

Chapter 1

GROUND HANDLING

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Safety precautions

1. The canopy hatch of this aircraft is jettisoned by the operation of an emergency release control which fires a gun. To prevent inadvertent firing of the canopy hatch jettison gun, a locking pin with warning flag must be fitted at all times and must only be removed by the pilot immediately prior to flight. A description of the canopy hatch jettison gun is contained in Sect. 7, Chap. 1.

General

2. This chapter covers the general handling of the aircraft on the ground, together with information on the equipment associated

with such handling. A complete list of the equipment and special tools required for general servicing is contained in Chap. 4.

Access to cockpit

3. A telescopic ladder is provided to facilitate access to the cabin. This may be secured to the fuselage by inserting a spigot provided on the ladder into one of two ferrules located in the port and starboard walls. The spigot should be turned after insertion to lock the ladder in position. Entry is through the hinged canopy hatch which is opened by an external lever on the rear starboard side.

Note . . .

To prevent damage to the canopy hatch locking mechanism, care must be exercised to avoid "snatch" when opening the hatch in high winds.

Towing

4. The aircraft may be towed by tractor, using the standard towing and steering arm together with the adapter as shown in fig. 1. It is important that the assembly should be used correctly to prevent structural damage resulting from shock loads sustained when towing. The overload release mechanism on the towing arm should be set to release at 2,250 lb.

