Chapter 13 BRAKE PARACHUTE

(Completely revised)

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LIST OF ILLUSTRATIONS

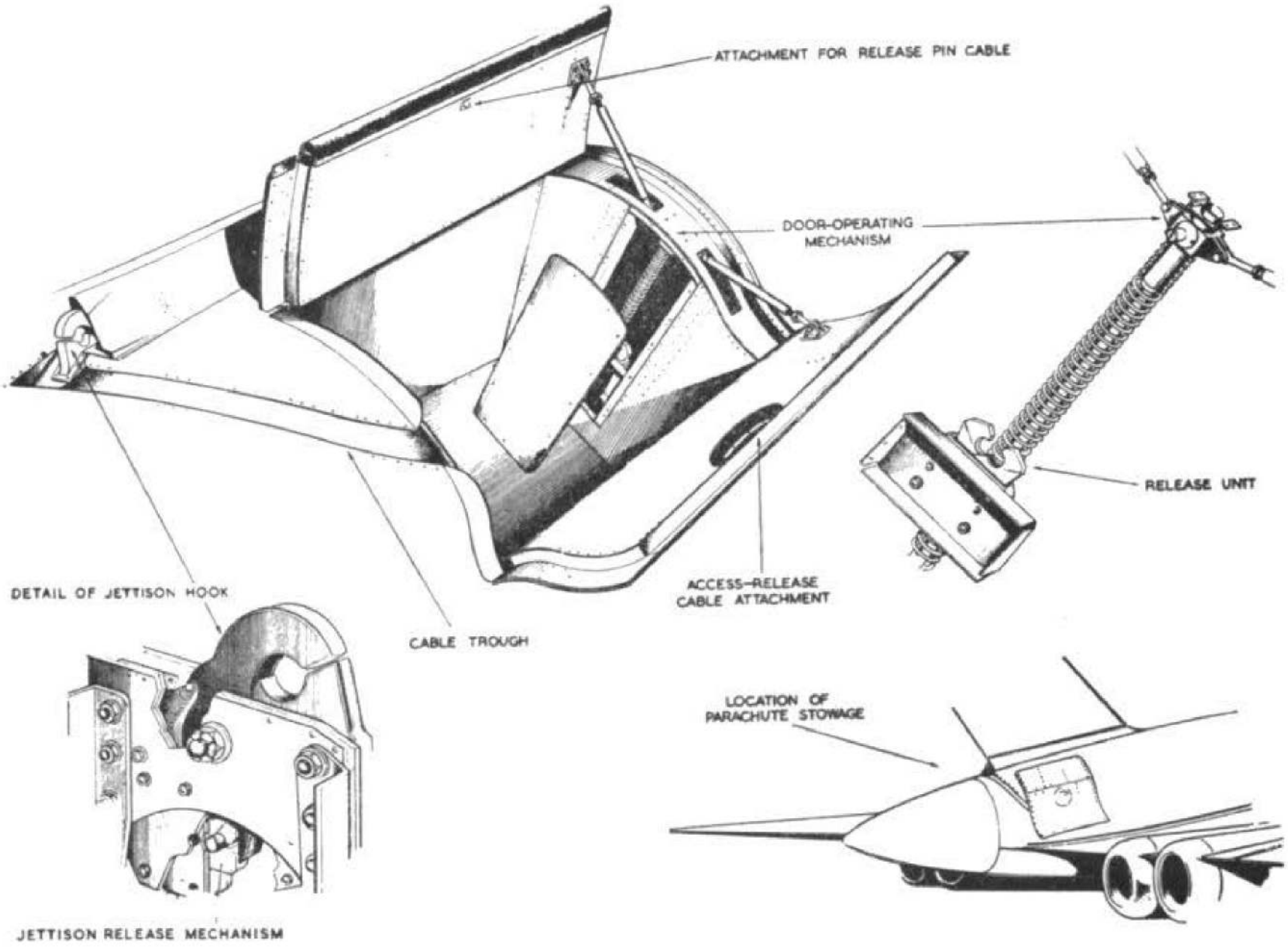

Fig. 1. Brake parachute installation

DESCRIPTION

Introduction

1. This chapter contains a description of the landing brake parachute assembly and housing, gives details of certain servicing operations and recommends the method of installation into the aircraft. General information on parachutes is contained in A.P.1182A, Vol. 1; an illustration of the stowage compartment in the rear end of the aircraft is shown in fig. 1.

General

2. A built-in stowage on the aft, starboard side of the rear fuselage accommodates a landing brake parachute assembly, Type F.38, Mk. 1.

