

SECTION 2

PRESERVATION AND PREPARING FOR INSTALLATION

LIST OF CHAPTERS

- 1 Preservation and packing**
- 2 Unpacking and preparing for installation**



Chapter 1

PRESERVATION AND PACKING

LIST OF CONTENTS

	Para.		Para.
<i>Introduction</i>	1	Long term storage	
Inhibiting procedure	4	<i>Inhibiting the fuel system</i>	10
<i>Fuel system components</i>	5	<i>First method of inhibiting the fuel system</i> ...	14
<i>Oil system</i>	6	<i>Second method of inhibiting the fuel system</i>	15
<i>Safety precautions</i>	7	External preservation	17
Short term storage		<i>Packing procedure</i>	20
<i>Engines that can be run</i>	8	<i>Installing the power plant in the packing case</i>	21
<i>Engines that cannot be run</i>	9		

LIST OF TABLES

	Table
<i>Blanking parts</i>	1

LIST OF ILLUSTRATIONS

	Fig.		Fig.
<i>Transit stand</i>	1	<i>Power plant in transit stand</i>	5
<i>Blanking points</i>	2	<i>Desiccant bandoliers fitted to power plant</i> ...	6
<i>Transit stand and m.v.p. bag</i>	3	<i>Lowering the top section of the packing case</i>	
<i>Lowering the power plant into the m.v.p. bag</i>		<i>on to its base</i>	7
<i>on transit stand</i>	4		

Introduction

1. This chapter describes the procedure to be adopted when removing the power plant from the aircraft, the method of preservation against condensation and corrosion, and the packing procedure.

2. The approved type of sling must be used when fitting the power plant to its transit stand and when handling the packing case.

Removing the power plant from the aircraft

3. Instructions for removing the power plant from the aircraft are given in A.P.4505B, Vol. 1.

INHIBITING PROCEDURE

4. Reference must be made to any overriding leaflet that may be issued for current information on protective material required and the extent of the work involved.

Fuel system components

5. The operations given in this chapter that apply to the fuel system components are concerned with them only as part of the complete system; the treatment of individual components when removed from the engine for storage as

separate units will be described in appendices to this chapter.

Oil system

6. The use of synthetic lubricating oil OX-38 obviates the need to inhibit the oil system as this type of oil provides ample protection against corrosion.

Safety precautions

7. Adequate precautions must be taken against fire risks and danger to personnel in the handling of flammable and toxic materials.

SHORT TERM STORAGE**Engines that can be run**

8. Ground run the engine for approximately five minutes and check that the accessories and fuel system components are functioning correctly. For details of the routine ground checks, refer to the appropriate servicing schedule. This procedure is applicable only to an a.a.p.p. installed in an aircraft where it can be run at least once in every seven days.

Engines that cannot be run

9. If it is not possible to run the engine or if

the period of storage or stand-by is expected to exceed seven days, the engine must be inhibited and protected as described in the following paragraphs.

LONG TERM STORAGE

Inhibiting the fuel system

10. The internal preservation procedure for long term storage requires the engine fuel system to be inhibited with protective OM.11 and then completely blanked off.

11. There are two methods of inhibiting the power plant fuel system, and the method to be used will depend on the circumstances prevailing and the equipment available.

12. The first method uses a low pressure supply connected to the main fuel inlet and necessitates wet cycling the engine to circulate the oil.

13. The second method employs a high pressure supply from a separate pump rig connected to a point on the high pressure side of the engine fuel system.

First method of inhibiting the fuel system

14. The first method of inhibiting the fuel system, involving the use of a compressed air operated fluid replenishing can (Ref. No. 4G/5358) to provide a low pressure inhibiting oil supply, is restricted to installed, serviceable power plants; proceed as follows:—

- (1) Remove the filter element (Sect. 5, Chap. 3) and examine it for serviceability and cleanliness. The element must be renewed if it is unserviceable or dirty.
- (2) Refit the filter element and bowl, using new sealing rings, and securely wire-lock.
- (3) Disconnect the fuel inlet pipe to the filter.
- (4) Fit a Lockheed Avery half-coupling (Ref. No. 4G/5719) to the outlet pipe on the replenishing can.
- (5) Check that the replenishing can contains one gallon (approx.) of inhibiting oil.

Note . . .

The inhibiting rig must be adapted to operate at a pressure of 15 lb/in² and under no circumstances must this pressure be exceeded.

- (6) Connect the replenishing can to the low pressure filter inlet and turn on the oil supply. Select the wet cycle switch in the port tail boom OFF, then select the appropriate controls on the a.a.p.p. control panel in the aircraft; carry out three successive wet cycles (Sect. 3, Chap. 2).
- (7) As soon as the engine comes to rest, make quite certain that the a.a.p.p. master

switch is OFF. Turn off the oil supply and disconnect the replenishing can delivery pipe.

