

ARMY CORRESPONDENCE COURSE PROGRAM

OF THE

US ARMY AIR DEFENSE SCHOOL

EXTRACT 38

EXTRACTS

FOR USE WITH

ADA SUBCOURSE 800

NIKE HERCULES MISSILE CREWMAN, PART I (16B20)

AND

ADA SUBCOURSE 802

NIKE HERCULES MISSILE CREWMAN, PART II (16B40)

March 1969

CONTENTS

For use with

Extract from

Page

Lesson 3

TM 9-1440-250-12/2, Aug 66, w/C 1 (chap 2,
3, 5, and 6)

(3)

TM 9-1440-250-12/2, Aug 66, w/C 1 (chap 2, 3, 5, and 6)
(For use with Lesson 3)

CHAPTER 2

DESCRIPTION AND SITING REQUIREMENTS

Section I. DESCRIPTION OF THE MOBILE LAUNCHING SET

2-1. General

A typical mobile launching set (fig. 2-1) consists of a trailer mounted launching control station and three mobile launching sections. The mobile launching set functions as part of a mobile weapons system, as the equipment can be transported and emplaced from one defense area to another.

2-2. Trailer Mounted Launching Control Station—Mobile Installation

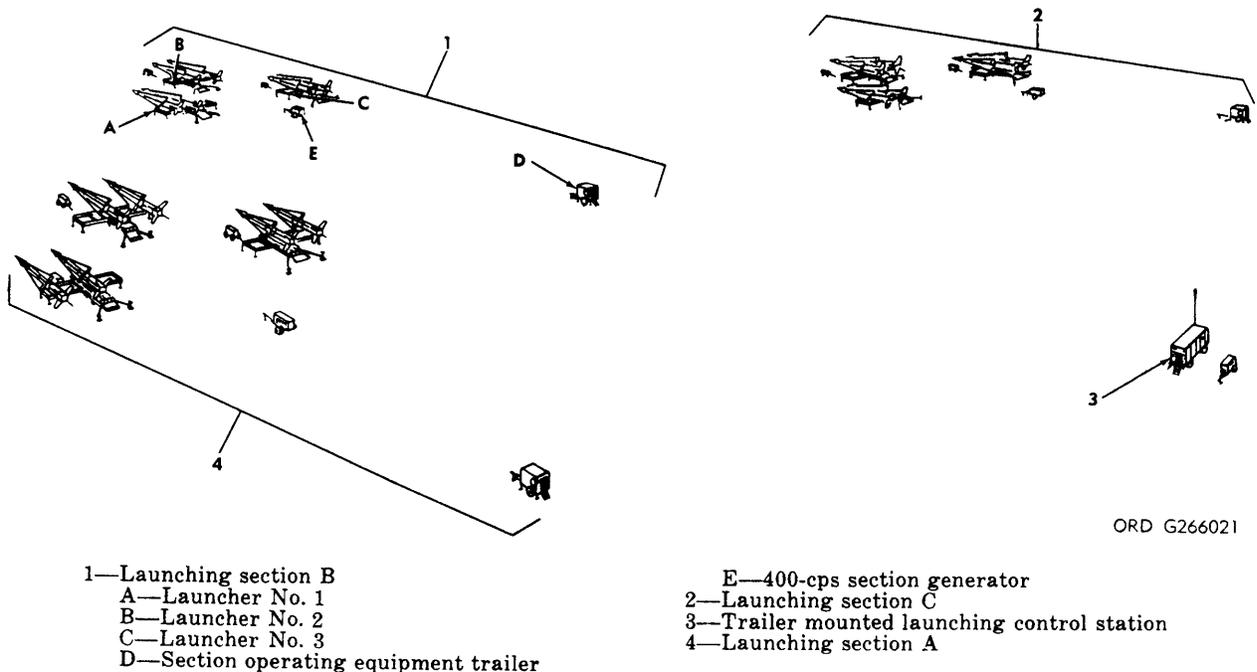
a. The trailer mounted launching control station (fig. 2-2) consists of a trailer, a launching control group and trailer interior furnishings.

b. In a mobile installation, the trailer mounted launching control station is towed into position and leveled with four leveling jacks

(11, fig. 2-2) mounted on the trailer. The launching control group provides for coordination of operations between the battery control area and the launching sections. The intercommunication cabinet station provides two-way voice communications between telephone stations at the various locations in the launching area and battery control area. The launching control group is capable of assuming complete control of launching set operations if cable connections between the battery control area and the launching area are disrupted. Power for the trailer mounted launching control station is supplied by a 400-cps generator.

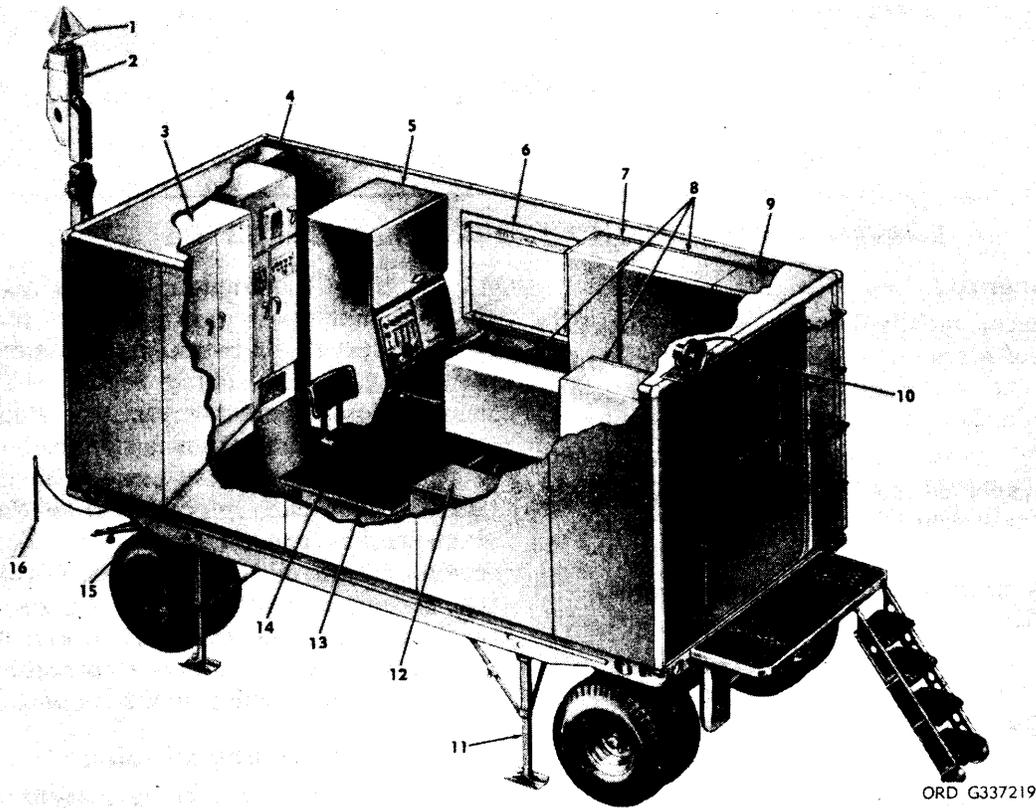
2-3. Mobile Launching Section

A typical mobile launching section consists of three mobile launchers (figs. 2-3 through 2-5), side trusses, storage rack supports, one



ORD G266021

Figure 2-1. Mobile launching set.



- 1—Radar target simulator
- 2—Flight simulator group
- 3—Utility storage cabinet
- 4—Main switch box
- 5—Launching control console
- 6—Operational status display board
- 7—Intercommunication cabinet station
- 8—Utility storage cabinet

- 9—Clothing locker
- 10—Siren
- 11—Leveling jack (4)
- 12—Utility desk
- 13—File cabinet
- 14—Launching control officer table
- 15—Personnel heater
- 16—Ground rod

Figure 2-2. Trailer mounted launching control station—mobile installation.

section operating equipment trailer (SOET) (fig. 2-6), three dolly-mounted launcher control-indicators (LCI), and one trailer mounted 400-cps section generator.

