Chapter 1

GROUND HANDLING

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WARNING . . .
Before entering or leaning over the cockpit for any purpose, personnel must ensure the ground safety of the ejection seats by applying the instructions given in the ejection seat warning on the marker card at the front of this book.

JET WARNING . . .
When the aircraft is being manoeuvred on the ground with the engines running, or when an engine is being run for any purpose, it is essential that personnel are given strict instructions to keep well clear of the air intakes and the jet exhausts, as to enter into the proximity of the danger area is a hazard to their safety. Fig.1 shows the danger area for all Mk.2 aircraft. Personnel and mechanical transport must not enter the shaded area when an engine or engines are running. Buildings must be at least 1 000 ft from the rear of the aircraft.

Personnel may walk with safety beneath the air intakes during engine running, the danger areas being confined to a 15 ft radius in the same horizontal plane as the intakes.

Introduction

1. Information on the general ground handling of the aircraft is given in this chapter, illustrations being used where necessary to show the attachment of such items as towing gear, covers, safety locks, etc. The equipment required for ground handling is listed in Chapter 4 of this section.

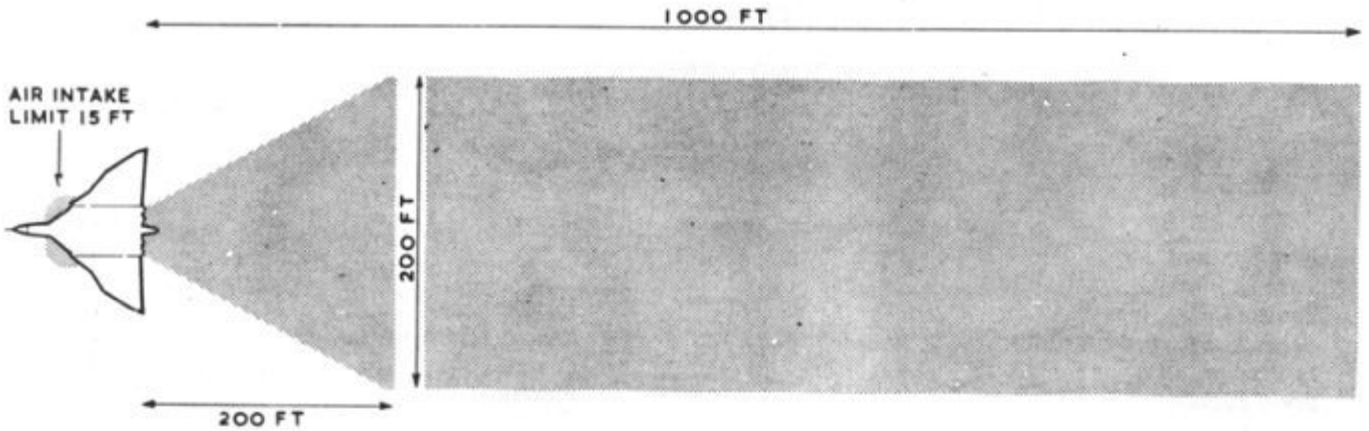
TOWING

NOTE . . .
During ground handling of the aircraft the following precautions must be observed:-

(1) When towing or taxying the aircraft, all engine access doors must be closed.

(2) A competent person must be detailed to occupy the pilot's seat and apply the brakes when told to do so by the driver of the towing vehicle.

(3) Ensure that the hydraulic pressure in the brake accumulators does not fall below 3 000 lb/in² as indicated on the triple pressure gauge on the pilots' panel. If the hydraulic pressure falls below 3 000 lb/in² the accumulators must be recharged (Sect.2, Chap.2).



PERSONNEL MUST NOT APPROACH THE JET PIPES FROM UNDER THE AIRCRAFT CLOSER THAN THE REAR OF THE BOMB BAY WITHOUT PERMISSION.

Fig.1 Danger areas

2. Normally the aircraft is towed forward (fig.2) from a lug on the nose wheel unit body with a steering adapter attached to the nose wheel axle using towing bar Part No. 1U/1342. The towing arm can also be used to push the aircraft rearwards provided the following conditions are strictly adhered to.

(1) The all-up weight must not exceed 215 000 lb.

(2) On hard ground with gradients not exceeding 1 in 66.

(3) The towing arm angle to the aircraft centre line must not exceed 5 deg each side of the aircraft.

(4) The towing vehicle speed must not exceed 2 m.p.h.

NOTE . . .
When pushing the aircraft rearward, the movement from the 'rest' position must be exercised with care to ensure that no jerking occurs.

3. The aircraft is towed backwards (fig.3) by attaching a V-type bridle Part No. 1U/1344 fitted with link plates and quick-release pins, to the inboard eye-end of each main wheel strut. When towing from the main wheels the aircraft is steered with a steering arm Part No. 1U/1634 attached to the nose wheel axle.

