Chapter 1

GNAT T. MK. 1

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Introduction

1. This chapter is primarily concerned with the installation of equipment in the ejection seat, preparation by the pilot for flying (dressing and functional testing of flying clothing), strapping-in procedure and the drill to be used when leaving the aircraft after landing. A brief description of various items of the A.E.A. is included; full details of these items will be found in the appropriate publications, references to which are contained in para. 12 of Appendix 1.

COMPOSITION OF THE ASSEMBLY

2. The aircrew equipment assembly for the Gnat T. Mk. 1 consists of the following items.—

Ejection seat	Mk. 4GT1 (front seat) Mk. 4GT2 (rear seat)
Parachute assembly	Back type, Mk. 35
Personal survival pack	Type X
Emergency oxygen set	Mk. 4B
Flying clothing assembly	Refer to Appendix 1

Note . . .

The main differences between the Mk. 4GT1 and Mk. 4GT2 seats are in the length of the canopy breaker and the length of the leg restraint straps; the straps for the 4GT2 seat are slightly longer.

The Mk. 4 GT ejection seat and associated equipment

3. The ejection gun of the Mk. 4 GT seat comprises a single combustion chamber with two cylinder and piston assemblies, the cylinders also serving as the side structural members of the seat. The gases resulting from the firing of the cartridge in the combustion chamber are ducted, via twin tubes, to the upper ends of the

cylinders where they react upon the fixed piston assemblies and eject the seat from the aircraft at a speed of 80 ft./sec. During ejection, the seat slides in four groups of small rollers attached to the aircraft structure, the rollers bearing on the ejection gun outer cylinder tubes.

4. The parachute assembly incorporates a combined safety and parachute harness which is attached to the seat at four quick-release points, one situated centrally at the top of the seat pan assembly, one in each lower rear corner of the seat pan and one in the base of the seat pan below the alternative firing handle. The harness may be released from these points automatically after ejection or by operation of the manual separation lever at the left-hand side of the seat pan. To enable the occupant to lean forward in his seat, a 'go-forward' lever is fitted to the forward left-hand side of the seat pan; the lever must be depressed to release the harness reel lock.

5. The parachute assembly is equipped with both manual and automatic release devices, the latter being barometrically controlled. A dual time-release mechanism is employed to effect automatic separation from the seat. If the aircraft speed at the time of ejection exceeds 285 knots a Q-sensing unit acts upon the release unit which is automatically switched over to the long delay position (1.4 sec. to 1.6 sec.). At speeds below 285 knots separation occurs almost immediately after ejection. In either event separation from the seat occurs regardless of the height at which ejection takes place. At heights exceeding 10 000 ft. a stabilizer parachute will be deployed from the pack of the parachute assembly to prevent tumbling and spinning until that height is reached; two seconds later, the barometric device contained within the parachute assembly is operated and assists in the automatic deployment of the main canopy If, however, ejection occurs below 10 000 ft., automatic deployment of the main canopy will occur approximately two seconds after ejection. A manual D-ring handle is fitted to the left waist-band of the harness for use if the automatic deployment device fails to function. Provided the aircraft speed exceeds 90 knots and the aircraft flight path is parallel to the ground, the seat may be used for low level ejection in accordance with the instructions in A.P.4781A – P.N

6. Two firing handles are fitted to each ejection seat. The main handle, which has an integral face screen, projects from the forward upper edge of the headrest; the alternative handle is partially recessed into the top front edge of the seat pan and is intended for use only when the occupant is unable to reach the main firing handle, e.g. when subjected to high 'G' forces. A firing unit safety lock is controlled by a lever on the underside of the headrest structure box; when the lever is facing forward, the firing mechanism is locked, swivelling the lever to starboard releases the lock and prepares the mechanism for firing. An interconnection between the main firing handle and the hood jettison unit ensures that when the main firing handle is pulled, the initial movement causes the hood to be jettisoned; further movement of the handle fires the ejection cartridge. As the alternative firing handle is NOT connected to the hood jettison unit, it is necessary to use the separate hood jettison handle or to eject through the hood when the alternative firing handle is to be used.

7. Leg restraint straps fitted through snubbing units under the seat pan ensure that the occupant's legs are drawn back to the seat pan and restrained there during ejection, thereby reducing the risk of injury. An interconnection between the straps and the harness lock release mechanism ensures that the straps are released from the legs during separation from the seat.