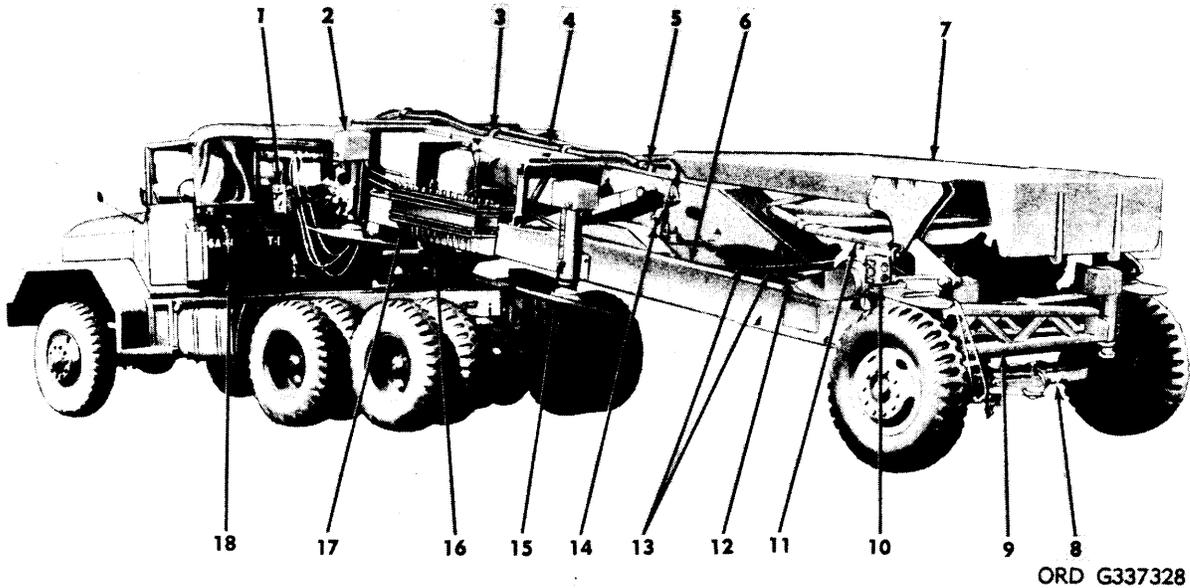
a. *Mobile Launcher.* The mobile launcher (fig. 2-5) consists of a launcher (1), a launcher field modification kit, a concrete launching pad (13), a blast deflector (3), and a transport modification kit.

Note. The concrete launching pad emplacement kit is optional.

- (1) The launcher in the mobile condition (figs. 2-3 and 2-4) utilizes a launcher, a mobile launcher axle, a kingpin support, marker lights, a tie-down linkage, stop light-taillights, and hose

assemblies. The mobile launcher is transported using truck tractor M52, or dolly M197A1 and truck M54. The forward jacks, center jacks, and outriggers are stowed when the launcher is in the mobile condition. The emplacement linkage is used to support the blast deflector during travel. The cable clamps are used to secure cable assemblies, pipe assemblies, and the electrical test station during travel.

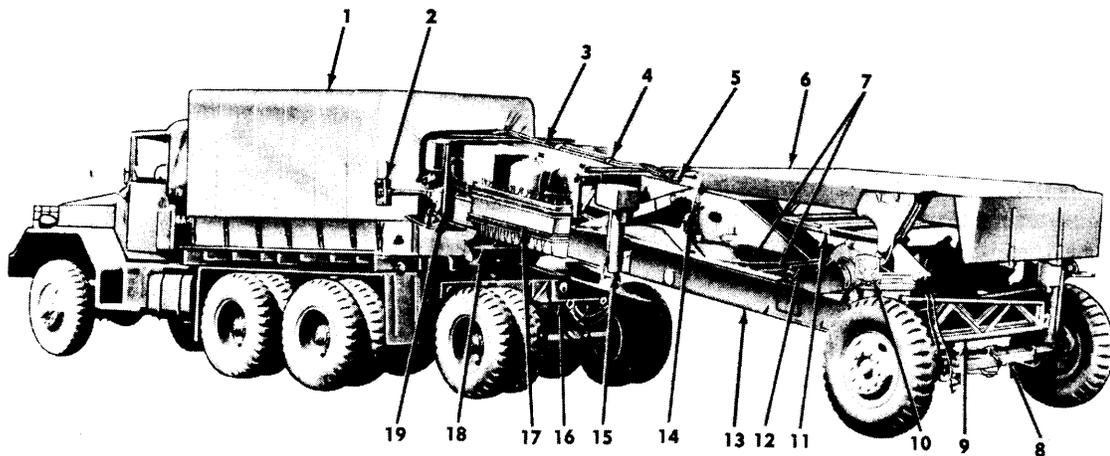
- (2) The normally emplaced mobile launcher is shown in figure 2-5.
- (3) The procedures and equipment used for accelerated emplacement of a mobile launcher when a minimum



ORD G337328

- | | |
|---------------------------|-----------------------------|
| 1—Marker light (2) | 10—Stop light-taillight (2) |
| 2—Forward jack (2) | 11—Emplacement linkage |
| 3—Cable clamp (4) | 12—Mounting plate (2) |
| 4—Cable assy (5) | 13—Hose assy |
| 5—Electrical test station | 14—Tie-down linkage |
| 6—Launcher | 15—Center jack (2) |
| 7—Blast deflector | 16—Kingpin support |
| 8—Mobile launcher axle | 17—Stake stowage box |
| 9—Outrigger (2) | 18—Truck tractor M52 |

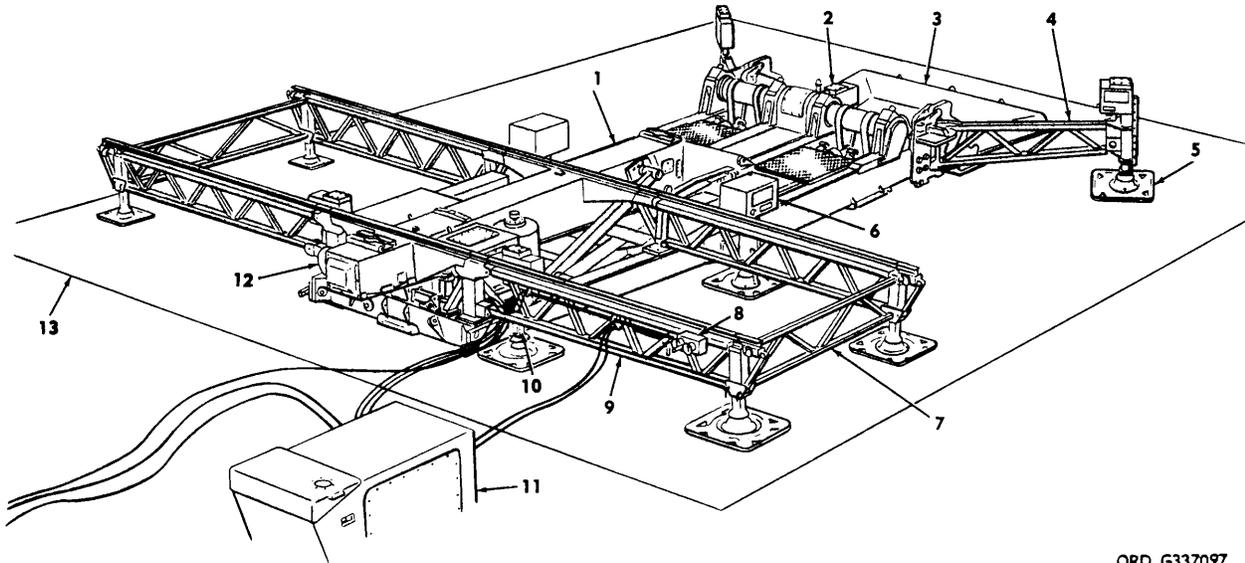
Figure 2-3. Mobile launcher and truck tractor M52 prepared for travel.



