ARROW 1 SERVICE DATA

SECTION 31

EJECTION SEAT MK C5

15 JAN 58

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DESCRIPTION

GENERAL

1 The Martin-Baker Mk C5 ejection seat is an automatic ejection seat which enables the crew members to abandon the aircraft safely at all altitudes within the aircraft range. Ejection at ground level at speeds over 80 knots is possible due to the high ejection velocity and the rapid deployment of the parachute.

2 Each seat is ejected from the aircraft by pulling on a firing handle which pulls a protective face screen over the crew member's face, operates the cartridge operated canopy emergency system and then fires the cartridge operated seat ejection system. An alternative firing handle is located on the seat between the crew member's knees.

3 A barostatic control automatically separates the crew member from the seat and deploys his parachute at an altitude of 5000 metres (16,400 feet).

4 A g-control mechanism operates at all altitudes to delay the separation of the crew member from the seat and the deployment of his parachute until the horizontal velocity of the seat is such that the parachute will not be damaged by the opening shock.

5 Provision is made for automatic emergency operation of the UHF and IFF systems after the seat has been ejected.

6 A leg restraint strap with calf straps is provided to pull the crew member's legs against the front of the seat during the initial upward movement, and to hold them in this position until separation from the seat takes place.

7 A nylon harness retains the crew member in the seat until separation takes place, when it is used as the parachute harness.

8 A duplex drogue system is provided to control, steady and retard the seat after ejection until the crew member is separated from the seat.

9 The crew member's parachute is 24 feet in diameter and is stowed in a horseshoe shaped pack located behind the crew member's shoulders.

STRUCTURE

10 The seat structure consists of a framework of two main side beams bridged by three cross-beams.

11 The seat is mounted on rails on the ejection gun. A set of slipper pads is fitted to the inside of each of the two main side beams. Each set of slipper pads engages in a guide channel rail fitted on each outboard side of the ejection gun cylinder.

12 The top cross-beam is reinforced to receive the full thrust of the ejection gun. A scissor shackle is attached to the upper face of this beam. This shackle is the attachment point of the duplex drogue.

13 The central cross-beam supports a shoulder harness release lock and a harness inertia mechanism. A housing surrounding the lock provides a support for the horseshoe shaped parachute pack. The beam is stressed to prevent the crew member from being thrown forward in the event of a crash landing. Seat adjustment compensating cords are attached to this beam.

14 The lower cross-beam retains a seat securing strut which locks the seat pan in the desired vertical position.

15 The left-hand side beam carries the drogue gun, a seat latch mechanism, an ejection gun firing pin release mechanism and a seat pan raising lever and seat locking mechanism.