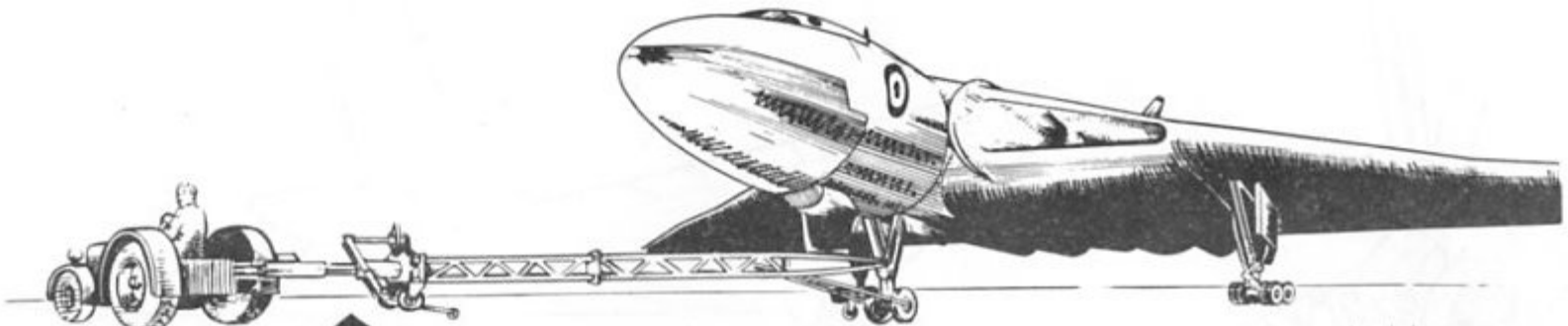
4. Communication between the pilot's position and the towing vehicle is catered for, the aircraft intercomm system being utilised for this purpose. The equipment includes an intercomm cable, one end of which is plugged into a socket on the nose wheel leg and the other is attached, by means of a quick-release plug and socket, to a headset on the towing vehicle.

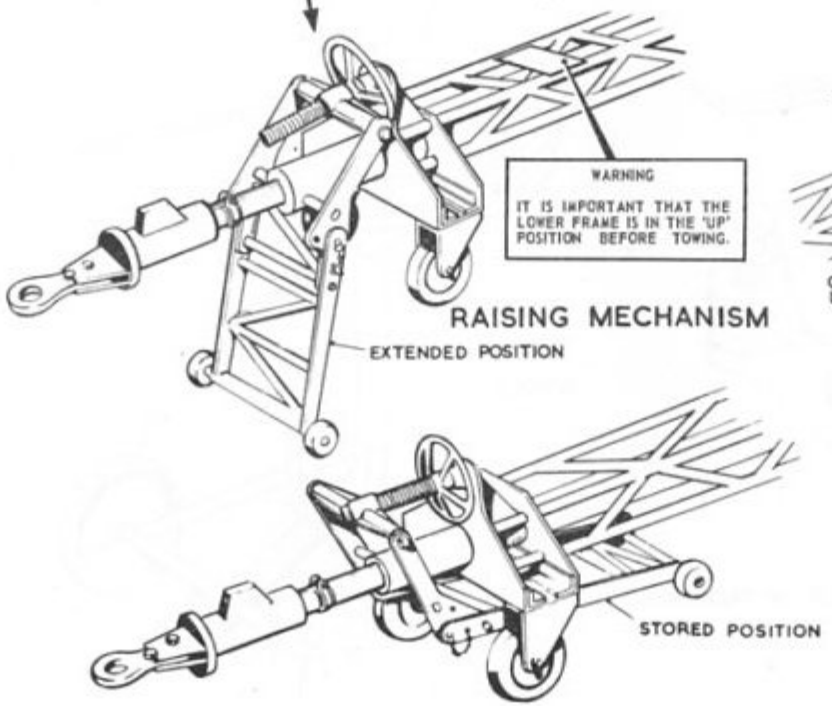
5. The aircraft brakes should not be applied without prior instructions from the tractor driver or before the aircraft has ceased to move, except in an emergency. Turns should not be attempted until the aircraft is rolling and acute turns should, as far as possible, be avoided. The steering arm must not be turned through an angle greater than 47.25 deg, as indicated by a red line on each side of the fuselage nose. The minimum turning circle has a radius of 28 ft measured between the aircraft centre line and the centre point of the circle.

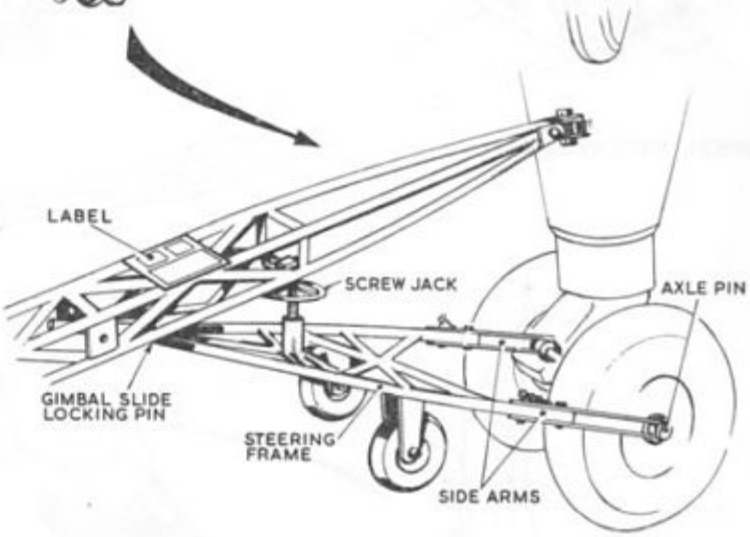
6. Provided that the requirements in para.5 are fulfilled, the aircraft may be manoeuvred using bridles Part No. 1U/1343 attached to both lugs on each main wheel leg. Attach a bridle to one leg which is towed forward or rearward, and a similar bridle to the opposite leg which is towed in the same direction. The inner leg is towed more slowly to maintain the required turning angle.