ORD G337329

- | | | |
|---------------------------|-----------------------------|----------------------|
| 1—Truck M54 | 8—Mobile launcher axle | 15—Center jack (2) |
| 2—Marker light (2) | 9—Outrigger (2) | 16—Dolly M197A1 |
| 3—Cable assy (5) | 10—Stop light-taillight (2) | 17—Stake stowage box |
| 4—Cable clamp (4) | 11—Emplacement linkage | 18—Kingpin support |
| 5—Electrical test station | 12—Mounting plate (2) | 19—Forward jack (2) |
| 6—Blast deflector | 13—Launcher | |
| 7—Hose assy | 14—Tie-down linkage | |

Figure 2-4. Mobile launcher, truck M54, and dolly M197A1 prepared for travel.



ORD G337097

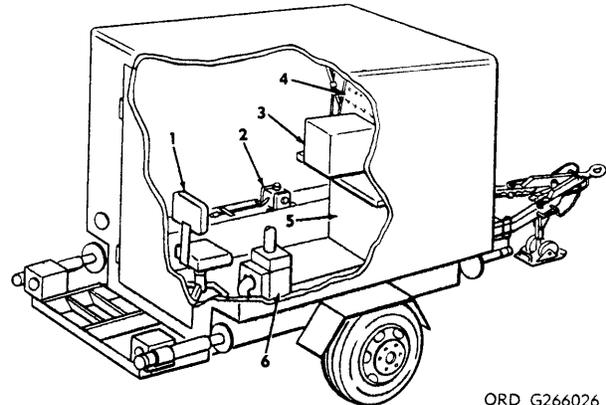
- | | |
|----------------------------|--------------------------------------|
| 1—Launcher | 8—Electrical test station |
| 2—Auxiliary jack | 9—Side truss (4) |
| 3—Blast deflector | 10—Forward jack (2) |
| 4—Outrigger (2) | 11—LCI |
| 5—Mounting plates (6) | 12—Loudspeaker with cable assembly |
| 6—Center jack (2) | 13—Concrete launching pad (optional) |
| 7—Storage rack support (2) | |

Figure 2-5. Normally emplaced mobile launcher.

amount of time is available, is left to the discretion of the appropriate commander.

b. *Section Operating Equipment Trailer (SOET)*. The SOET (fig. 2-6) contains the section control group and provides protection for the operating personnel during firing operations and inclement weather. The section control group functions as the intermediate control point between the trailer mounted launching control station and the launcher and is capable of assuming complete control of section operations if the trailer mounted launching control station should become disabled.

c. *400-cps Generator*. A trailer mounted 400-cps generator supplies the power for one mobile launching section.



ORD G266026

- | |
|------------------------------|
| 1—Operator's chair |
| 2—Power cabinet junction box |
| 3—Stowage box |
| 4—Section control-indicator |
| 5—Section simulator group |
| 6—Heater |

Figure 2-6. Section operating equipment trailer (SOET)

Section II. DESCRIPTION OF THE PERMANENT LAUNCHING SET

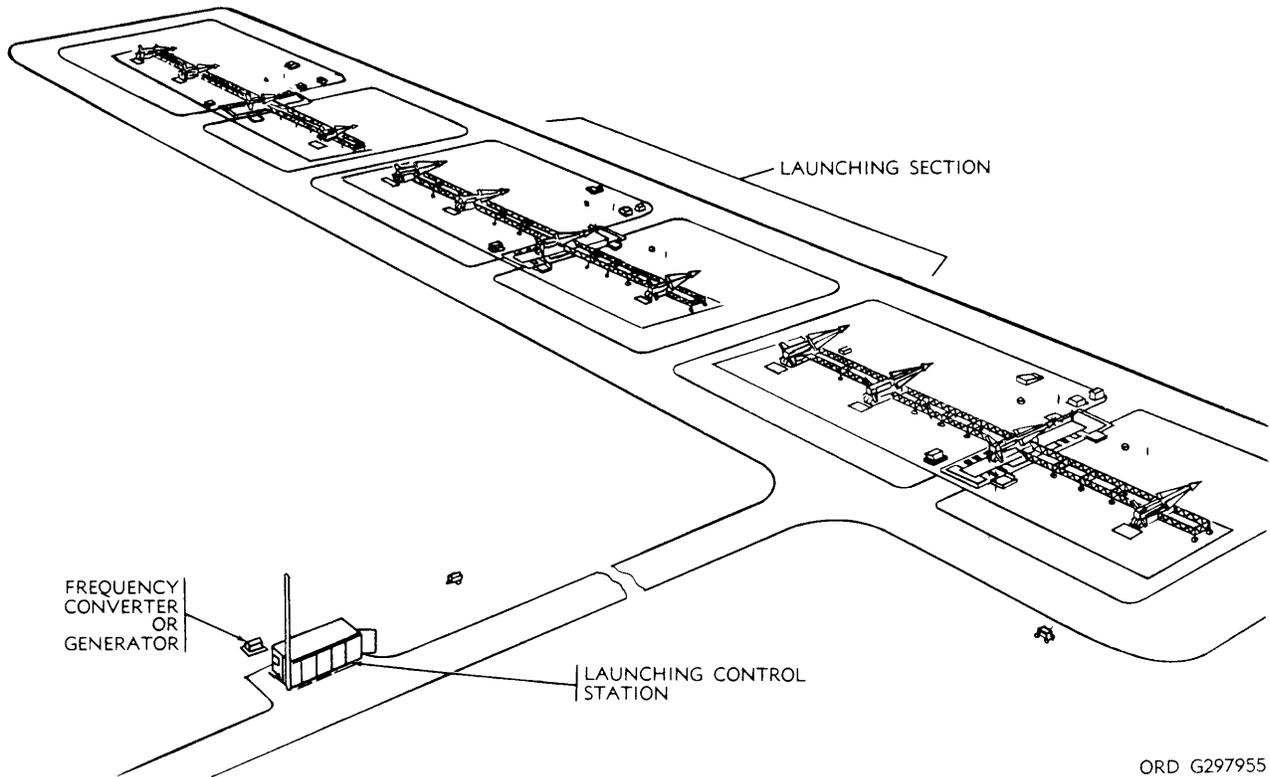


Figure 2-7. Typical permanent launching set.

2-4. General

A typical permanent launching set (fig. 2-7) consists of a launching control station (fig. 2-2) and three launching sections. The launching set functions as part of a permanent weapons system for a defensive area. Normally, the equipment is not expected to be moved from one area to another. Although only three sections are covered in this manual, design capabilities permit the use of four launching sections with a single launching set.