Second method of inhibiting the fuel system

15. The second method of inhibiting the fuel system should be used when it is not practical to start and run the engine. The following equipment will be required:

- (1) A hydraulic pump rig capable of delivering inhibiting oil at a pressure of 400 lb/in². The pump should be supplied with oil from a tank of not less than two gallons capacity; this tank must be fitted with a low pressure filter.
- (2) The pump must be fitted with a flexible delivery pipe that has an $\frac{1}{8}$ in BSP nut and nipple for attachment to the fuel system non-return inhibiting valve fitted on the temperature control unit.
- (3) To enable the pressure to be controlled a hand-operated cock must be fitted in the oil delivery line; this cock will allow oil to be spilled back to the tank.
- (4) A slave lead and a 24V battery to open and close the burner during the inhibiting cycle.

WARNING . . .

During the inhibiting cycle there will be a continuous flow of oil from the high pressure side of the fuel system to the low pressure side, the excess of which must be permitted to escape through the fuel pump inlet union; any restriction of this flow could cause a pressure build up that might result in serious damage to the fuel system.

16. The inhibiting procedure is as follows:—
 - (1) Remove the filter element (Sect. 5, Chap. 3) and examine it for serviceability and cleanliness. The element must be renewed if it is unserviceable or dirty.
 - (2) Refit the filter element and bowl, using new sealing rings, and securely wire-lock.
 - (3) Cut the locking wire and release the wiring harness at the socket connection on the burner actuator.
 - (4) Using the slave lead and battery, energize the terminal pins 'A' and 'B' in the burner actuator socket connection, to close the burner.
 - (5) Remove the split pin, sleeve nut and nipple blanking the non-return inhibiting valve on the temperature control unit, then attach the rig delivery pipe to the exposed union.

- (6) Sever the wire locking and disconnect the fuel inlet pipe at the fuel pump. Connect a suitable pipe to the exposed union and insert the free end in a container.
- (7) Check that the rig tank contains at least two gallons of inhibiting oil.
- (8) Start the rig pump and increase the pressure gradually to 400 lbf/in². Run the rig for approximately one minute at this pressure, during which time the burner should be opened three times for five second periods by energizing pins 'A' and 'C' with the slave lead and battery.
- (9) Turn off the rig pump, disconnect the rig delivery and return pipes and immediately reconnect and wire-lock the fuel pump low pressure fuel inlet pipe to prevent any loss of inhibiting oil.
- (10) Refit the sleeve nut, nipple and split pin blanking the non-return inhibiting valve.
- (11) Refit and correctly wire-lock the harness at the burner actuator socket connection, having made quite certain that the burner is closed.
- (12) Slacken the bleed screw on the fuel pump, then disconnect the inlet pipe to the low pressure filter and connect the fluid replenishing can. Ensuring that the pressure does not exceed 15 lbf/in², inhibit the system until an air-free flow of fluid issues from the bleed screw. Disconnect the fluid replenishing can, then close the bleed screw and wire-lock.
- (13) The inhibiting oil flushed through the system will contain traces of fuel and should therefore be discarded.