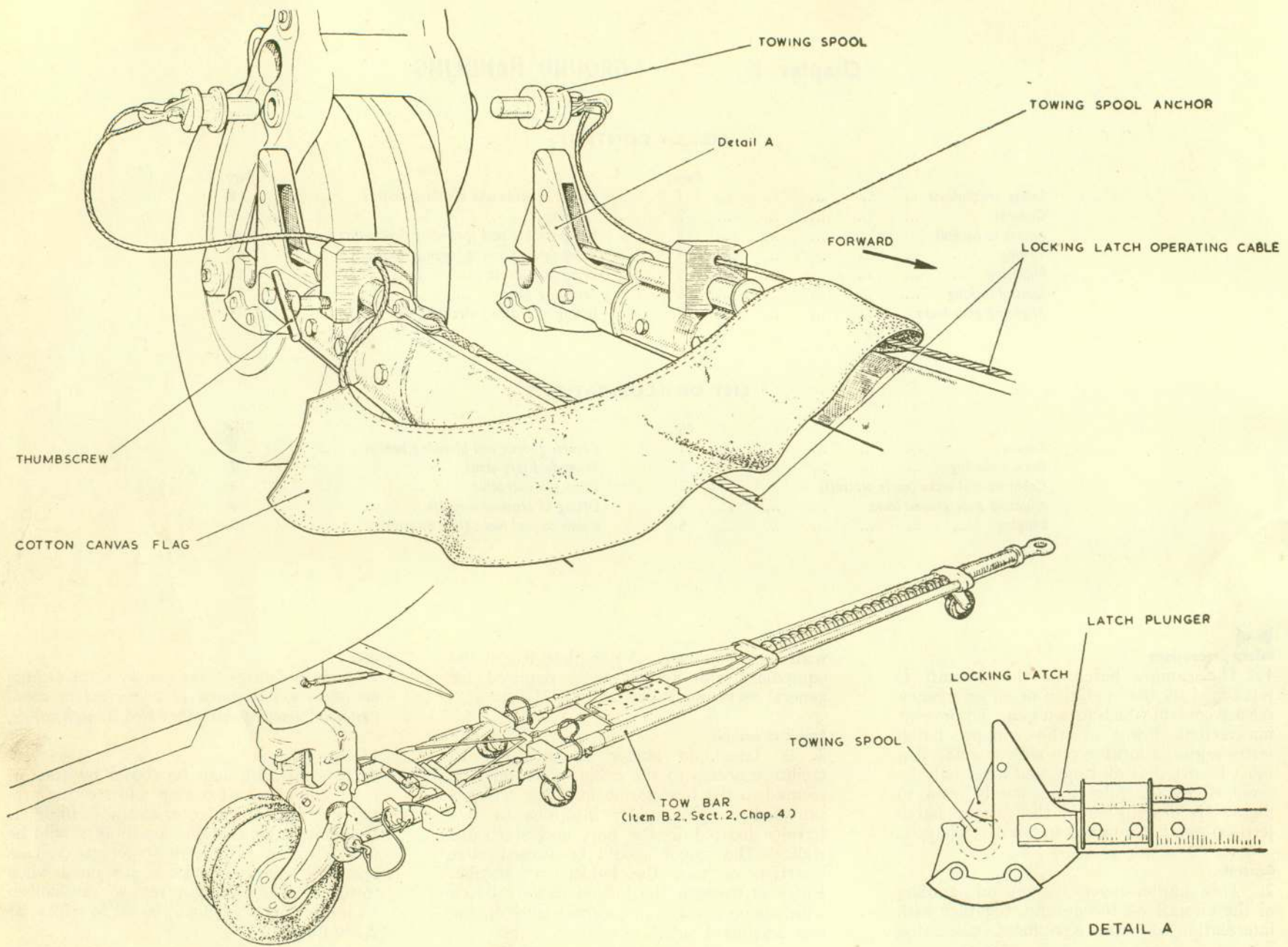


Fig. 1. Towing

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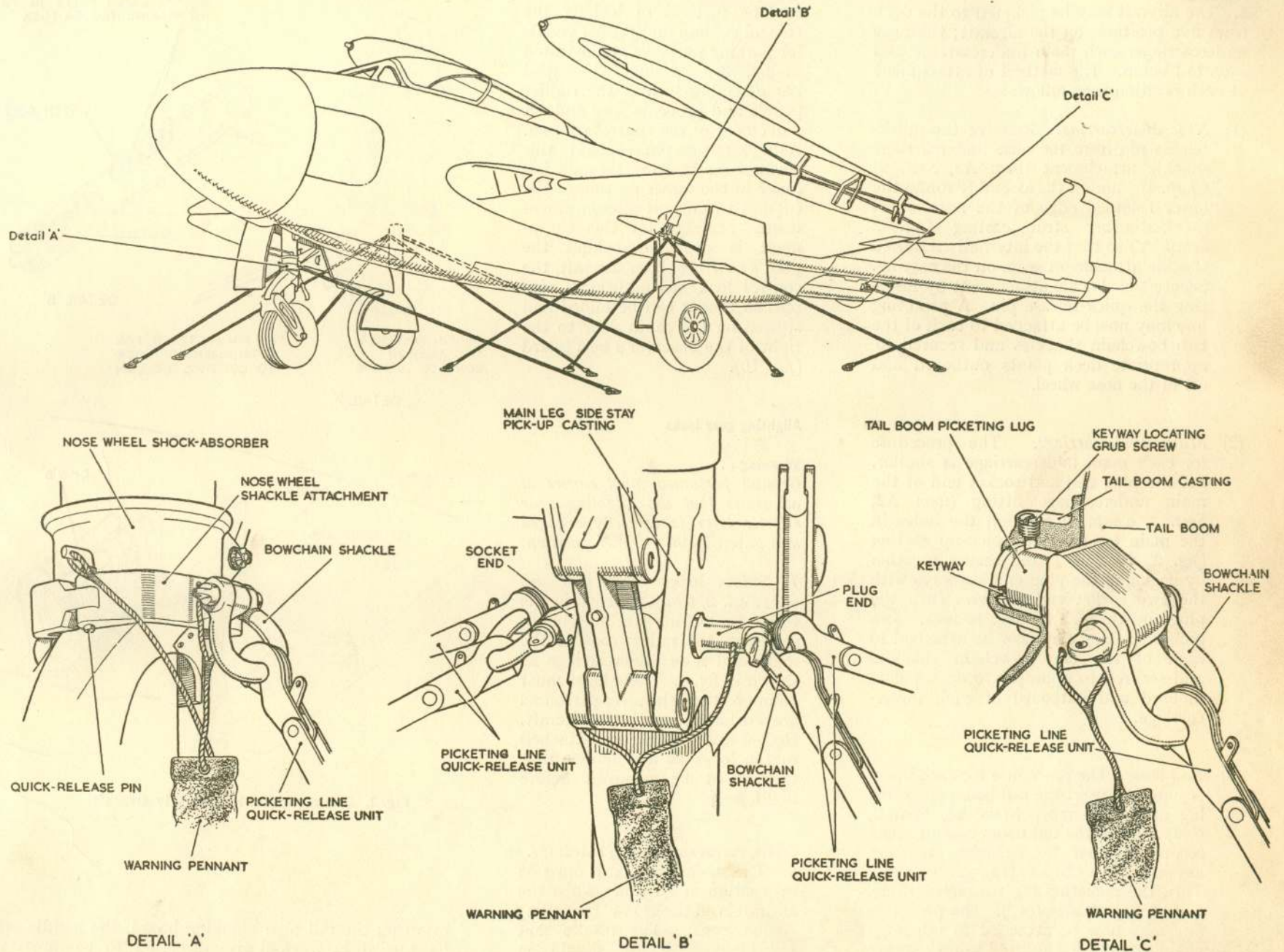


Fig. 2. Deck picketing

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Picketing

5. The aircraft may be picketed to the deck from five positions on the aircraft; the nose undercarriage, each main undercarriage and each tail boom. The method of attachment at each position is as follows:—

- (1) *Nose undercarriage.* Remove the quick-release pin from the nose undercarriage shackle attachment (*item A3, Sect. 2, Chap. 4*), and fit the assembly round the lower rounded edge of the nose wheel shock-absorber strut casting (*fig. 2 detail 'A'*) so that the internally radiused shackle attachment seats on the casting. Secure the shackle attachment by inserting the quick-release pin. A picketing line may now be attached to each of the two bowchain shackles and secured to appropriate deck points outboard and aft of the nose wheel.
- (2) *Main undercarriage.* The procedure for each main undercarriage is similar. Fit the plug end and socket end of the main undercarriage fitting (*item A2, Sect. 2, Chap. 4*) through the holes in the main leg side stay pick-up casting (*fig. 2, detail 'B'*), and secure together by engaging the plug end keyways with the two socket end screws. Turn the plug end through 90 deg. to lock. Two picketing lines may now be attached to each of the two bowchain shackles and secured to appropriate deck points inboard and outboard of each undercarriage.
- (3) *Tail boom.* The procedure for each boom is similar. Insert the tail boom picketing lug of the assembly (*item A4, Sect. 2, Chap. 4*) into the tail boom casting, then secure together by engaging the lug keyways with the locating grub screws. Turn the picketing lug through 90 deg. to lock (*fig. 2, detail 'C'*). The picketing line may now be attached to the bowchain shackle and secured to an appropriate deck point outboard of the opposite boom.


Control locking

6. The method of locking the control column and rudder pedals for parking purposes is illustrated in *fig. 3*. A single V-shaped bar assembly secures the rudder pedals and prevents fore and aft movement of the control column. A quick-release pin secured to this assembly is inserted through the hinge of the upper portion of the column to prevent aileron movement. Stowage for this equipment is provided behind the pilot's seat. On later aircraft, the control lock has additional pippins so that it can be folded and stowed on the cabin floor to the right of the observer's heel guard (*fig. 10*).

Alighting gear locks

Warning . . .

Ground personnel must ensure at all times that the alighting gear selector lever is correctly engaged and gated in the DOWN position.

7. Safety locks (*items G.6 and G.7, Sect. 2, Chap. 4*), each in the form of a locking pin, may be inserted in the radius rods of the main and nose undercarriage as shown in *fig. 4*. These locks must be in position whenever personnel are working beneath the aircraft. Red warning flags are attached to the locks as a reminder that they must be removed before flight. 