CONTROL SURFACE LOCKS

7. No ground equipment control surface locks are provided. The power control units each incorporate a hydraulic lock which acts as an efficient parking lock on the ground.







TOWING BAR ATTACHMENT	TOWING BAR REMOVAL
1. REMOVE AXLE PIN 2. SWING SIDE ARMS OUTWARDS 3. JACK UP TOW BAR UNTIL IT CAN BE ATTACHED TO AIRCRAFT 4. REVERSE JACK TO BRING STEERING FRAME INTO POSITION 5. REMOVE GIMBAL SLIDE LOCKING PIN 6. CLOSE SIDE ARMS AND INSERT PIN THROUGH AXLE 7. FINALLY, DETACH AND FOLD SCREW JACK	1. RAISE SCREW JACK AND FIX IN POSITION 2. RELIEVE LOAD FROM AXLE PIN AND REMOVE PIN 3. INSERT GIMBAL SLIDE LOCKING PIN 4. SWING STEERING FRAME SIDE ARMS OUTWARDS 5. LOWER STEERING FRAME UNTIL WHEELS TOUCH GROUND 6. CONTINUE OPERATING SCREW JACK UNTIL TOW BAR CAN BE DETACHED FROM AIRCRAFT 7. OPERATE SCREW JACK TO CLOSE POSITION 8. SWING SIDE ARMS INWARDS AND INSERT AXLE PIN