16 The right-hand side beam carries the time delay mechanism.

17 Fitted to the outer face of each side beam is a guide channel for the seat pan.

SEAT PAN AND SEAT RAISING MECHANISM

18 The seat pan is a riveted, sheet alloy structure forming a square pan with a sloping

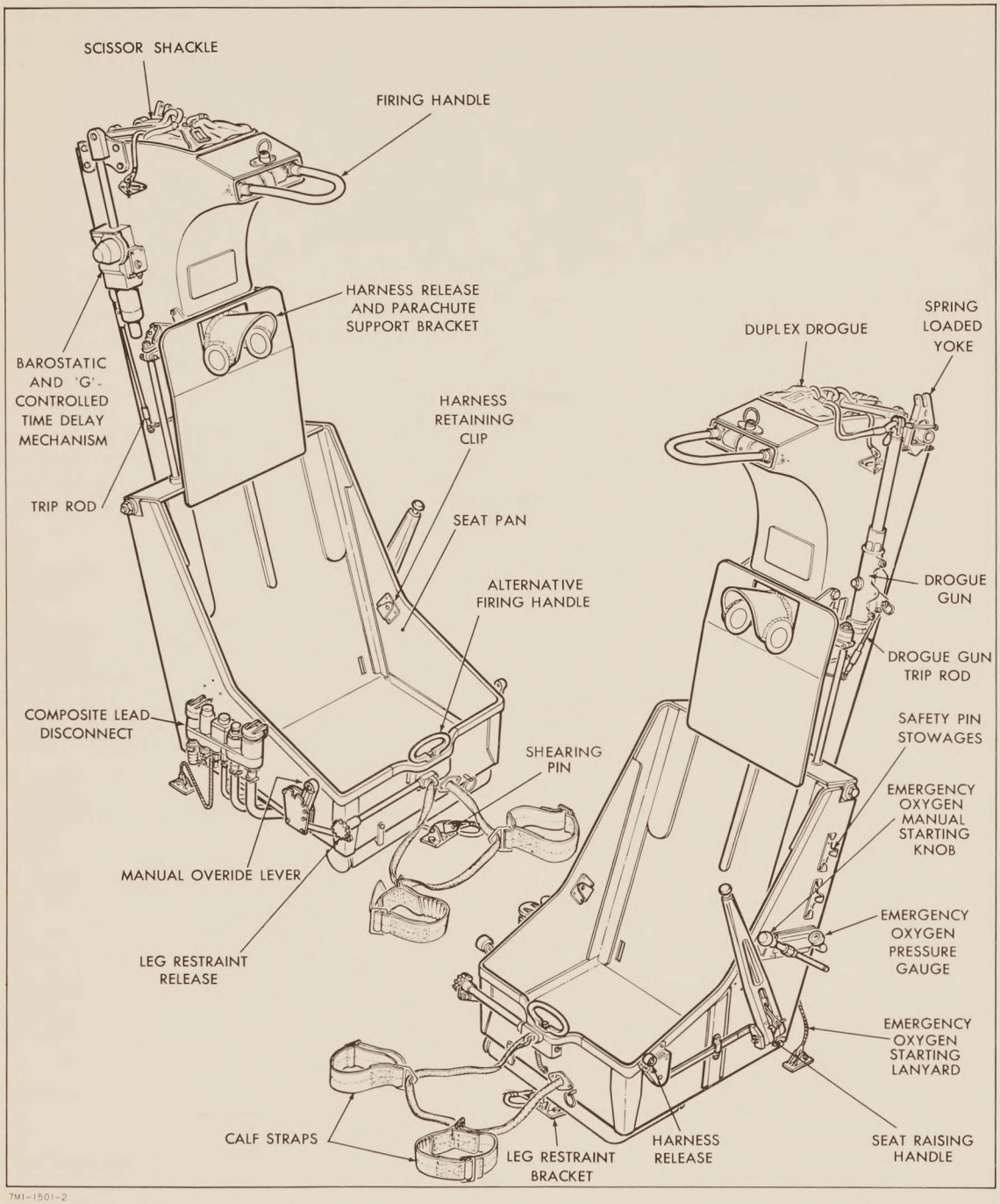

FIG. 1 EJECTION SEAT MK C5

backrest. The pan is supported by four sliding runners, closely fitted in guide channels attached to the main beams. The vertical position of the seat pan in relation to the seat structure can be adjusted and locked in seven positions. The adjustment is made by depressing a plunger on the end of the seat raising lever located on the left-hand side of the seat pan and moving the lever up or down to obtain the desired position. When the seat raising lever plunger is released a spring-loaded stop engages in one of several holes in a securing strip on the lower cross-beam. The weight of the seat pan, the crew member and his equipment is balanced by two rubber bungee cords. The lower ends of these cords are attached to brackets riveted to the back of the seat pan and the upper ends of the cords are attached to brackets on the centre cross-beam. There must be a load on the seat pan before the seat raising lever is operated, otherwise the seat pan may be damaged as it springs up to the top position under the action of the bungee cords.

19 An alternative firing handle is located on the front face of the seat pan.

20 A handwheel, operating a leg restraint release lock, and a manual override control lever, are located on the right-hand side of the seat pan.

21 A composite leads disconnect unit is located on the right-hand side of the seat pan. This unit acts as a junction box to supply the crew member with the following services:

(a) Oxygen supplied from the aircraft to the breathing mask and the partial pressure suit.

(b) Visor demisting.

(c) Tele/mic leads for intercommunication.

(d) Low pressure air to the anti-g suit.

(e) Emergency oxygen after the seat has been ejected.

22 A leg restraint snubbing unit and the emergency oxygen system are located on the underside of the seat pan.

23 A pressure gauge and a starting and charging valve for the emergency oxygen system are located on the rear face of the seat pan backrest.

24 A harness release lever is located on the left-hand side of the seat pan.

SEAT LOCKING MECHANISM

25 The seat locking mechanism is located at the top of the left-hand side beam. The mechanism consists of a spring-loaded locking plunger, passing through the side beam and the top cross-beam, which engages with a latch housing in the ejection gun outer cylinder. A chamfered end of the locking plunger engages in a breech groove on the ejection gun inner piston. A knurled cap unit compresses the plunger spring to maintain a positive engagement of the chamfered end of the locking plunger with the breech groove.

DROGUE GUN

26 A drogue gun is fitted to the top of the left-hand side beam. A trip rod, which has its lower end attached to the ejection gun, withdraws a sear from the gun when the seat is ejected from the aircraft. After a time delay of one half second, a spring-loaded striker is released which detonates a cartridge. The resultant gas pressure projects a steel piston upwards and withdraws a duplex drogue from a compartment in the headrest of the seat.

BAROSTATIC AND G-CONTROLLED TIME DELAY MECHANISM

27 A barostatic and g-controlled time delay mechanism is fitted to the top of the right-hand side beam. This unit automatically controls the following operations after ejection:

(a) The release of the crew member's harness from the seat.

(b) The release of the leg restraint.

(c) The opening of a scissor shackle to release the duplex drogue from the seat.

(d) The appropriately delayed automatic deployment of the crew member's parachute. This delay varies according to the forward speed of the aircraft at the moment of ejection.

28 On ejection from the aircraft, the time delay mechanism delays the deployment of the crew member's parachute until the seat has been stabilized by the two drogues and retarded to a safe speed for the opening of the parachute. The unit incorporates a train of gears regulated by an escapement and star wheel.

29 A barostatic control and a g-control mechanism remain in engagement with the star wheel if the seat is ejected at heights above 5000 metres (16,400 feet). When the seat reaches this height, the barostatic control withdraws a stop from a star wheel which permits the clockwork mechanism to operate for 1.3 seconds, providing the horizontal deceleration on the seat is less than 6g.

30 If ejection occurs at high speed at a height below 5000 metres (16,400 feet), a g-control mechanism imposes a restraint on the star wheel during ejection and horizontal deceleration. When the 'g' loading on the seat falls below 6g a spring-loaded toggle weight removes the restraint from the star wheel, permitting the clockwork mechanism to operate for 1.3 seconds. At the end of this time a spring-loaded shackle release plunger is allowed to descend rapidly under spring pressure.

31 The downward action of the shackle release plunger has the following three results:

(a) It removes the restraint imposed on the scissor shackle by the shackle release plunger, thereby permitting the scissor shackle to open and release the drogues from the seat. The drogues withdraw a pin from brackets on each side of the seat. This action disconnects the parachute restraining straps and the face screen from the seat.

(b) It strikes and depresses the trip lever of the harness release mechanism, which, in turn, releases the parachute harness from the seat and enables the link line to withdraw and deploy the parachute.

(c) It disconnects the seat portion from the crew member portion of the composite leads disconnect.

EJECTION GUN (Fig 2)

32 The ejection gun, which has a stroke of 72 inches, propels the seat upwards with an approximate velocity of 80 feet per second. The gun consists of three telescoping steel tubes as follows:

(a) An outer cylinder which is bolted to and forms part of the aircraft structure.

(b) An inner piston, which is attached to the seat and imparts the upward thrust during ejection.

(c) An intermediate piston, located concentrically between the inner piston and the outer cylinder.

33 Three cartridges are used to generate the gas required to extend the ejection gun, these are:

(a) A primary cartridge, housed in a breech in the upper end of the inner piston and fired by a spring-loaded firing pin in a firing body.

(b) Two secondary cartridges, each located in a housing on the outer cylinder and fired by the flame from the primary cartridge. Ports, uncovered by the upward movement of the inner and intermediate pistons, permit the passage of this flame.

34 The ejection gun is operated by the descent of a spring-loaded firing pin in a firing body. This action detonates the primary cartridge which causes the inner piston, together with the intermediate piston, to rise due to the pressure of the generated gases.