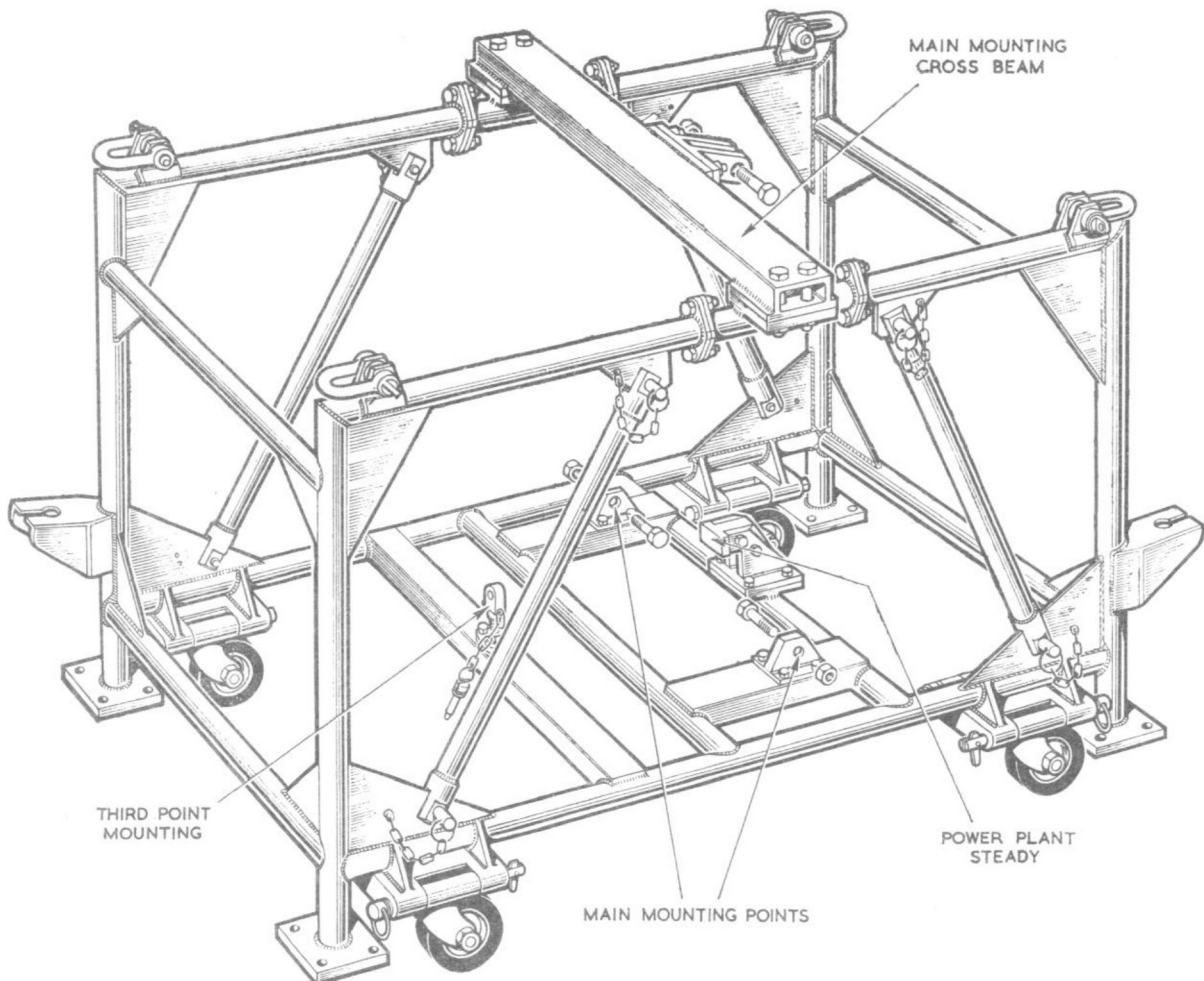


Fig. 1. Transit stand

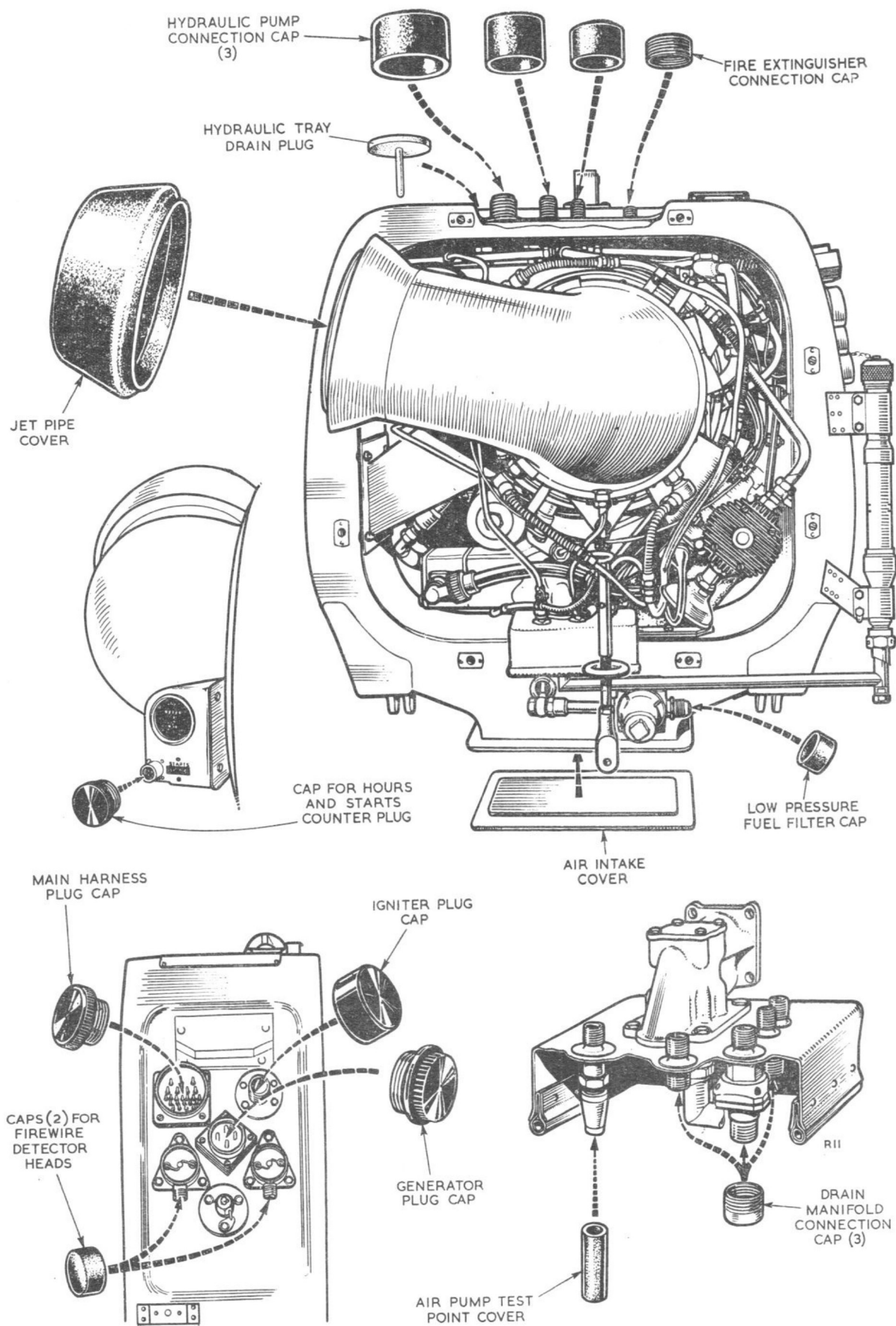


Fig. 2. Blanking points

TABLE 1

Blanking parts

Part No.	Ref. No.	Location	No. off
A102/3E	28DU/9414342	Drive shaft cover bolt	2
A25/1C	28D/9138768	Fuel pump cover bolt	2
A25/16C	28D/1011021	Temperature control cover bolt	2
422071	36AF/1196	Hydraulic tray drain plug	1
422075	36AF/1205	Air assistance connector dust cap	1
422064	36AF/1204	C12 bulkhead plug dust cap	1
422063	36AF/1203	E23 bulkhead plug dust cap	1
AGS597/B	28N/11333	Fuel drain valve dust cap	1
422072	36AF/1201	Filter inlet coupling dust cap	1
422073	36AF/1202	Fire detector heads dust cap	2
AGS597/D	28N/11414	Fire extinguisher connector dust cap	1
423644	5X/1963	Hours and starts counter connector dust cap	1
422069	36AF/1199	Hydraulic by-pass coupling dust cap	1
422068	36AF/1198	Hydraulic inlet coupling dust cap	1
422070	36AF/1200	Hydraulic outlet coupling dust cap	1
AGS597/B	28N/11333	Hydraulic pump drain boss dust cap	1
423641	36AF/746	Igniter bulkhead connector dust cap	1
AGS597/B	28N/11333	Jet pipe drain boss dust cap	1
428559	36AF/1206	Air intake aperture blanking cover	1
421247	36AF/674	Jet pipe and shroud blanking cover	1
424562	36AF/1399	Fuel pump and temperature control cover	2
424560	36AF/1398	Fuel pump drive shaft cover	1
A103/EP	28M/9414136	Drive shaft cover nut	2
A27/CP	28M/9403520	Temperature control cover nut	2
SP13/C	28W/9419402	Fuel pump cover plain washer	2

Note . . .

Whenever possible these parts must be retained for further use when removed from components.

EXTERNAL PRESERVATION

17. The m.v.p. bag (Ref. No. 40B/1454) or (Ref. No. 40B/1685) is supplied for use with the Rover airborne auxiliary power plant Mk. 10201 and must be used only in conjunction with the transit stand (Ref. No. 40B/1453).

18. Commence by removing both end covers and making quite certain that the power plant conforms with the checking list and that the result is recorded on the appropriate form.

19. Refit both end covers and ensure that all the specified blanks and covers are fitted and sealed with self-adhesive tape to make them air tight. All blanking points for the power plant are shown in fig. 2. A list of the blanks is given in Table 1.

Packing procedure

20. Before packing the power plant in the m.v.p. bag, ensure that the bag is not damaged and that the zip fastener is clean and free from foreign matter such as strands of cotton. Proceed as follows:

(1) Remove the top beam and the detachable side members from the transit stand.

(2) If the m.v.p. bag has been stored separately from the transit stand, remove the four bearer plates from the base of the stand, fully unzip the bag and offer it up to the stand the correct way round (one end of the bag is stencilled FRONT). Refit the front bearer plate, the two side plates, and the rear plate (in that order); the bag is now securely attached to the base of the stand.

(3) Pad all sharp projections on the power plant, using cellulose wadding to Spec. DEF. 1248 (Ref. No. 32B/9432407) and secure the wadding with masking tape to Spec. B.S.J.11 (Ref. No. 33B/9436999). Lower the power plant into the stand, and secure to the four bearer plates, adjusting the height of the clevis attachment as necessary.

(4) Place three lengths of grease resistant paper DEF.1360 (Ref. No. 32B/820) around the centre portion of the power plant and secure with the specified masking tape. This paper prevents the desiccant contacting the bare metal when the bandoliers are fitted.

(5) Carefully ease the bag up the sides of the power plant, ensuring that it is not snagged or damaged by any projections, then fit

the side members to the stand. Align the polythene mouldings in the bag with the top-beam stand attachment bolt holes and dowels. Bolt the top beam to the stand, and pad the heads of the bolts as in sub-para. (3).

(6) Ease the bag over the top beam and bring the two edges together; then secure the internal straps with the press studs; these straps correctly align the zip fastener and prevent the zip from coming under strain when closing the bag.

(7) Check the closure of the zip; the slider must run freely; if it becomes stiff, it must be eased back and the cause of the stiffness remedied. Unzip the bag fully, then release the internal straps and open the bag.

Caution . . .

It should never be necessary to use

force when either closing or opening the zip.

(8) Insert the humidity indicator card Spec. D.E.F.1296 (Ref. No. 32B/9432506) into the pocket behind the humidity indicator window in the bag.

(9) Place three bandoliers (18 lb) of desiccant to Spec. B.S.2540 (Ref. No. 33C/1060) in position on the grease resistant paper.

Caution . . .

The bandoliers must remain sealed in the transportation containers until the last possible moment, otherwise the silica gel desiccant will be rendered ineffective if exposed to the atmosphere for more than 10 minutes.