8. Seat height adjustment is controlled by a spring-loaded lever on the right-hand side of the seat pan, the lever being raised to disengage the locking plungers.

9. An emergency supply of oxygen is carried in a cylinder in the parachute pack. Its primary function is to provide oxygen during a descent subsequent to a high-altitude ejection and, to this end, provision is made for the supply to be automatically turned on during ejection. The secondary purpose of the emergency supply is to provide the occupant with sufficient oxygen to enable him to descend safely following failure of the main oxygen system; in these circumstances, the supply must be operated manually by pulling the striped knob on the right waistband of the combined harness. The emergency oxygen supply will last for approximately 10 minutes.

10. An aircraft services connector is fitted near the right-hand side of the seat and forms a break-point for the anti 'G' suit air supply hose,

the main oxygen hose and the Mic/Tel lead during ejection.

11. The personal survival pack (P S.P) is housed in the seat pan and is connected to the combined harness by two side quick-release couplings. During the parachute descent, these couplings are released and the pack is then suspended from the wearer by a lowering line connected to the life jacket which pays out from its satchel as the pack falls.

12. A full description of the Mk. 4GT ejection seat will be found in A.P.4288, Vol. 1, information concerning the Mk. 35 parachute assembly and the Type X personal survival pack will be found in A.P.1182A, Vol. 1, and A.P 1182C, respectively

Connections to the aircraft

13. On a fully equipped seat, the following items are connected to the airframe structure: –

(1) *Right-hand side of seat:* –

(a) Main oxygen supply hose and Mic/Tel.

(b) Anti 'G' suit air supply hose.

(c) Static line from emergency oxygen cylinder operating head.

(2) *Rear of seat.* –

(a) Time-release mechanism arming cable.

(3) *Underside of seat pan:* –

(a) Leg restraint straps.

EQUIPPING THE SEAT

14. Before equipping the seat, ensure that the firing unit safety lock is set to the SAFE position. The following procedure is to be used when installing the equipment in the seat (refer to fig. 1 and 2): –

(1) Ensure that the seat pan is clean. The harness leg and lap straps are not attached to the parachute assembly at this stage and must be clipped to the release links in the lower rear corners of the seat pan. Fit the parachute pack into the seat pan making sure that the lower edge of the pack fits behind the retaining lip at the base of the pan.

(2) Ease the top of the parachute pack forward and connect the barometric release mechanism arming cable.

(3) Push the parachute pack into the seat pan and connect the harness lower attachments to the slotted fittings in the lower rear corners of the seat pan. Connect the harness shoulder attachments and the yoke restraining cable to the harness yoke.

(4) Fit the P S.P into the seat pan and connect the side quick-release couplings to the harness. Check that the exposed length of lowering line is connected to the press fastener on the side flap.

(5) Fit the emergency oxygen cylinder operating cable housing into the anchor socket on the right-hand side of the seat pan and connect the cable to the static line.

(6) Connect the anti 'G' suit air supply hose to the aircraft services connector.

(7) Connect the oxy-mic-tel connector to the aircraft services connector.

(8) Place the shoulder strap lugs on the stowage hooks located on the headrest box; stow the oxy-mic-tel chest connector in the stowage provided on the starboard side of the cockpit and arrange the remainder of the harness straps neatly about the seat to receive the occupant.

(9) Adjust the length of the leg restraint straps between the floor anchorages and snubbing units under the seat pan to (a) front seat 6½ in. and (b) rear seat 7½ in.

Note . .

This adjustment may be made before the seat is installed if more convenient.

STRAPPING-IN PROCEDURE

15. The strapping-in procedure is as follows (refer to fig. 3 and 4): –

(1) Check that the firing unit safety lock is set to the SAFE position and the green indicator pin is protruding.

(2) Sit in the seat and connect the P S.P lowering line to the lifejacket.

(3) Remove the blanking plug from the anti 'G' suit air supply hose and connect the hose to the suit.

(4) Connect the left-hand leg restraint strap quick-release fitting to the right-hand leg restraint garter; connect the right-hand leg restraint strap to the left-hand leg restraint garter ensuring that it does not pass through the loop formed by the left-hand strap.

(5) Connect the negative 'G' restraining strap to the harness quick-release fitting and fasten the centralising strap, maintaining the quick-release fitting in a central position against the body

(6) Pull up the leg straps between the legs. Pass the left lap strap through the square link on the left leg strap; pass the left shoulder strap lug through the link of the left lap strap (from the outside inwards) and insert the lug in the harness quick-release fitting. Repeat for the right-hand straps, noting that both the shoulder strap lug and the lug of the centralising strap occupy the same aperture of the inertia-proof quick-release fitting.