UNLOCKING OF THE EJECTION GUN (Fig 3)

35 The initial movement of the inner piston forces the spring-loaded locking plunger out of the breech groove, back into the latch housing. The inner piston continues to rise, thrusting against the top cross-beam of the

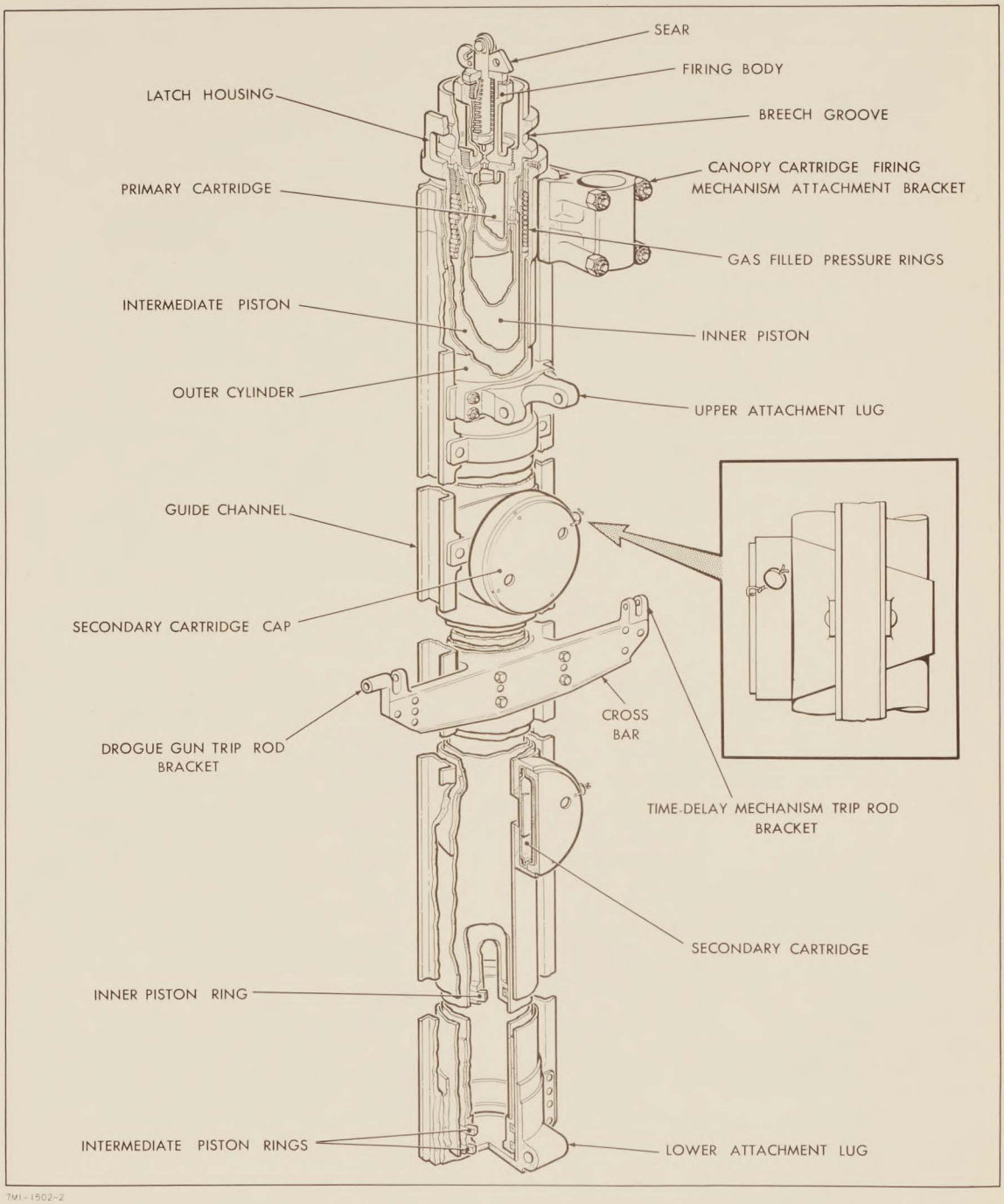

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FIG. 2 EJECTION GUN

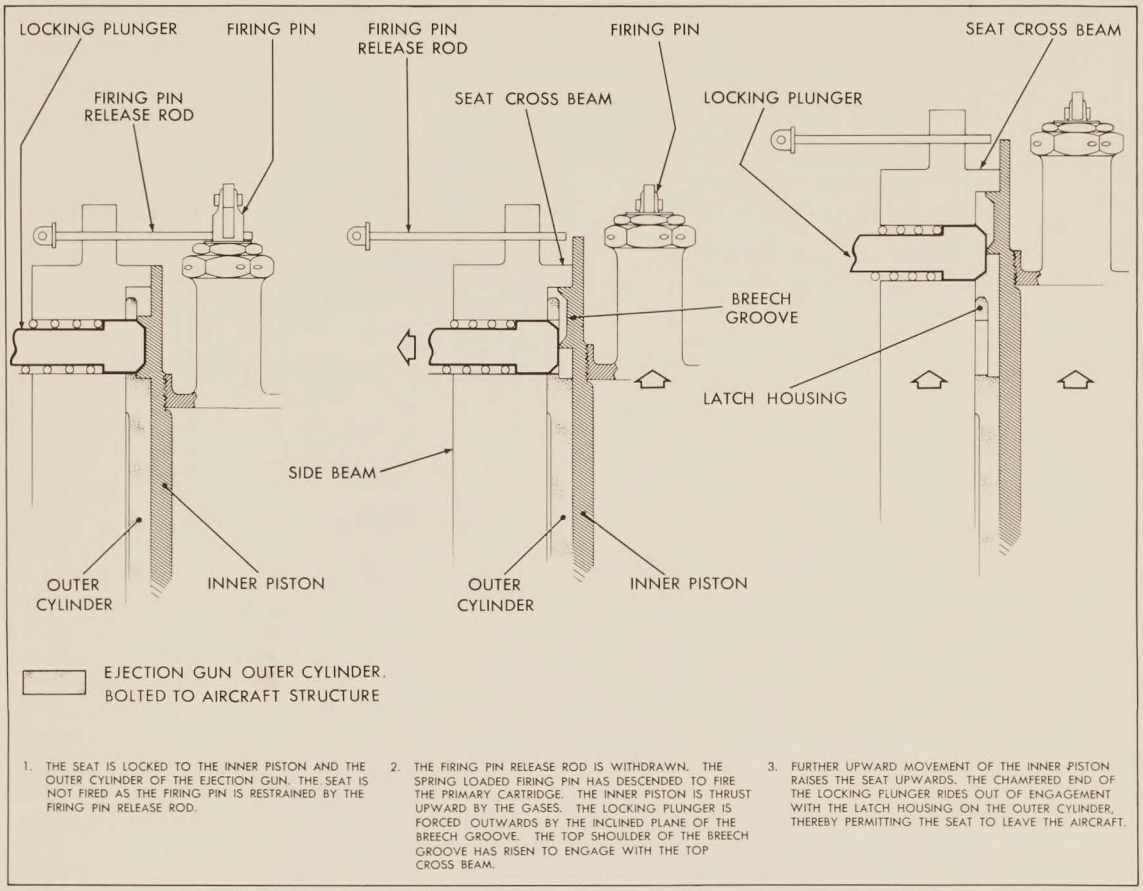

FIG. 3 EJECTION SEAT UNLOCKING MECHANISM

seat and moving it upwards. The upward movement of the seat causes the chamfered end of the spring-loaded locking plunger to move outwards and disengage from the latch housing on the top of the outer cylinder, completely unlocking the seat from the outer cylinder.