2-5. Launching Control Station—Permanent Launching Set

The trailer mounted launching control station used with permanent launching sets is identical to the one used with mobile launching sets as discussed in paragraph 2-2 except that at

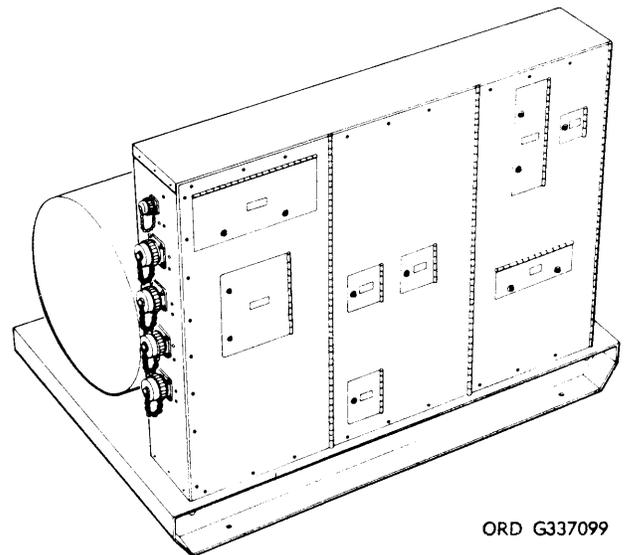
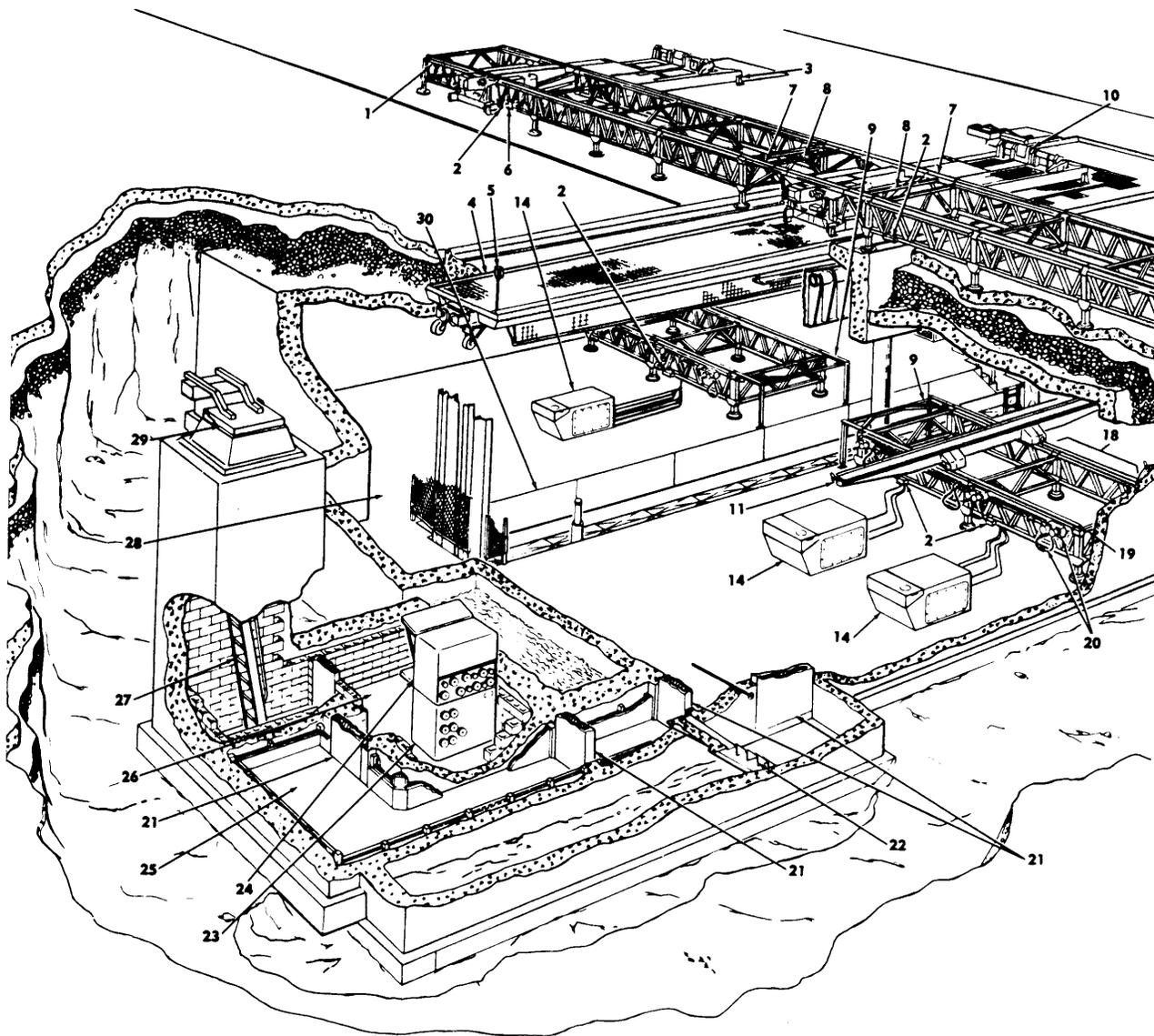


Figure 2-8. Rotary converter.



ORD G337325

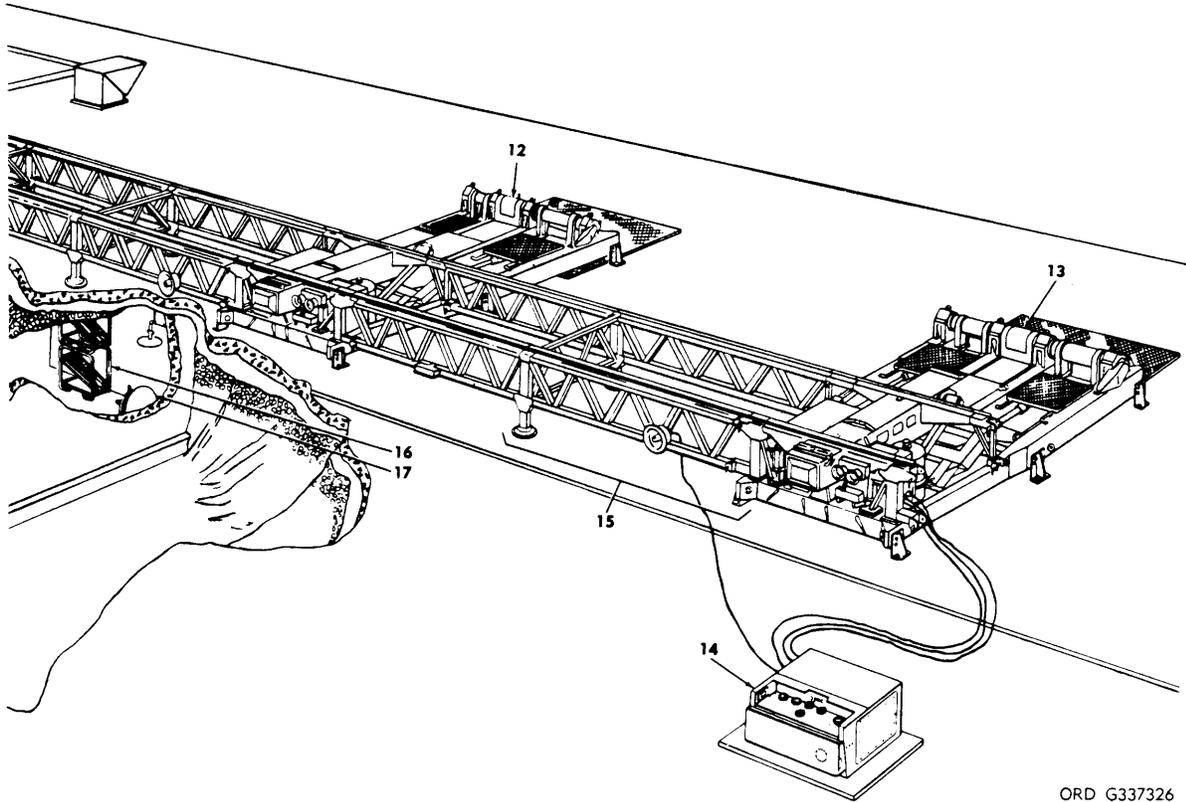
Figure 2-9. Typical permanent launching section—cutaway view (sheet 1 of 2).

permanent launching sets the trailer undercarriages are removed and the launching control station is emplaced on timbers on a concrete pad. Power for the launching control station is normally supplied from a rotary converter (fig. 2-8) which converts 60-cps power to 400-cps power. The 400-cps generators are available in cases of failure of the 60-cps power source.

2-6. Permanent Launching Section

a. Figure 2-9 illustrates a permanent launching section. A launching area missile test set (fig. 4-98) is provided for missile checkout.

b. Power for each section is normally supplied from a rotary converter which converts 60-cps power to 400-cps power for use in the section. In the event of 60-cps power failure, 400-cps generators are available for power backup.



