1 and Type 2CA/2, Mk 1 and 2 seats only)

53 (1) Open the four flaps and the protective sleeve, then roll the sleeve down so that it does not obstruct packing operations.

(2) Hold the main drogue at arms length, extend the lines from the shackle and check that they are not entangled (fig 10, action 1).

(3) Pair off the rigging lines and fold the drogue into six folds (fig 10, actions 2, 3 and 4).

(4) Bring the drogue to the container. Insert the sleeve-protected rigging lines into the rear right hand corner (the corner furthest from the drogue gun) and fold the remaining rigging lines down into the container. Stow the drogue (periphery first) packing it concertina fashion well down into the container, finishing with the apex of the drogue opened out and laid flat (fig 12, upper view).

(5) Ensure that the nylon tape is not twisted. Lay the tape in from left to right on top of the main drogue working from front to rear.

(6) Unroll the protective sleeve and fold it over to enclose the main drogue and nylon tape in such a manner that the controller drogue rigging lines emerge from the right hand corner adjacent to the sleeve protected rigging lines.

To pack the main drogue (Type 2CA/1 Mk 2 and Type 2CA/2 Mk 3 and 4 seats only)

54 (1) Open the four flaps and the protective sleeve, then roll the sleeve down so that it does not obstruct packing operations.

(2) Position the drogue shackle in the scissor shackle in such a manner that when the scissor shackle is in the fully forward position, the drogue shackle nut is uppermost. Close the scissor shackle and cock the barostatic time-release unit.

(3) Extend the drogue rigging lines, ensuring that the lines are not entangled. Hold the anti-squid line at the drogue periphery between two rigging lines (fig 11, Action 1).

(4) Starting at one side of the anti-squid line, count twelve lines, bring the twelfth line up through the centre of the drogue and pair it with line one, (line one will be the line adjacent to the anti-squid line, right or left, dependent upon which side the twelfth line was counted from). Ensure that the anti-squid line is retained in the central position with six pairs of rigging lines equally disposed on either side (fig 11, Action 2).