36 After 14 inches of movement, a port is uncovered which permits the flame from the primary cartridge to ignite the lower secondary cartridge. A further movement of 17 inches uncovers a second port which enables the flame to ignite the upper secondary cartridge. The inner and intermediate pistons continue to rise until the intermediate piston is stopped by a flange on the outer cylinder. The resultant shock is cushioned by twelve gas-filled pressure rings. The inner piston continues to rise, together with the seat and the crew member, until it parts from the intermediate piston.

DUPLEX DROGUE

37 The duplex drogue system employs a small controller drogue and a larger main stabilizer drogue. The controller drogue, when deployed by the drogue gun piston, tilts the seat into a horizontal attitude and then pulls the main drogue out of its container. This horizontal flight path reduces the height loss to a minimum.

38 Between the controller and the main drogue is a long nylon line which allows the

controller drogue to be fired clear of the seat wake. The nylon line also allows a delayed extraction of the main drogue in order to apply deceleration progressively along the line of the seat axis.

39 The drogues and their shroud and withdrawal lines are packed into a container at the top of the seat.

THE HORSESHOE PARACHUTE PACK

40 The parachute pack is a horseshoe shaped back type pack which is tapered to fit the crew member's shoulders. This shape permits a clean extraction of the canopy, and also permits the seat occupant to sit well back in his seat.

41 Automatic deployment of the canopy is effected by an extension line attached to the main drogue. This drogue withdraws the pack pin and extracts the canopy from the pack. A manual override is provided which is connected to an additional D-ring on the rip-cord assembly. This D-ring, when used in conjunction with the manual override control on the ejection seat, disconnects the automatic attachment and enables the crew member to leave the seat. A normal descent can then be made using a standard D-ring to open the parachute.

42 The parachute used with the horseshoe pack is a standard Irvin 24 foot diameter canopy.

AUTOMATIC LEG RESTRAINT

43 The leg restraining gear consists of a reinforced nylon strap, one end of which is attached to the cockpit floor by a special roller bracket. A light alloy shear pin passes through the centre of the roller and the bracket. The shear pin fails at the load required to hold the legs of the crew member against the forward edge of the seat pan during ejection. The other end of the nylon strap is passed through a snubbing unit attached to the underside of the seat pan and then through metal D-rings fitted to calf straps which are buckled just below the knees of the crew member. The end of the nylon strap is then attached to a release lock located on the front face of the seat pan.

44 The nylon strap is arranged to permit free movement of the crew member's legs while seated in the ejection seat. On ejection, the strap tightens between the snubbing unit and the harness release lock. This action automatically withdraws the crew member's legs to the front face of the seat pan, where they are firmly held until the nylon strap is released by the release lock when the crew member is separated from the seat.

LEG RESTRAINT RELEASE LEVER

45 A manually operated leg restraint release is fitted on the front face of the seat pan. The release is operated by a part turn of a hand wheel, located at the front of the right-hand side of the seat pan.

HARNESS RELEASE MECHANISM

46 A crew member, during normal flight, is able to lean forward by operating a harness release lever, located on the left-hand side of the seat pan. Movement of this lever rotates a snubbing shoe away from a nylon strap at the harness upper release point. Attached to one end of the nylon strap is a spring-loaded harness reel which allows the harness to move forward and away from the seat structure when the harness release lever is operated. There is always a free return movement to the back position, but the snubbing shoe locks the nylon strap against forward movement in any position unless the harness release lever is operated.

MANUAL OVERRIDE CONTROL

47 In the event of a failure in the automatic separation mechanisms on the ejection seat, a manual override lever is provided. When this lever is pulled to the rear it operates, through linkages, the following services:

(a) Releases the parachute harness and parachute from the seat.

(b) Releases the leg restraint strap from the seat.

(c) Disconnects the crew member portion from the seat portion at the composite leads disconnect.

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EMERGENCY OXYGEN SYSTEM

48 An emergency oxygen system is located beneath the seat pan to provide the crew member with oxygen while descending from very high altitudes to the height where separation takes place.

49 The emergency system consists of a storage bottle, an oxygen regulator, a starting and charging valve, and a pressure gauge. The storage bottle is L-shaped and has a capacity of 53 cubic inches. The bottle and the regulator are located beneath the seat pan. The starting and charging valve, and the pressure gauge are located behind the back rest of the seat pan.

50 When the seat is ejected from the aircraft a lanyard attached to the cockpit floor operates a starting valve. This valve permits the oxygen from the cylinder to be fed through a double non-return valve to the oxygen regulator. The regulator regulates the supply pressures for the breathing mask and the partial pressure suit.

51 The emergency oxygen system may be started manually by pulling upwards on a round knob located at waist height on the left-hand side of the seat pan.

OPERATION

52 In an emergency, the crew member grasps the firing handle with both hands and pulls the face screen down over his face. This withdraws the sear from the canopy cartridge firing mechanism firing pin and the sear from the seat ejection gun firing pin. The firing pin in the seat ejection gun is prevented from descending to fire the cartridge at this time by a release rod passing through it.

53 A telescopic link is attached to the LH canopy half shell and to a yoke mounted on the LH side of the ejection seat. This yoke is maintained in position by a cotter pin. When the canopy has passed the normal open position, the telescopic link reaches its full extension, shears the yoke cotter pin and pulls the yoke outwards. The ejection gun firing pin release rod is attached to the yoke and is withdrawn from the firing pin by the movement of the yoke. At approximately 41° of canopy opening the release rod is completely withdrawn, allowing the ejection gun firing pin to descend and detonate the ejection gun primary cartridge.

54 The final movement of the canopy shears a copper washer in the telescopic link, disconnecting it from the seat.

55 One half second after the seat leaves the aircraft, the drogue gun fires, withdrawing the controller drogue from the container. The controller drogue tilts the seat into a horizontal position and withdraws a nylon line attached to the main stabilizer drogue. The main stabilizer drogue stabilizes and decelerates the seat.

