Chapter 2

EJECTION SEAT, Mk. 2F
(VENOM AIRCRAFT)

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LIST OF ILLUSTRATIONS

Introduction

1. The Mk. 2F ejection seat (Stores Ref. 27L/50005) embodies the following items of standard equipment:—

(1) Type 2 ejection gun

(2) Type 2 drogue gun

(3) Barostatic time-release unit

(4) Duplex drogue and apron.

GENERAL DESCRIPTION

2. The seat structure (*fig.* 1), complete with seat pan, slides during ejection on four rollers in a guide rail bolted to the aircraft structure. It is propelled by the cartridge-operated ejection gun located within the hollow guide rail.

3. The ejection gun is fired by the action of pulling out a large, horizontal handle, coloured red, immediately above the headrest pad. This handle draws out from the headrest a flexible screen which covers the occupant's face and protects it from the effects of the airstream. It also holds his head against the headrest pad and prevents it from jerking forward during ejection. A restraining plate is incorporated to prevent the face screen from being sucked out of its compartment by the airstream. Attached to the screen is a cable which is connected to a sear in the firing body of the ejection gun. When the screen is pulled out and right down over the face, the cable withdraws the sear and the gun is fired. The face screen and firing cable are so proportioned that the gun is fired whether the seat occupant is wearing a protective helmet or not.

4. The seat pan is provided with thigh guards and accommodates a K dinghy pack, Type J. It can be adjusted for height by means of a hinged handle on the starboard side of the seat structure. The seat pan moves relative to the headrest and thus can 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.

5. A Mk. 8 back-type parachute is carried and supported in a metal container hinged at its lower edge to the seat pan and attached at its upper edge to the seat frame by telescopic radius arms. A back pad fits into the angle made by the container and the back of the seat pan. The dinghy pack, parachute and back pad are all attached to the parachute harness.

6. Type ZF safety harness is provided and has the two shoulder straps attached to the parachute container at the radius arms. The arms may be freed in flight by the movement of a lever projecting from the starboard thigh guard, thus permitting the occupant to lean forward when required. The arms can also be locked in intermediate positions.

7. The automatic system comprises a barostatic control unit, which controls the opening of a scissor shackle at the top of the seat structure, and the operation of the safety harness quick-release fitting. An apron, to which the parachute withdrawal line is attached, is provided to pitch the occupant forward and open his parachute.