ORD G337326

- | | |
|--|---|
| <ul style="list-style-type: none"> 1—Side truss (30) 2—Telephone holder (6) 3—Launcher No. 3 4—Elevator 5—Elevator control station 6—Loudspeaker with cable assembly (4) 7—Storage rack adapter assy 8—Rail extension assy 9—Rail extension assy 10—Launcher No. 1 11—Launching-handling rail (7) 12—Launcher No. 2 13—Launcher No. 4 14—LCI 15—Storage rack (11) | <ul style="list-style-type: none"> 16—Fin storage rack 17—Hose (4) 18—Storage rack section (4) 19—Storage rack support (16) 20—Hydraulic and electrical test station (9) 21—Blast-proof door 22—Stairway 23—SSG 24—SCI 25—Passageway 26—Section control room 27—Steel ladder (2) 28—Underground storage chamber 29—Escape hatch (2) 30—Elevator well |
|--|---|

Figure 2-9. Typical permanent launching section—cutaway view (sheet 2 of 2).

SECTION III. SITING REQUIREMENTS

2-7. General

a. Scope.

- (1) This section contains siting requirements for emplacement of the launching set. Site selection and the prob-

lems primarily related to site selection are not covered in this manual. For information on site selection, refer to FM 44-85. For details of battery control area siting requirements refer to TM 9-1430-251-10.

- (2) This chapter deals primarily with siting requirements for mobile sites because at permanent sites, buildings, concrete emplacement pads, and the underground storage chamber and control room are prepared prior to the arrival of the equipment.

b. Presentation. Paragraph 2-8 establishes the allowable maximum and minimum distances between components of the launching set. Paragraph 2-9 indicates material limitations of the various components which impose limitations during emplacement. Paragraph 2-10 describes certain mandatory and desirable requirements which should be met when emplacing the launching set if the HERCULES system is to achieve maximum accuracy. Paragraph 2-11 establishes the order in which selection of positions for the various components should be made within the selected site.

2-8. Distance Requirements Between Components of the Launching Set

In the mobile launching set, a minimum safety distance of 450 feet is maintained between each launching section, and a minimum distance of 800 feet is maintained between the launchers and the trailer mounted launching control station. A minimum distance of 300 feet and a maximum distance of 750 feet is maintained between the section operating equipment trailer (SOET) and the trailer mounted launching control station and a minimum distance of 425 feet and a maximum distance of 500 feet is maintained between the SOET and the launchers. A distance of 375 feet is maintained between the SOET and the section generator.

2-9. Material Limitations of Equipment

a. General. Size and weight of equipment of the launching set will materially limit travel and emplacement of the equipment in some areas. Refer to tables 4-3, 4-4, and 4-5 for size and weight to establish minimum emplacement area requirements for the major components of the launching set.

b. Trailer Mounted Launching Control Station. In the mobile site, the trailer mounted launching control station cannot be leveled on terrain with a slope greater than 89 mils longitudinally and 160 mils transversely.

c. Mobile Launcher. In the mobile site, the launcher cannot be leveled on terrain which has a slope greater than 17 mils in either direction.

2-10. Mandatory and Desirable Requirements for Emplacement of Equipment of the Mobile and Permanent Launching Sets

Note. All references to line-of-sight refer to radar line-of-sight unless otherwise indicated.

a. General. When emplacing the launching set, certain mandatory requirements must be met to facilitate meeting the maximum capabilities of the HERCULES or Improved HERCULES System. Certain additional requirements are desirable and provide added efficiency of operation and ease of emplacement. However, it should be understood that at some sites it may not be possible to meet all requirements due to irregular terrain and the presence of surrounding objects. In many cases, particularly at permanent sites, such hindrances may be overcome by grading the terrain and removing the objects. If this is not possible, and certain poor terrain features cannot be avoided, then waivers of requirements may have to be obtained. The recommended permanent emplacement layout is shown in figure 2-7, and the recommended mobile emplacement layout is shown in figure 2-1.

b. Mandatory Requirements. The mandatory requirements described in steps (1) through (12) below must be met when emplacing a launching set within the selected site.

- (1) The equipment must be emplaced so that the maximum distances between components do not exceed the usable length of supplied cables. The usable length of 252-foot cables is approximately 230 feet, and for 126-foot cables is approximately 115 feet. The difference between the actual and the usable lengths for any cable is caused by the terrain irregularities and distances between the ground and the junction boxes on the equipment.
- (2) The minimum distance between the missile track antenna-receiver-transmitter group in the battery control area and the nearest missile in the launching area is 1,000 yards. This

minimum distance is determined by the maximum tracking rate of the antenna during the boost phase of the missile. Due to the lengths of supplied cables, the maximum distance allowable between the battery control and launching control areas is 5,200 yards. By use of additional cables this distance could be increased to 6,000 yards but cannot exceed this value due to the design characteristics of radar course directing central equipment.

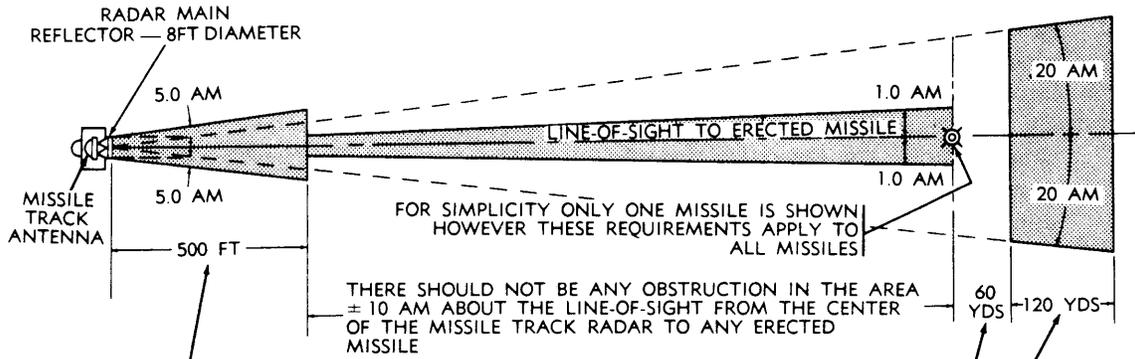
- (3) There must not be any large metallic surfaces other than chain link fences within a definite area behind each erected missile. This area begins 60 yards behind the missile and extends outward for 20 angular mils on each side of the line-of-sight to a depth of 180 yards behind the missile (fig. 2-10).
- (4) A line-of-sight must exist between each erected missile and the missile track antenna-receiver-transmitter group. There must be no obstructions above this line-of-sight originating at a point 15 feet below the antennas of any erected missile. There must be no obstructions within one angular mil on each side of the line-of-sight to each erected missile.
- (5) Launchers must be carefully oriented so that a minimum optical clearance of four feet exists between adjacent erected missiles in a section (fig. 2-11) when viewed from the missile track antenna-receiver-transmitter group. The four-foot clearance is determined as described in steps (a) through (f) below.
 - (a) On a carefully prepared scaled layout of an emplacement site (combined battery control area and launching area) plot the proposed position of the missile track antenna-receiver-transmitter group and the proposed position of each launcher in each section.
 - (b) Draw a line from a point representing the estimated center of the antenna of the missile track

antenna-receiver-transmitter group to points representing the estimated center of each erected missile in each section. The lines are represented by the letters a, b, c, and d.

Note. These lines represent the optical line-of-sight between the antenna of the missile track antenna-receiver-transmitter group and each erected missile.