56 If ejection has taken place above 5000 metres (16,400 feet) the seat will descend until this height is reached, when the barostat operates, provided the deceleration of the seat has fallen below 6 g. The barostat withdraws a stop from a star wheel in a gear train, permitting a clockwork mechanism to operate for 1.3 seconds. At the end of this time a plunger is released and descends rapidly under spring pressure to perform four functions:

(a) Permits the scissor shackle to open and release the drogues from the seat.

(b) Releases the parachute harness from the seat.

(c) Disconnects the seat portion from the crew member portion of the composite leads disconnect.

(d) Releases the leg restraint straps.

57 If ejection has taken place below 5000 metres (16,400 feet) the barostat stop will be withdrawn and restraint is imposed on the mechanism by a g-controller. When deceleration falls below 6 g, movement of a spring-loaded toggle weight removes restraint from the star wheel, allowing the clockwork mechanism to operate as described in para 56.

58 The result of these actions is that the seat falls away from the crew member and a link line attached to the main stabilizer drogue

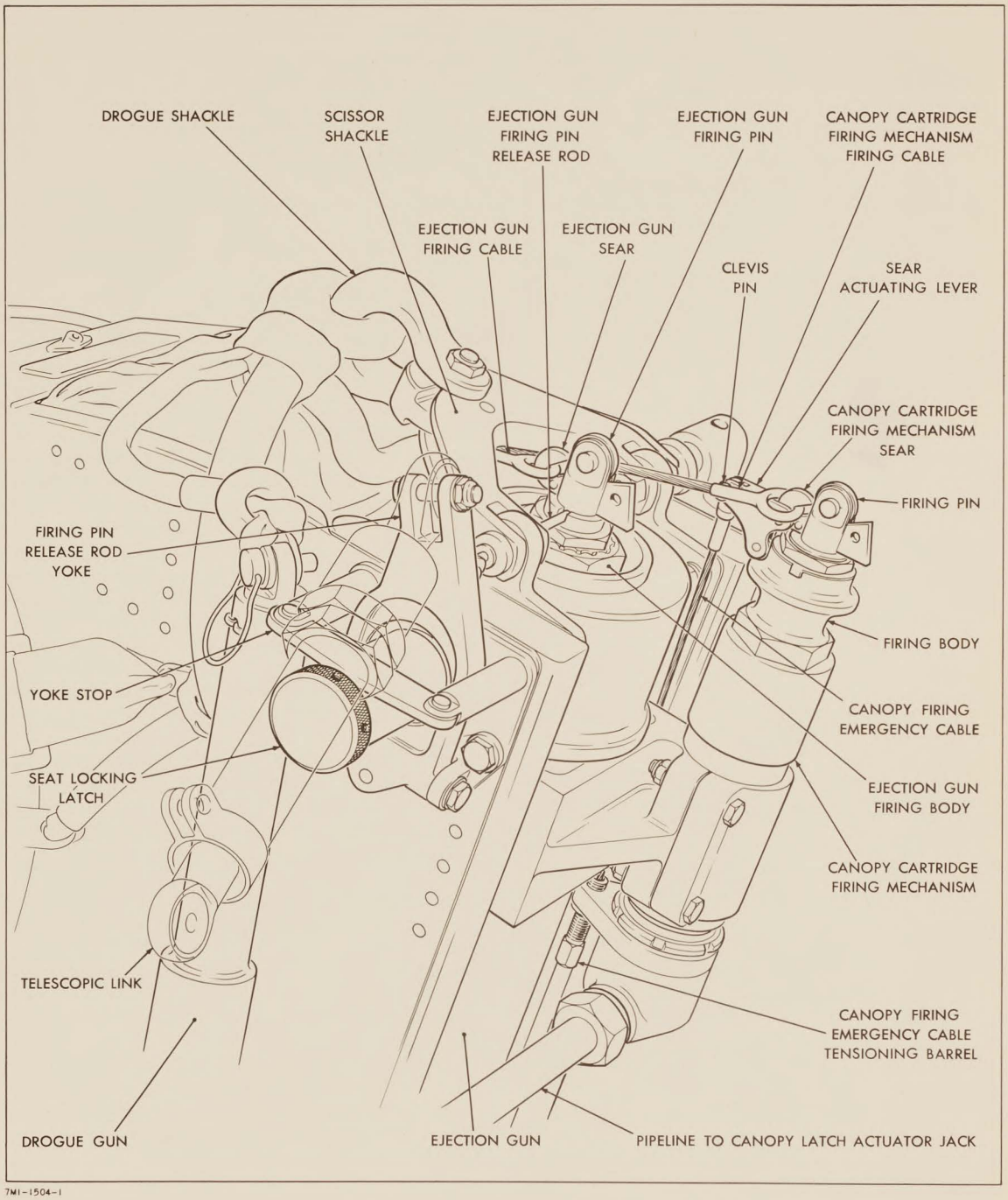

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FIG. 4 EJECTION SEAT AND CANOPY FIRING MECHANISM

shackle withdraws the crew member's parachute from the horseshoe shaped pack, allowing the crew member to make a normal parachute descent.

SAFETY PROCEDURES

59 Each ejection seat is provided with the following safety pin and warning disc assemblies:

(a) A safety pin assembly consisting of:

(1) A quick-release safety pin which is used to lock the face screen firing handle to the front of the face screen container or alternatively, is used to prevent the inadvertent withdrawal of the canopy cartridge firing mechanism sear.

(2) A spring-type safety pin, which is used to prevent the inadvertent withdrawal of the ejection gun firing body sear.

(b) A quick-release safety pin, which is inserted in the safety lock of the drogue gun body.

(c) A quick-release safety pin, which is used to prevent the inadvertent withdrawal of the alternative firing handle.

60 Immediately before flight, the ejection gun firing body sear safety pin and the canopy cartridge firing mechanism sear safety pin must be removed, the drogue gun safety pin must be removed and the alternative firing handle safety pin must be removed.

61 These safety pins should be shown to, and acknowledged by, the crew member. The safety pins should then be stowed in the clips located on the left-hand side of the seat pan.

62 On completion of flying, the safety pins should be inserted in their respective safety positions on the ejection seat.

63 If any work is to be carried out on the ejection seats, they must be disarmed in accordance with the instructions given in para 64.