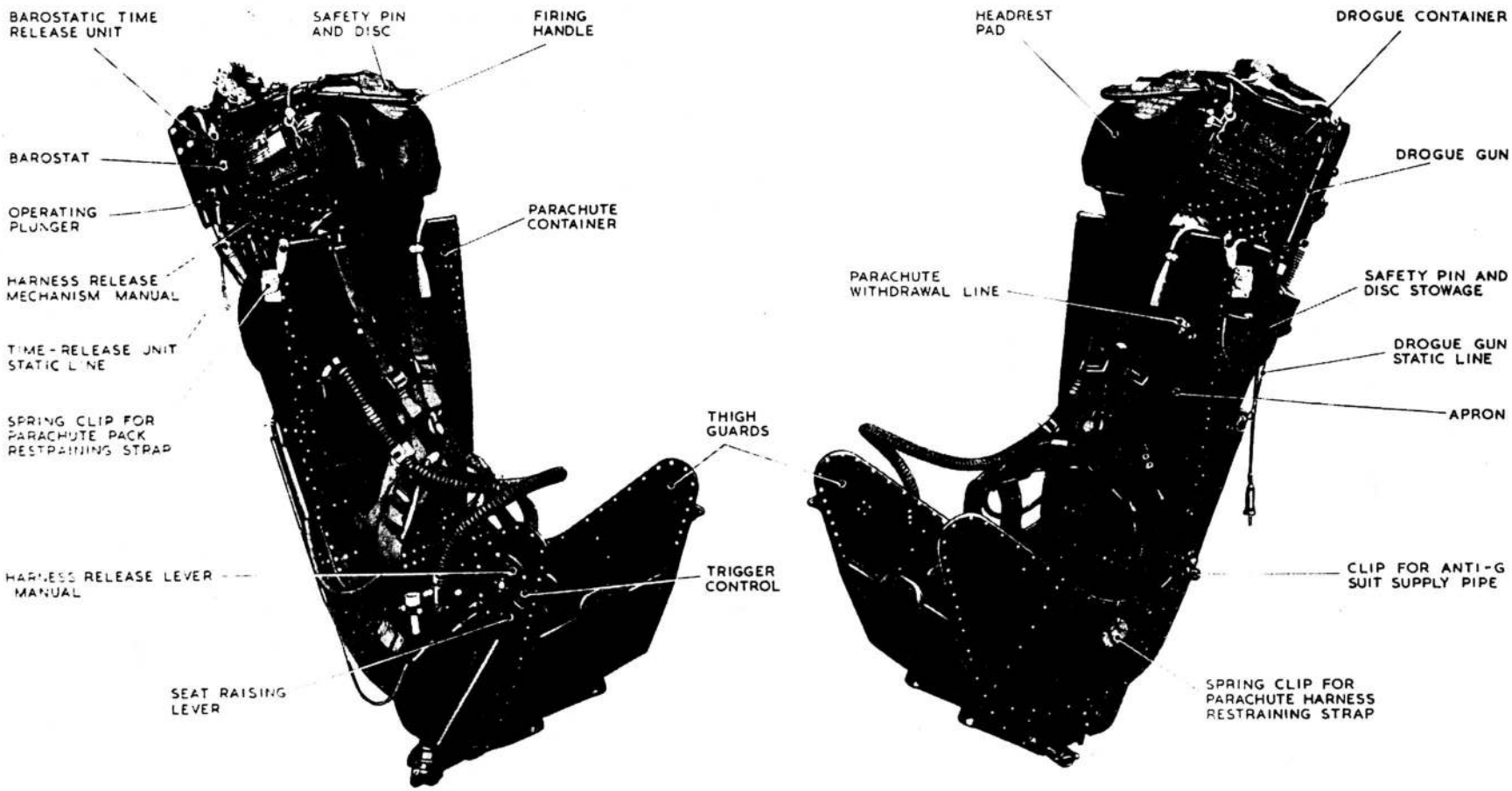

Fig. 1. Mk. 2F ejection seat

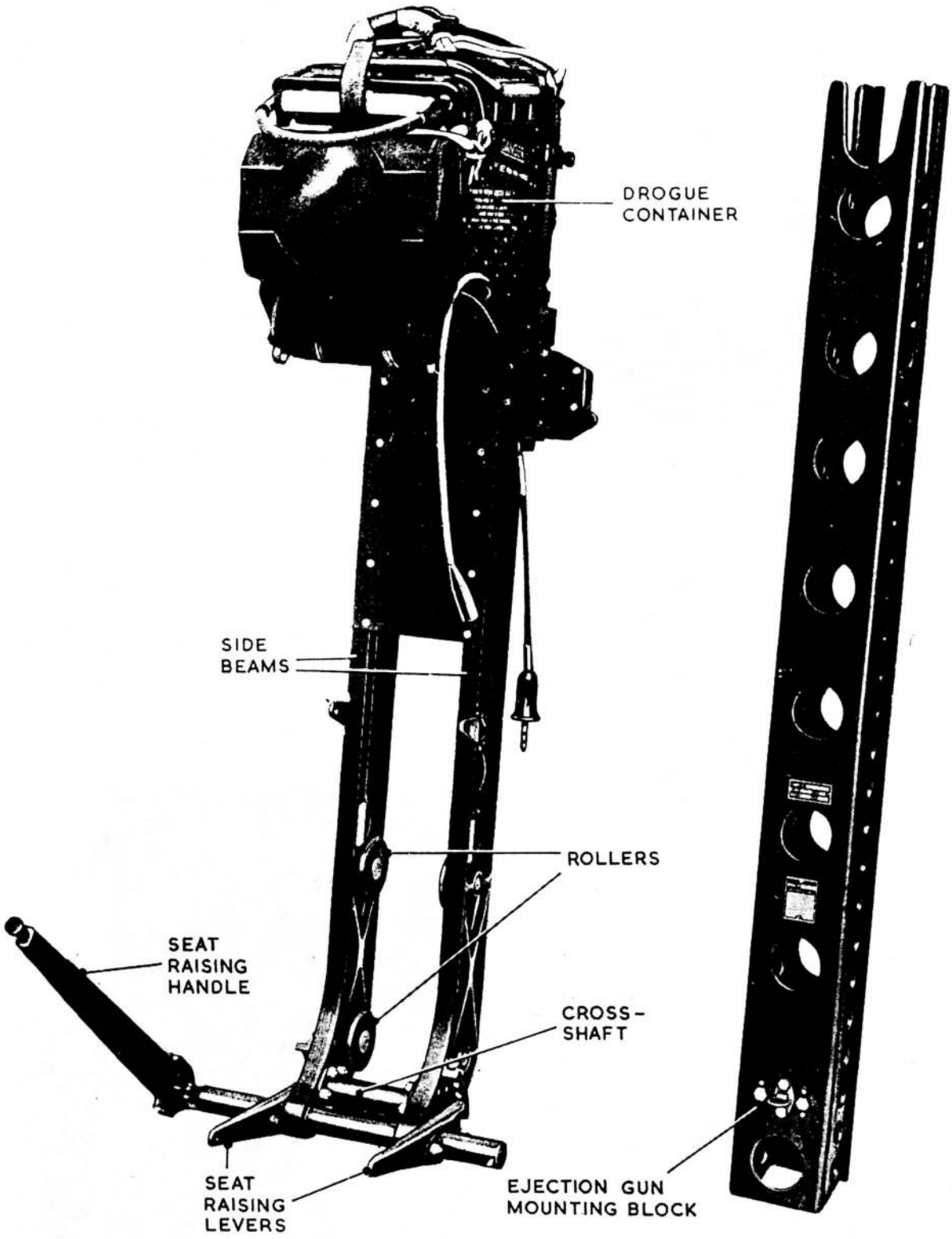

Fig. 2. Seat structure and guide rail

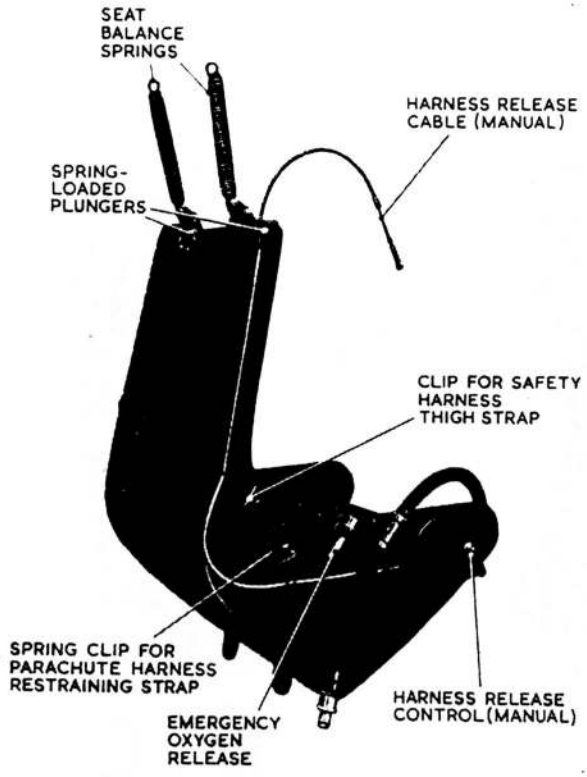

Fig. 3. Seat pan

Quick-release connections

8. When the seat is ejected, the aircraft oxygen and intercom. services disengage automatically at the quick-release connections. Further quick-release connections are provided for disengaging these services when the occupant leaves the seat subsequent to ejection. Quick-release connections are also provided for the emergency oxygen system: one to operate the emergency oxygen bottle on ejection and then disengage, and another to enable the oxygen mask to be disconnected from the oxygen bottle in the dinghy pack. The latter action is not automatic.