DETAIL OF LABEL

Fig. 2. Forward towing
◀ Labels added ▶

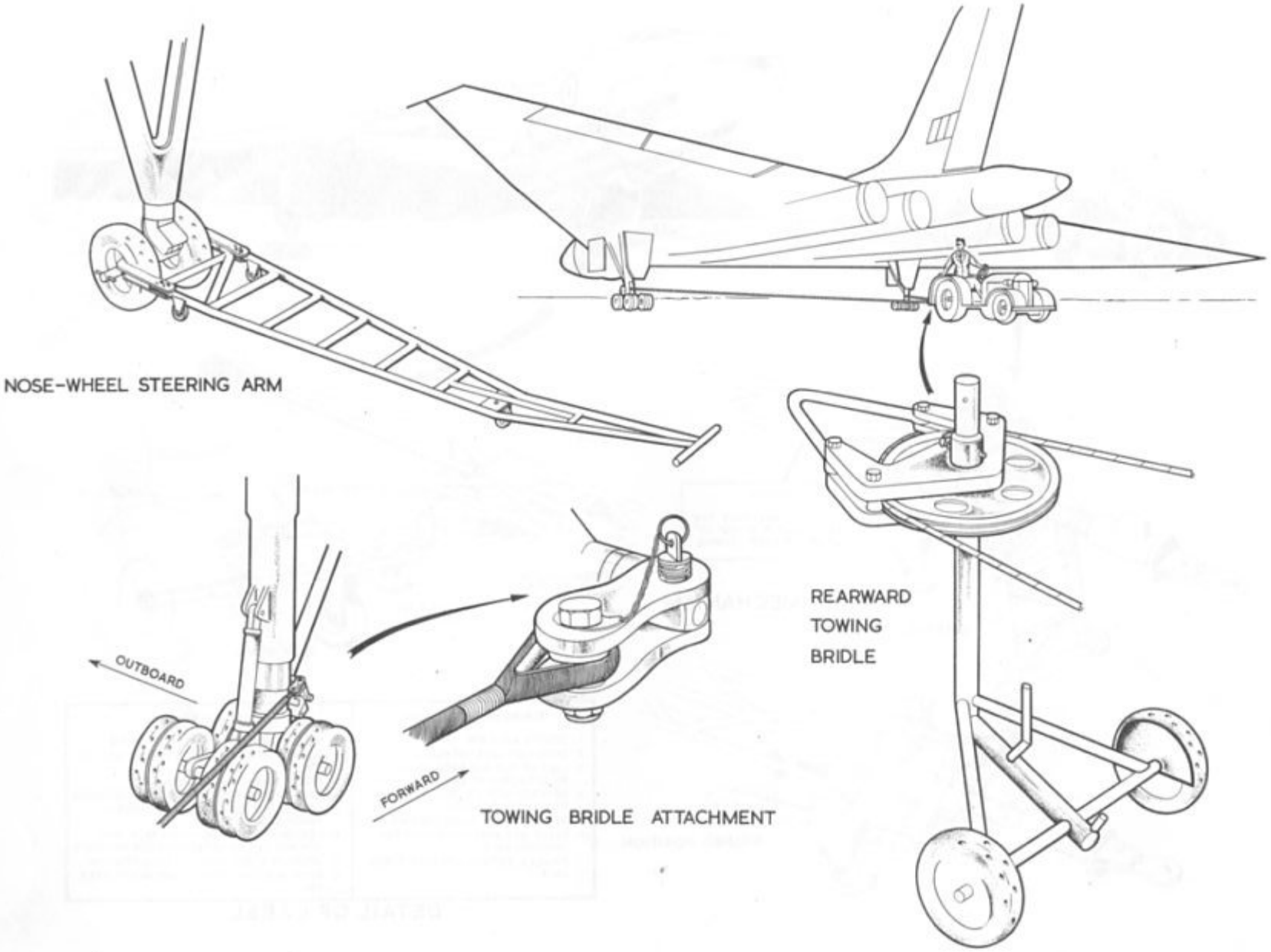


Fig. 3 Rearward towing

GROUND SAFETY LOCKS AND STRUTS

8. When an aircraft has landed and the engines are stopped and before any ground handling is commenced, the alighting gear ground safety locks and struts must be fitted and should be left in position until immediately prior to engine start for flight. The alighting gear locking arrangements, illustrated in fig.6, consist of a hinged tubular strut Part No. 1U/1178 fitted over the nose wheel retracting jack piston between the jack body and the piston rod end fitting, and a jury strut Part No. 1U/1341 fitted and held in position with quick-release pins between lugs on the main wheel body casting and the universal joint at the lower end of the assembly.

9. When the aircraft is on the ground normally the engine bay centre doors only may be opened. Before opening any other doors, jury struts Part No. 1U/1098 must be positioned in the main wheel bays as illustrated.

10. Stowage brackets are provided in each main wheel bay for the wheel and the bay jury struts, and in the nose wheel bay for the nose wheel strut.

LOCKING GUARDS

Bomb doors

11. To prevent inadvertent closing of the bomb doors, a removable guard Part No.1U/1123 is provided for the bomb door selection switch. Before the guard is fitted the bomb door emergency switch must be set to NORMAL and the bomb door selection switch to OPEN. The guard must be fitted immediately after opening the bomb doors when the aircraft is on the ground and must remain in position at all times when personnel are working in the vicinity of the bomb bay.

12. When not in use, the guard is stowed in brackets on the starboard side of the cabin above the main entrance door.

Entrance door

13. A check strap and guard Part No.1U/1632 is provided to prevent a foul between the main entrance door and the towing bar. This strap must be fitted prior to attachment of the towing bar to the nose wheel unit. The strap, which prevents the door from moving to its fully open position, passes round the door and is attached to the aft face of the crew's floor by two Pip pins. The guard, which is attached to the strap by a length of cord, must be fitted in the emergency slot of the control box to prevent the operating lever being moved to the EMERGENCY position, which would force the door to the fully open position by air pressure and cause damage to the strap and door. The safe working load of the strap is such that the entrance ladder attached to the door may be used with the strap in position. Leather guards Part No.1U/1280 are provided for the entrance door jack rams to prevent damage to them during maintenance operations.