TESTING AND SERVICING

DISARMING THE EJECTION SEAT AND THE CANOPY

64 To disarm the ejection seat and canopy, proceed as follows:

NOTE

The front seat should be disarmed first and the rear seat should be disarmed last. The operator should not, at any time, position his body above the drogue gun or the ejection seat during the ejection seat disarming procedure.

(a) Ensure that a safety pin is inserted in the sear of the ejection gun firing body, the sear of the canopy cartridge firing mechanism, the safety lock of the drogue gun and the alternative firing handle.

(b) Withdraw the quick-release pin from the drogue gun trip rod bracket located on the cross-beam at the rear of the ejection gun. The trip rod will be swung forward by the bungee cord which is attached to the seat structure. Replace the quick-release pin in the bracket. Disconnect the bungee cord from the trip rod.

(c) Disconnect the controller drogue withdrawal line shackle from the lug at the top of the drogue gun piston by removing the nut and bolt. Replace the nut and bolt in the withdrawal line shackle.

(d) Remove the two self-locking nuts securing the drogue gun to the left-hand side beam.

(e) Remove the drogue gun from the two studs on the side beam. Replace the nuts on the studs.

(f) Remove the bolt and self-locking nut from the firing pin release rod yoke. Permit the telescopic link to move upwards and clear of the yoke mechanism.

(g) With the safety pin in position in the sear of the canopy cartridge firing mechanism,

press the sear forward and remove the eye of the firing cable from the hook of the sear. Allow the sear to return to its normal position.

(h) With the safety pin in position in the ejection gun firing body sear, press the sear forward and disconnect the eye of the firing cable from the hook of the sear. Permit the sear to return to its normal position.

(j) Break and remove the lead-sealed locking wire from the top of the ejection gun and the firing body. Remove the locking wire completely from the aircraft.

(k) Remove the nut and bolt securing the firing pin release rod to the yoke, and withdraw the release rod through the aperture in the yoke.

(m) Carefully remove the safety pin from the sear of the ejection gun firing body and unscrew the firing body from the ejection gun using the special wrench MBEU/6146.

(n) Remove the primary cartridge from the breech of the ejection gun by using the extractor tool MBEU/5826. Replace the firing body in the ejection gun.

(p) Replace the safety pin in the firing body sear.

(q) Break and remove the lead-sealed locking wire from the firing body and the body of the canopy cartridge firing mechanism. Remove the locking wire completely from the aircraft.

(r) Remove the 1/16 inch cotter pin from the clevis pin in the sear actuating lever. Remove the clevis pin to disconnect the canopy emergency firing cable from the sear actuating lever.

(s) Carefully remove the safety pin from the sear of the firing body. Using the special wrench, unscrew the firing body from the breech of the canopy cartridge firing mechanism.

(t) Remove the canopy cartridge using the extractor tool MBEU/5826.

(u) Replace the firing body in the canopy cartridge firing mechanism.

(v) Replace the safety pin in the firing body sear.

(w) Connect the canopy emergency firing cable to the sear actuating lever and insert the clevis pin. Insert a 1/16 inch cotter pin in the clevis pin.

REMOVING THE EJECTION SEAT FROM THE AIRCRAFT

WARNING

The ejection seat must be disarmed before any attempt is made to lift it from the aircraft. See para 64.

65 To remove an ejection seat from an aircraft, proceed as follows:

(a) Remove the survival pack from the seat pan.

(b) Withdraw the quick-release pin that secures the time-release mechanism trip rod to the aircraft structure.

(c) Withdraw the quick-release pin securing the leg restraint strap to the pulley bracket on the cockpit floor.

(d) Disconnect the composite leads disconnect unit and cover the aircraft portion of the unit with a cloth bag to protect it from dirt, swarf, etc.

(e) Disconnect the emergency oxygen starting lanyard from the cockpit floor by removing the quick-release pin from the bracket.

(f) Replace the quick-release pin in the bracket.

(g) Ensure that the UHF and IFF circuit breakers on the circuit breaker console are pulled out.

(h) Withdraw the seat latch by breaking and removing the lead-sealed locking wire and unscrewing the knurled nut as far as possible using the tommy bar provided on the seat for this purpose.

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(j) Lift the seat up until it is clear of the guide rails on the ejection gun, otherwise the rail slippers may be distorted.

NOTE

Do not lift the seat by either of the red firing handles.

(k) Seal all service connections to prevent the ingress of dust and foreign matter.

(m) Place the ejection seat on rubber matting or other suitable material to protect the seat from damage.

REMOVING THE EJECTION GUN FROM THE AIRCRAFT

66 The removal of the ejection gun is only necessary if the cartridges are time expired or the ejection gun requires servicing. To remove the ejection gun from the aircraft, proceed as follows:

(a) Disarm the ejection seat. See para 64.

(b) Remove the seat from the aircraft. See para 65.

(c) Disconnect the canopy cartridge firing unit from the ejection gun, proceeding as follows:

(1) Slacken the canopy emergency firing cable by unscrewing the tensioning barrel located at the base of the canopy cartridge firing unit.

(2) Remove the four bolts connecting the canopy cartridge firing unit to the ejection gun.

(3) Temporarily secure the canopy cartridge firing unit to the cockpit rear bulkhead.

(d) Remove the top pick-up bolt and tilt the ejection gun forward to clear the canopy emergency mechanism.

(e) Remove the lower pick-up bolt and remove the ejection gun from the aircraft.

REMOVING THE SECONDARY CARTRIDGES FROM THE EJECTION GUN

NOTE

The removal of the secondary cartridges is only necessary if the cartridges are time-expired, otherwise they may be left in position in the gun.

67 To remove the secondary cartridges from the ejection gun, proceed as follows:

(a) Place the ejection gun on a clean bench and break the locking wire on the side of the upper secondary cartridge housing.

(b) Unscrew the cartridge cap using the special wrench.

(c) Remove the cartridge and loosely replace the cartridge cap.

(c) Repeat the procedure for the lower secondary cartridge.

NOTE

The bench should be covered with a linoleum or rubber top.

REMOVING THE HORSESHOE PARACHUTE PACK FROM THE SEAT

NOTE

It is not necessary to remove the seat from the aircraft for this operation.

68 To remove the parachute pack from the seat, proceed as follows:

(a) If the seat has not been disarmed, ensure that safety pins are inserted in the ejection gun sear, the canopy cartridge firing mechanism sear and the safety lock of the drogue gun.

(b) Disconnect the two quick-release connections and remove the survival pack from the seat pan.

(c) Disconnect the parachute restraining straps at their adjustment buckles.

(d) Pull out each harness restraining strap from the clip located on the inside of each side panel of the seat pan.