- (c) On the four lines representing one section, find the two line-of-sight lines which form the smallest angle. This angle is represented by the letter A, and the two remaining angles are represented by the letters B and C.
- (d) Draw a line perpendicular to the left line of the two lines forming the smallest angle. The perpendicular line is to be drawn so that it intersects the other line-of-sight lines. This perpendicular line is designated as e.
- (e) Draw perpendicular lines between line e constructed in step (d) above and the center points of the remaining missiles in the section (lines f, g, and h). The distance along line e between lines a and f, f and g, and g and h must be a minimum of 4 feet on a scaled drawing to meet the requirements of this procedure.
- (f) Repeat steps (c) through (e) above for the remaining sections of the launching set.
- (6) The location of the launching control station must be such that it is not in the line-of-sight zone between any missile and the missile track antenna-receiver-transmitter group.
- (7) A line-of-sight must exist between the missile track antenna-receiver-transmitter group and the flight simulator group which is mounted on a mast on the launching control station.
- (8) A line-of-sight must exist between the radar target simulator and the target track and missile track antenna-receiver-transmitter groups. The radar target simulator is designed to be mounted on the flight

HORIZONTAL CLEARANCE REQUIREMENTS

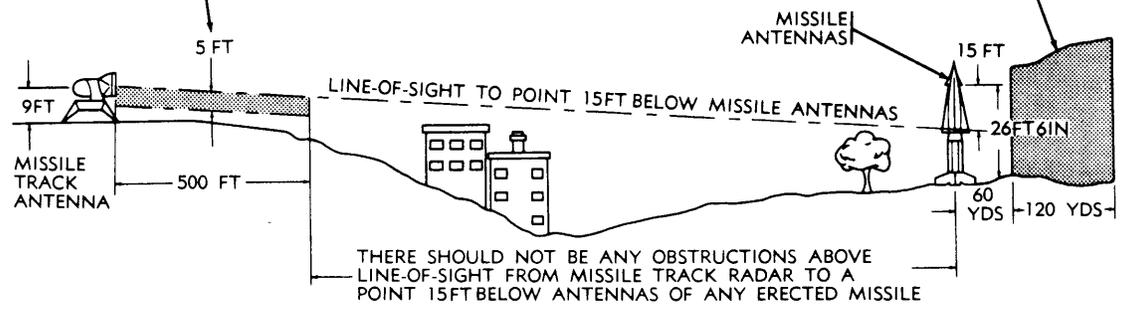


OBSTRUCTION FREE AREAS WITHIN 500 FT OF MISSILE TRACK RADAR

1. HORIZONTAL CLEARANCE ANGLES OF 5.0 AM FROM PERIPHERY OF MAIN REFLECTOR
2. AN ADDITIONAL VERTICAL CLEARANCE OF 5 FT IS REQUIRED BELOW LINE-OF-SIGHT TO POINT 15 FT BELOW MISSILE ANTENNAS

LARGE METALLIC SURFACES IN THE AREA 60-180 YDS BEHIND AN ERECTED MISSILE AND ± 20 AM ABOUT THE LINE-OF-SIGHT CAN CAUSE SYSTEM DEGRADATION

VERTICAL CLEARANCE REQUIREMENTS



NOTE: 1. SHADED AREAS ARE TO BE MAINTAINED FREE OF OBSTRUCTIONS.
2. AM EQUALS ANGULAR MILS.

ORD G337100

Figure 2-10. Line-of-sight clearances and marginal requirements between missile track antenna-receiver-transmitter group and missiles.

simulator group but may be mounted on a separate mast to meet line-of-sight or radar reflection sensitivity requirements.

- (9) The angle of depression between the antenna of the missile track antenna-receiver-transmitter group and any erected missile cannot exceed 200 mils. If this condition is not met, the erected missile lies below the maximum depression angle of the antenna.
- (10) The slope of the terrain on which the launching control station and SOET are to be emplaced must not exceed 89 mils longitudinally and 160 mils transversely in the mobile site. The launching control station and SOET cannot be leveled on terrain which exceeds these slopes.
- (11) The slope of the terrain on which the launcher and its associated equipment is to be emplaced must not exceed 17 mils in either direction in the mobile site. The launchers and associated equipment cannot be leveled on terrain exceeding these slopes.
- (12) The minimum safe distances between components of the launching set and areas or buildings to be safeguarded must meet the requirements of the Ordnance ammunition quantity-distance tables in TM 9-1300-206, and will depend upon the type and maximum quantities of explosives expected to be stored in the launcher complex at any one time.

c. Desirable Requirements. The desirable requirements listed in steps (1) through (7) below must be met when possible.

- (1) The terrain of the selected site should be relatively level, or suitable for leveling, and as free from obstructions such as trees, boulders, and structures as possible. The soil should not be excessively rocky or marshy.
- (2) If possible, crossroads which can be extended or reconditioned with a minimum of effort should exist. These roads must connect the various areas and must extend around the emplaced launchers to allow access to storage

racks for loading and unloading of missiles.

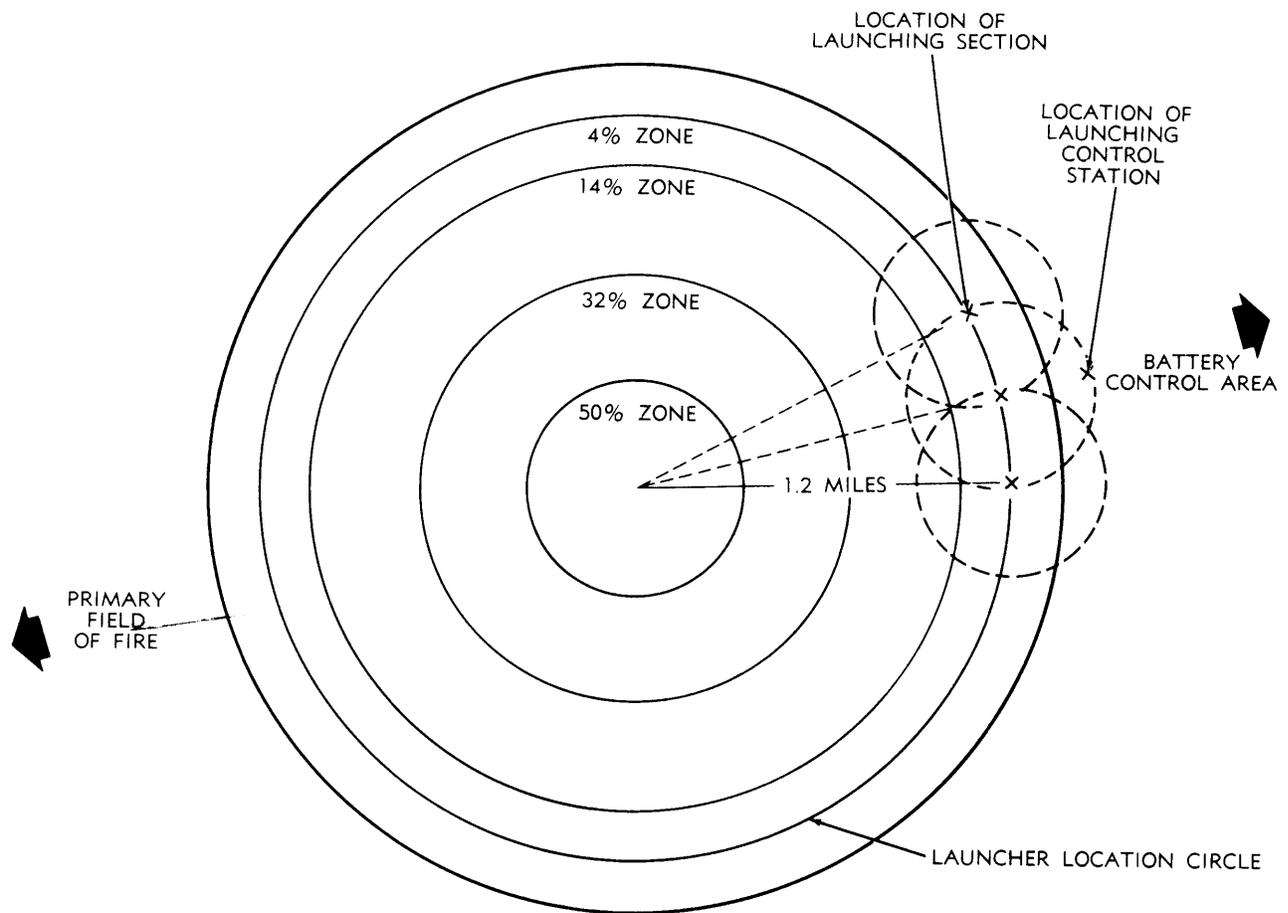
- (3) The emplacement area should be within a 180-degree sector centered about the primary field of fire and in front of and directed away from the battery control area.
- (4) The in-line launcher emplacement layout shown in figure 2-7 should be used if at all possible. The advantage of an in-line emplacement layout is that it allows all line-of-sight requirements to be easily met and produces a single rocket motor cluster disposal zone for all three launching sections and their associated launchers (fig. 2-12).