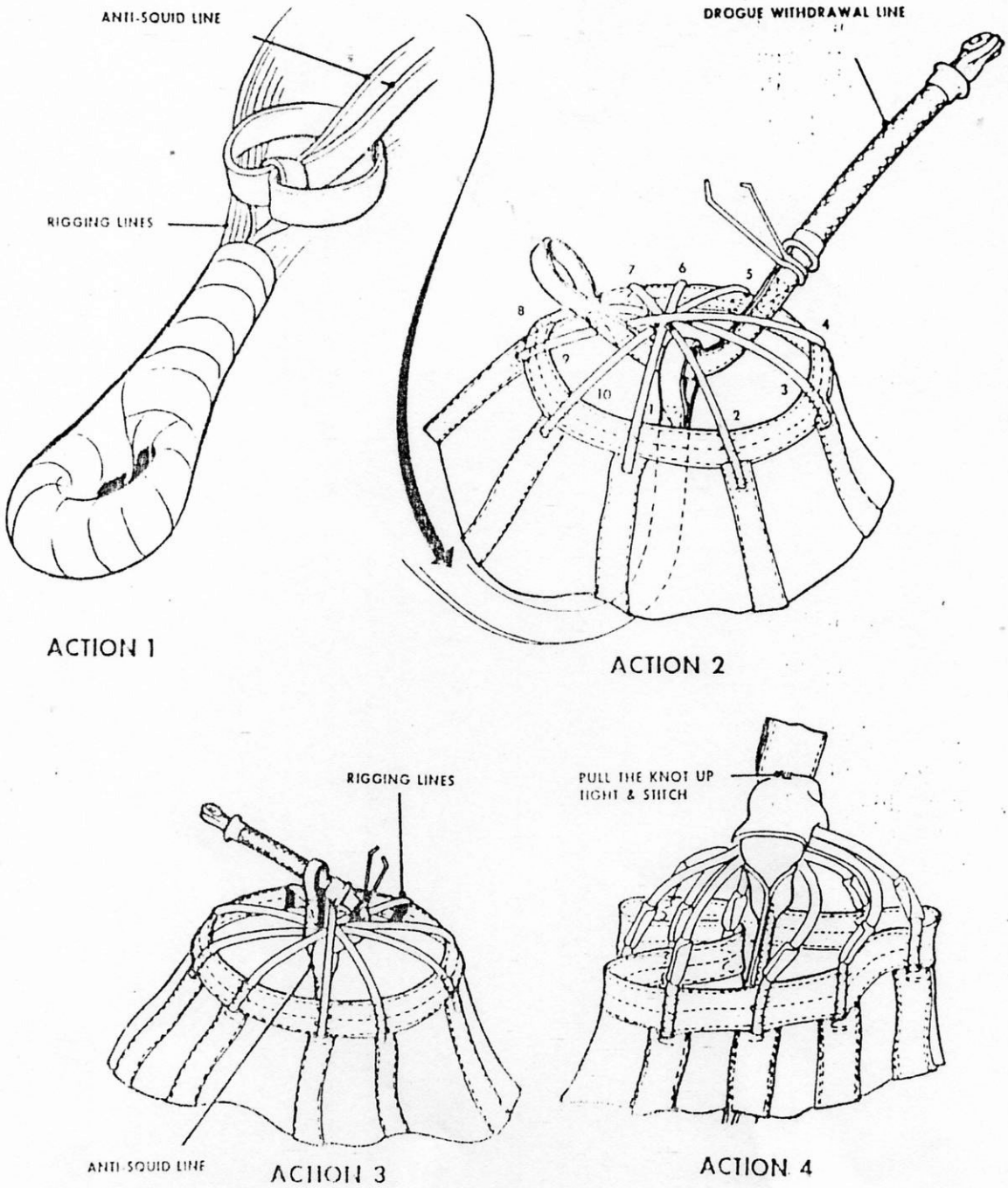


Fig 9 Renewing the drogue withdrawal and anti-squid lines

(5) Beginning at the right hand side of the drogue, take up the periphery between the second and third pairs of rigging lines and concertina fold the drogue upward towards the centre, positioning the rigging lines on top of each other (fig 10, Action 3). Make a similar fold between the fourth and fifth pairs of rigging lines and complete the folding so that six pairs of rigging lines lie on top of each other (fig 10, Action 4).

(6) Hold the anti-squid line central and fold the left hand side of the drogue as detailed in sub-para (5). The anti-squid line will now run from the periphery of the drogue, between two sets of rigging lines, to the sleeve protected end of the rigging lines (fig 11, Action 5).

(7) Bring the drogue to the container, insert the sleeve protected rigging lines into the rear right hand corner and lay the protected lines from side to side across the bottom of the container working from rear to front. Continue stowing the unprotected rigging lines and anti-squid line ensuring that the complete area of the container is utilised.

(8) Stow the drogue, periphery first, into the front of the container, lay the drogue rearward and then concertina fold the drogue on top of the rigging lines. Pack down hard at each fold to occupy all corners of the container; finally open out the apex of the drogue to lay flat.

(9) Ensure the connecting strop is not twisted. Lay the strop in folds from left to right on top of the drogue, working from front to rear (fig 12, upper view).

(10) Unroll the container protection sleeve and fold it over to enclose the drogue and connecting strop in such a manner that the connecting strop emerges from the right hand rear corner of the container adjacent to the protected rigging lines.

To pack the controller drogue

55 (1) Hold the controller drogue and extend the rigging lines ensuring that they are not entangled. Pair off the rigging lines and fold the drogue into five folds. Adjust the folds to stagger the rigging lines to reduce the bulk in the centre of the drogue. Lay the eye-end of the rigging lines across the rear of the container from left to right and continue laying the rigging lines and anti-squid line from side to side to cover the protective sleeve.

(2) Stow the drogue periphery into the left side of the container, lay to the right, fold back and open out the apex so that it lies flat. The drogue withdrawal line must emerge from the corner of the container nearest to the drogue gun and should extend sufficiently to expose the flap securing pin.

WARNING...

IT IS VITAL THAT THE CONTROLLER DROGUE WITHDRAWAL LINE PASSES OVER ALL OTHER LINES SO THAT THE DROGUES MAY BE WITHDRAWN WITHOUT DANGER OF ENTANGLEMENT

(3) Close the starboard, port and rear closure flaps, in that order, passing the wire loop on the starboard flap through the eyelets on the other flaps. Lead the firing cable over the port flap to the left of the wire loop and pass it OVER the lifting lines. Close the front flap, passing the wire loop through the eyelet and insert the securing pin through the wire loop and into the fabric pocket on the front flap.

WARNING...

