

## Chapter 1

(Completely revised)

### CANBERRA B. Mk. 2, B. Mk. 6 AND PR. Mk. 3

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#### Introduction

1. Canberra B Mk. 2 and B Mk. 6 aircraft carry a crew of three, each member being provided with an ejection seat. The pilot occupies the ejection seat in the front cockpit and the navigator and bomb aimer occupy side-by-side ejection seats in the rear cockpit. The Canberra PR. Mk. 3 carries a crew of two, each occupying an ejection seat; a pilot in the front cockpit and a navigator in the rear cockpit. Since the aircrew equipment assemblies in all three aircraft are identical, the following instructions will therefore apply to all crew stations.

2. This chapter is primarily concerned with the installation of the A.E.A. in the seat, strapping-in procedure and the drill to be used when leaving the aircraft after landing. A brief description of the various components of the A.E.A. and their functions are included; full details will be found in the appropriate publication, a reference to which is contained in subsequent paragraphs.

#### COMPOSITION OF THE ASSEMBLY

3. The aircrew equipment assembly for each crew member consists of the following items: -

Ejection seat	Mk. 1 CN
Safety harness	Type ZG
Parachute assembly	Seat type Mk. 11
Personal survival pack	Type M
Emergency oxygen set (in parachute pack)	Mk. 4
Flying clothing assembly	To be included later

#### EJECTION SEAT

4. Although all the Mk. 1 CN ejection seats are fitted with canopy breakers to enable ejection to be made without jettisoning the canopy beforehand, this procedure is only possible for the pilot in the front cockpit. The rear hatch is not at present suitable for ejection in this manner,

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because of possible injury, even though canopy breakers may be fitted to the seats. Until aircraft modifications are embodied, the rear hatch MUST be jettisoned before ejection. In the pilot's position in all three aircraft the control column snatch unit must be operated manually before ejection (See Pilot's Notes A.P.4326B, F and C-P.N.). Information concerning the seat will be found in A.P.4288, Vol. 1.

5. The Mk. 1 CN seat is ejected from the aircraft by a cartridge operated gun at a speed of 80 ft./sec. During ejection the seat slides on a guide rail attached to the aircraft structure.

6. The seat pan is adjustable for height by a handle on the right-hand side of the seat. The plunger in the end of the handle must be depressed before the height can be adjusted.

7. On the same side of the seat pan (mounted on the thigh guard) is the 'go-forward' release lever which, when operated, permits the occupant to lean forward without disconnecting the safety harness from the seat. When assuming the normal sitting position, the 'go-forward' mechanism is locked by its ratchet and prevents forward movement until the lever is operated again.

#### Firing handle

8. The firing handle, which projects from the front of the drogue container, has an integral face screen. Pulling this firing handle right down over the face fires the ejection gun and operates the seat immediately.

#### Leg restraint system

9. Leg restraint cords are provided to ensure that the legs are drawn back and held close to the seat pan during and after ejection. The cords pass through snubbing units in front of the seat pan and are then attached to the aircraft floor by fittings which embody shear rivets. The snubbing units allow the cords to pass freely down through the units but prevent the cords passing upwards except when released by pressing the spring button underneath each snubbing unit.

10. The leg restraint cords are threaded through rings attached to garters worn just below the knees of the occupant. The cords are then looped around the shoulder strap lugs of the safety harness at the quick-release fitting. The garters are provided with small quick-release couplings

and the rings (which are usually threaded on the leg restraint cords beforehand) have lugs which lock into the quick-release couplings and attach the rings to the garters. The rings are released by squeezing the triggers on each side of the coupling simultaneously.

#### Automatic safety harness release

11. The release is mounted on the left-hand side of the seat and is connected by a guarded cable and conduit to the safety harness quick-release fitting. The release unit contains a spring-controlled time-delay mechanism which is set in operation by the withdrawal, on ejection, of a pin connected by static line to the seat guide rail. After a predetermined delay the spring mechanism is tripped, opening the harness quick-release fitting and freeing the occupant from the seat. The automatic release mechanism does not interfere with the manual opening and closing of the quick-release fitting.