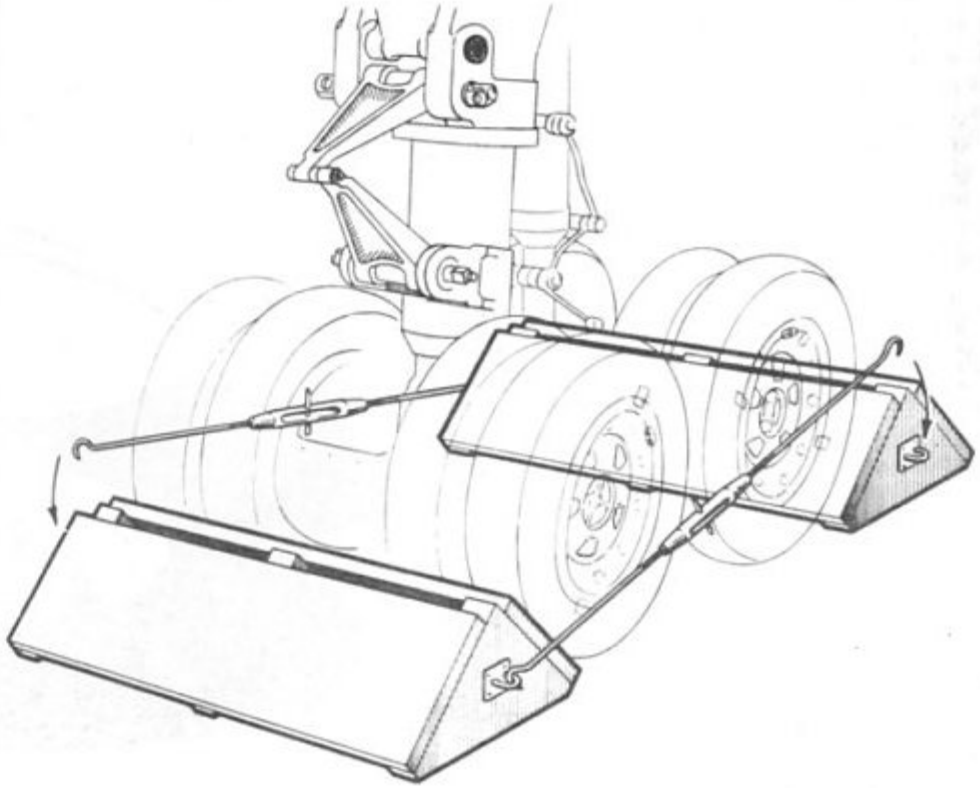


Fig.4 Main wheel chocks

CANOPY RELEASE HANDLE

14. On each side of the canopy rail, a Pip quick-release pin is stowed adjacent to the control lever. To avoid inadvertent opening of the canopy, the pin is to be removed from its stowage when the aircraft is on the ground and inserted in the hole in the control lever quadrant.

COVERS

15. The canopy and pressure head covers should always be fitted when an aircraft is parked or picketed. In addition, when the aircraft is to be picketed, covers or plugs must also be fitted as indicated on fig.7 as soon as possible after stopping the engines, and should only be removed prior to starting. A protective cover Part No.1Z/7733 is to be fitted to the inside of the window in the bomb aimer's blister when a bomb sight is being fitted or removed, or during servicing operations involving entry into the blister.

16. Protective mats are to be used inside the nose radome during servicing operations involving entry into the radome. Reference numbers of these mats are given in Chapter 4 of this section.

PICKETING

17. When an aircraft is being parked or picketed immediately after landing or taxying, the parking brake must not be left in the ON position until the temperature of the wheels has fallen to approximately that of the surrounding atmosphere.

18. The aircraft must, where possible, be picketed facing into wind with all wheels chocked and interlocked fore and aft in the manner shown in fig.4. Equipment provided