Covers, guards and blanking boards (*fig. 6*)

8. The air-intake guards must be in position at all times when the aircraft is on the ground (including engine runs). The intake and tail blanking boards should be fitted when the aircraft is parked for any appreciable time. After

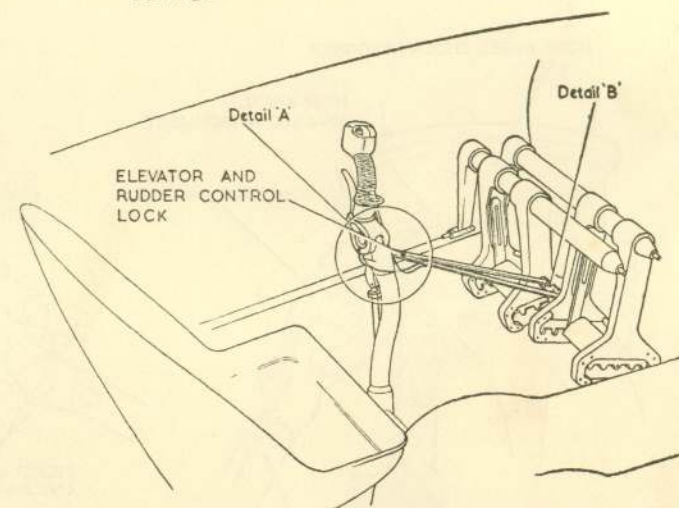
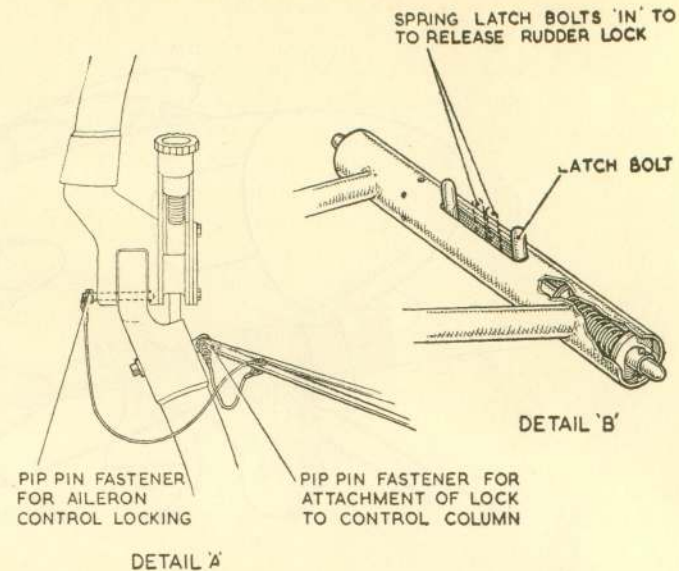
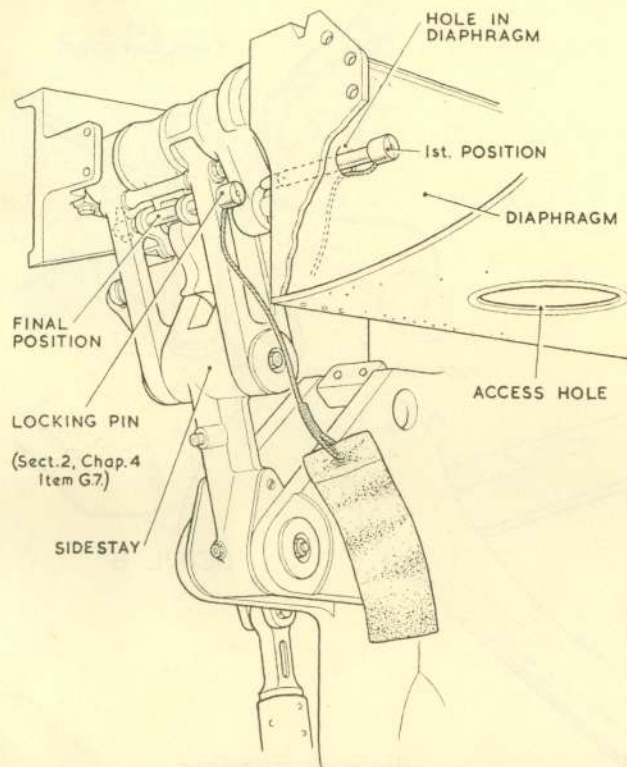


Fig. 3. Cabin control locks (early aircraft)

inserting the tail pipe blanking board, the handle must be turned in a clockwise direction to compress the rubber seal, thereby expanding its periphery outwards to grip the internal wall of the jet pipe.



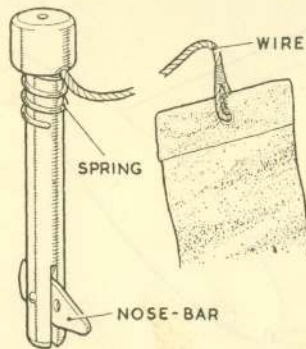
MAIN U/C LOCKING PIN INSERTION

1. Insert the head of the locking pin rearwards through the small hole in the diaphragm until the nose of the pin is in line with the holes in the sidestay (1st. position).
2. Pull the wire of the locking pin to draw the pin into the sidestay. (Final position).
3. Turn down the nose-bar of the locking pin

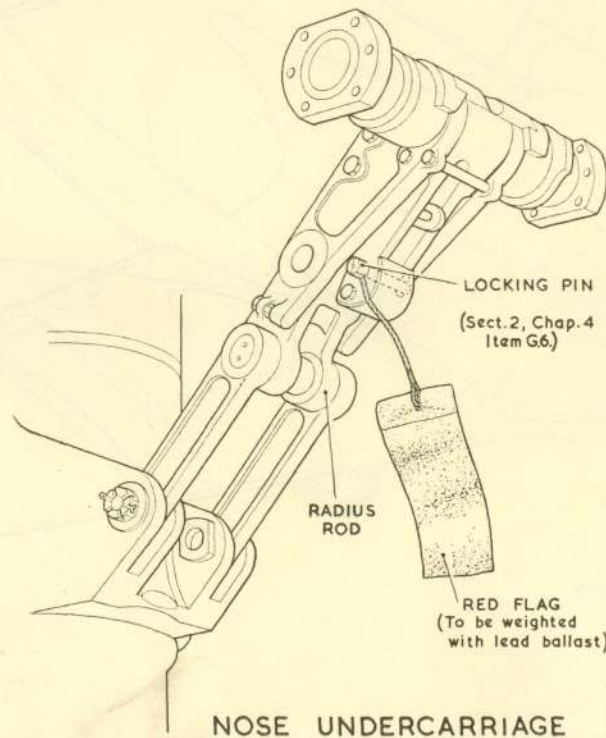
EXTRACTION

Remove the locking pin in the reverse sequence

MAIN UNDERCARRIAGE



DETAIL OF LOCKING PINS



NOSE UNDERCARRIAGE

Slinging

9. The method of slinging the complete aircraft is shown in fig. 5. The two forward attachment bolts are screwed through the nose fuselage skin, into castings secured to the stiffeners mounted on the forward face of bulkhead No. 1. Access to the two aft attachment points is gained by removal of small cover plates from the forward end of each boom. The double-ended threaded adapter, must be screwed into the boom end casting and the lifting bolt assembly (item E7, Sect. 2, Chap. 4) offered up to the adapter, and tightened down with the inner sleeve to secure the assembly in place. The aircraft may be slung with the main planes spread or folded; if the main planes are folded the jury struts must be secured in position between the wing tip tank crutch fitting and the jury strut lug (fig. 7).