#### Sequence of events during ejection

12. The following is the normal sequence of events after the firing handle has been pulled. There is no delay between pulling the handle and firing the ejection gun. As the seat ascends the guide rail, the following sequence occurs:—

- (1) The leg restraint cords tighten until the rivets shear in the floor anchorages.
- (2) The static line on the automatic safety harness release withdraws the pin which sets the time-delay mechanism in motion. The time delay is two seconds.
- (3) The main oxygen supply hose pulls out at the aircraft bulkhead flanged fitting. The supply hose to the A.V.S. (if used) is disconnected automatically. The Mic/Tel lead disconnects at the push-pull connection.
- (4) The static line to the emergency oxygen cylinder is operated and the emergency oxygen supply is turned on.
- (5) After the ejection seat has left the aircraft another static line is operated and fires the drogue gun. This deploys the drogue which, when developed, first checks the forward speed of the seat

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and then stabilizes it in a slightly forward attitude.

- (6) Two seconds after withdrawal of the automatic safety harness release pin, the safety harness quick-release fitting opens automatically and the occupant is able to fall forward out of the seat. The main and emergency oxygen supplies are disconnected; the helmet Mic/Tel lead disconnects from the seat lead.
- (7) Separation from the seat causes the static line attached to the seat to withdraw the pin in the automatic parachute release and trip the barostatic delay mechanism.
- (8) If ejection has taken place below 13,000 ft. the parachute rip cord will be withdrawn after a delay of  $3\frac{1}{2}$  to  $4\frac{1}{2}$  sec. and the parachute will open. If above 13,000 ft. the rip cord withdrawal mechanism is checked by the barostat until the seat and occupant reach this altitude, then, after a further delay of  $3\frac{1}{2}$  to  $4\frac{1}{2}$  sec., the parachute will open. The parachute rip cord can be withdrawn manually, overriding the barostat, at any time after separation from the seat, by pulling the lower striped operating knob on the parachute harness waist belt.

#### EMERGENCY OXYGEN

13. The emergency oxygen cylinder is installed in the seat type parachute pack, but the operating cable conduit is clamped by the anchor socket to the rear of the seat. The cable, which runs through the conduit, is connected to another static line by an anchor hook so that the emergency oxygen is turned on automatically on ejection. A ball handle is incorporated in the static line assembly to turn on the emergency oxygen supply manually if required.

#### PARACHUTE ASSEMBLY

14. The seat Type Mk. 11 assembly, described in A.P.1182A, Vol. 1, incorporates a combined automatic and manual release attached to the

harness waistbelt. The manual release consists of the rip cord, terminating in a striped knob, situated at the lower part of the casing, which is pulled to release the canopy and initiate deployment; this knob is only used when the automatic release cannot be employed (manual bale-out) or if the automatic release fails after leaving the aircraft (manual separation).

15. The automatic release mechanism is set in operation by the withdrawal of a pin at the end of a static line as the occupant separates from the seat after ejection. This cable is in two sections which are coupled together at a position approximately midway between the release and the point of anchorage on the seat pan. Incorporated in the mechanism is a disconnect key which is turned to break the cable coupling and immobilise the mechanism; this key is situated under a cap on the casing above the manual operation knob. When the key is turned the static line is uncoupled and at the same time the barostatic delay device is locked, so that subsequently the parachute can only be operated manually.

#### PERSONAL SURVIVAL PACK

16. The personal survival pack, described in A.P.1182C, Vol. 1, is placed on top of the seat type parachute pack and in normal flight serves as a cushion; it is attached to the life jacket by quick-release couplings during the strapping-in procedure. A lanyard, which connects to another quick-release coupling on the life jacket, is provided to prevent the pack being lost on discarding the parachute harness after a descent.

17. The personal survival pack has a slotted hole in the centre to permit the leg loop of the parachute harness to pass through.

#### EQUIPPING THE SEAT

18. The following procedure is to be used when equipping the seat; refer to fig. 1 and 2 for detail as necessary: -

- (1) Ensure that the safety pin is in position in the ejection gun sear.
- (2) Undo the safety harness and clear the straps from the seat pan. Ensure that

the quick-release fitting is in the closed position.