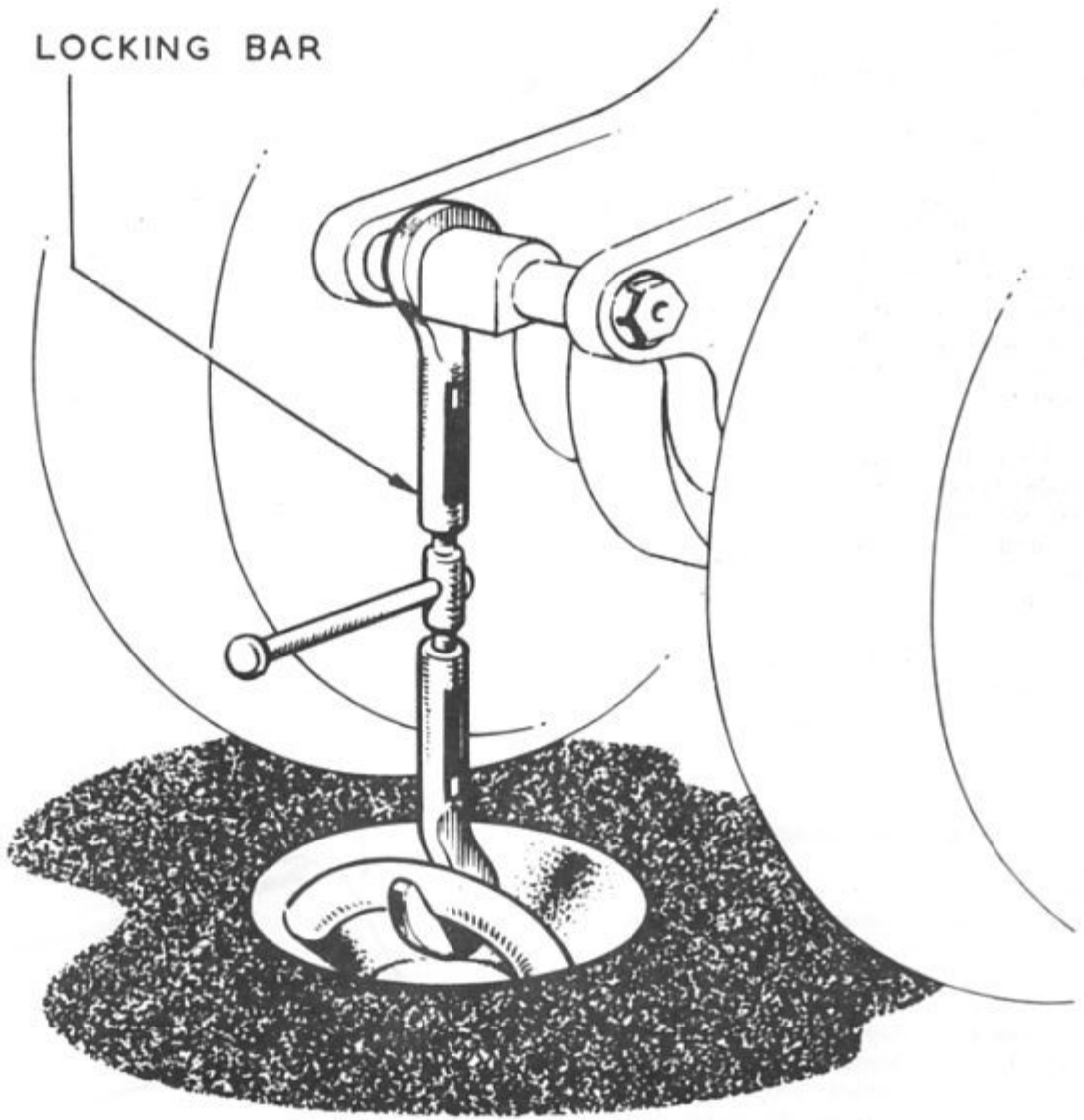


Fig.5 Nose picketing attachment

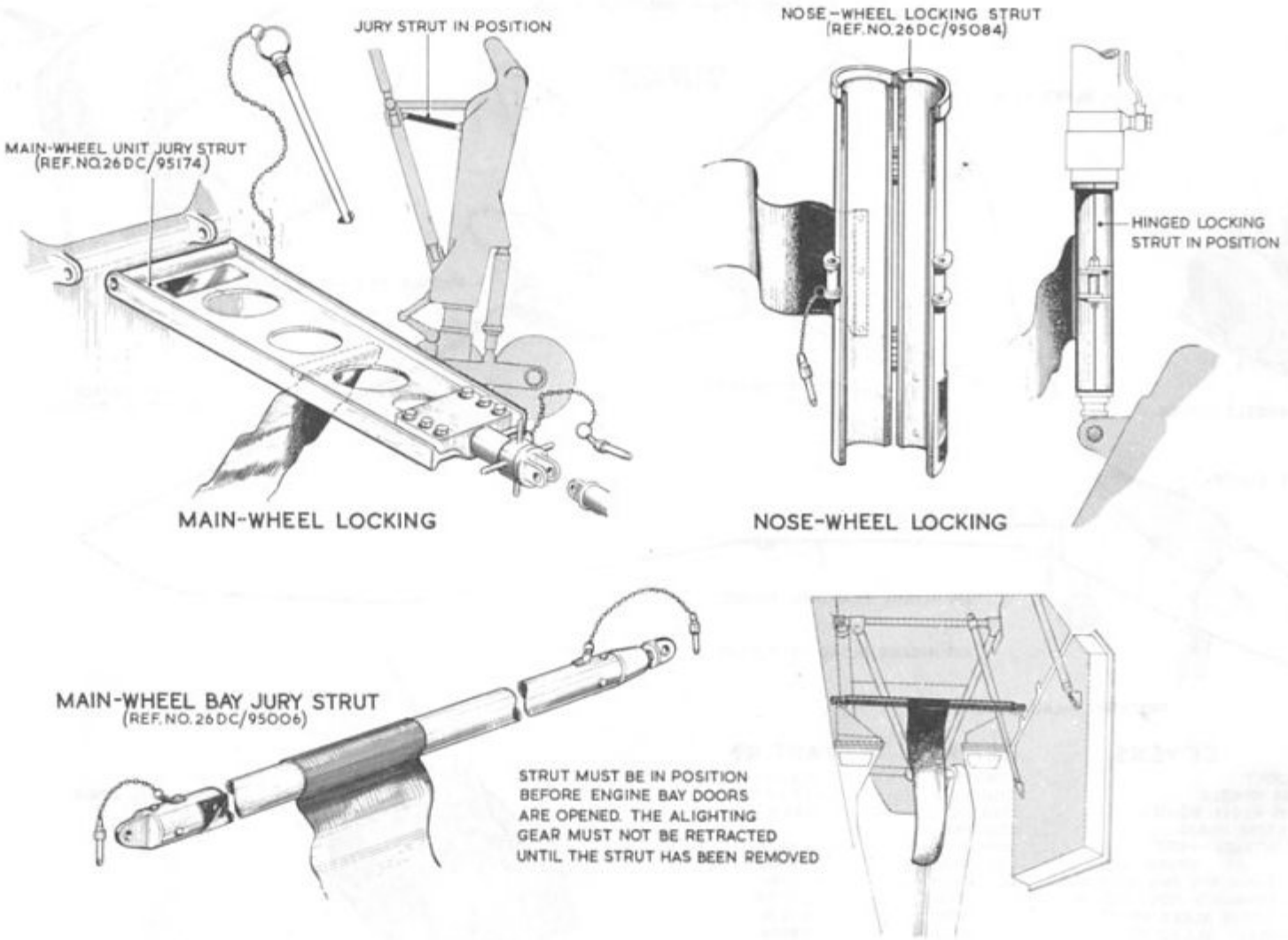


Fig.6. Ground safety locks and struts
(◀ Ref. No: altered ▶)