Wing folding and spreading (hydraulic)

10. Two levers, mounted side by side on the rear lower port side of the cockpit, control the folding and spreading of the outer sections of the main planes. The outer lever controls the withdrawal of the locking pin from the forward latch pin, and the inner lever selects the hydraulic pressure to the wing fold jack. The jack is located in the outer portion of the wing and power is supplied by the engine-driven hydraulic pumps. Inter-connected with the locking pin control, a red indicator lamp is raised above the top surface of the inner wing near the leading edge when the locking pin is withdrawn, and lowers flush with the wing surface when the wings are spread and locked. In addition, the latch pins, when in the locked position, operate micro switches which are connected to an indicator on the instrument panel. The outer wing moves through an angle of 144 deg. to the folded position and can be braced by a jury strut (fig. 7). The strut is attached to a fitting at the forward end of the tail boom and to a fitting on the crutch of the wing tip fuel tank. To enable the wing fold mechanism to be operated by the hand pump, a manually-operated non-return valve is provided. Further details of the wing folding mechanism are given in Sect. 3, Chap. 2.

Fig. 4. Alighting gear ground locks.

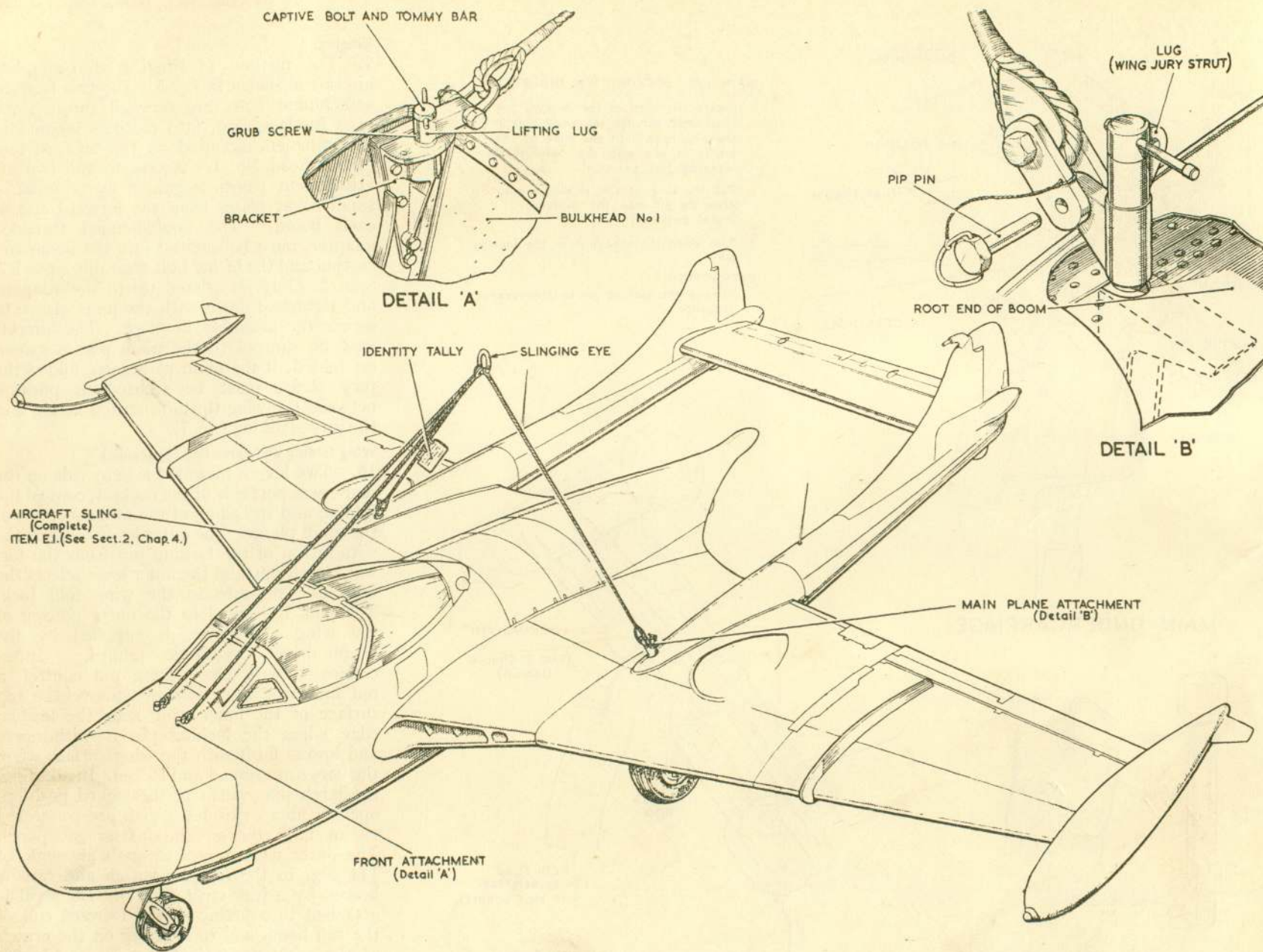


Fig. 5. Slings.