- (3) Place the parachute in the seat pan and spread out the harness straps to leave the seat clear. Connect the parachute static line (on the seat) to the barostatic release operating cable at the disconnect unit. Alternatively, if the disconnect unit is already coupled, connect the static line to the seat by the eyebolt spliced on the end.
- (4) Place the personal survival pack on top of the parachute with the connecting lanyard on the right. Pull the leg loop of the parachute harness through the aperture in the centre of the survival pack.
- (5) Connect the emergency oxygen cable housing fitting in the gate clamp at the rear of the seat. The cable must lie OUTSIDE the parachute harness and INSIDE the safety harness. Connect the anchor hook to the static line-cum-manual operating cable.
- (6) Remove and retain the safety pin from the emergency oxygen cylinder.
- (7) Check that the knurled cap on the automatic harness release static line is screwed into the curved tube at the left hand rear of the seat.
- (8) Open the parachute harness straps ready for occupation of the seat; ensure that the quick-release fitting is in the locked position.
- (9) Remove the safety pin from the ejection gun sear and fit through the firing handle safety strap.

#### Connections to the aircraft

19. When the seats are installed in the aircraft and are properly equipped the following items are connected: -

- (1) *Left-hand side of the seat:* -
  - (a) Mic/Tel lead push-pull connection.
  - (b) Static line from the drogue gun.

- (c) Static line from the automatic safety harness release.

- (d) Static line from the automatic parachute release. This is connected to the left-hand side of the seat pan.

- (2) *Right-hand side of the seat:* -

- (a) Main oxygen supply hose. This is clipped to the right-hand lap strap of the safety harness.

- (b) Static line and manual control knob to the anchor hook of the emergency oxygen assembly.

- (c) A.V.S. air supply hose. (This may be fitted on either left or right-hand side according to seat position.)

- (3) *Underneath the seat:* -

- (a) Leg restraint cords.

#### STRAPPING-IN PROCEDURE

20. Strapping-in procedure is as follows: refer to fig. 3, 4 and 5 for detail as necessary: -

- (1) Check that the safety pin for the firing handle is in position.

- (2) Sit in the seat. Put on the leg restraint garters, just below each knee (if this has not already been done).

**Note . . .**

*The garters may be stitched into the flying suit, or fitted before entering the aircraft.*

- (3) Connect the personal survival pack lanyard to the life jacket quick-release coupling on the right so that the lanyard lies across the right thigh.

- (4) Connect the side quick-release couplings of the personal survival pack to the two corresponding fittings on the life jacket.

- (5) Connect the parachute harness shoulder straps to the quick-release fitting. The shoulder straps should lie under the life jacket stole.

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- (6) Pass the parachute harness leg straps through the leg loop and couple them to the quick-release fitting.
  - (7) Adjust the quick-release fitting so that it lies centrally with the waistbelt close to the body.
  - (8) Tighten the shoulder straps first so that the parachute harness quick-release fitting will lie above and clear of the safety harness quick-release fitting when this is assembled.
  - (9) Tighten the parachute harness lap straps. When tightening harness straps in general, pull on the running end with one hand, and push the standing end towards the buckle with the other hand to relieve the tension on the buckles.
  - (10) Insert the safety clip behind the disc knob of the parachute harness quick-release fitting.
  - (11) Connect the air supply hose to the air ventilated suit (if worn).
  - (12) Fasten the lap straps of the safety harness, but do not tighten.
  - (13) Thread the leg restraint cords through the quick-release coupling rings on the garters as follows: -
    - (a) Pass the cord emerging from the snubbing unit behind the left leg through the garter ring on the right leg and UNDER the right safety harness lap strap. Insert the lug of the right shoulder strap of the safety harness through the loop at the end of the cord and secure the right shoulder strap in the quick-release fitting.
    - (b) Pass the cord emerging from the snubbing unit behind the right leg through the garter ring on the left leg and UNDER the safety harness lap strap. Insert the lug of the left shoulder strap of the safety harness through the loop at the end of the cord
- and secure the left shoulder strap in the quick-release fitting.
- (14) If there is insufficient length of cord, press and hold the plunger under the snubbing unit and pull more cord through. If there is too much slack in the cord, pull back any excess through the unit towards the floor. (It is unnecessary to press the plunger in this instance).
  - (15) First tighten the safety harness lap straps, then the shoulder straps.
- Note . . .**
- Ensure that the harness quick-release fitting is as low as possible to expose the parachute harness fitting. The emergency oxygen release cable and emergency oxygen supply tube must be under the safety harness and over the parachute harness.*
- (16) Connect the oxygen connecting box to the pressure breathing waistcoat. Connect the main oxygen hose to the quick-release socket. Remove the blanking cap and couple the emergency oxygen tube to the connector.
  - (17) Connect the Mic/Tel lead.
  - (18) Check that the cap on the static line disconnect and barostat override control is in place. If the cap has been removed, try to replace it; if it cannot be refitted, the parachute assembly will not operate automatically and a new assembly is to be obtained.
  - (19) Adjust the height of the seat. Ideally, the head should be located in the centre of the headrest cushion.
  - (20) Stretch the arms upwards with both hands together to check that the firing handle is within easy reach.
  - (21) Ensure the chin straps of both helmets are fastened, fit the oxygen mask and perform pre-flight oxygen checks.