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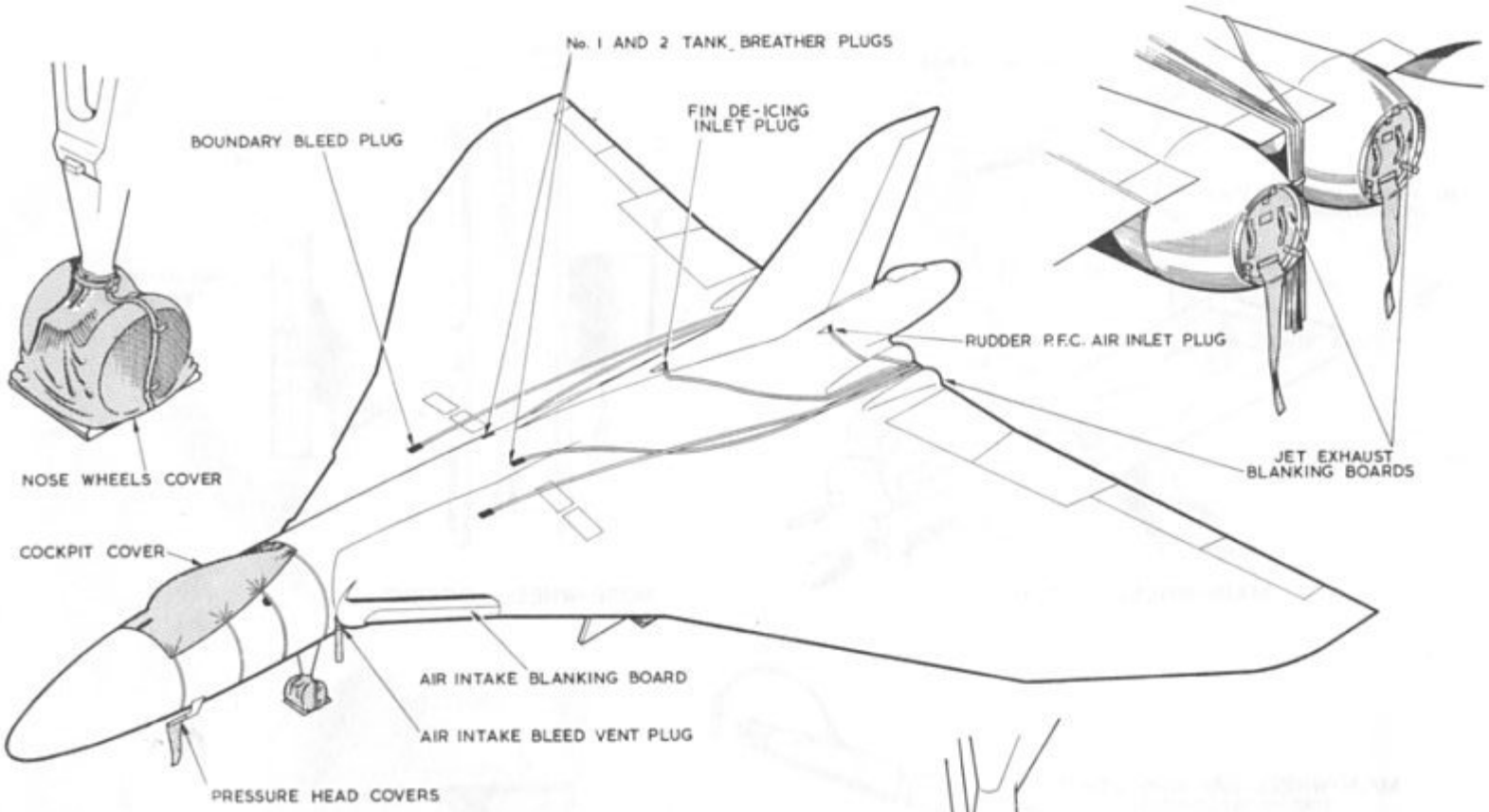

COVERS	REF. Nº	PART Nº
COCKPIT	27D/2994	1/Z8252
NOSE WHEELS	27D/3000	1/Z7102
MAIN-WHEEL BOGIES	27D/3001	1/Z8219
PRESSURE HEADS	27D/2963	—
AIR INTAKES – PORT	26DC/95389	1/Z9424
STARBOARD	26DC/95390	2/Z9424
JET EXHAUSTS PRE MOD. 906	26DC/95267	1/Z9581
JET EXHAUSTS POST MOD. 906	26DC/95512	1/Z10558
AIR-INTAKE BLEED VENTS	27D/2995	1/Z7576
BOUNDARY BLEED PLUGS	27D/3034	1/Z8594
◀ No.1 AND 2 TANK BREATHERS PRE MOD. 526.	27D/3037	1/Z8595
No 1 AND 2 TANK BREATHERS POST MOD. 526	26DC/3294	1/Z10174 ▶
FIN DE-ICING INLET PLUGS	27D/3035	1/Z8596
RUDDER P.F.C. AIR INLET	27D/3038	1/Z8818

Fig. 7. Arrangement of covers
(◀ Mod No. 526 ▶)