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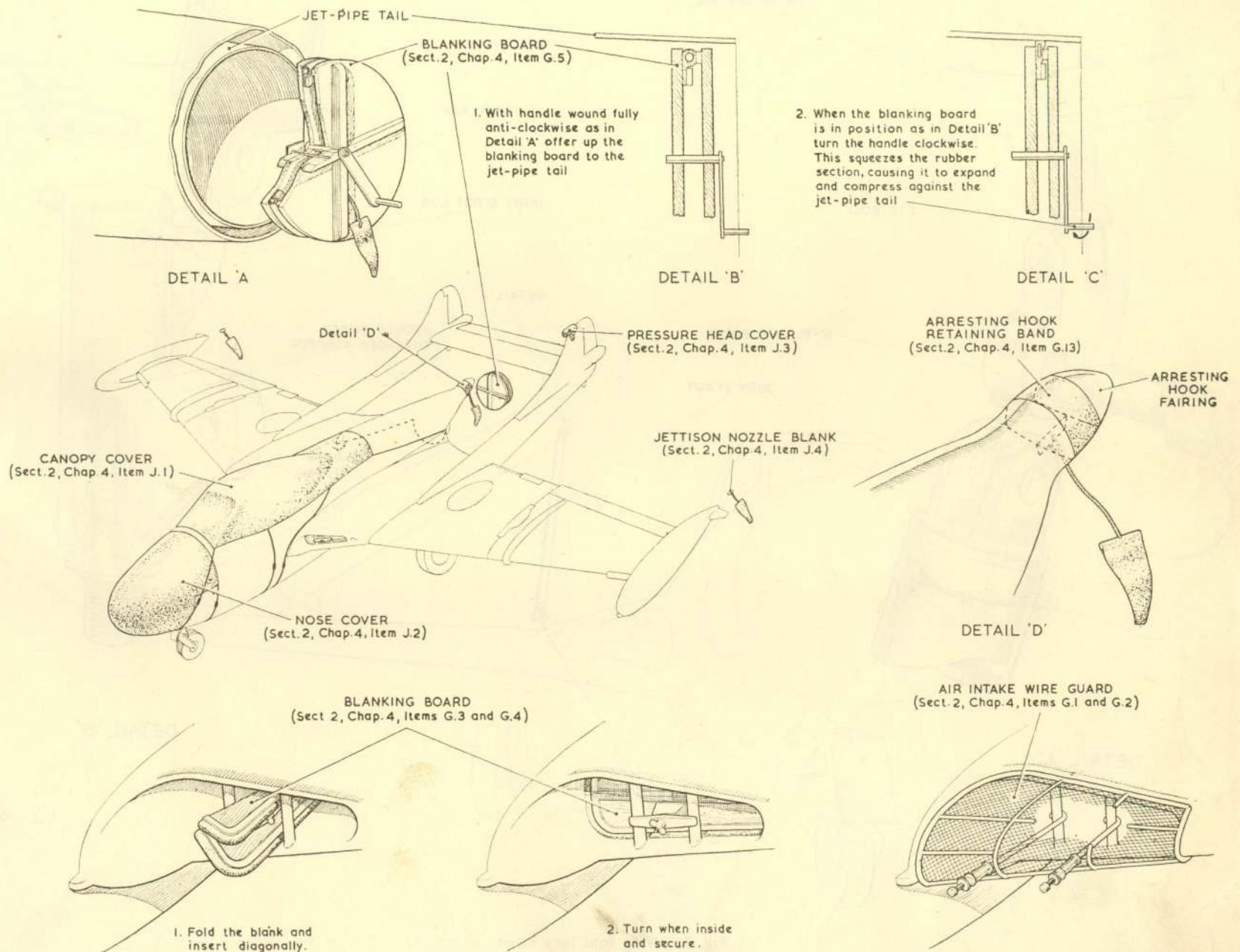


Fig. 6. Covers, guards and blanking boards

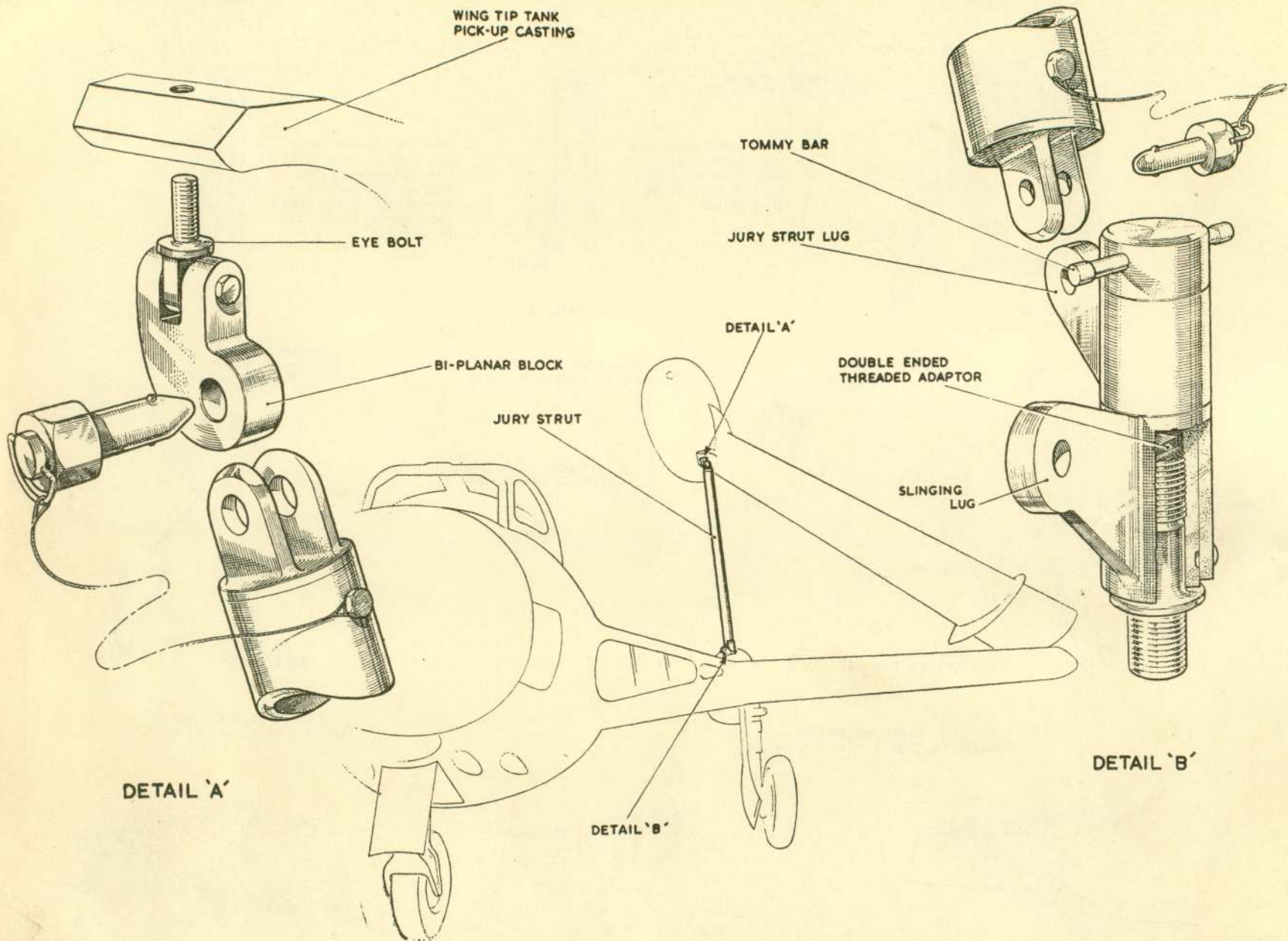


Fig. 7. Wing fold jury strut

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Warning . . .