(e) Pull the manual override lever to the rear and remove each harness lug from the lock located at each inside corner of the seat pan.

(f) Lift the parachute pack and harness from the central support bracket.

(g) Remove the parachute from its case and inspect for damage or deterioration.

REPACKING THE DUPLEX DROGUE

69 To repack the duplex drogue into the ejection seat headrest, proceed as follows:

(a) Ensure that the ejection seat has been disarmed. See para 64.

(b) Break the safe-tie thread and withdraw the flap securing pin.

(c) Raise the scissor shackle, untie and remove the tethering cord from the drogue shackle.

(d) Fold back the four flaps and open the protective sleeve and withdraw the controller and main drogues.

(e) Examine the drogues, shroud lines, withdrawal lines and attachments for damage or deterioration.

(f) Clean the inside of the drogue container and check that no burrs are present.

(g) Roll the protective sleeve downwards and outwards to avoid obstructing the packing of the larger main drogue.

(h) Hold the main drogue at its periphery, and extend the shroud lines from the drogue shackle. Ensure that they are not entangled.

(j) Pair off the shroud lines so that the top pair at the periphery are an adjacent pair at the nylon sleeve.

(k) Starting at the top of the periphery of the drogue, fold it into double folds, so that each pair of shroud lines comes between the edges of the folds.

(m) Before stowing the main drogue in the container, insert the main drogue shroud lines into the container, commencing with the nylon sleeved end. Fold in the remaining shroud lines from left to right.

NOTE

The nylon sleeved end of the shroud line should emerge from the rear right-hand corner of the drogue container.

(n) Stow the main drogue, concertina fashion, periphery downwards, well down into the container.

(p) Unroll the protective sleeve and fold it to enclose the main drogue so that the main drogue withdrawal line emerges from the right-hand rear corner of the drogue container.

(q) Hold the controller drogue at its periphery and extend the shroud lines. Ensure that they are not entangled.

(r) Pair off the shroud lines, repeating the procedure carried out for the main drogue and fold the controller drogue into three single folds.

(s) Fold the main drogue withdrawal line into approximately seven folds and place it on top of the protective sleeve, well to the front of the container. Loop the controller drogue shroud lines so that they cover the remaining area of the protective sleeve.

(t) Lay the controller drogue in the container so that the apex of the drogue is towards the left-hand side of the container.

(u) The controller drogue withdrawal line should emerge from the rear of the left-hand side of the drogue container and should extend sufficiently to expose three inches of line on

the drogue side of the flap securing pin. Fold any surplus line under the controller drogue.

(v) Close the four flaps in the order - right, left, rear and front, ensuring that the wire loop engages in each flap eyelet.

(w) Insert the flap securing pin through the wire loop and into the pocket on the front flap.

(x) Push the scissor shackle down on top of the flaps. Tie the scissor shackle to the flap securing pin using a length of tethering cord. Tie the cord with a reef knot.

CAUTION

Ensure that the tethering cord is threaded under the flap securing pin and not through it. When the flap securing pin is withdrawn, the shackle must be free to rotate upwards.

(y) Re-stow the face screen as described in para 70.

(z) Safe-tie the flap securing pin to the fabric loop on the front flap using No. 8 parachute thread. Lead seal the thread.

CAUTION

Ensure that the drogue withdrawal line is looped over the link line and that the withdrawal line is free to extract the drogues without entanglement.

REPACKING THE FACE SCREEN

70 To repack the face screen, proceed as follows:

(a) Ensure that a safety pin is inserted in the ejection gun firing body sear and that a safety pin is inserted in the canopy cartridge firing mechanism sear.

(b) Pull the firing handle outwards to extend the face screen from the face screen housing.

(c) Inspect the canvas and the lining for deterioration and damage, and check the firing cable for security and serviceability.

(d) Fold each side of the face screen downwards and inwards so that the face screen is the same width as the mouth of the face screen housing.

(e) Fold the stitched end of the face screen back and underneath the face screen.

(f) Insert the folded end of the face screen into the mouth of the face screen housing.

(g) Feed the firing cable into the hole located at the back of the face screen housing.

(h) Feed the firing cable through the hole in the front of the front flap and pass the firing cable under the front flap and over the rear flap of the duplex drogue compartment.

(j) Engage the eye of the alternative firing cable in the crotch of the face screen firing cable.

(k) Using the thumbs, stow the remainder of the face screen into the face screen housing, packing the screen well down into the corners of the housing.

(m) Insert the firing handle into the mouth of the housing, ensuring that the spring-loaded plungers are engaged in their locating holes on the inside of the housing mouth. Insert the quick-release safety pin into the hole in the top of the headrest.

INSTALLING A HORSESHOE PARACHUTE PACK ON TO THE EJECTION SEAT

71 To install a parachute pack on to the ejection seat, proceed as follows:

(a) Ensure that the manual override lever is in the forward position.

(b) Lay the harness in the seat pan. Pull back the harness release lever, pull out the loop strap and pass it down through the yoke on the shoulder harness. Pass the lug of the strap through the rings of the parachute restraining straps and plug the lug into the top harness lock. Depress the striker lever and the harness release linkage to assist this operation.

(c) Ensure that none of the straps have become twisted.

(d) Pass the restraint lines through the holes located on each side of the central support bracket.

(e) Place the pack on the central support bracket.

(f) Pass each parachute restraining strap over the parachute pack and secure the restraining straps to their respective adjustment buckles.

(g) Adjust the parachute restraining straps to retain them tightly around the parachute pack.

(h) Insert the harness retaining straps into their clips.

NOTE

The harness retaining straps should pull out from the clips at a withdrawal load of 30-40 pounds.

(j) Insert each harness lug into the lock located at the rear of each inside corner of the seat pan.

(k) Adjust the seat pan to the lowest position and ensure that the straps buckled to the legs of the parachute have a slight amount of slack.

(m) Connect the quick-release coupling on the parachute withdrawal line.

(n) Install the survival pack into the seat pan and connect the two quick-releases.

(p) Ensure that the leg restraint release handwheel is in the forward position.

INSTALLING THE SECONDARY CARTRIDGES INTO THE EJECTION GUN

72 To install the secondary cartridges into the ejection gun, proceed as follows:

(a) Place the ejection gun on a clean bench.

(b) Remove the upper cartridge cap and insert a secondary cartridge, rim inwards, into the cartridge housing.

(c) Replace the upper cartridge cap and tighten using the special wrench.

(d) Lockwire the cartridge cap to the cartridge housing. Lead seal the locking wire.