3. Normally the parachute is used to supplement the drag of the air brakes, when the aircraft has reached the ground, and thus reduce the landing distance. It can also be used as an emergency brake or to assist braking in bad, e.g., icy, runway conditions. Use of the parachute reduces the load on the main-wheel tyres and brakes, consequently minimising wear on these components.

CONTROLS

4. Opening of the stowage compartment doors, to release the parachute, is accomplished electrically, a two-position toggle switch being provided on the starboard side of the first pilot's instrument panel. The up position selects STREAM, and the down position selects OFF or JETTISON to release the parachute from the aircraft.

DOOR-OPERATING MECHANISM

5. The doors are attached by tubular struts to a door-operating release mechanism; the parachute release pin is attached, by cable, to the upper door (*fig.* 1). The mechanism consists of a tubular member supported by channels in which it is free to move upwards or downwards. Near the lower end of this tubular member is a built-in stud, whilst below the member is a compression spring. When the doors are closed, the member is held by a bomb-release type unit, the jaws of which encircle the stud, and the spring is held in compression.

JETTISON MECHANISM

6. Adjacent to the parachute housing is a jettison release mechanism, to which the parachute cable is attached, consisting of a fixed block and a jettison hook (*fig.* 1). The latter has a pivot bolt through its centre and is normally held in the closed position by the bomb-release type unit, the jaws of which hold a stud at the lower end of the hook. A helical tension spring is attached, at one end, to the hook and, at the other end, to the aircraft structure; the spring is extended when the hook is closed.

PARACHUTE ASSEMBLY

7. The parachute assembly, weighing 112 lb., consists of a main canopy of concentric ribbons, a spring-loaded vane-type auxiliary, a pack and a riser connecting the main parachute to the hook mechanism (*para.* 6) at the rear of the aircraft.

8. A 38-feet flat nylon ribbon parachute of the FIST type constitutes the main canopy. It has 34 gores fitted with taschengurts and rigging lines 53 feet long overall, the last 15 feet being bound together to form the riser.

9. The spring-loaded auxiliary parachute measures seven feet across the canopy and is of the non-fouling type. The rigging lines are bound together forming an eye to which the five feet nylon auxiliary strop is attached. This strop connects the auxiliary parachute to the bridles on the pack.

10. Constructed of khaki cotton fabric duck, the pack is divided into two parts, one containing the main canopy and the other the horizontally-stowed rigging lines when they are in the stowed position. The pack, in turn, is connected to the apex of the main parachute by nylon extension and apex strops.

11. The auxiliary parachute and pack remain attached to the main canopy during the landing but can be detached and replaced separately if required.

OPERATION

12. Operation of the cockpit toggle switch, to the STREAM position, energises the solenoid of the bomb-release type unit to open the jaws (*para.* 5). The tubular member now being released, is forced upwards by the spring below it and, through the strut linkage, the doors are opened. Opening of the upper door pulls the release pin cable of the parachute pack and the pin is withdrawn from the parachute locking cone.

13. The locking cone normally holds the four petals of the cover together over a spring-loaded vane auxiliary parachute. When the cone is released, the auxiliary parachute moves out into the air stream and develops just aft of the aircraft tail structure. Drag produced by the auxiliary parachute is sufficient to withdraw the main parachute pack out of its stowage and clear of the aircraft.

14. The main pack moves aft, relative to the aircraft, and the rigging lines deploy from the pack followed by the main canopy which then develops in the airstream to produce a drag on the aircraft; the pack and auxiliary parachute remain attached to the canopy by an extension cord tied to the canopy apex.

15. Attachment of the main canopy to the aircraft is effected by means of a steel shackle, one end of which is secured through a shear pin and bobbin to a hide-bound loop formed at the end of the rigging line riser; the other end of the shackle rests inside the jettison hook (*para.* 6) secured to the aircraft structure.

16. Drag produced by the streamed canopy reacts along the rigging lines, up the main riser through the shear pin to the shackle and is then transferred to the main structure through the attachment hook.

17. Selection of the JETTISON position by the cockpit switch will energise the bomb-release unit solenoid to open the unit jaws (*para.* 6). The hook stud, now being released, allows the hook to be opened by the contraction of the tension spring, the shackle is released and the parachute assembly is jettisoned.

18. Should the parachute be streamed at an excessive speed (the limit is given on a label in the pilots' cockpit) at which the braking load of the parachute would damage either the parachute assembly or the aircraft structure, the shear pin housed in the shackle attachment would break and the parachute fall away from the aircraft. The shear load of the pin is, at present, 28·4 tons ± five per cent.