afety precautions

9. A fabric strap is attached to the front edge of the drogue container. When this strap is passed through the firing handle and secured to the lugs below the face screen slot by the spring safety pin provided, the face screen is locked against the possibility of withdrawal. A warning disc is attached to the safety pin. Before flight, this pin must be withdrawn by the pilot and stowed, with the warning disc, in the stowage provided on the left-hand side of the parachute container. On leaving the aircraft, the pilot must replace the safety pin to lock the firing handle.

10. Before any work is done in the aircraft cockpit, the safety pin must be withdrawn from the face screen lock and inserted in the hole in the sear at the top of the ejection gun in accordance with A.M.O. A.284/50 as amended.

11. A rivet is fitted to the front portion of the firing sear to prevent it being pulled backwards nd so firing the ejection gun.

SEAT STRUCTURE

12. The seat structure (*fig.* 2) is made 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, and at the bottom by a distance tube through which passes the countershaft carrying the seat raising levers and handle.

13. 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 the piston tube emerges from the cylinder tube at the end of the ejection stroke.

14. The seat pan (*fig.* 3) is supported on the seat raising levers and restrained at its upper corners by two blocks which slide in guides machined in the side beams. The sides of the pan are shaped to form thigh guards which both restrain the occupant's knees from contact with the aircraft structure during ejection and also prevent his legs from being injured by being blown apart by the air pressure on emerging from the cockpit. The thigh straps of the safety harness are attached to the seat pan. The weight of the occupant is counterbalanced by two direct acting compression springs (*fig.* 4).

15. The seat raising mechanism (*fig.* 5) is operated by a hinged handle on the starboard side of the seat. The trigger control by means of the bell crank lever and connecting link 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. Release of the trigger control allows the plungers to engage the nearest holes in the quadrants and lock the mechanism in the desired position.