ENSURE THAT THE SECURING TIE IS THREADED UNDER THE SECURING PIN FORWARD OF, NOT THROUGH, THE WIRE LOOP SO THAT THE SCISSOR SHACKLE IS FREE TO LIFT UP WHEN THE PIN IS WITHDRAWN

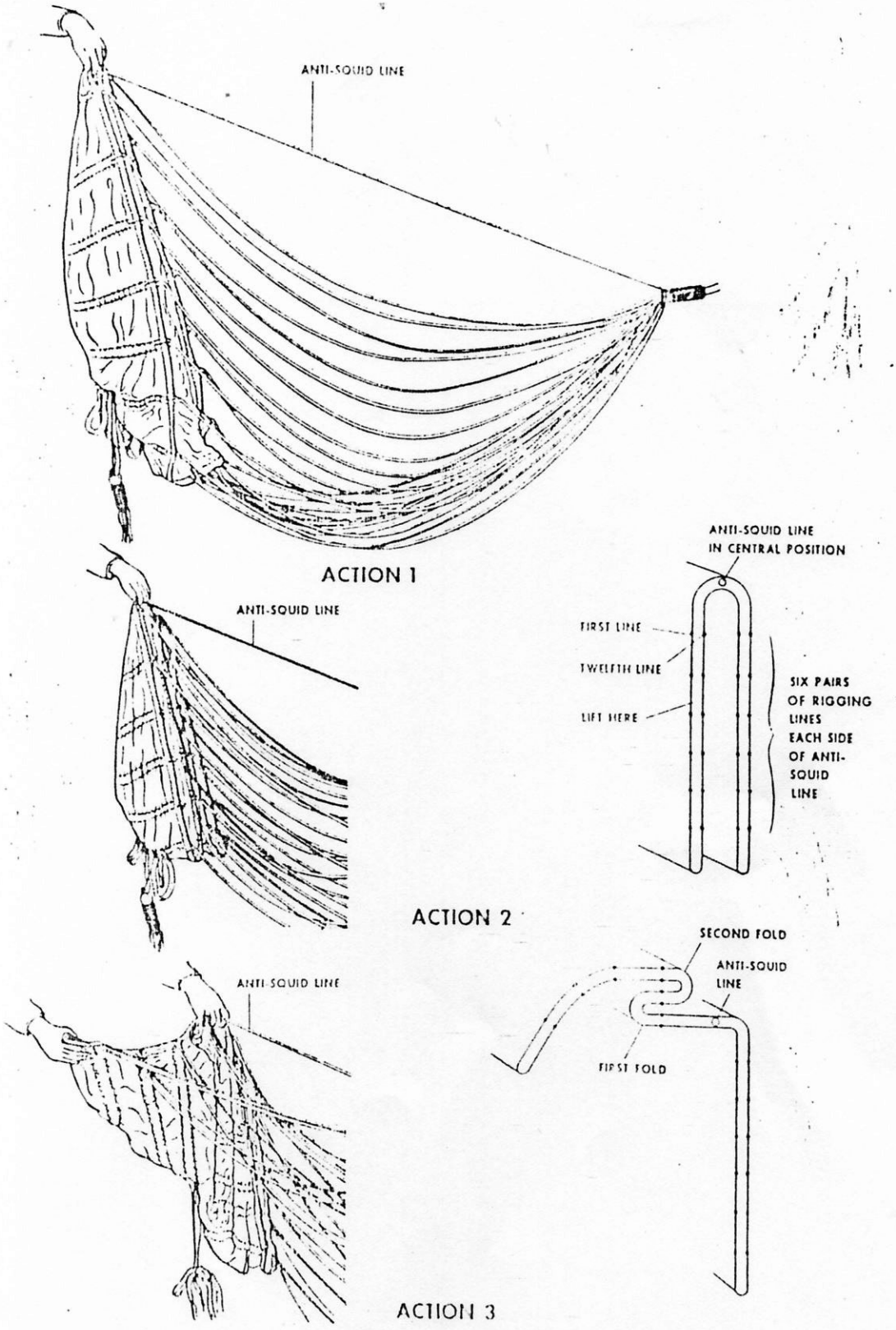
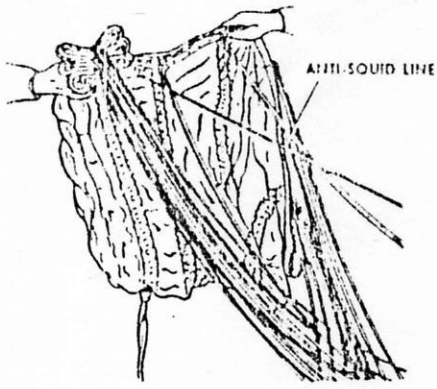
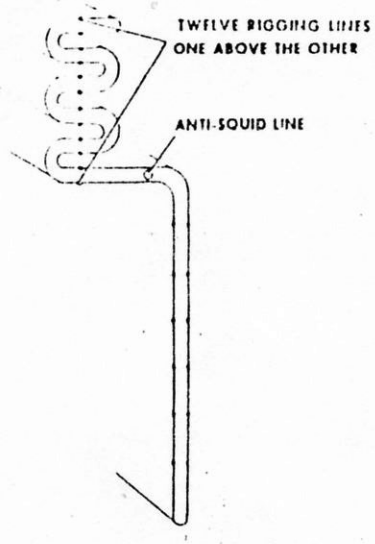
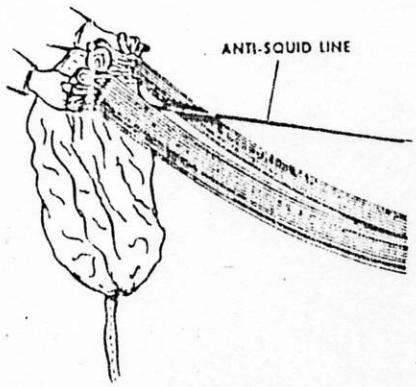