**Note . . .**

*If the chin straps are not fastened the helmets may be wrenched off during ejection.*

- (22) Remove the safety pin from the firing handle and place it in its stowage.

**EMERGENCIES**

21. For drill and procedure to be taken in emergencies refer to Pilot's Notes, A.P.4326B, F and C - P.N.

**VACATING THE SEAT AFTER LANDING**

22. (1) Remove the firing handle safety pin from its stowage and fit through the safety strap. (Assistance should be obtained, wherever possible, from a

member of the ground crew).

- (2) Disconnect the main and emergency oxygen supply and the Mic/Tel lead.
- (3) Disconnect the air ventilated suit (if worn).
- (4) Release the safety harness; pull out the safety clip and release the parachute harness.
- (5) Disconnect the personal survival pack from the life jacket and allow the lanyard to drape over the right-hand side of the seat pan.
- (6) Remove the leg restraint cords.
- (7) Leave the seat.

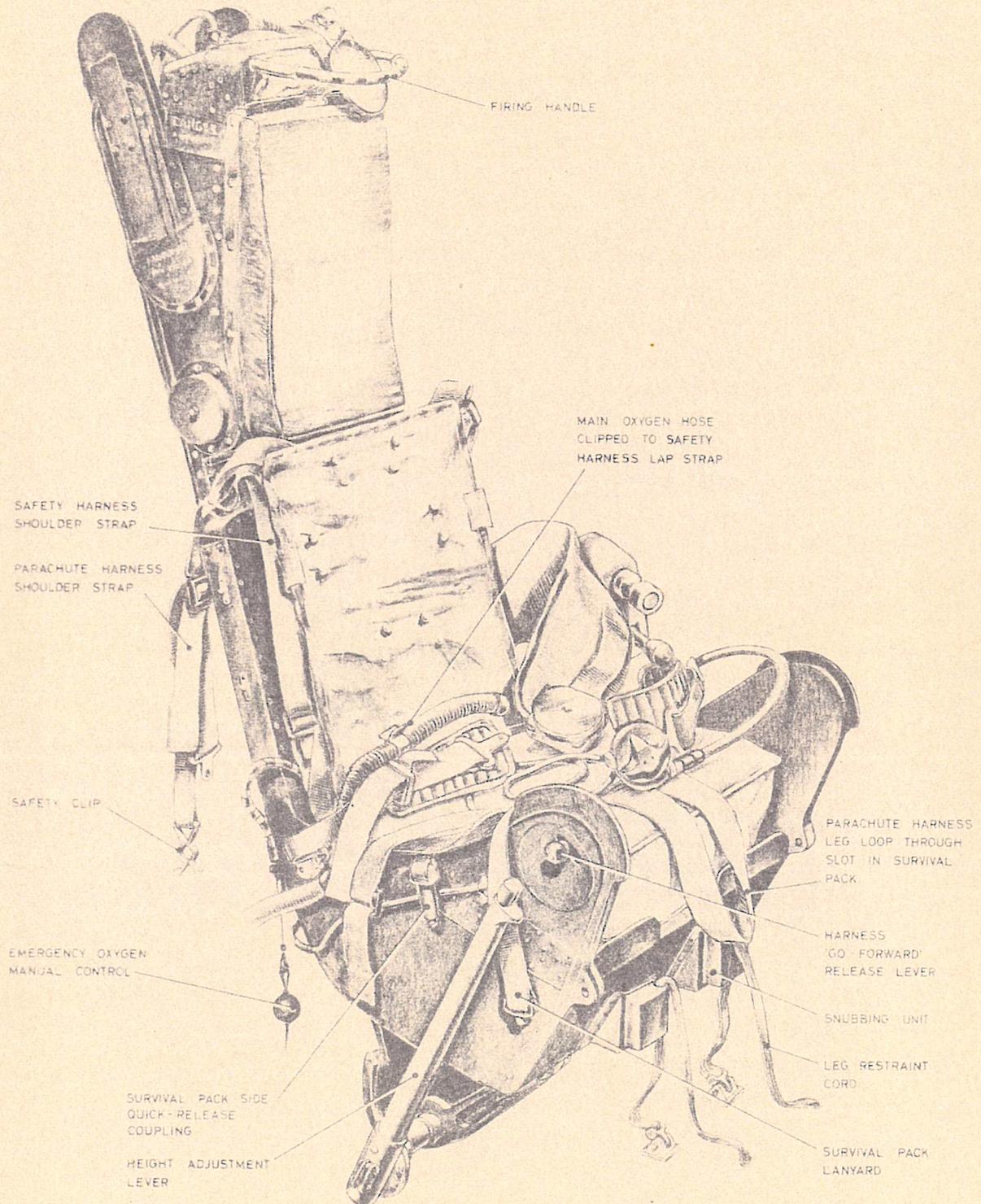


Fig. 1 The seat equipped (1)

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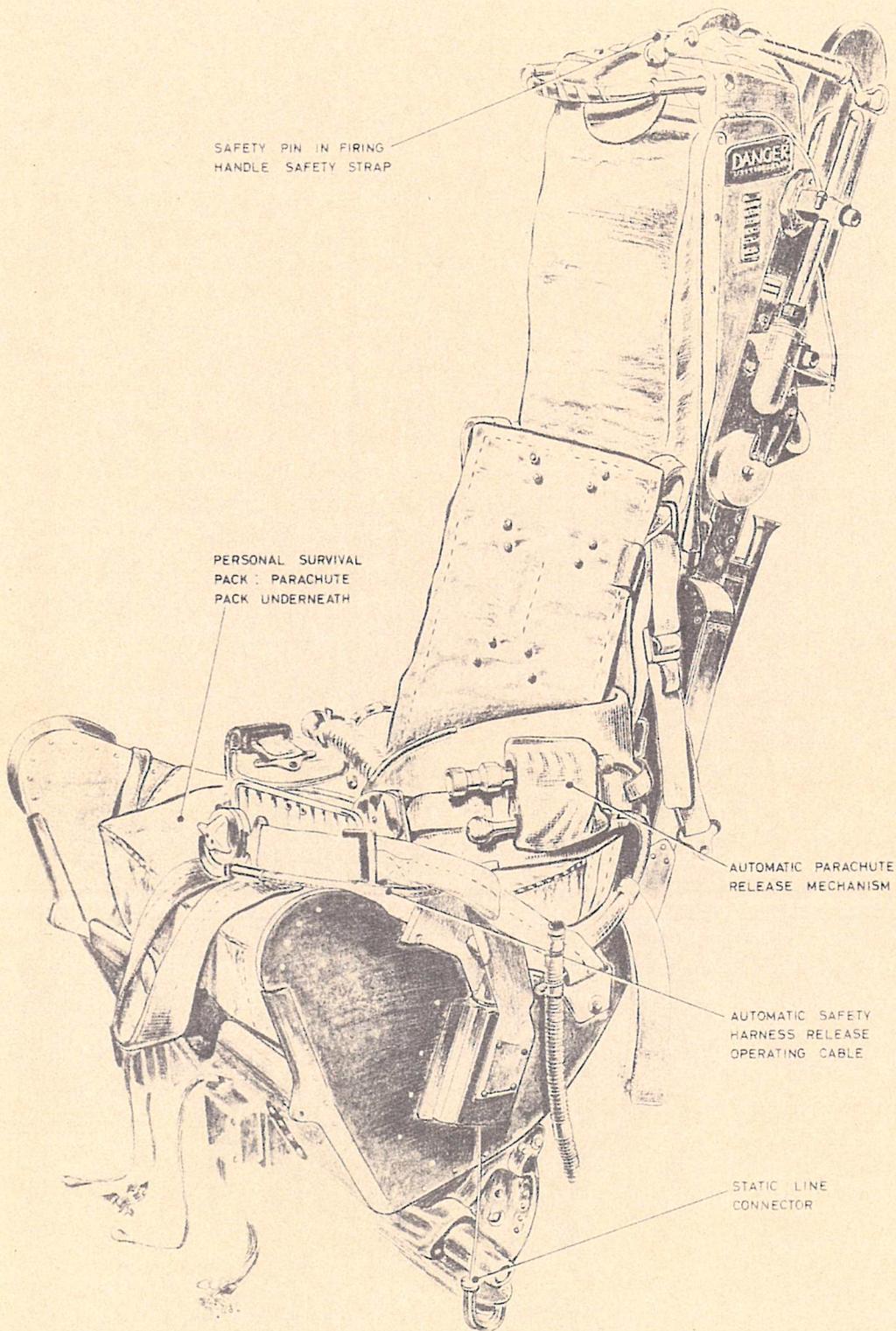