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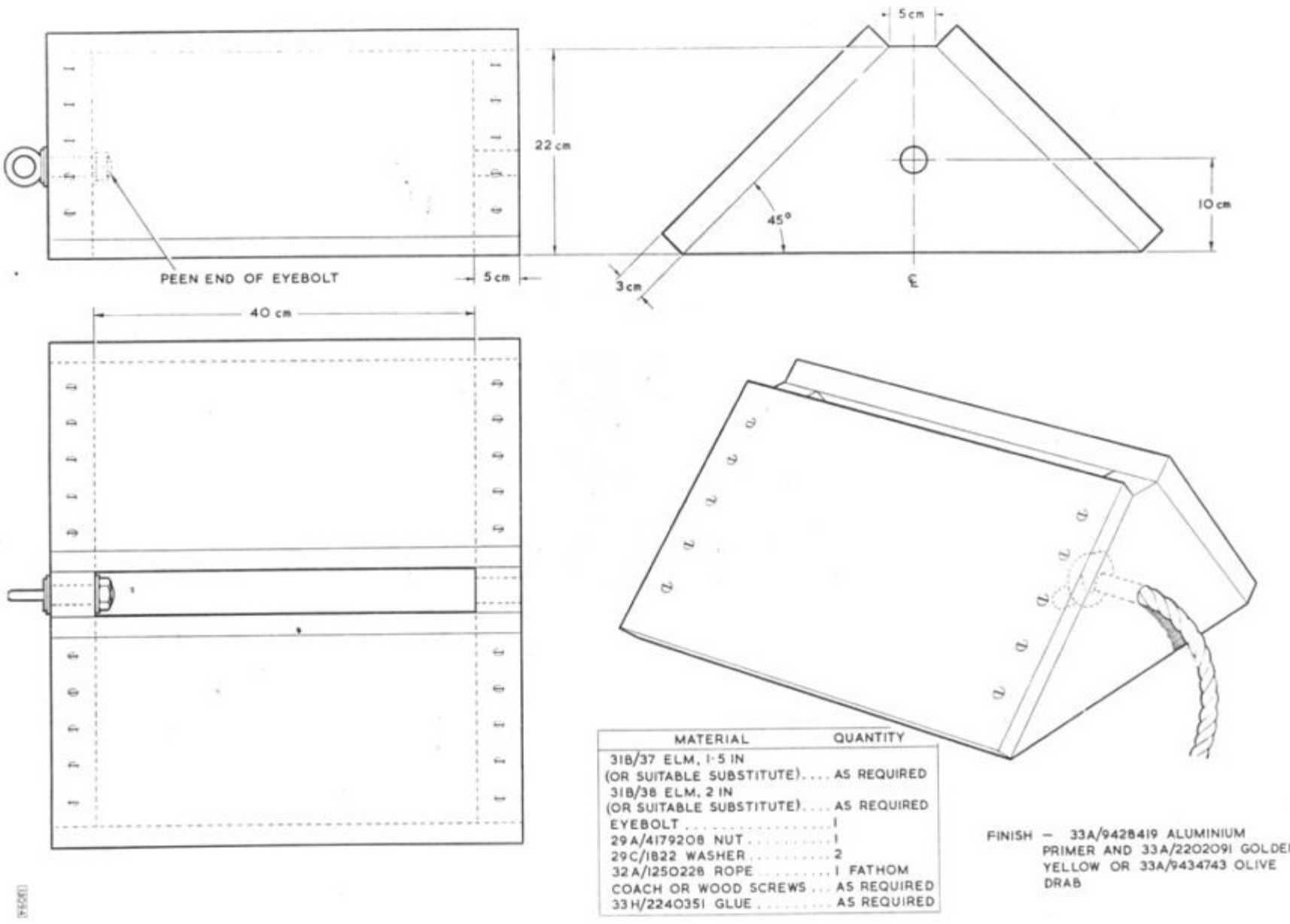

MATERIAL	QUANTITY
31B/37 ELM, 1·5 IN (OR SUITABLE SUBSTITUTE)	AS REQUIRED
31B/38 ELM, 2 IN (OR SUITABLE SUBSTITUTE)	AS REQUIRED
EYEBOLT	1
29A/4179208 NUT	1
29C/1822 WASHER	2
32A/1250228 ROPE	1 FATHOM
COACH OR WOOD SCREWS	AS REQUIRED
33H/2240351 GLUE	AS REQUIRED

FINISH – 33A/9428419 ALUMINIUM PRIMER AND 33A/2202091 GOLDEN YELLOW OR 33A/9434743 OLIVE DRAB

Fig. 8 General purpose chocks

for picketing these aircraft is as follows:-

Chocks, main wheels	Part No.1U/1145
Locking bar, main wheels	Part No.1U/1146
Chocks, nose wheels	Part No.1U/1147
Locking bar, nose wheels	Part No.1U/1148
Locking bar, nose picketing	Part No.1U/2042

NOTE . . .
The above chocks are declared obsolescent and are to be replaced, on a wastage basis, by medium sized general purpose chocks locally manufactured in accordance with CSDE drawing CSDE/GSS/10 (fig.8).

19. It is permissible to park nose to wind, with all wheels double chocked and interlocked, at all tare weights at wind speeds up to 80 knots. For wind speeds up to 40 knots in any direction, or if it is anticipated that snow will fall, the nose wheel unit must be secured to the picketing base as shown in fig.5. The hook on the nose wheel unit may be positioned on either side of the jacking block whichever is directly above the picketing point, and the locking bar should be tightened until it is just in tension.

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