19. In the event of an unselected stream taking place, the electrical system is such that if the stowage compartment doors open without electrical selection in the cockpit, an electrical supply is fed to the jettison release unit, which immediately opens and the parachute assembly is released before it can develop.

SERVICING

Warning

Personnel must keep well clear when the parachute compartment doors are tested, since they open with considerable force.

General

20. Servicing of the brake parachute assembly should be to the same standard as that detailed in A.P.1182A, Vol. 1; there is no limit to the number of permissible streaming operations providing that the serviceability does not fall below the requirements given in A.P.1182A, Vol. 1. Following a stream and after examination, the parachute may be repacked and installed in the aircraft provided that it has not been exposed to extreme climatic conditions.

21. Routine servicing should consist of airing, examination and repacking at the stipulated intervals or more frequently if necessitated by the ingress of moisture during aircraft installation life. During storage, a bi-monthly examination only is required if the storage conditions are satisfactory.

COMPARTMENT MECHANISM

22. Periodical lubrication of the compartment mechanism is the only servicing normally required. All surplus lubricant must be removed and care must be taken to ensure that no oil or grease comes in contact with the parachute assembly.

Jettison hook

23. A hole drilled in the top jaw of the jettison hook through which a bar is inserted to help the tradesman to close the hook, should be greased regularly with grease XG-275 to prevent corrosion.

REMOVAL AND ASSEMBLY

INSTALLATION IN AIRCRAFT

General

24. To install a brake parachute in the aircraft:—

(1) Ensure that the cockpit switch is OFF.

Note . . .

Frequent operation of the electrical release units should be avoided as this will cause them to burn out.

(2) Pull out the two bridles from the locking loops (*fig.* 3) and push them into the fold between the ends of the pack as illustrated in *fig.* 4.

(3) Manoeuvre the pack into its correct position in the compartment (*fig.* 5).

(4) Lay the riser in the trough and estimate the length of riser required to ensure that slack is eliminated between the jettison hook and the compartment when installation is complete. The length of the riser is adjusted by lifting the pack and withdrawing or pushing the riser from or into the riser guide on the bottom of the pack.

(5) Partly close the compartment doors until it is possible to attach the parachute release pin cable to the attachment point on the upper door. Ensure that the pin is located in the locking cone on the pack so that it may be withdrawn by an upward pull, and then attach the static line, self-locking hook to the top door (*fig.* 6). If the static line pin is incorrectly located in the locking cone on the pack, the parachute will not be released on selection.

(6) Close and lock the doors by pushing them down into their correct position. The door release unit should automatically close with the doors.

(7) Ensure that the doors are closed correctly by checking with a test lamp and battery (current not to exceed 0·2 amp) or test set in the cocking test socket accessible through the rear access panel below the parachute compartment.

Note . . .

The correct sequence of closing the doors, checking and then closing the jettison hook must be followed otherwise the release units will be damaged electrically.

(8) Lay the shackle in the bottom jaw of the jettison hook and the riser across the fuselage just forward of the trough (*fig.* 7).

(9) Lift the shackle so that it is approximately horizontal and then close the jettison hook. The shackle may have to be manoeuvred before the jettison hook will close (*fig.* 7).

(10) Check the locking of the jettison hook with a test set or lamp plugged into the socket adjacent to the door cocking test set.

(11) Push the riser into the trough. The trough seal should be held to prevent the riser forcing it into the trough. Check that the riser is taut between the shackle and the compartment (*fig.* 8).

(12) Cover the trough with the seal and make it as flush as possible with the aircraft skin line.

(13) The installation is now complete and ready for flight (*fig.* 9) and full development on landing run should be as shown in fig. 10.

REMOVAL FROM AIRCRAFT

25. The parachute assembly can be removed from the aircraft by manually operating the release units. The doors are opened by pulling the manual release wire on the bomb-release type unit (inside the tail end of the aircraft); to open the jettison hook, push a $\frac{1}{8}$ in. dia. pin into the hole on the centre line of the former adjacent to the hook. Ensure that the door manual release is reset before attempting to reclose the doors, the jettison hook manual release will automatically reset after operation.