(7) Tighten the harness shoulder straps followed by the lap straps, ensuring that the shoulder straps pass under the folds of the life jacket stole and the negative 'G' strap is tight.

(8) Put on the flying and protective helmets and fasten the chin straps. If the straps are not fastened, the helmets and oxygen mask may be wrenched off during ejection with the consequent loss of vital oxygen at high altitude.

(9) Connect the oxygen mask hose to the oxy-mic-tel connector.

(10) The ground crew member assisting with the strapping-in should then move the firing unit safety lock to the FIRING position. If no ground-crew member is available, the occupant MUST operate the lock before entering the seat.

EMERGENCIES

16. Instructions for dealing with emergencies are contained in Pilot's Notes, A.P.4781A – P.N.

LEAVING THE AIRCRAFT AFTER LANDING

17 When leaving the aircraft after landing, the following procedure is to be adopted: –

(1) Disconnect the oxygen mask hose from the oxy-mic-tel connector.

(2) Operate the harness quick-release fitting and free the straps.

(3) Disconnect the P.S.P lowering line from the life jacket.

(4) Disconnect the anti 'G' suit air supply hose from the suit and insert the blanking plug.

(5) Release the leg restraint straps from the leg restraint garters.

(6) Vacate the aircraft.

(7) The ground crew member moves the firing unit safety lock to the SAFE position, if no ground crew member is available the aircrew member MUST make the seat safe before leaving the aircraft.