When the wing is being folded using the hand pump, no manual assistance should be applied at the wing tip, as this alters the loading at the bottom pivot and can cause the cam actuator to jam and possibly fracture. ▶

Wing folding and spreading (manual)

11. In the event of hydraulic failure, the outer wings can be folded manually, in the following manner:—

- (1) Open the two access doors on the underside of the main plane beneath the folding mechanism.
- (2) Lift locking pin from forward latch pin, using the control lever in the cockpit, and select WING FOLD.
- (3) Insert the spigots of the latch pin extractor tool (item 10, Sect. 2, Chap. 4) in the angles formed by the jack levers and the forked links. Fig. 8 illustrates the extractor tool in position.
- (4) Tighten the nut on the extractor tool to withdraw the latch pins. If the latch pins do not withdraw, the hydraulic jack must be disconnected from the jack levers.
- (5) With sufficient man-power, fold the wing and fit the jury strut, ensuring that the weight of the outer wing is suitably supported when folding beyond the vertical position.

Wing jury struts

12. These struts are to be fitted whenever aircraft are picketed for flight deck stowage and when wing folding jacks are unserviceable, the outer wings being in the folded position. To fit a jury strut (item G.10, Sect. 2, Chap. 4), remove the covers from the forward end of each boom, and screw the double-ended threaded adapter (detail B, fig. 7) into the boom end casting. The lifting bolt assembly (item E.7, Sect. 2, Chap. 4), should then be offered up to the adapter and tightened down with the inner sleeve to secure the assembly.

Arresting gear

13. For deck landing purposes an arresting hook assembly is fitted at the aft end of the fuselage. It is operated by two hydraulic

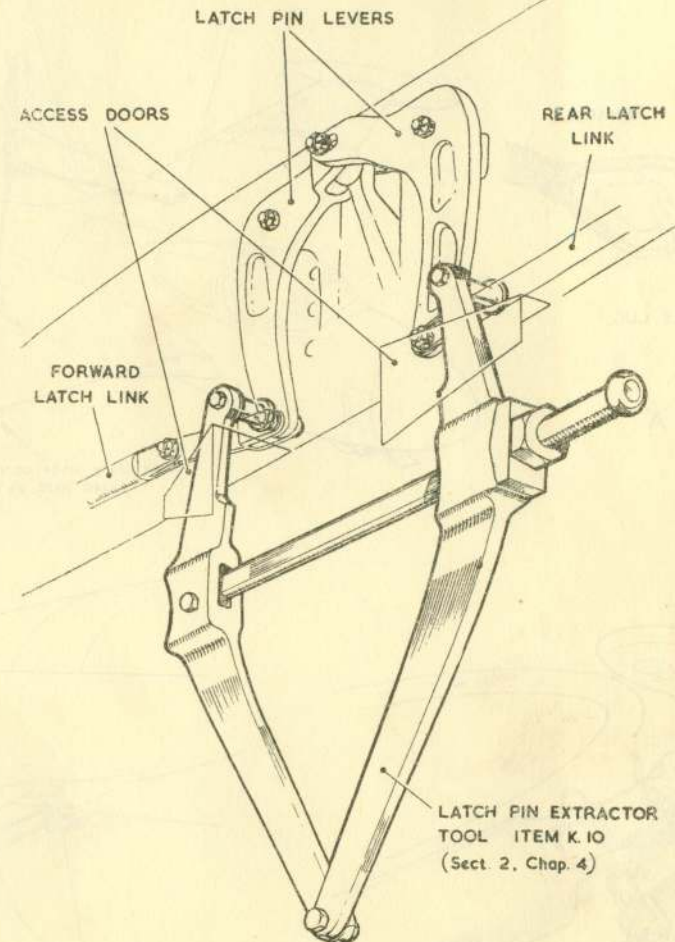


Fig. 8. Latch pin extractor

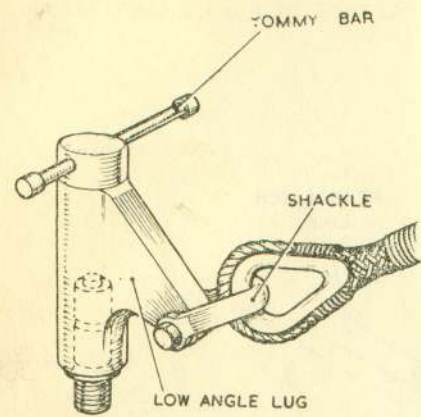
jacks, and, to prevent the hook bouncing on contact with the flight deck, the jacks are connected to hydraulic accumulators. A warning lamp in the cabin indicates when the arresting hook has been lowered to 25 deg. to 29 deg. below the horizontal. For further details of this assembly refer to Sect. 3, Chap. 5. The air pressure in the accumulators is given in the Leading Particulars. There is no mechanical up-lock for the hook, and therefore a retaining band (item G.13, Sect. 2, Chap. 4) is provided and is

to be fitted round the hook and rear cone beak when the aircraft is on the ground. The band, which has a danger pennant fitted to it, must be removed before flight.