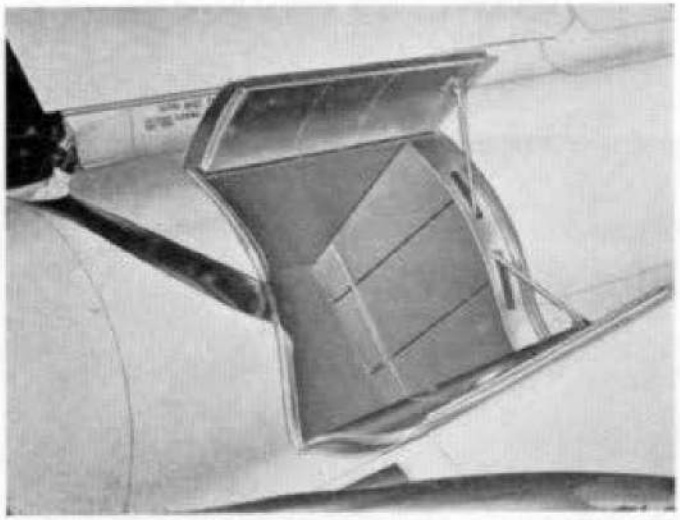

Fig. 2. Aircraft stowage ready for installation

Fig. 3. Fitting of parachute to aircraft (1)

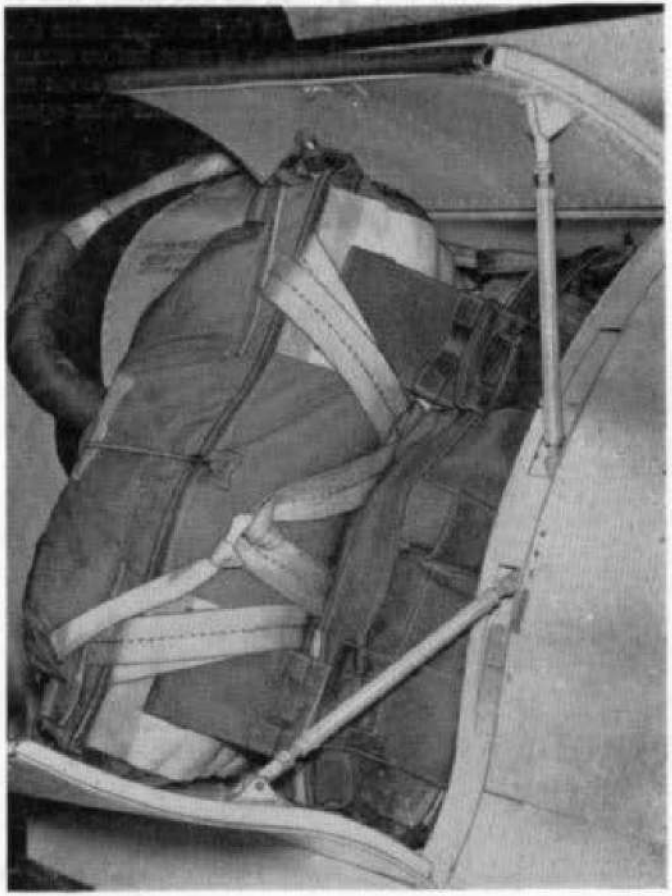

Fig. 4. Fitting of parachute to aircraft (2)