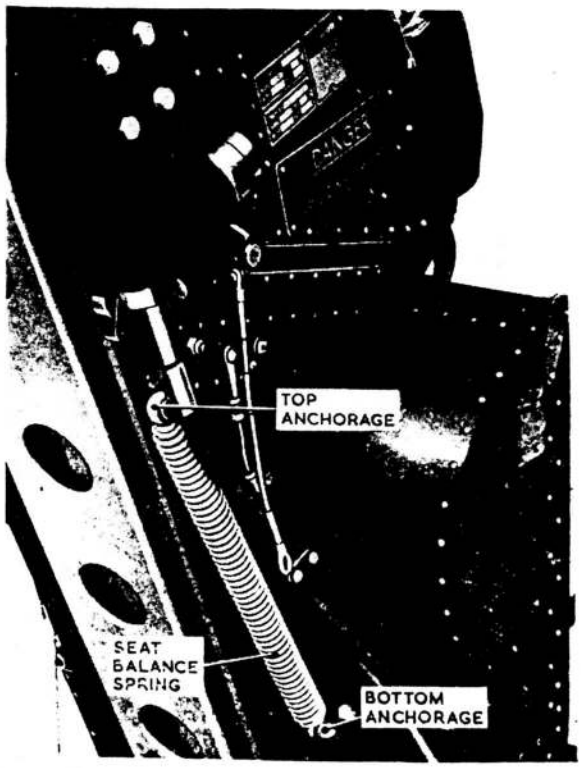

Fig. 4. Seat balance spring

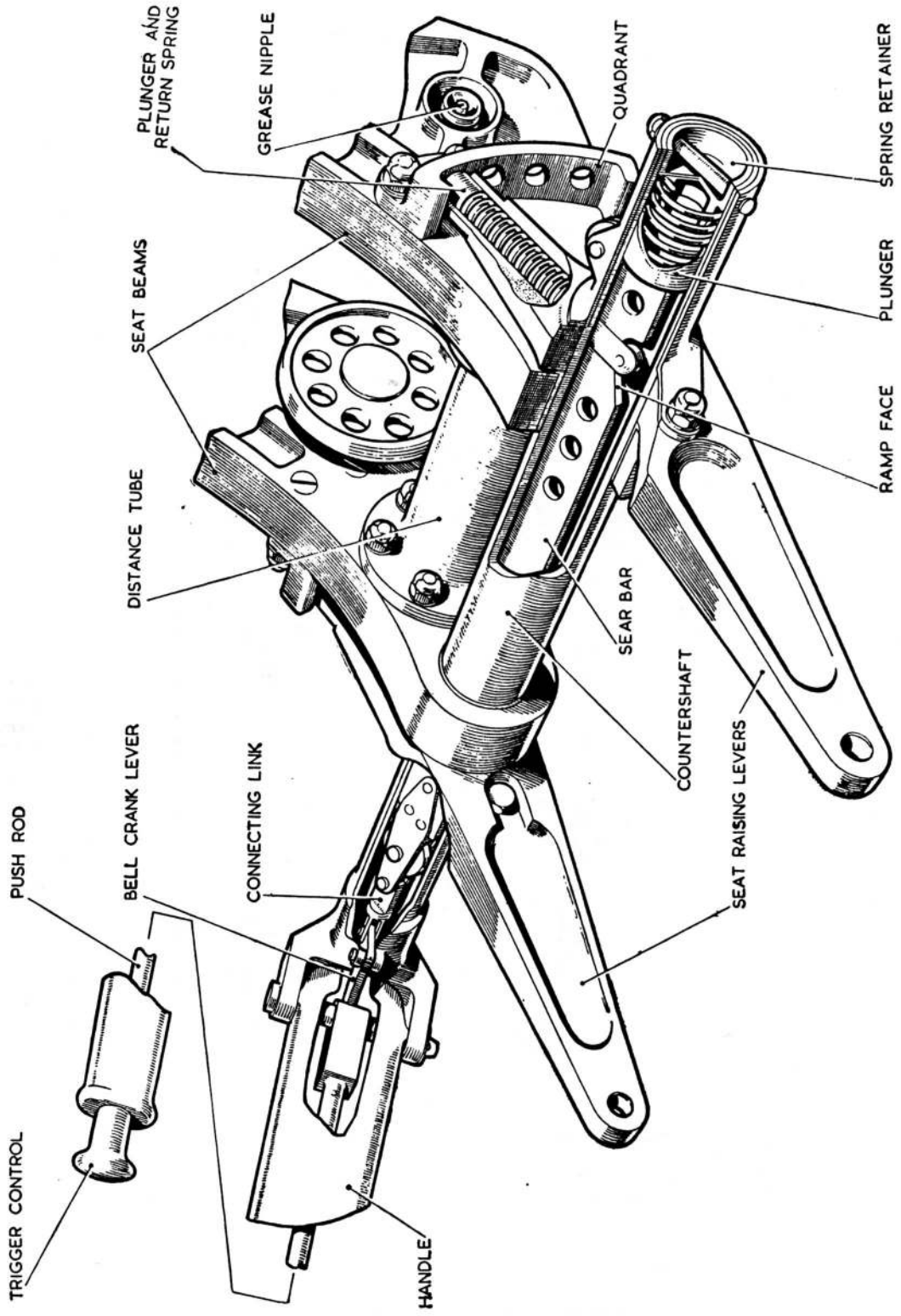

Fig. 5. Seat raising mechanism

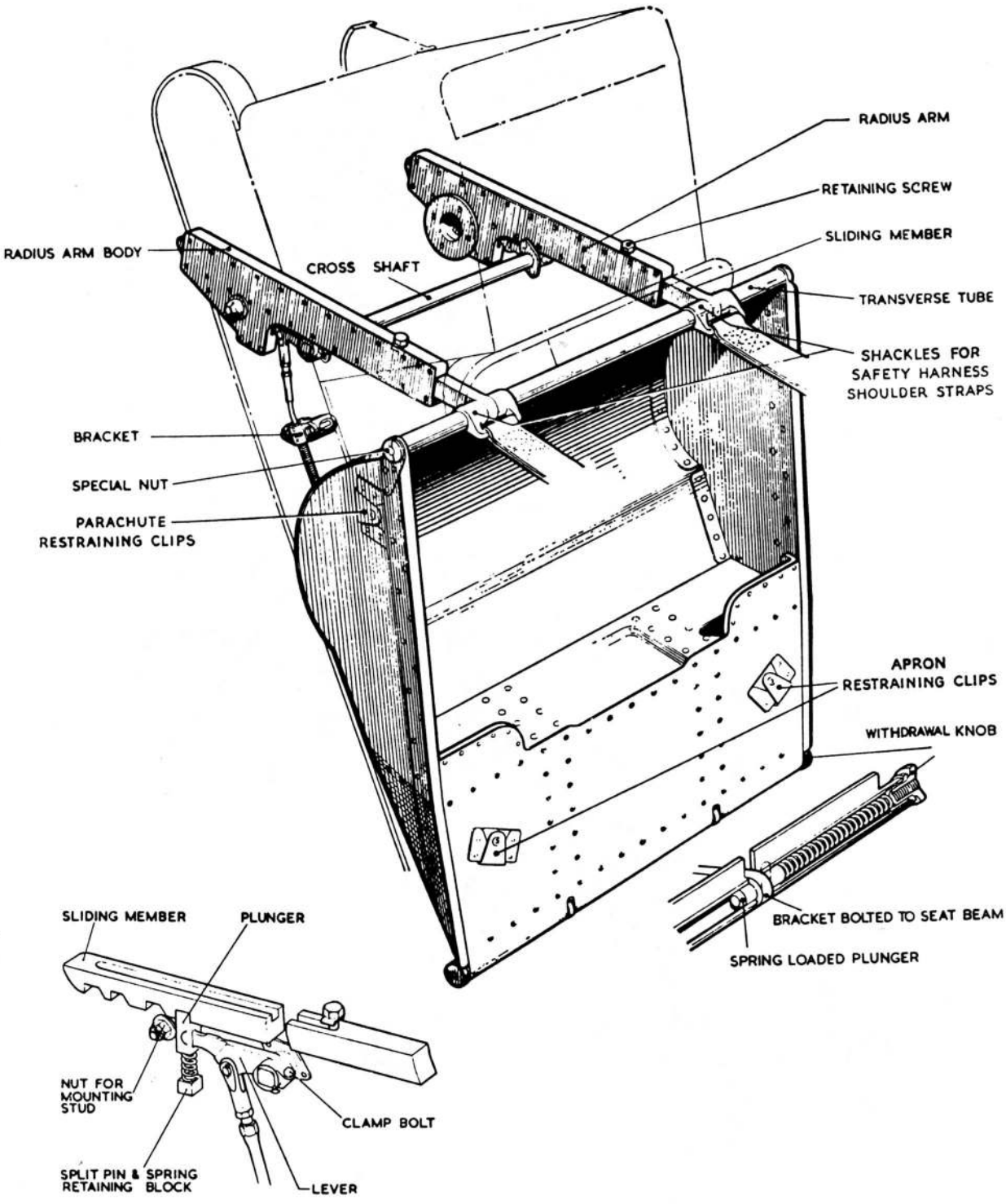

Fig. 6. Parachute container

16. The parachute container (*fig.* 6) is a riveted sheet metal box hinged at its lower edge to a pair of brackets bolted to the seat beams. The hinge is formed by spring-loaded plungers which are freed by pulling the withdrawal knobs. The container supports the weight of the parachute during flight and takes sideways loads. The parachute lifts easily out of the container when the occupant leaves the seat. The upper edge of the container is secured to a pair of telescopic radius arms, the body of each of which is pivoted to the seat beam, and the sliding member to the container upper edge. This latter point forms the attachment for the shackles for the Type ZF safety harness shoulder straps. Each sliding member has four notches which may engage with the spring-loaded plunger. Three of these notches are chamfered on their forward faces so that if the plunger is in either of these notches the seat occupant can return the container to the next position to the rear by leaning back without operating the harness release lever. The spring-loaded plungers are controlled by the levers mounted on the cross-shaft, the starboard lever being operated by the flexible cable from the control lever in the starboard thigh guard.