(10) Immediately the desiccant has been inserted, close the bag as detailed in sub-

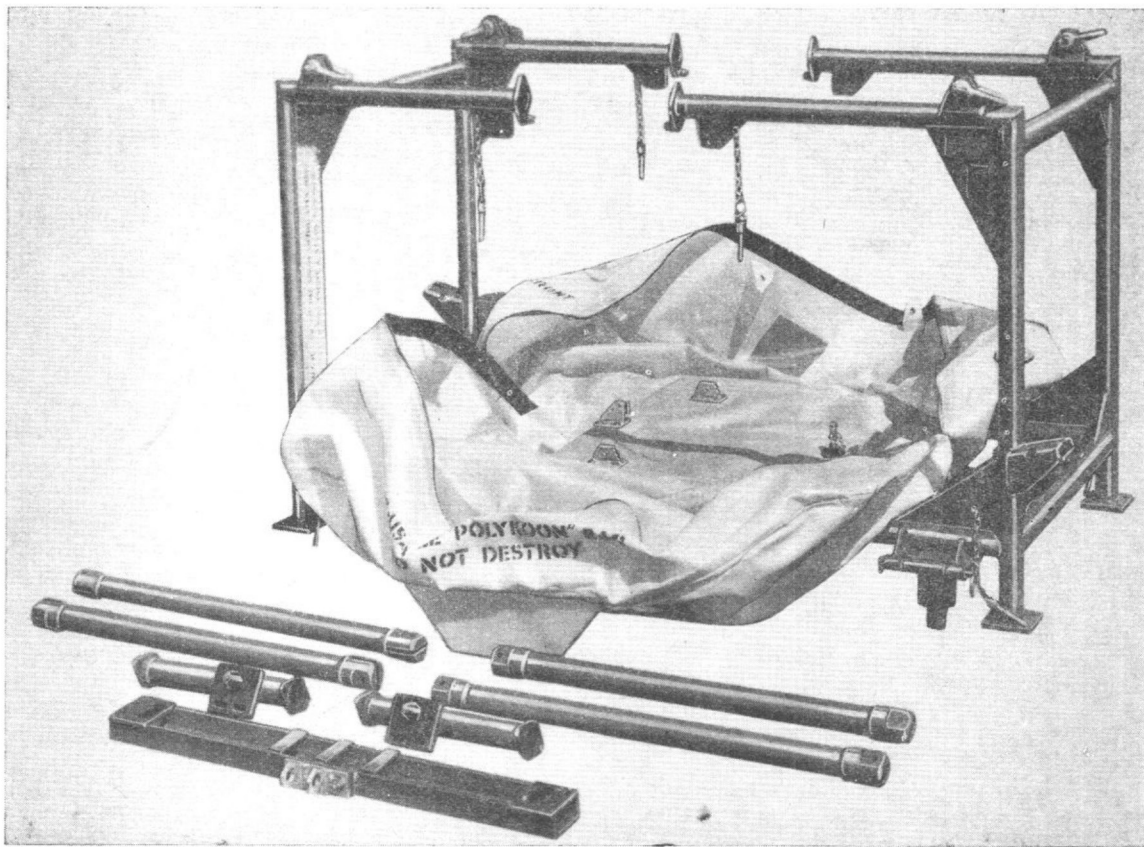


Fig. 3. Transit stand and m.v.p. bag

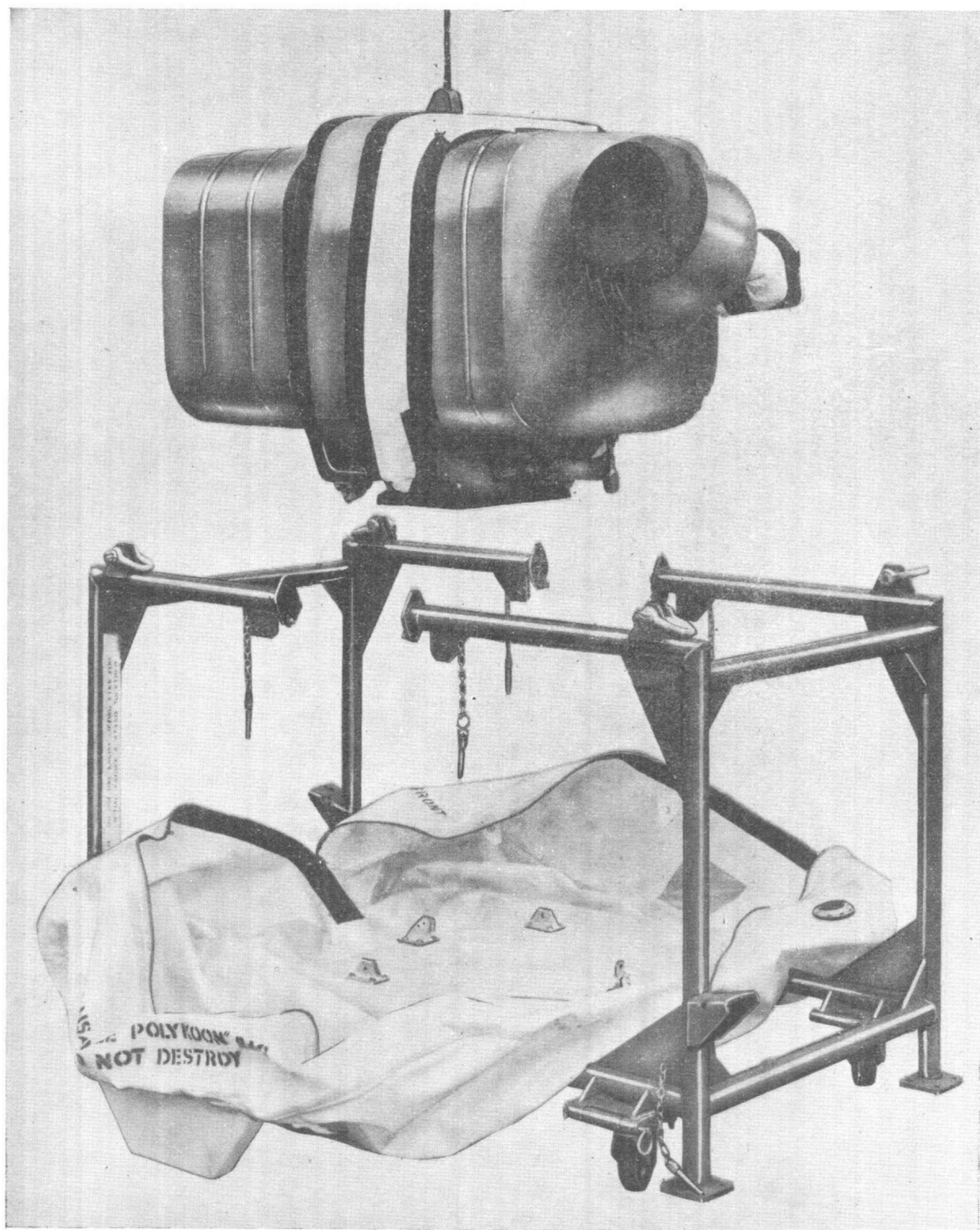


Fig. 4. Lowering the power plant into the m.v.p. bag on transit stand

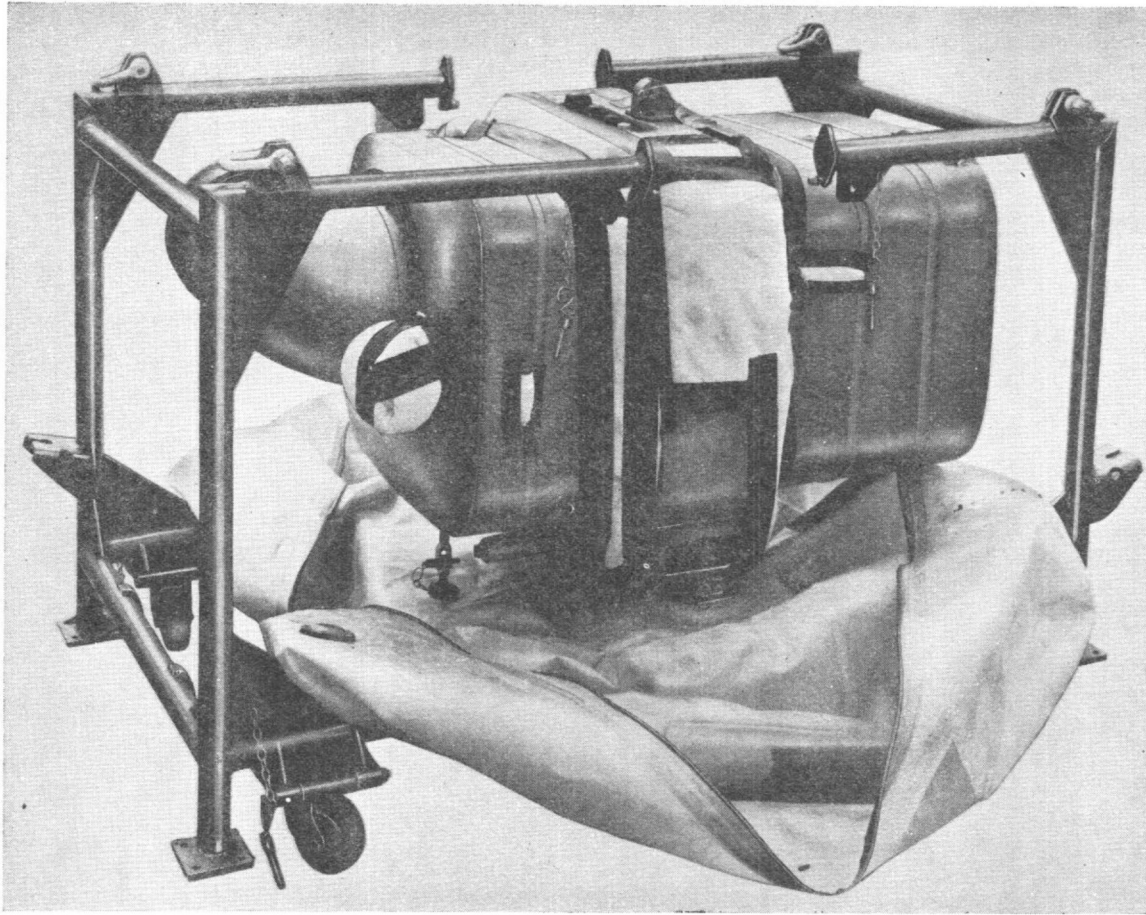


Fig. 5. Power plant in transit stand

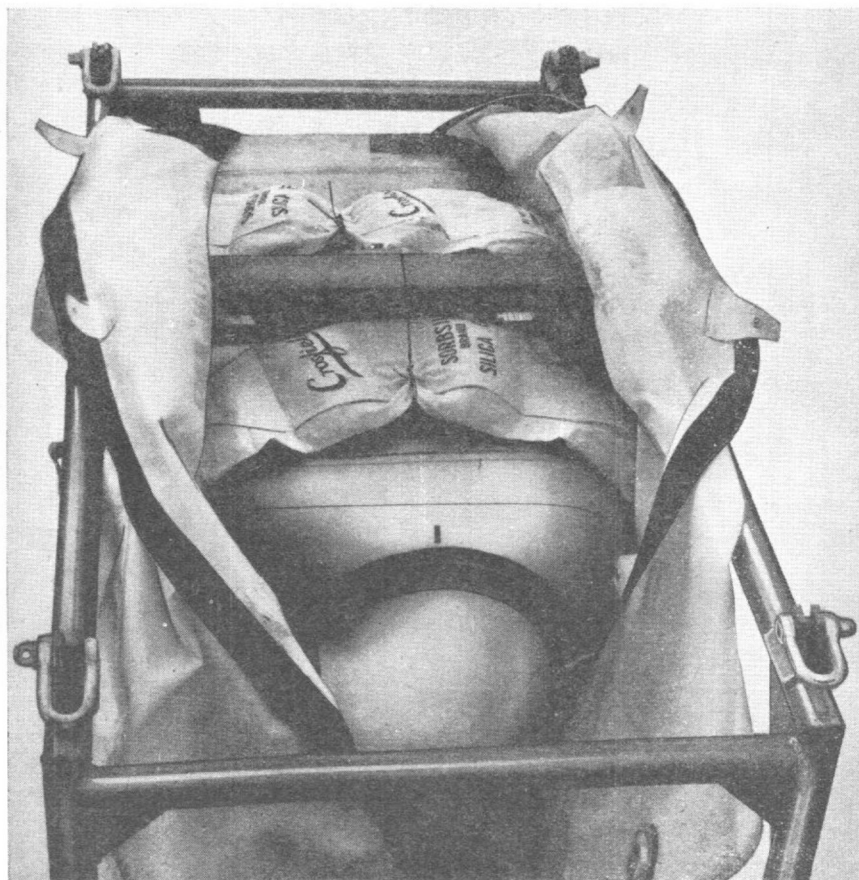


Fig. 6. Desiccant bandoliers fitted to power plant

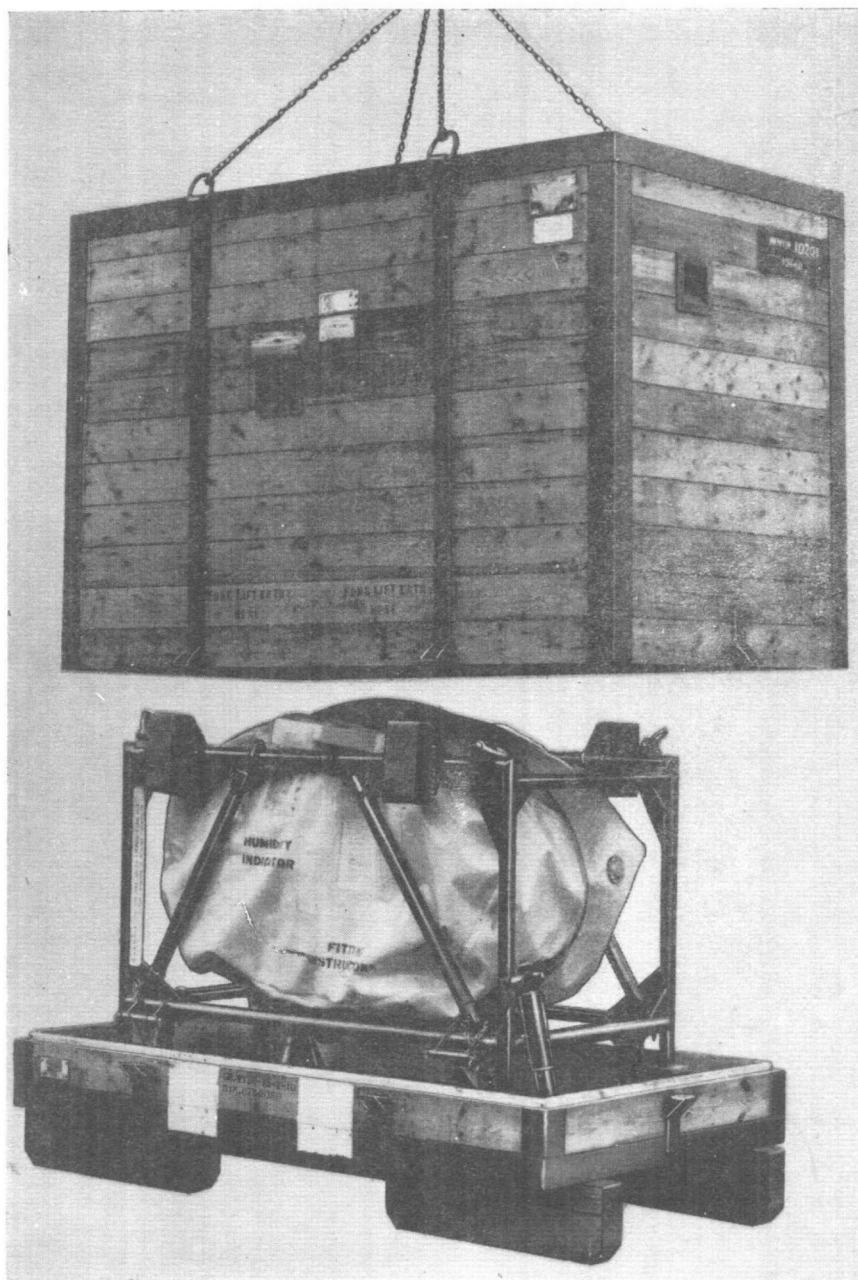


Fig. 7. Lowering the top section of the packing case on to its base

para. (6) and wire-lock the slider in the closed position. The examining authority may then fix the seal as required.

(11) Record the fitting of the m.v.p. bag on the history card provided, then replace the card in the appropriate pocket.

Installing the power plant in the packing case

21. The packing case (Ref. No. 40B/1267) used for storage or transit consists of a wooden base on which the engine stand is mounted. The box type lid for the case is fitted with four metal straps; each strap has a lifting eye at the top end for use when lifting the assembled case. Metal straps are also fitted to the base and are bolted to the top

straps when the case is assembled. Angle brackets at the joint between the lid and the base provide additional securing points. An inspection window in the lid, in line with the humidity indicator window in the engine cover, facilitates inspection of the indicator.