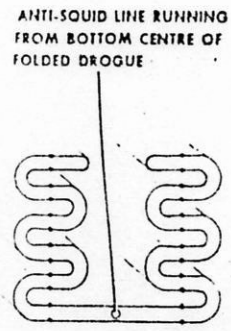
Fig 11 Folding the main drogue (Type 2CA/1 Mk3 and 4 and Type 2CA/2 Mk3 and 4 seats)
(Actions 1, 2 and 3)





ACTION 4





ACTION 5

Fig 11 Folding the main drogue (Type 2CA/1 Mk2 and Type 2CA/2 Mk3and 4 seats) (Actions 4 and 5)

(4) Pass a length of No 8 thread under and around the legs of the securing pin forward of the closure flap wire loop. Lay the loose ends of the thread over the starboard side of the drogue container. Pass a second length of thread through the ring of the securing pin, OVER the loose thread previously prepared, through the fabric loop on the pocket of the front closure flap and tie off with a reef knot followed by a half-hitch on each side of the knot (fig 13, Detail A).

(5) Rotate the scissor shackle forward on top of the closure flaps. Pass one end of the previously prepared thread through both the eye-end of the main drogue rigging lines and the drogue shackle, draw tight and tie off with a reef knot followed by a half-hitch on each side of the knot (fig 13, Detail B).

Note...

The parachute withdrawal line is routed UNDER the headrest pad and the face screen securing tapes (fig 14).