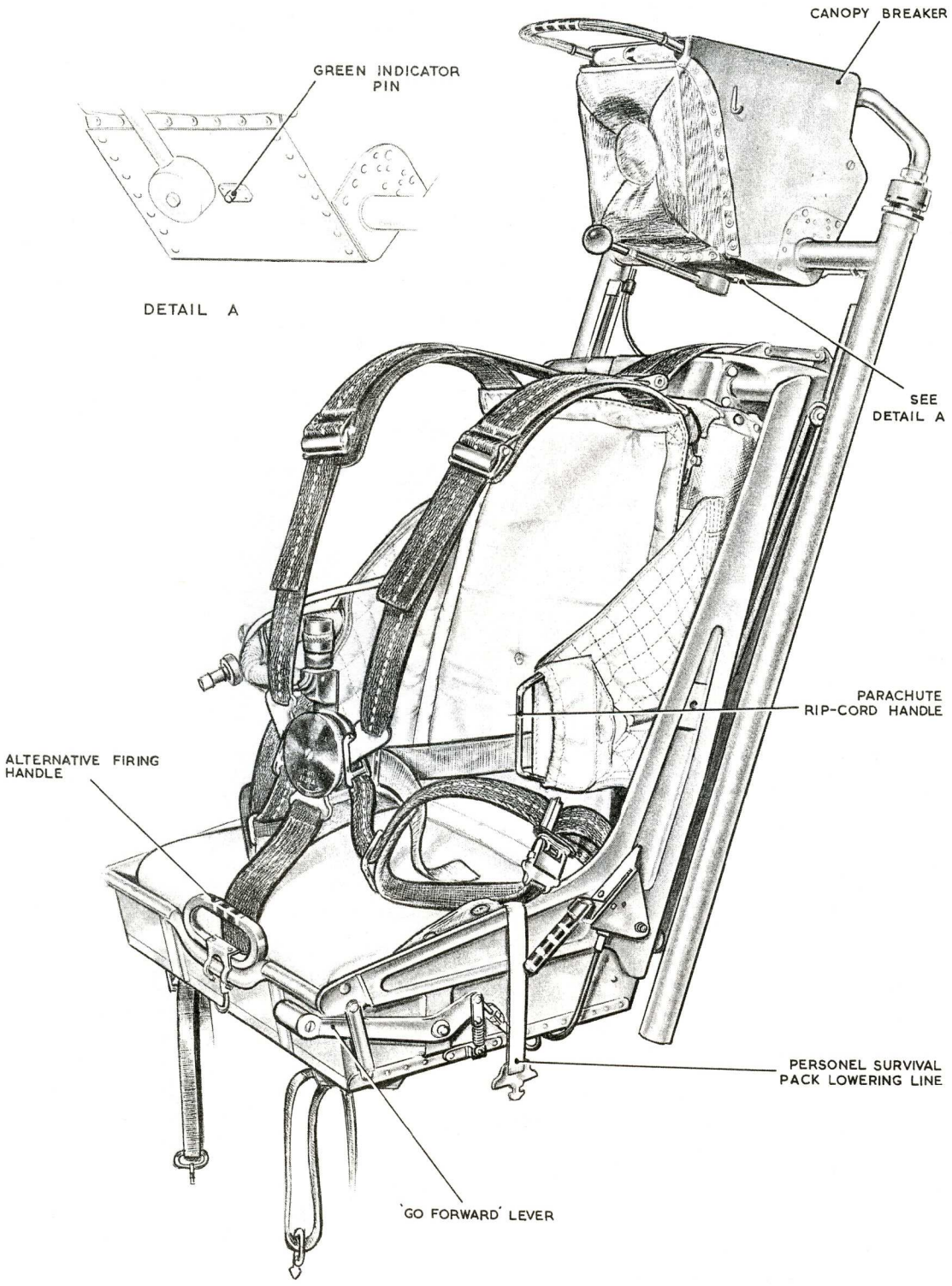

Fig. 1 The seat equipped (1)