22. The procedure for installing the power plant in the packing case is as follows:—

(1) Secure the approved four point sling to the transit stand lifting points and lower the stand complete with power plant on to the Metalastik mountings in the base of the packing case.

(2) Secure the feet of the transit stand to the mountings with sixteen bolts and plain washers.

(3) Secure the bottom eye of the Metalastik dampers to their respective brackets in the base and then, with the dampers in a nearly vertical position, extend and compress each unit three or four times until there is no lost motion at the change from extension to compression.

(4) Immediately the dampers have been

primed, they should be secured to the lugs on the transit stand, taking care to ensure that the rubber grommets are located one on either side of the lug. It is most important that there should be no delay between priming the dampers and securing them to the transit stand.

(5) Using a four point sling lower the top section of the packing case on to the base and secure with six bolts, plain washers and nuts.

Chapter 2

UNPACKING AND PREPARING FOR INSTALLATION

LIST OF CONTENTS

	Para.
Introduction	1
Unpacking the power plant	3
Preparing the power plant for installation ...	4
Installing the power plant	5

Introduction

1. This chapter describes the procedure to be adopted when removing the power plant from its packing case and the preparation required immediately prior to installing the unit in the aircraft.

2. The approved types of sling must be used when handling the packing case and removing the power plant from the transit stand.

Unpacking the power plant

3. (1) Remove the six bolts, nuts and plain washers that secure the top section of the packing case to the base.

(2) Use a four-point sling to lift the top section clear of the base and remove it to a safe storage position.

(3) Release the two shock absorbers from the anchorages on the transit stand.

(4) Remove the sixteen bolts and spring washers that secure the transit stand to the rubber feet in the base of the packing case.

Caution . . .

Do not attempt to lift the transit stand while it is still secured to the base of the packing case.

(5) Fit the approved four-point sling to the transit-stand lifting points, and lift the stand complete with the power plant clear of the base.

(6) Remove the locking wire and/or lead seal from the end of the zip fastener.

(7) Fully open the zip fastener; then release the internal straps by opening the press studs, and ease the bag from the top of the power plant.

(8) Remove the top beam and detachable side members from the stand, and carefully ease the bag down the sides of the power plant, ensuring that it is not snagged or damaged by any projections; pay particular care to avoid damaging the zip fastener.

(9) Release the power plant from the four bottom bearer plates (from inside the bag), leaving the bag attached to the stand at these four points.

(10) Remove the three bandoliers of desiccant from the power plant.

(11) Attach the appropriate sling to the hoisting lug at the top of the power plant, and lift the power plant away from the transit stand.

(12) The bag is now attached to the stand at the four bottom bearer plates. If the bag is to remain with the stand, it should be neatly folded, *avoiding sharp bends*, and stowed within the confines of the stand. If the bag is to be stored separately it should be released by removing the four bearer plates; after removing the bag, refit the bearer plates to the stand. Check the bag for damage, fold and pack it in accordance with Form 673 and store with the appropriate labels stating the condition of the bag. Refit the top beam and side members to the stand.

Preparing the power plant for installation

4. Normally, the power plant will not be de-inhibited until it has been installed in the aircraft and is being prepared for use; the de-inhibiting procedure is given in Section 3, Chap. 1. Remove all blanking parts from the power plant; a list of these is given in Chap. 1 of this section.

Installing the power plant

5. Instructions for installing the power plant in the aircraft are given in A.P.4745A, Vol. 1.