Fig. 2 The seat equipped (2)

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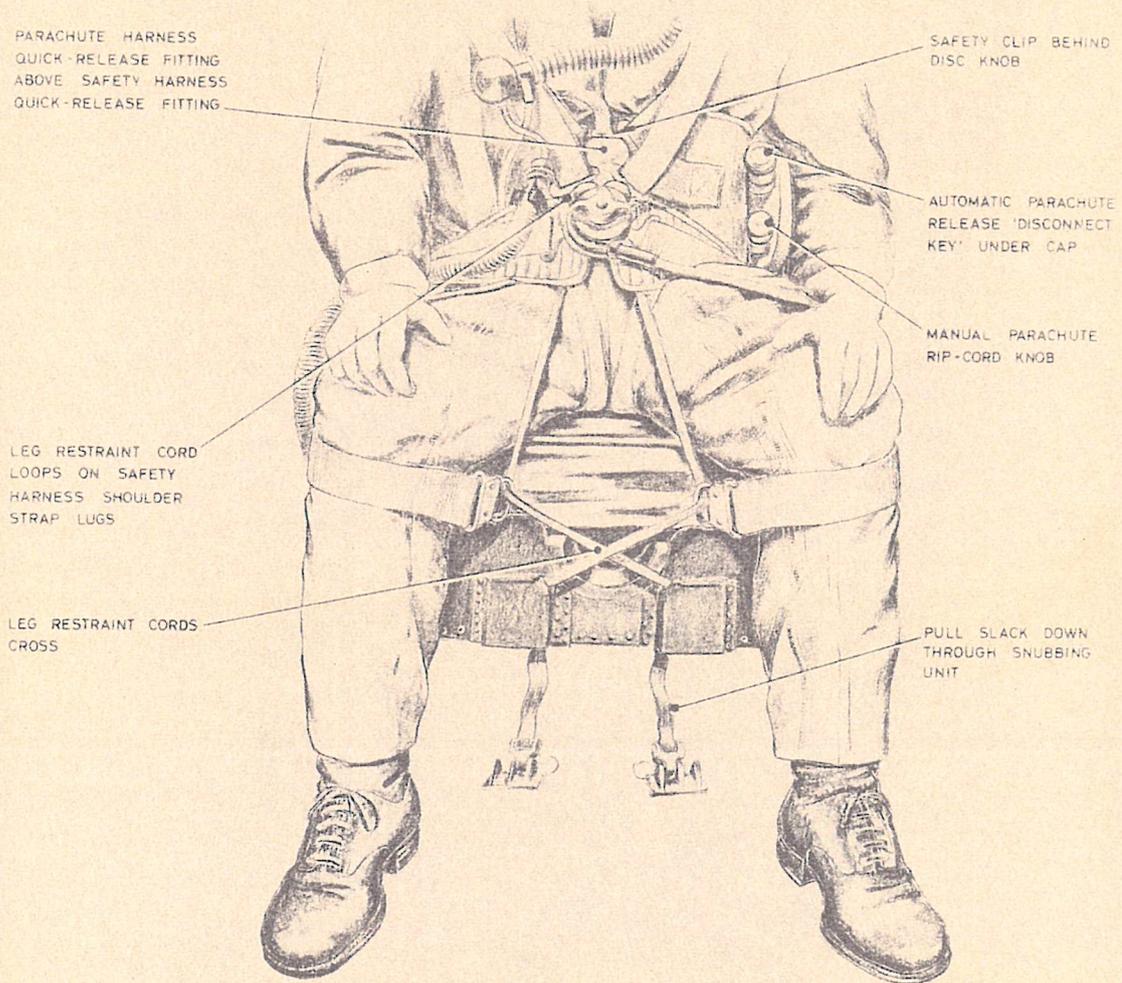