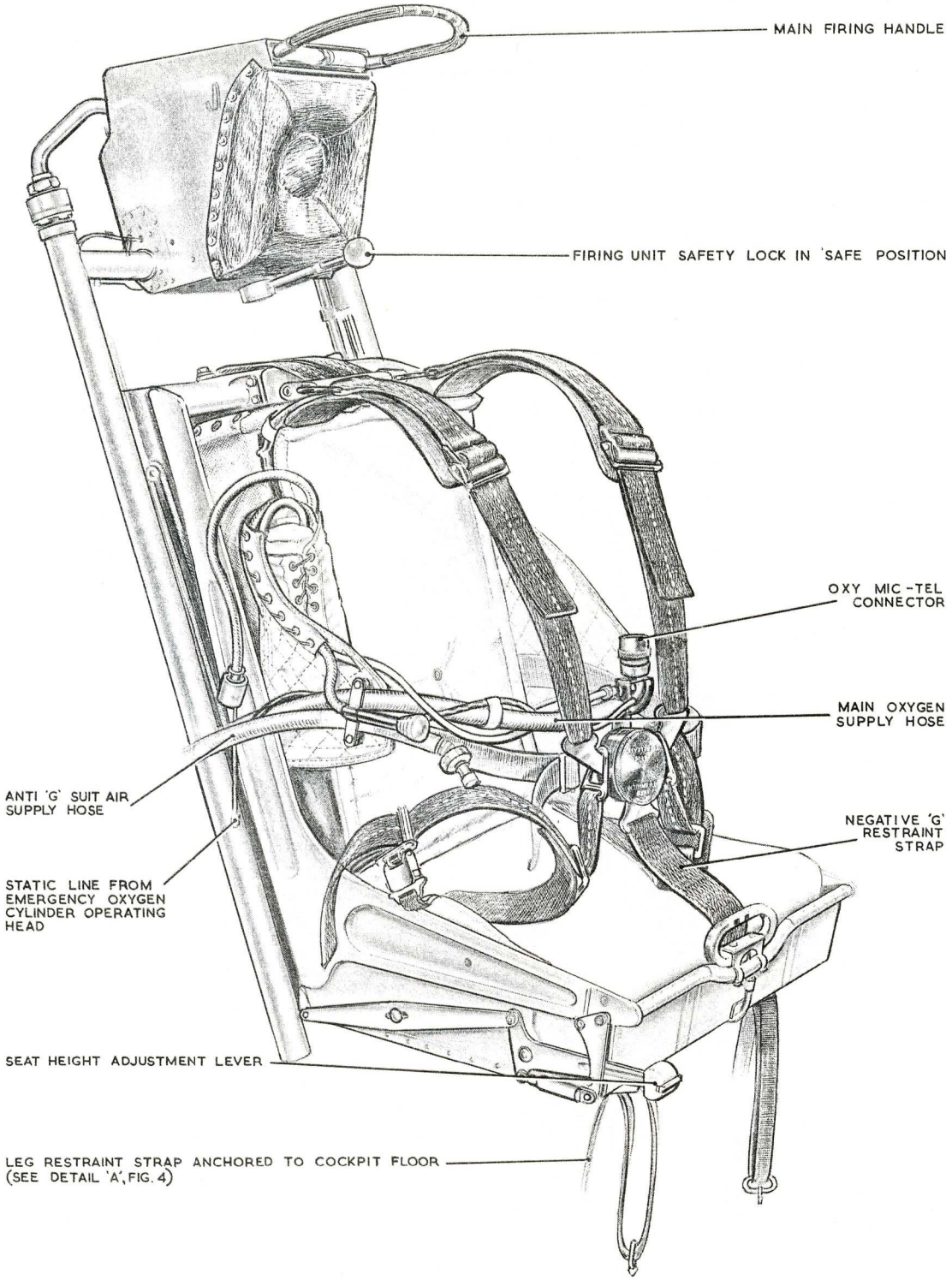

Fig. 2. The seat equipped (2)

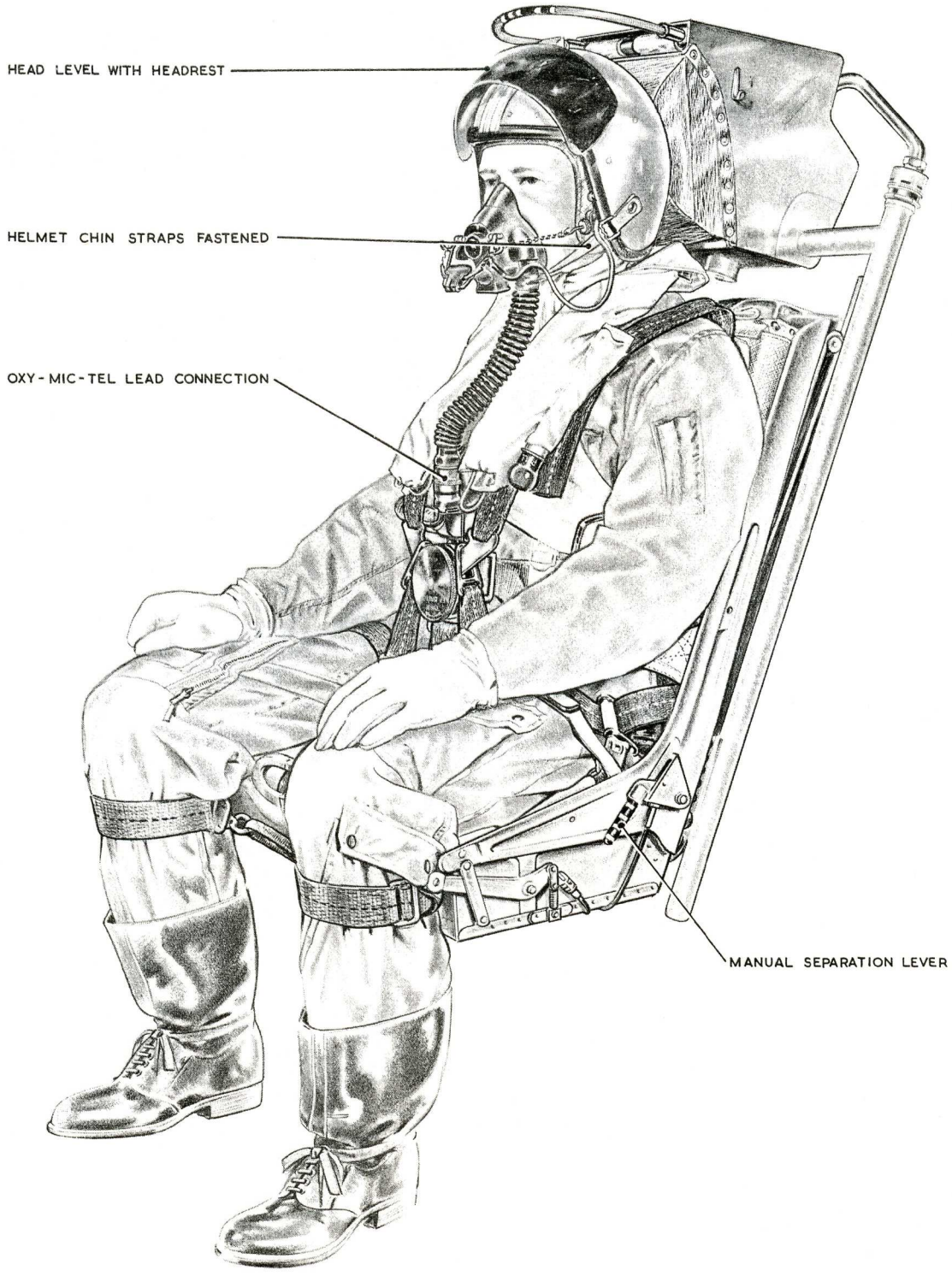

Fig. 3. The seat occupied (1)