(e) Repeat the procedure for the lower secondary cartridge.

NOTE

The bench should be covered with a linoleum or rubber top.

INSTALLING THE EJECTION GUN INTO THE AIRCRAFT

73 To install an ejection gun into an aircraft, proceed as follows:

(a) With the ejection gun in a vertical position in the cockpit, align the lower pick-up lug with the forked bracket at the bottom of the cockpit bulkhead.

(b) Insert the lower pick-up bolt and secure with a self-locking nut.

(c) Swing the ejection gun to the rear until the upper pick-up lug is aligned with the upper bracket on the cockpit bulkhead.

(d) Insert the upper pick-up bolt and secure with a self-locking nut.

(e) Attach the canopy cartridge firing unit to the ejection gun, proceeding as follows:

(1) Align the canopy cartridge firing unit with the bracket on the rear of the ejection gun.

(2) Insert the four bolts and secure them with self-locking nuts.

(3) Check the canopy emergency firing cable run for misalignment on the pulleys.

(4) Re-tension the firing cable to remove all slackness by adjusting on the tensioning barrel at the base of the canopy cartridge firing unit. Lockwire the tensioning barrel.

INSTALLING THE EJECTION SEAT INTO THE AIRCRAFT

NOTE

Ensure that the primary and canopy cartridges are not installed and that the drogue gun is not fitted to the ejection seat.

74 To install an ejection seat in the aircraft, proceed as follows:

(a) Ensure that the ejection gun intermediate piston is seated correctly in the outer cylinder.

(b) Ensure that the nut and bolt have been removed from the firing pin release rod and that the release rod has been withdrawn through the slot in the yoke to obtain sufficient clearance for the ejection gun firing body to pass freely through the top cross-beam of the seat.

(c) Ensure that the breech groove on the inner piston of the ejection gun is central within the latch housing.

(d) Ensure that the UHF and IFF circuit breakers on the cockpit circuit breaker console are pulled out.

(e) Guide the seat slipper pads into the ejection gun guide rails and permit the seat to descend slowly.

NOTE

The seat should be kept parallel with the guide rails to prevent the slipper pads from becoming distorted.

(f) Press down on the seat and tighten up the knurled nut of the seat locking plunger using the tommy bar provided on the seat for this purpose.

NOTE

The nut will be stiff to turn owing to the spring-loading of the latch. If the seat is correctly located with the ejection gun, the nut will remain stiff until the final turn, and will then become free.

(g) Ensure that the UHF and IFF switch actuator is correctly compressed by the striker plate.

(h) Lockwire the knurled nut to the side beam of the seat. Lead seal the lockwire.

(j) Align the leg restraint pulley bracket with the bracket on the cockpit floor and insert the quick-release pin.

(k) Remove the cloth bag from the aircraft portion of the composite leads disconnect and connect the aircraft portion to the seat portion.

(m) Remove the quick-release pin from the emergency oxygen starting lanyard bracket on the cockpit floor. Align the eye of the lanyard in the bracket and insert the quick-release pin.

(n) Swing the time delay mechanism trip rod forward and align the trip rod eye in the bracket on the cross-beam. Insert the quick-release pin in the bracket.

(p) Replace the survival pack in the seat pan.

ARMING THE EJECTION SEAT AND THE CANOPY

75 To arm the ejection seat and the canopy, proceed as follows:

NOTE

The rear seat should be armed first and the front seat should be armed last. Before commencing the seat arming procedure, ensure that the secondary cartridges are present in the ejection gun. This condition may be assured by the presence of locking wire and a lead seal on the side of each of the secondary cartridge housings.

(a) Remove the 1/16 inch cotter pin from the clevis pin in the sear actuating lever. Remove the clevis pin to disconnect the canopy emergency firing cable from the sear actuating lever.

(b) Remove the safety pin from the firing pin sear of the canopy cartridge firing mechanism and remove the firing body with the special wrench.

(c) Insert the canopy cartridge and replace the firing body. Tighten with the special wrench and replace the safety pin in the firing pin sear.

(d) Lockwire the firing body to the mechanism body and lead seal the locking wire.

(e) Align the fork end of the canopy emergency firing cable with the sear actuating lever and insert the clevis pin and lock with 1/16 inch cotter pin.

(f) Press the sear of the canopy cartridge firing mechanism forward and engage the eye of the longer firing cable with the hook of the sear. Allow the sear to return to its normal position.

NOTE

The operator should not, at any time, position his body above the drogue gun or the ejection seat during the ejection seat loading procedure.

(g) Remove the safety pin from the sear of the ejection gun firing body.

(h) Remove the firing body from the ejection gun using the special wrench.

(j) Insert the primary cartridge into the breech.

(k) Replace and tighten the firing body by using the special wrench MBEU/6146.

(m) Insert the safety pin into the sear of the ejection gun firing body.

(n) Lockwire the firing body to the breech collar of the ejection gun. Lead seal the lockwire.

(p) Align the vertical slot in the firing pin with the firing pin release rod aperture in the yoke. Insert the firing pin release rod through the aperture in the yoke and the slot in the firing pin, and ensure that the release rod rests in the slots in the firing pin collar. (See fig 4). Using a nut and bolt, secure the firing pin release rod to the yoke.

(q) Press the ejection gun sear forward and engage the eye of the short firing cable with the hook of the sear. Allow the sear to return to its normal position.

(r) Ensure that the sear is correctly located in the locking plunger of the drogue gun and that the safety pin is inserted in the safety lock.

(s) Ensure that the barrel is lockwired to the drogue gun body and that the lockwire is lead-sealed. Ensure that the cotter pin, locking the drogue gun piston to the barrel, is serviceable.

(t) Locate the drogue gun on the two studs on the left-hand side beam of the seat.

(u) Secure the drogue gun to the seat using the two self-locking nuts.

(v) Remove the nut and bolt from the controller drogue withdrawal line shackle and connect the shackle to the lug on the top of the drogue gun piston. Replace the nut and bolt in the shackle.

(w) Withdraw the quick-release pin from the bracket on the cross-beam at the rear of the ejection gun. Align the eye of the trip rod of the drogue gun with the bracket. Replace the quick-release pin in the bracket. Attach the bungee cord to the trip rod.

(x) Remove the quick-release pin from the lug on the yoke. Align the lug end of the telescopic link with the yoke lug and insert the quick-release pin.

(y) After the loading procedure has been completed, hang a "Warning - Seat Loaded" sign on the ejection seat and/or the canopy.