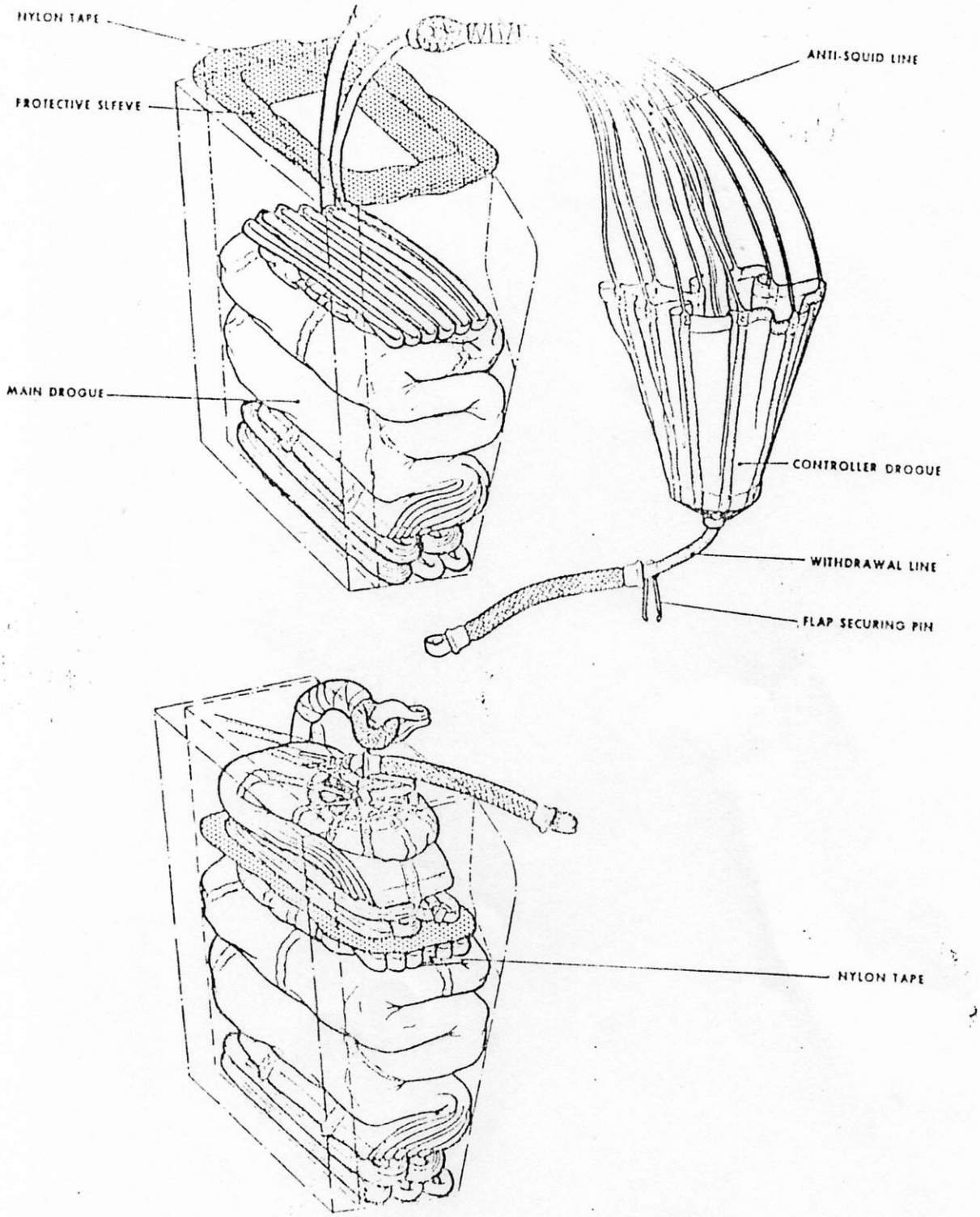


Fig 12 Packing the drogues

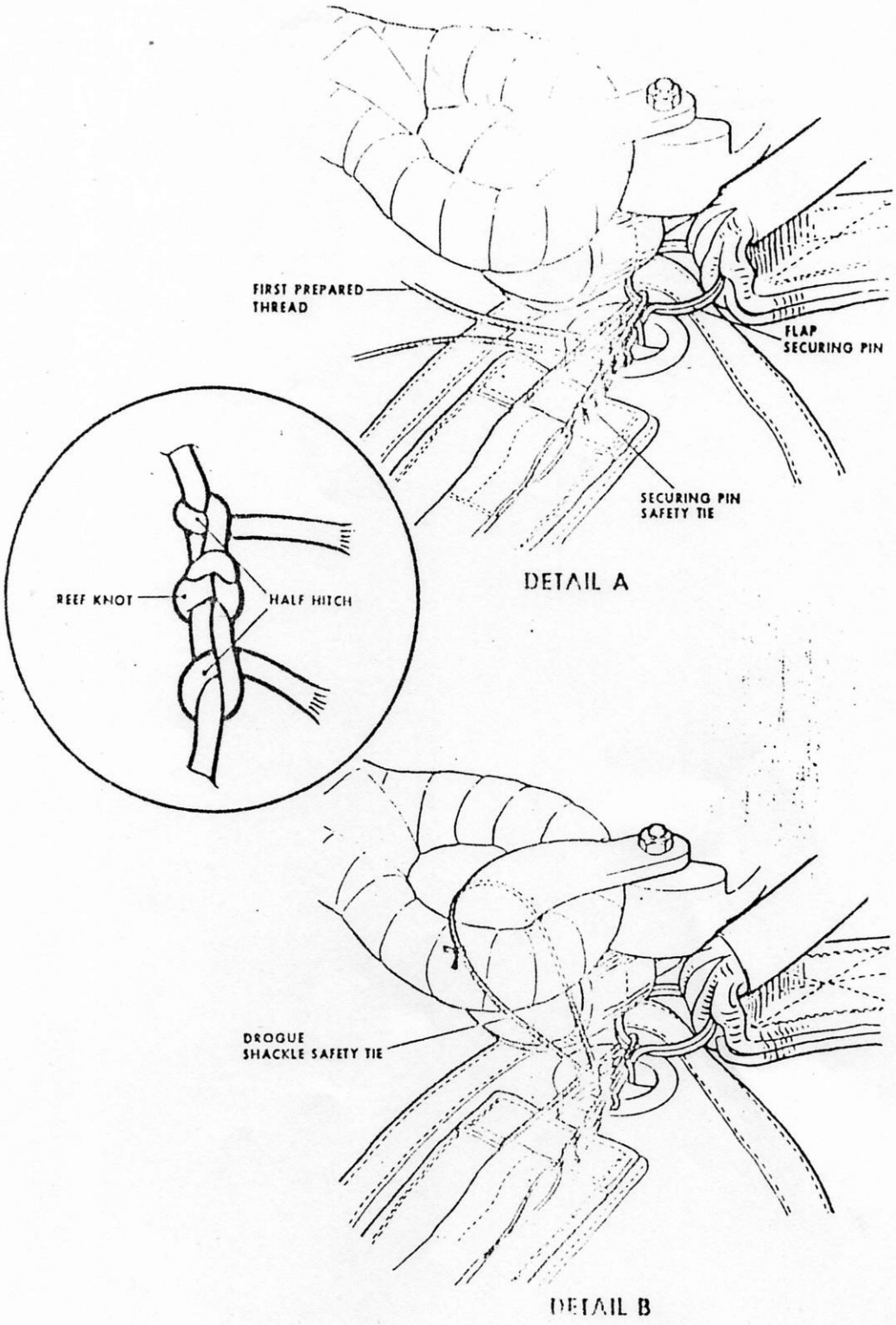


Fig 13 Drogue shackle safety tie