Note. The term "in-line" refers to the arrangement of launcher sections along an arc of 1.2 mile radius, the center of which is the center of the rocket motor cluster disposal area. Note that the launching sections are not actually along a straight line in the layout in figure 2-12.

- (5) The selected area should be located so that its dead zone (the area which the missile cannot defend due to its trajectory) does not overlap the dead zone of another area.
- (6) The direction of fire should be toward the primary field of fire. The missile may be fired in a direction other than toward the primary field of fire, but then an increased time of flight results.
- (7) If possible, the rocket motor cluster disposal zone should be selected so as to minimize possible damage to man-made structures. It should be located in front of the launching area and directed away from the defended area.

2-11. Priority of Equipment Placement

a. When emplacing the launching set, priority of placement must be given to the launcher complex. This is necessary because the terrain on which the launchers are installed must permit leveling of the launchers. A line-of-sight must exist between each erected missile and the antenna of the missile track antenna-receiver-transmitter group. Consideration must also be given to rocket motor cluster disposal (fig. 2-12).



ORD G337102

Figure 2-12. Development of a mobile in-line configuration and the associated rocket motor cluster disposal zone.

b. Second highest priority should be given to the placement of the launching control station to insure that it will not mask any missile from the missile track antenna-receiver-transmitter group.

c. Third priority of placement should be given to the section control group.

d. The remaining items of the launching set may be placed anywhere within the launching site within reach of the issued cables so long as the placement requirements in this section satisfy requirements concerning fire hazard, personnel safety and line-of-sight.

Section IV. SUMMARY OF SERVICES PERFORMED BY OTHER AGENCIES BEFORE AND DURING EMPLACEMENT

Many services related to assembly and emplacement of the launching set are performed by agencies other than the using organization. Services performed by agencies other than the using organization may be performed by a

responsible military agency or by a private contractor designated by the responsible military agency. Only the responsible agency will be referred to in the procedures given in this technical manual.



—

.

.

—

—

—

.

.

—

CHAPTER 3

TOOLS AND SERVICE UPON RECEIPT

Section I. TOOLS AND EQUIPMENT REQUIRED FOR ASSEMBLY AND EMPLACEMENT

3-1. General

Tools and equipment are issued to the using organization for assembly, emplacement, operation, and maintenance of the launching set. Tools and equipment should not be used for purposes other than those prescribed, and, when not in use, should be properly stored in storage boxes or cabinets.

3-2. Common Tools and Equipment

a. Common tools and equipment required for assembly and emplacement of the launching set are listed in SC 4935-95-CL-A31, SC 4935-95-CL-A32, SC 4935-95-CL-A42, and SC 4935-95-CL-A33. Contents of these SC's are discussed in paragraphs b through e below.

b. Tools and equipment listed in SC 4935-95-CL-A31 "Tool Kit, Launcher Loader, Guided Missile" are issued for assembly and maintenance of the launcher and components. The tool kit consists of common tools such as hammers, screwdrivers, pliers, wrenches, etc., which are intended for general work.

c. Tools and equipment listed in SC 4935-95-CL-A32 "Mechanical Assembler, Guided Missile," are general purpose tools issued to the

mechanical maintenance personnel for performing their assigned duties.

d. Tools and equipment listed in SC 4935-95-CL-A42 "Missile Operations and Maintenance, NIKE-AJAX, NIKE-HERCULES, NIKE-HERCULES (Imp)," are general purpose tools issued to organizational maintenance personnel for assembly and maintenance of the launching set.

e. Tools and equipment listed in SC 4935-95-CL-A33 "Tool Kit, Guided Missile: Electronic Assembler," are issued to electronic maintenance personnel for routine maintenance and adjustment of electrical and electronic components of the launching set.

3-3. Special Tools and Equipment

Special tools and equipment listed in table 3-1 and illustrated in figure 3-1 are either listed in the applicable columns of Department of the Army Supply Manual SC 4935-92-CL-001 "SHOP EQUIPMENT: Guided Missile, Special, Organizational Maintenance" or in the appropriate tables of organization and equipment, except the setting tool and the loading rack lift bar.

Table 3-1. Special Tools and Equipment for Assembly and Emplacement of the Launching Set

Item	Identification number	Reference fig.	Use
Aiming circle M2 mount ----	8525491	3-1	Mounting aiming circle M2. Orienting launcher. Leveling racks and launcher, and checking launcher erecting beam for correct angle of elevation.
Aiming circle M2 -----	F001-5800551		
Gunner's quadrant M1 -----	7578398		
Cable connector wrench ----	8015353	3-1	Connecting launching area cables. Emplacing cables. Installing hexagon bolts and expansion shields in concrete for supports on loading and storage racks and various phases of the emplacement.
Reel stand -----	3895-252-6896		
Setting tool ¹ -----	9026123		
Loading rack lift bar ----	9977529	3-1	Assisting personnel in handling the loading racks during emplacement and evacuation.

¹Part of launcher sub-surface four-rack modification kit.

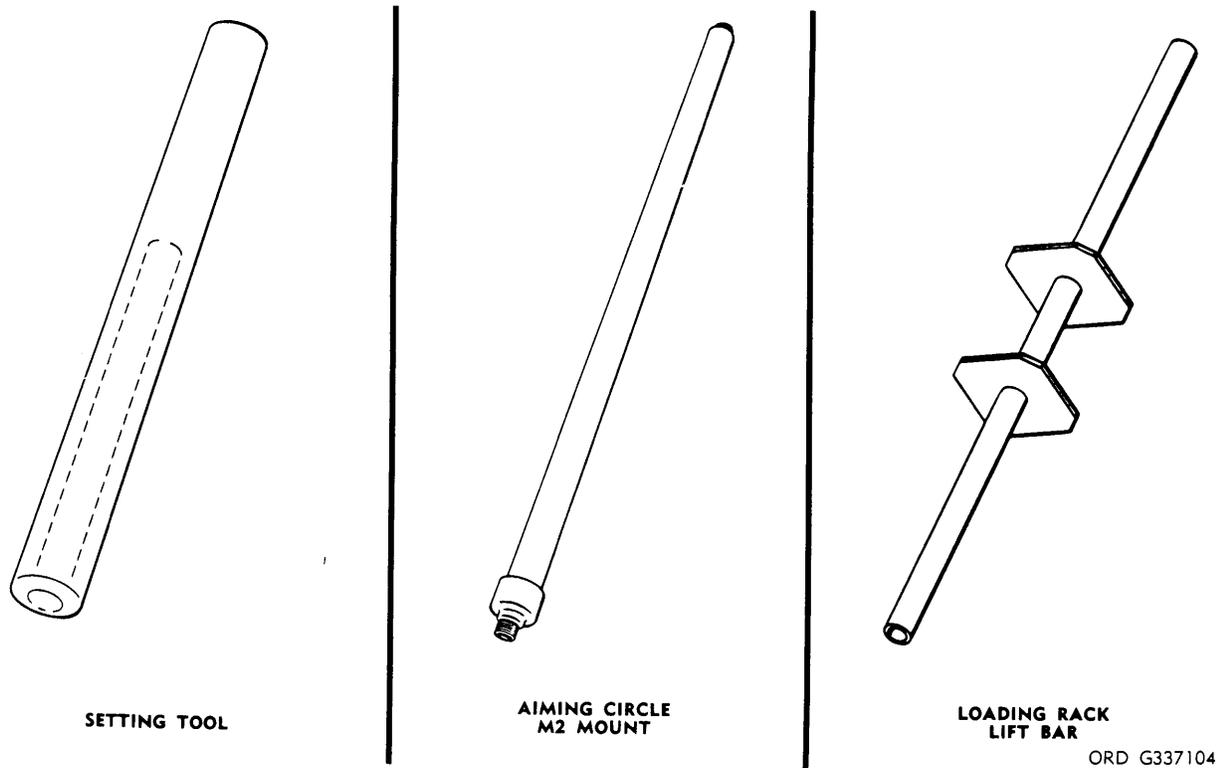


Figure 3-1. Special tools and equipment required for assembly and emplacement of the launching set.