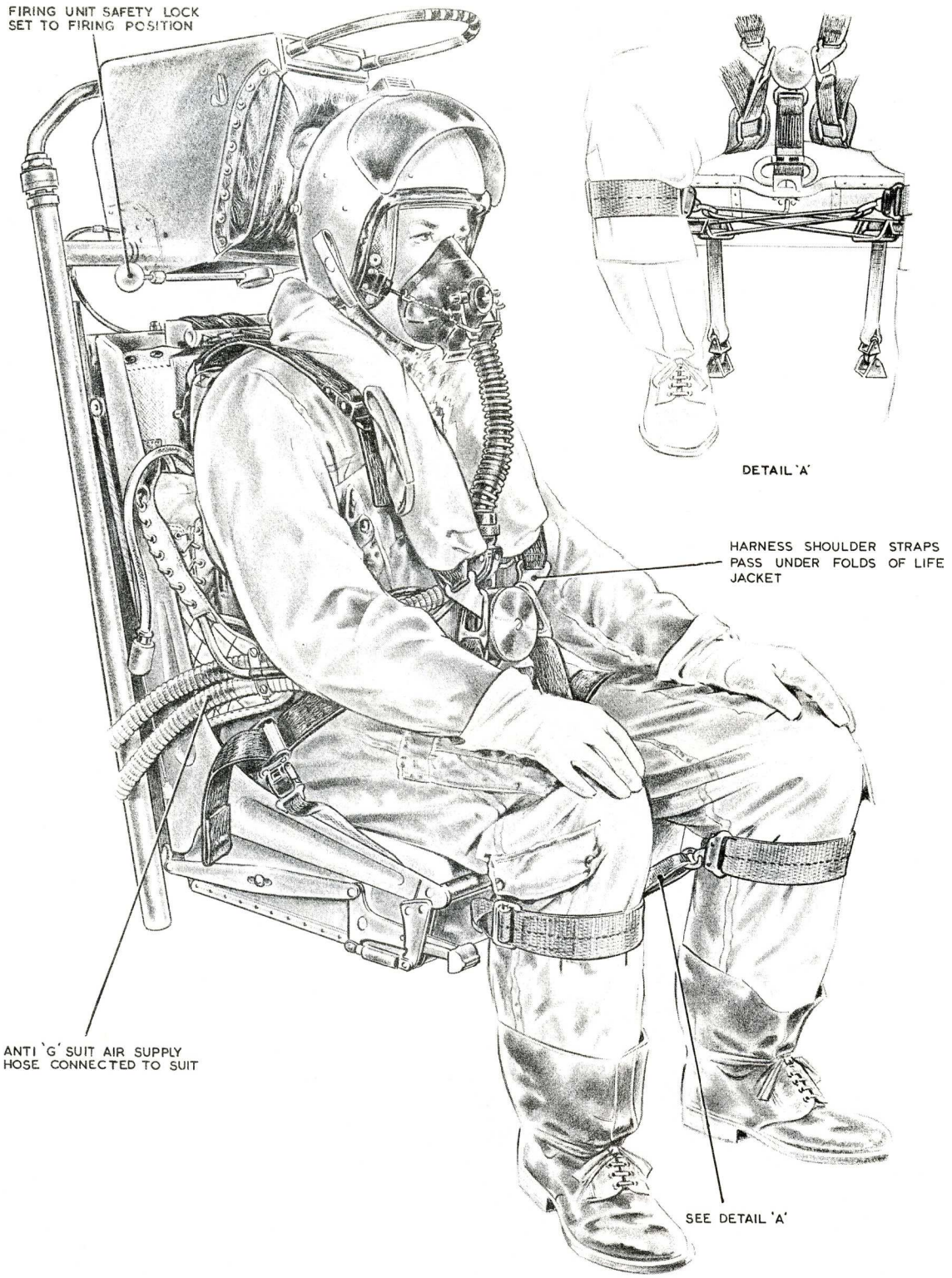

Fig. 4. The seat occupied (2)

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