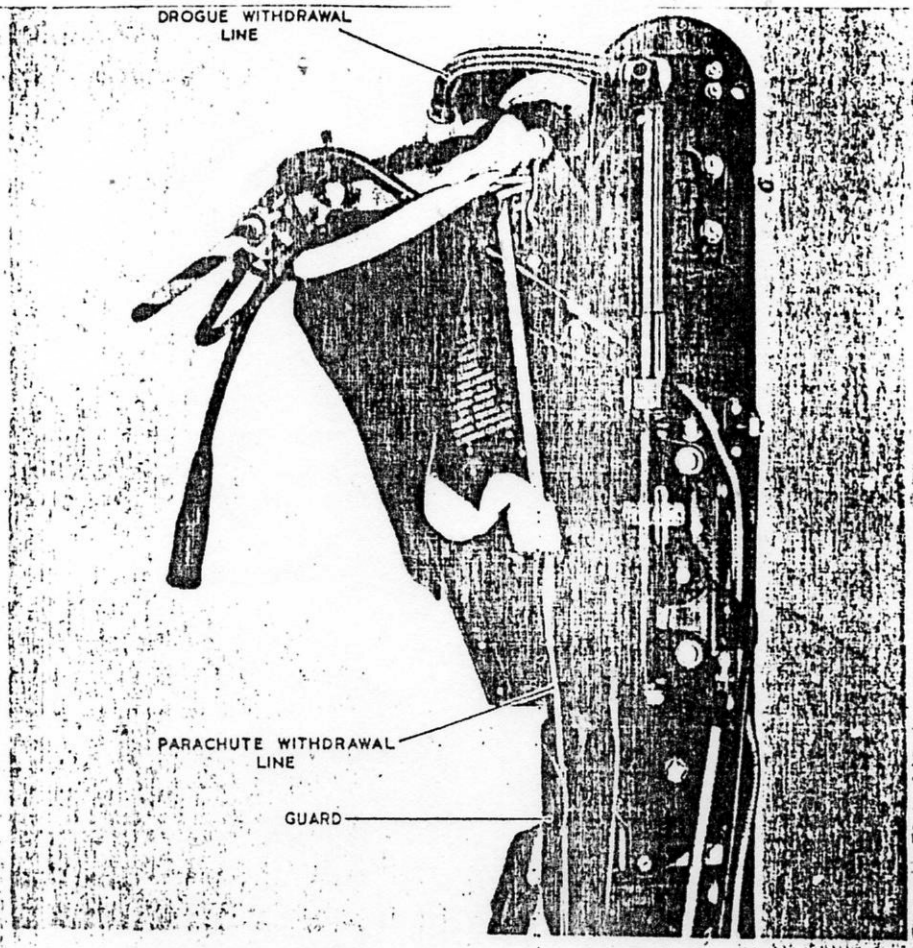


Fig 14 Routeing of parachute withdrawal line

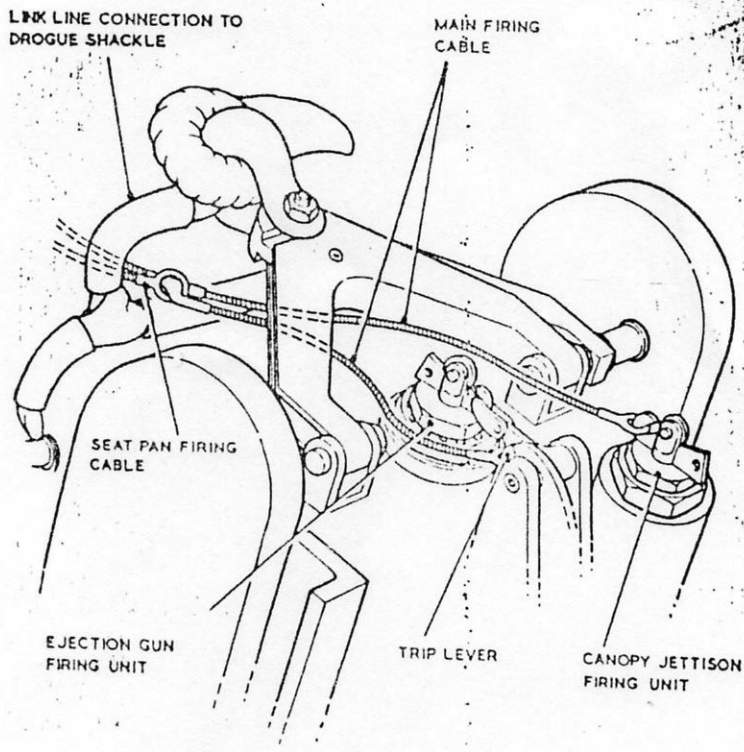