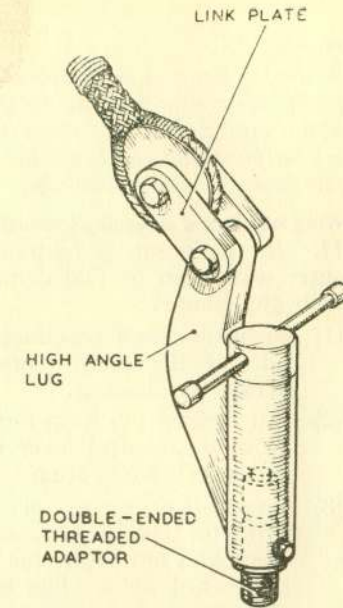
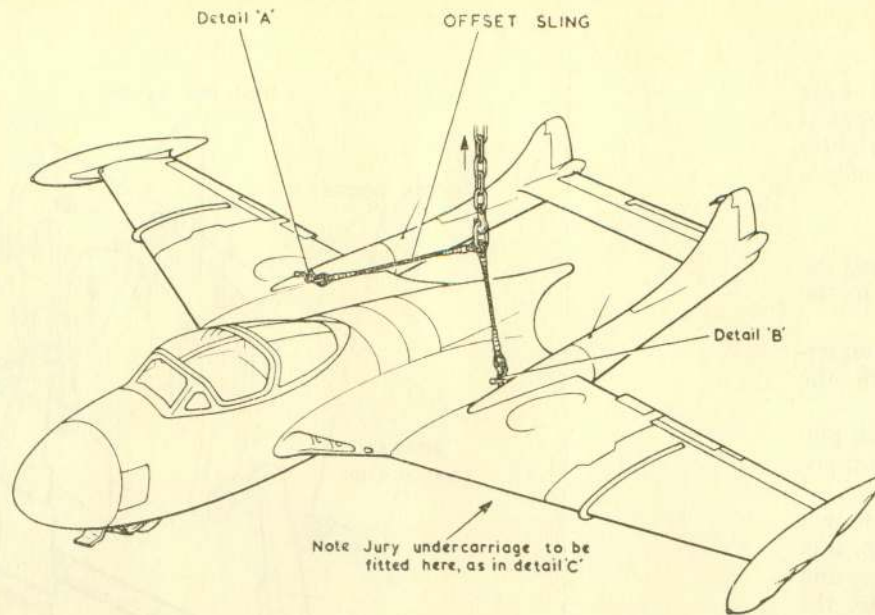
Lifting of crashed aircraft**14.****Note . . .**

The jury undercarriage is a standard unit and may be used at either port or starboard side of the aircraft. When fitted, the side stay is attached to the inboard wheel axle eye end

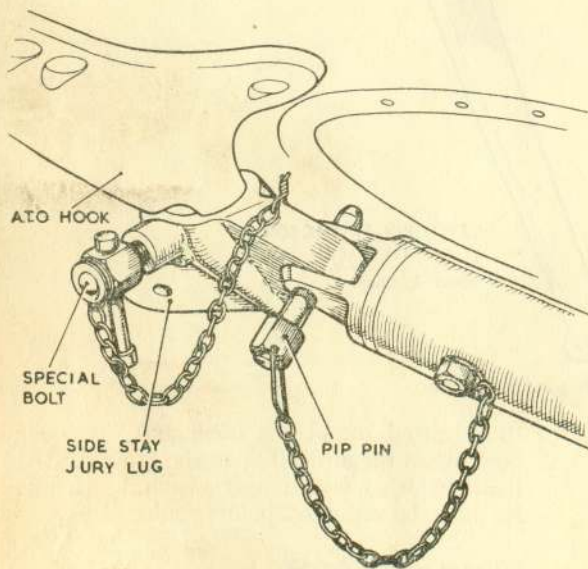
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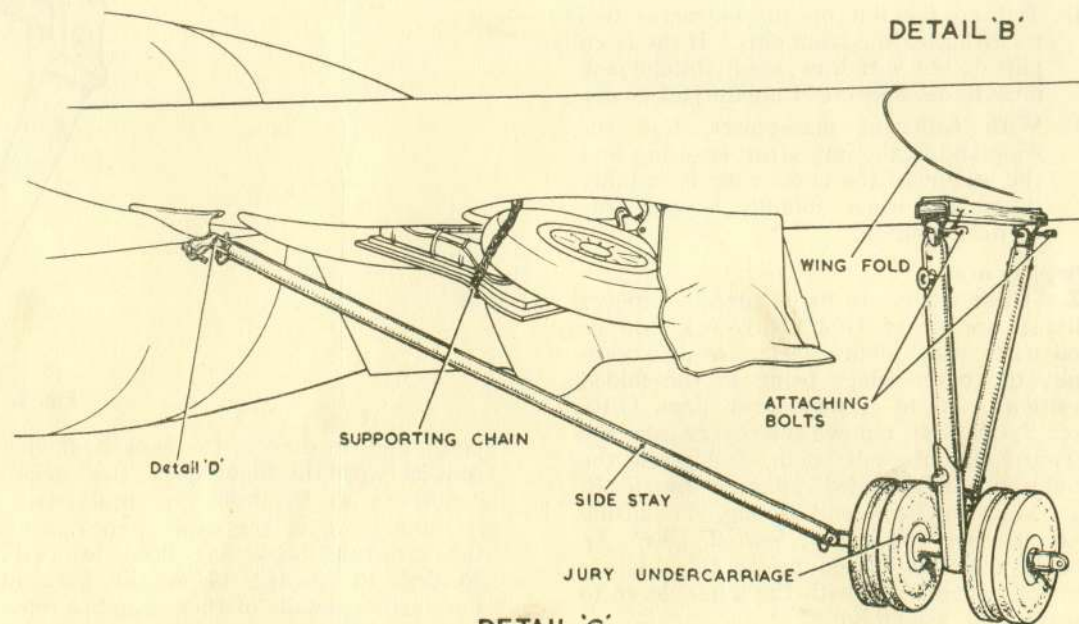
DETAIL 'A'



DETAIL 'B'



DETAIL 'D'



DETAIL 'C'

Fig. 9. Lifting of crashed aircraft

of the jury undercarriage. Before the jury undercarriage can be attached to the under-surface of the main plane, it is necessary to remove the slave plate (when R.P. struts are not fitted) from the port and starboard forward outboard positions by operating the lock and sliding the slave plate rearwards. The rear fairing plate, which is held in place by a single DZUS fastener, can then be removed.

If the aircraft has crash landed and rendered either or both of its main undercarriage struts unserviceable, the following procedures are to be adopted to enable the aircraft to be rigged on a jury undercarriage.