Fig. 3 Arrangement of leg restraint cords

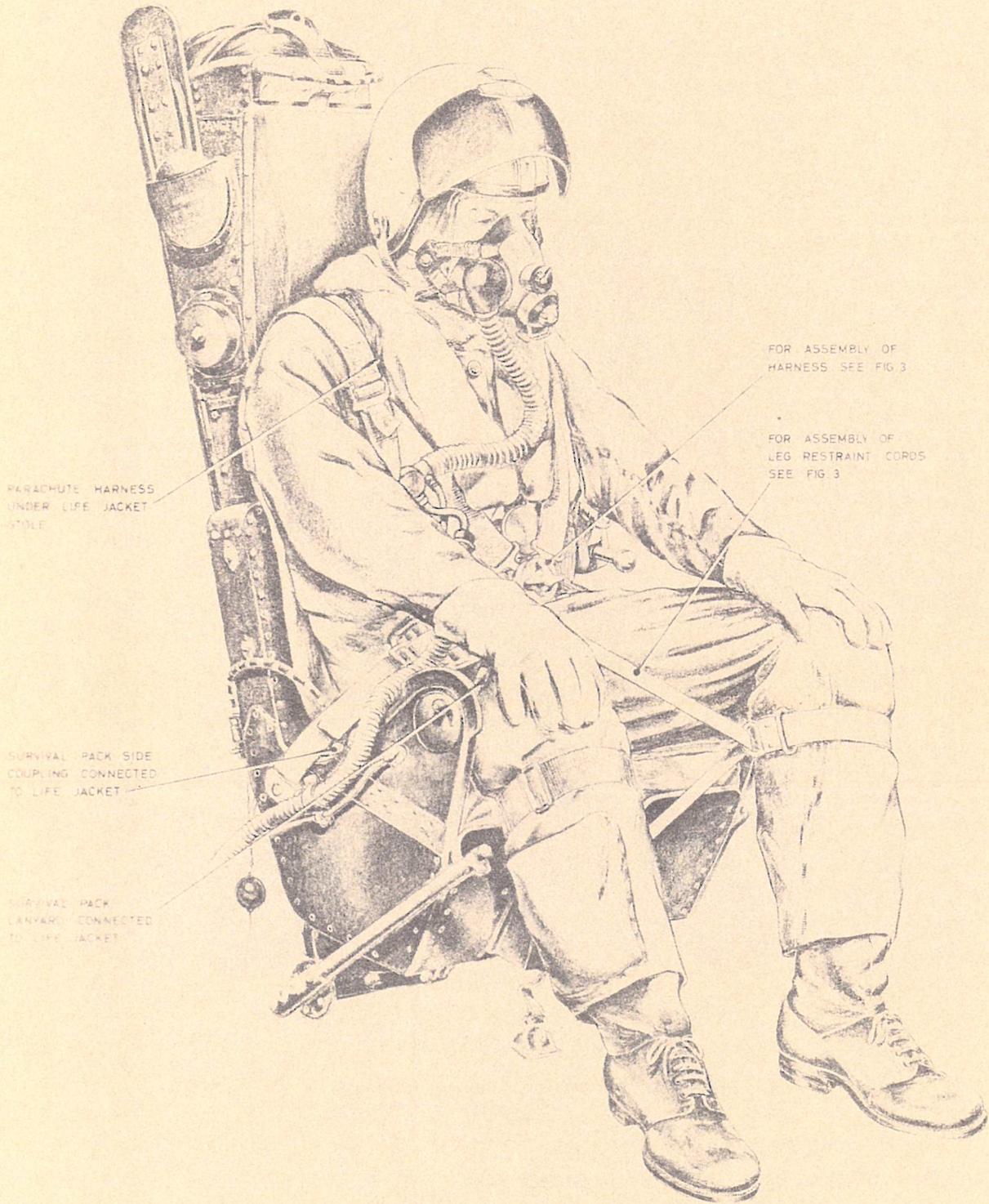


Fig. 4 The seat occupied (1)