Fig 15 Routeing of firing cables (Type 2CA/1 Mk 1 and 2 seats)

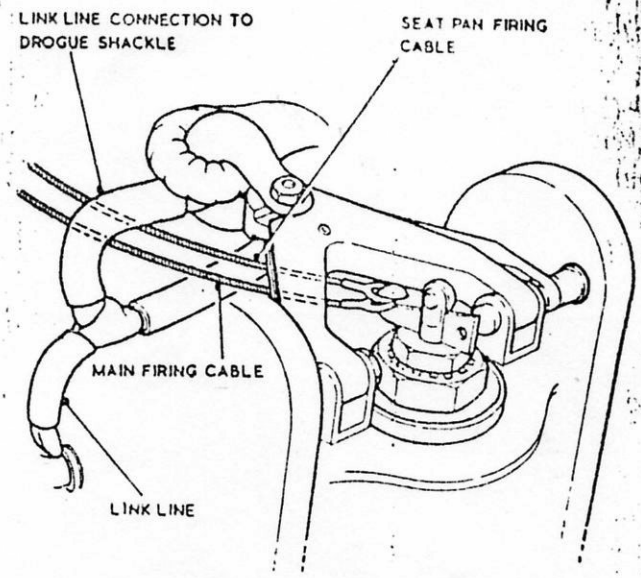


Fig 16 Routeing of firing cables (Type 2CA/2 Mk 1 and 3 seats)