- (1) If one undercarriage leg is unserviceable, proceed as follows:—
 - (a) Remove the cover plates and fit the double-ended threaded adapters at the boom end castings on the top surface of the main planes. With the special off-set sling (item E.8, Sect. 2, Chap. 4) in position on the overhead crane, fit the appropriate slinging lugs, the high-angled lug assembly to the side requiring lifting (fig. 9, detail B) and the low-angled lug assembly to the opposite side (fig. 9, detail A), then screw down with the tommy bar on each boom to secure the assemblies.

- (b) Chock the serviceable main undercarriage wheel fore-and-aft to prevent the aircraft from swinging, and lift the aircraft just sufficiently to allow the jury undercarriage (item G8, Sect. 2, Chap. 4) to be fitted.
- (c) Fit the jury undercarriage by screwing the two attachment bolts on the main strut into the two holes provided in the underside of the main plane just inboard of the wing fold.
- (d) Secure the damaged undercarriage leg by fitting the supporting chain (item G9, Sect. 2, Chap. 4) around the leg and attaching the chain and hooks to the wheel well housing.
- (e) Fit the inboard attachment assembly to the catapult A.T.O. hook (detail D, fig. 9) and secure by screwing in the special bolt. Attach the side stay tube of the jury undercarriage to the inboard attachment.
- (f) Lower the aircraft and remove the sling at the attachment points at the boom end castings, then guide the sling end assemblies clear of the aircraft structure as the crane lifts the sling clear.
- (g) Remove the chocks. The aircraft may now be towed away at a speed not exceeding 3 m.p.h.

Note . . .

Both wheels of the jury leg must be chocked simultaneously.

- (2) If both undercarriage legs are unserviceable, proceed as follows:—
 - (a) If conditions permit, the main sling (item E.1, Sect. 2, Chap. 4) may be used to lift the aircraft and the jury struts may be fitted simultaneously.
 - (b) If the conditions are such that the aircraft may swing and therefore be unstable, the procedure should be as detailed in sub-para. (1). When one jury strut has been satisfactorily fitted, the off-set sling and slinging lugs are to be reversed and the opposite jury undercarriage fitted, taking care to chock the previously fitted jury strut wheels fore-and-aft to prevent the aircraft from swinging.
- (3) If the nose wheel is unserviceable, the tail of the aircraft should be supported by personnel to clear the nose of the aircraft from the ground when moving the aircraft.
- (4) When the crash has occurred on the Flight Deck, and as soon as the sling has been disengaged from the crane hook, the sling may be removed together with the slinging lugs, and the wing fold jury struts fitted.

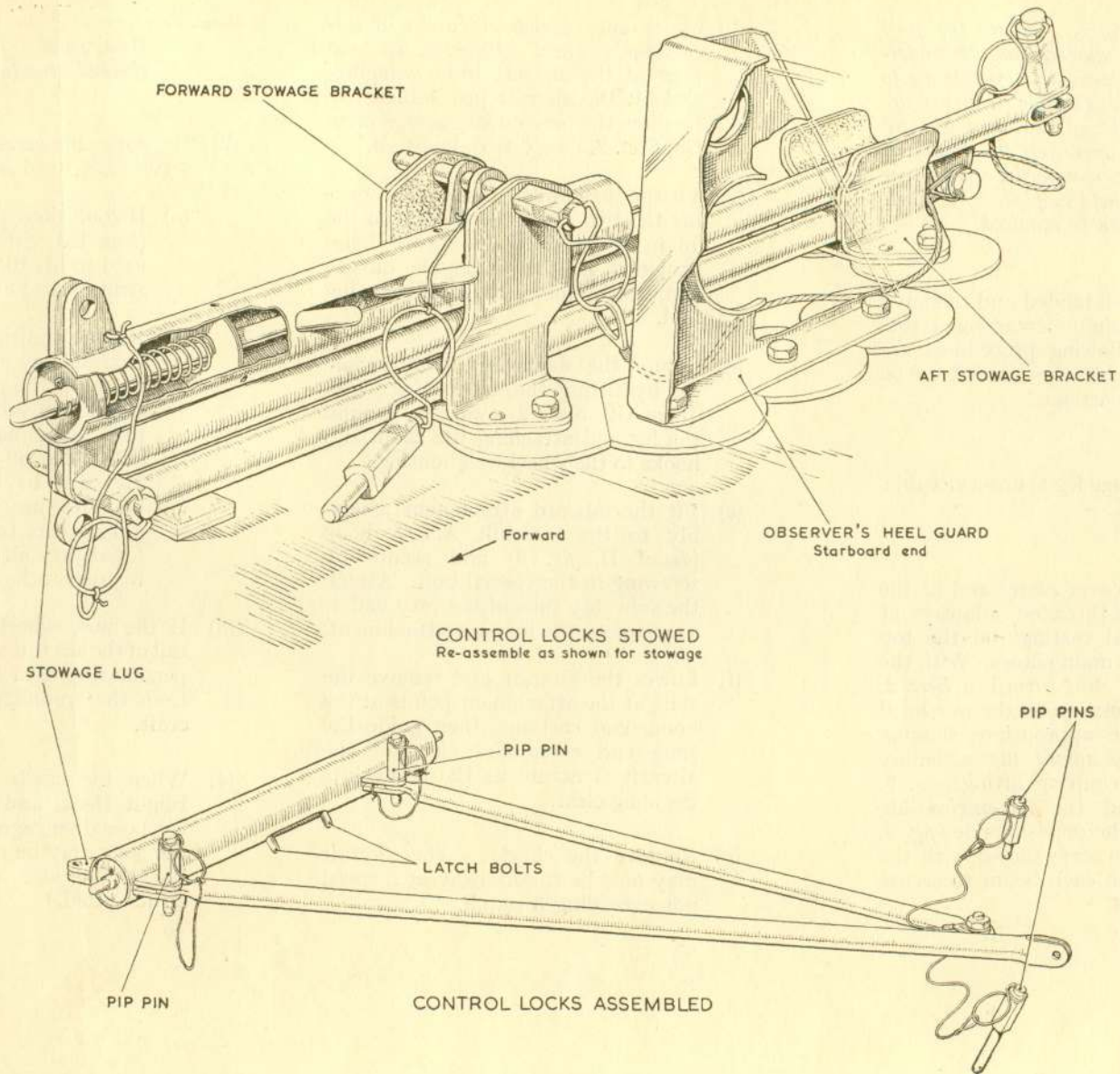


Fig. 10. (Cabin control locks (late aircraft))

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