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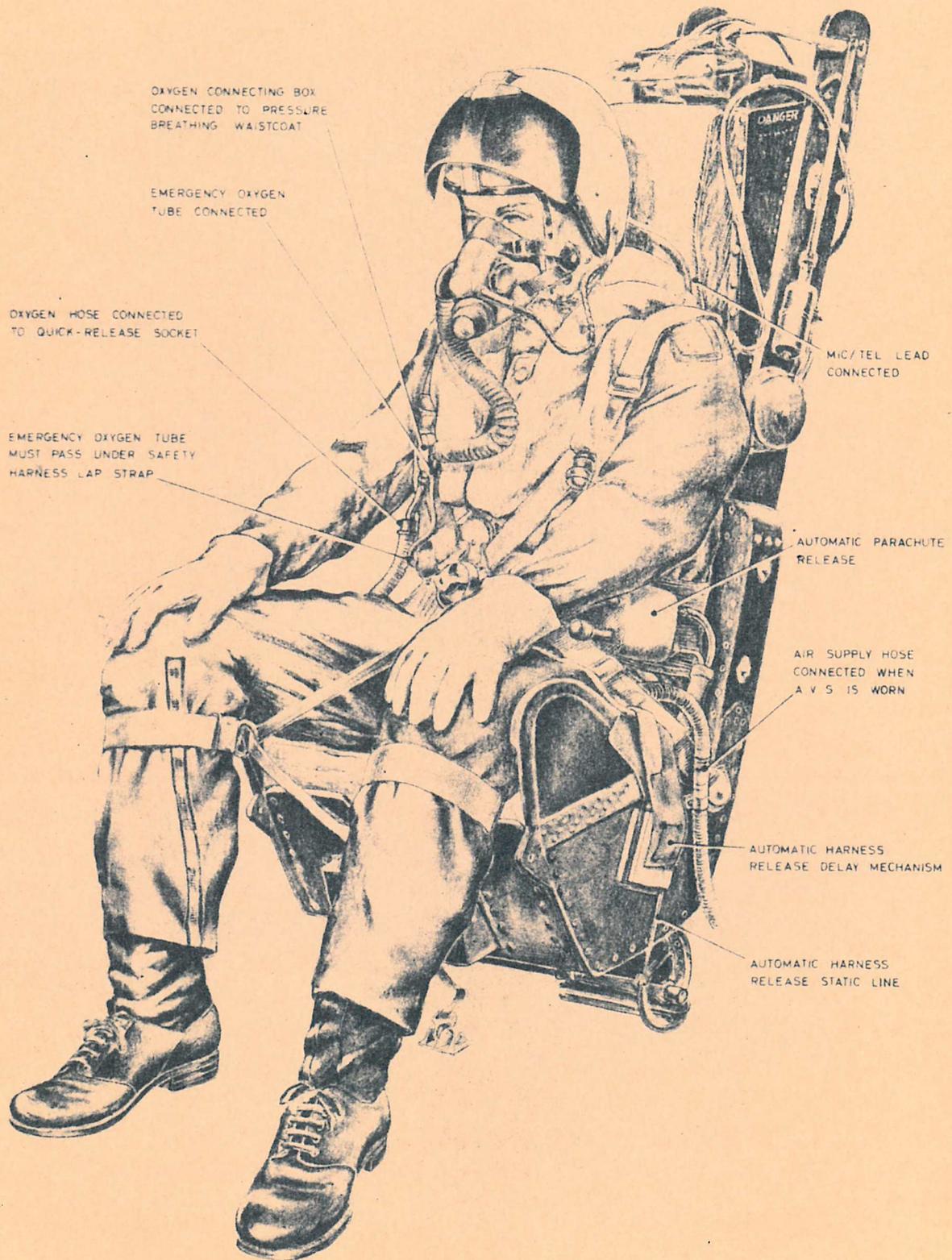


Fig. 5 The seat occupied (2)

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