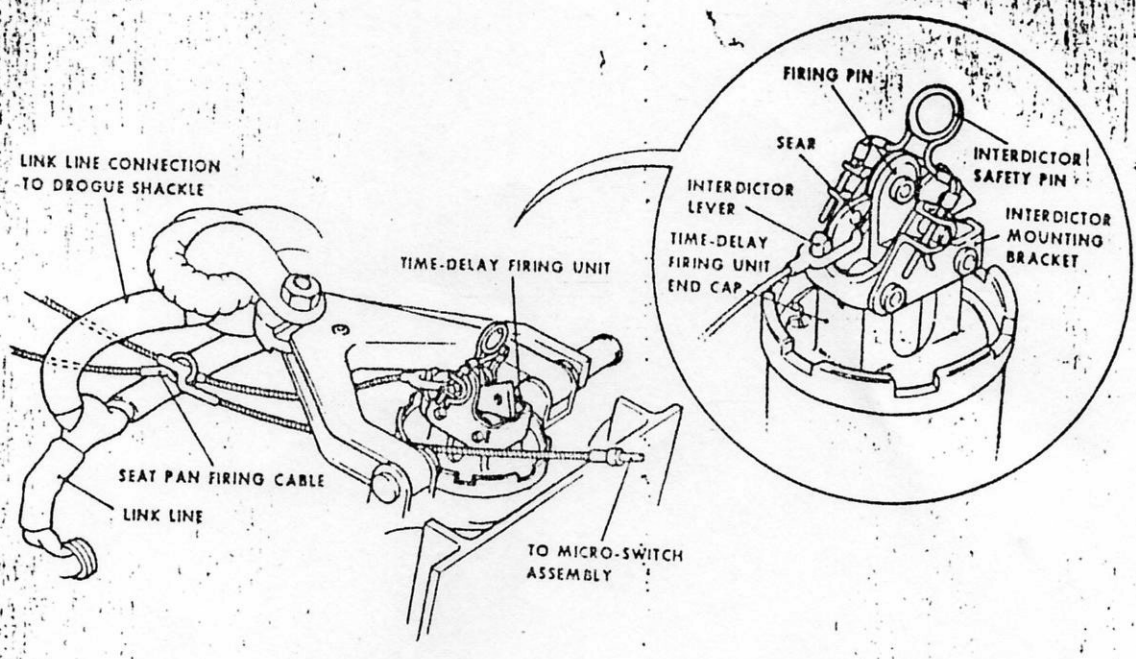


Fig 17 Routeing of firing cables (Type 2CA/2 Mk 2 and 4 seats)

(5) Route the parachute withdrawal line behind the guard on the port side of the seat structure, position the apron in the back of the seat pan and secure by inserting the lugs of the apron into their respective sticker clips.

Routeing of firing cables.

56 Fig 15 to 17 show the correct method of connecting the firing cables in the particular seat installations. It is essential that these methods are strictly observed to avoid possible malfunction of the firing mechanism.

FITTING A NEW FACE SCREEN FIRING CABLE

57 To fit a new firing cable to the face screen, proceed as follows:

(1) Place the ring of the single swaged end of the firing cable over the face screen loop followed by a new black plastic locking ring (fig 18, Action 1).

(2) Thread the free end of the cable through the face screen loop and pull tight (fig 18, Action 2).

(3) Position the back plastic locking ring as shown in fig 18, Action 3.

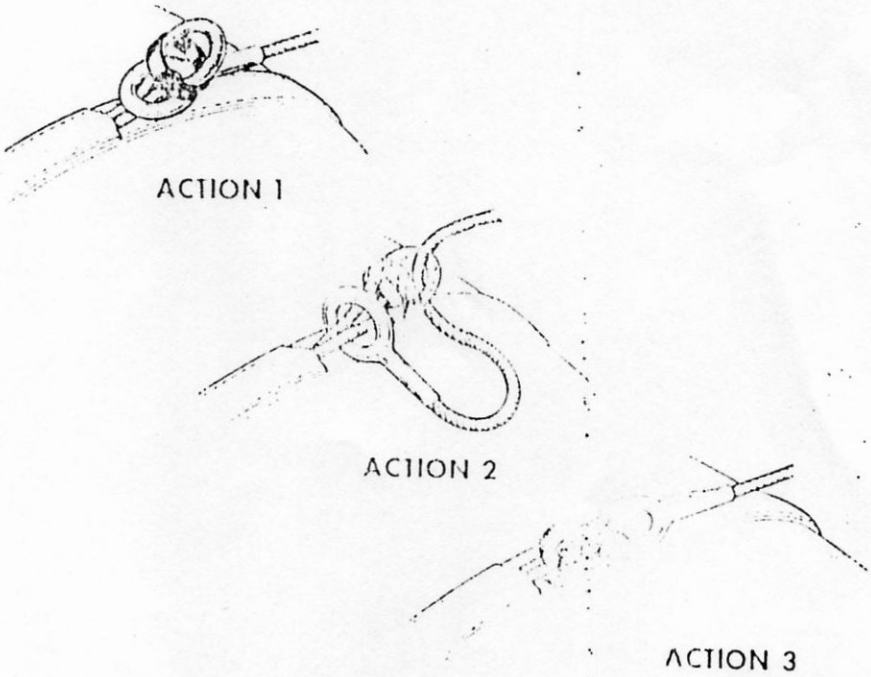


Fig 18 Fitting a new face screen firing cable

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