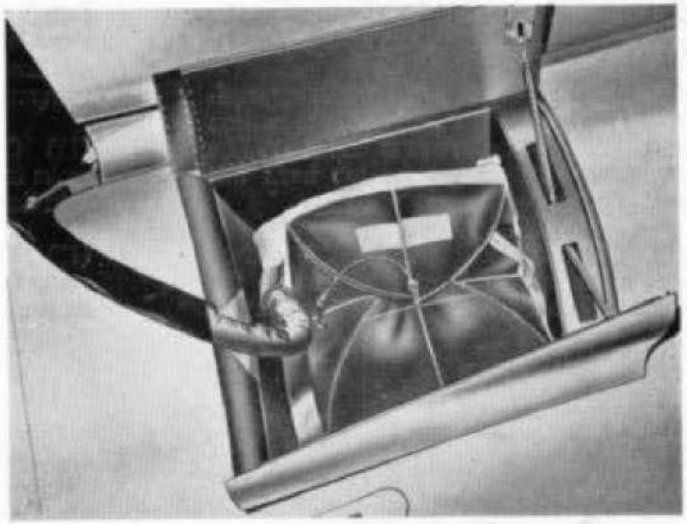

Fig. 5. Parachute stowed in aircraft

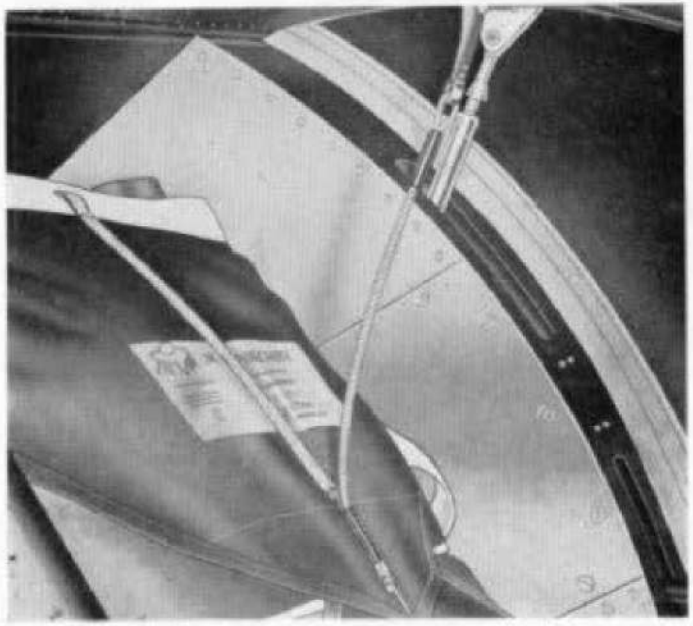

Fig. 6. Attachment of release pin

Fig. 7. Attachment of shackle

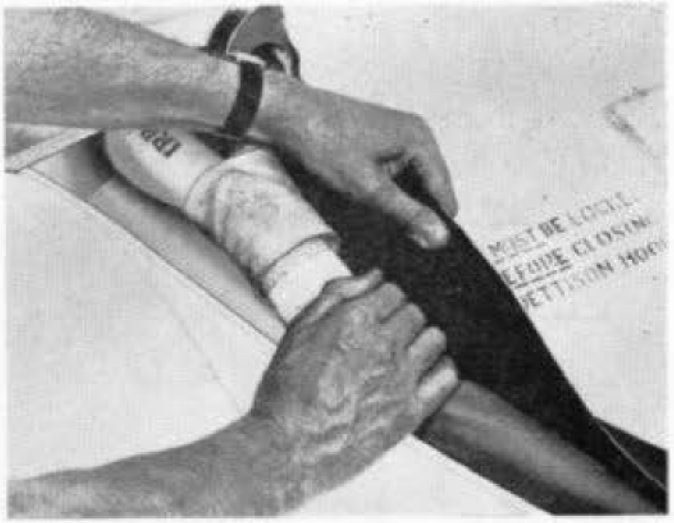

Fig. 8. Installation of riser

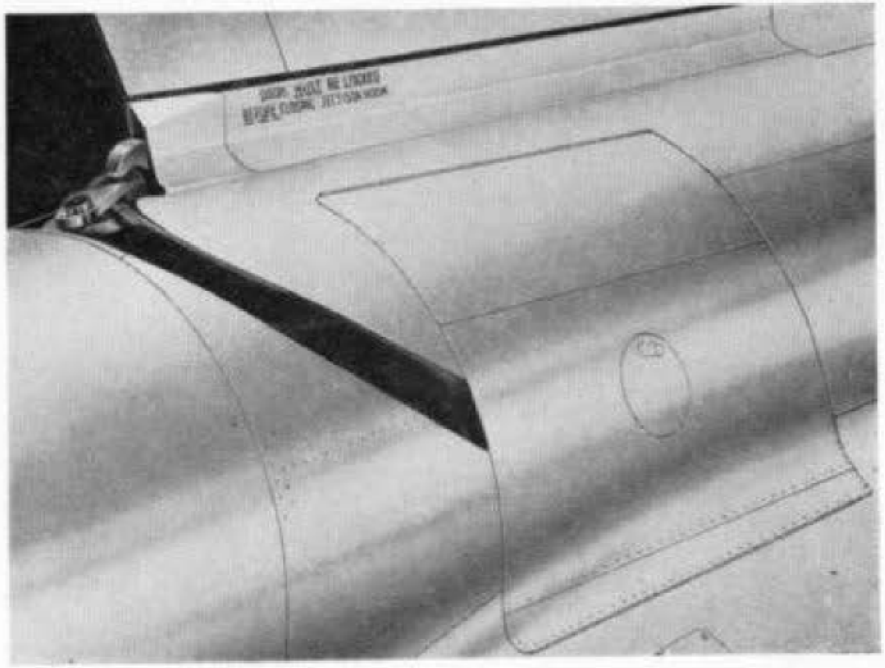

Fig. 9. Aircraft stowage ready for flight

Fig. 10. Tail parachute in operation

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