17. In the position shown in fig. 6, the mechanism is locked right back. The three other notches provide positions of restraint against forward movement, and the unchamfered one against backward movement also. With all the notches forward of the plunger the sliding member moves freely, but is limited in the forward direction by the retaining screw which butts against the edge of the groove in the sliding member. The parachute container embodies clips for restraining the apron and parachute pack.

18. The drogue container (*fig.* 7) is a riveted sheet metal box mounted at the top of the seat frame. A leather covered headrest pad is secured to the front of the container by two pins which are withdrawn by the lifting lines after the scissor shackle has opened. The firing handle is attached to the front edge of the face screen. The face screen, which is normally retained folded in the front compartment of the drogue container, is made of lined canvas and is specially shaped to protect the user's face from the airstream and to provide support for the head. The face screen is designed to accommodate a protective helmet. The firing cable is attached to the centre of the face screen by a sewn nylon cord loop and then passes through a conduit to the ejection gun firing mechanism. This conduit prevents the cable from being pulled inadvertently and so firing the gun.

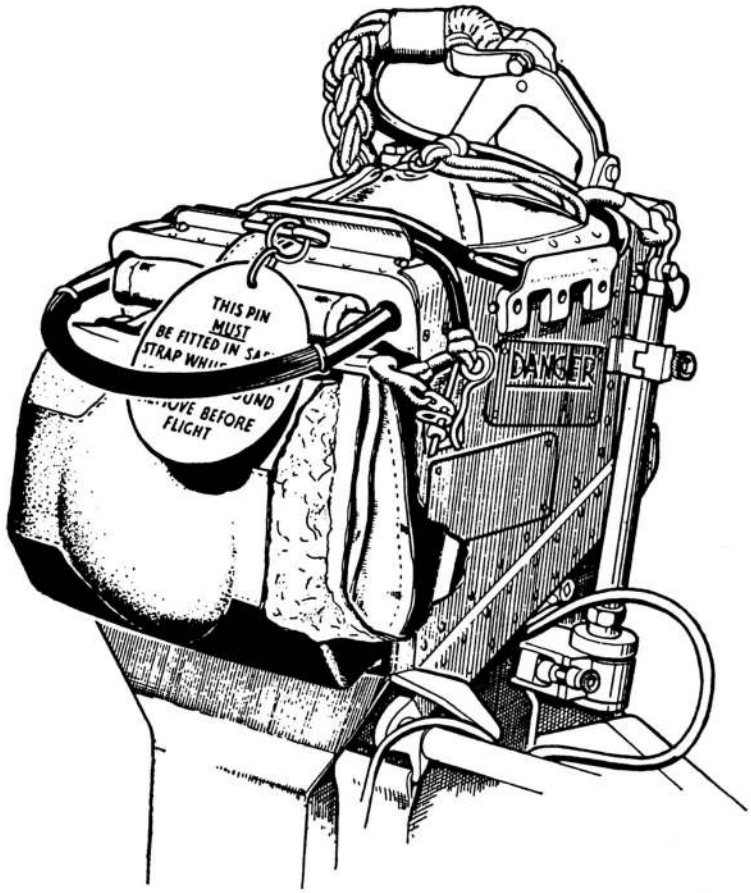

Fig. 7. Drogue container

19. The top of the drogue container is cosed by four fabric flaps which normally retain the drogues. They are numbered 1 to 4 in the order starboard, port, rear, front.

GUIDE RAIL

20. The guide rail (*fig.* 2) consists of a single extrusion bolted to the aircraft structure and normally it should not be necessary to remove it. Built into it towards its lower end is a block which receives the thrust of the ejection gun cylinder and incorporates the bottom latch which retains the cylinder tube. The slots in the upper end of the guide rail receive the cross-beam and restrain the forward impulse of the seat in the event of a crash landing.