Section II. SERVICE UPON RECEIPT OF MATERIEL

3-4. General

When a launching set is first received by the using organization, it is the responsibility of the officer in charge to determine that all the equipment is present and is capable of performing its assigned mission. For the above reason, organizational maintenance personnel must inspect all assemblies, subassemblies, repair parts, and tools to determine that the equipment is properly assembled, cleaned, and correctly adjusted and lubricated. A record must be made of all damaged or missing items and all deficiencies must be corrected as soon as possible.

3-5. General Inspection

a. The apparent physical condition of the equipment comprising the launching set can be determined by visual inspection. Its previous operating condition is revealed by records in the appropriate log books.

b. As soon as possible after receipt of the equipment, a complete physical inspection should be performed.

c. Upon receipt of the materiel, check all repair parts and equipment against the listing in TM 9-1410-250-15P/1/1, TM 9-1440-250-15P/1/1, TM 9-1440-250-15P/2/1, TM 9-1440-250-15P/3/1, TM 9-1440-250-15P/4/1, TM 9-1440-250-15P/6/1, TM 9-4935-253-12P/1/1, TM 9-4935-253-12P/2/1, and TM 9-4935-253-12P/4/1 to make certain that all items are present.

d. Check all tags attached to the equipment, and transfer to the system log or record book all information pertaining to lubrication or maintenance to be performed before assembling and adjusting the parts. Check that the serial numbers on the equipment and on the major components agree with the numbers listed in the records.

e. Check the list of modification work orders to make certain that all modifications have been incorporated on the materiel.

f. A general inspection of the materiel will be made using the applicable procedures prescribed in TM 9-1400-250-12.

3-6. Electrical and Mechanical Alinement

As soon as possible after the equipment is physically emplaced, the launching set should be electrically and mechanically checked and alined as specified in chapter 6.

CHAPTER 5

ASSEMBLY AND EMPLACEMENT OF THE MOBILE LAUNCHING SET

Section I. GENERAL

5-1. Introduction

Note. Emplacement of the mobile launcher on a concrete pad is optional and will be determined by the local command.

The mobile launching set (fig. 2-1) is designed to provide field mobility with minimum emplacement and evacuation time. Assembly and emplacement procedures for the mobile launcher, dolly mounted launcher control-indicator (LCI), section operating equipment trailer (SOET), cable reel racks, cable assemblies, trailer mounted launching control station and other associated equipment are covered in this chapter. For information on the low-bed trailer, which is used to transport missile MIM-14B to the mobile launcher, refer to TM 9-2330-255-14.

5-2. Equipment Furnished

The major items of equipment furnished for a mobile launching set are listed in table 5-1.

5-3. Terrain Requirements

a. The mobile launching set may be emplaced on a 19-acre area.

b. The minimum longitudinal and transverse level requirements of terrain for emplacement of the trailer mounted launching control station, the mobile launcher and associated equipment are identical to those described in paragraphs 2-10b(10) and 2-10b(11), respectively.

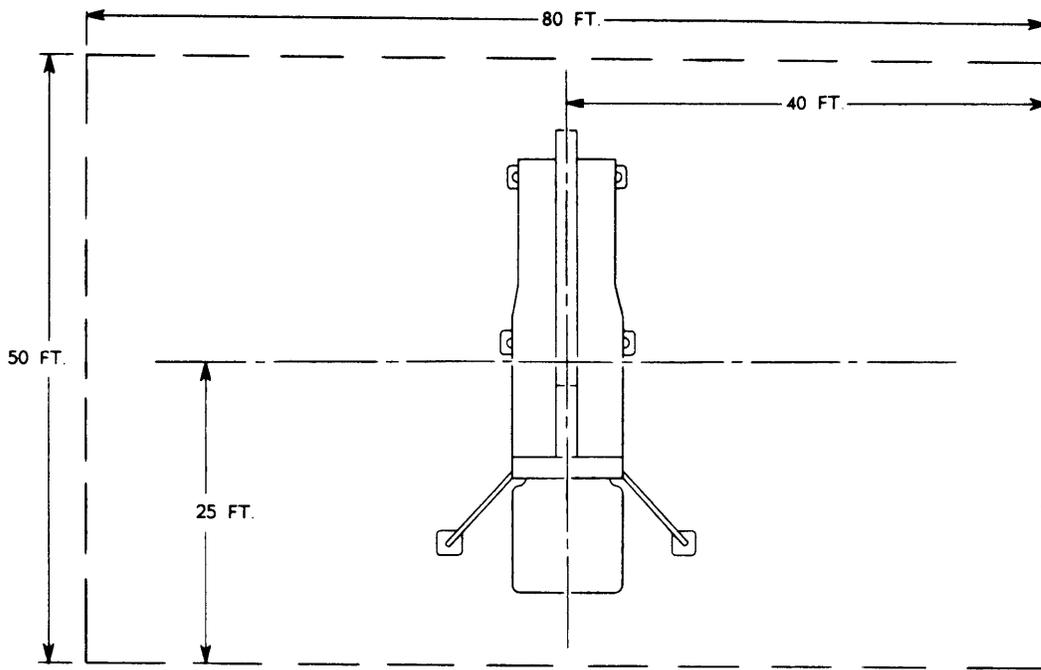
c. The mobile launcher emplaced (fig. 2-5) requires an area 50 feet long and 80 feet wide (fig. 5-1). This area includes space for loading and unloading the low-bed trailer.

Table 5-1. Mobile Launching Set—Major Equipment

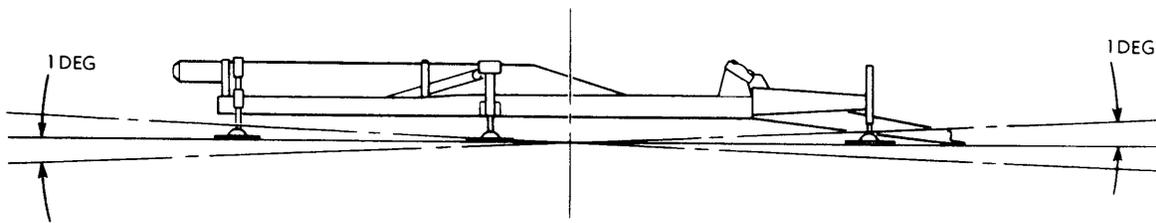
Equipment	Quantity	Paragraph reference
Blast deflector kit ¹ -----	9	5-15, 5-22, 5-23
Cable reel rack (1 × 2) -----	1	5-41 through 5-43
Cable reel rack (3 × 2) -----	9	5-41 through 5-43
Cable reel rack (3 × 3) -----	2	5-41 through 5-43
Concrete launching pad emplacement kit ² -----	9	5-12
Converter dolly M197A1 -----	9	2-3
Generator (45-kw) -----	4	2-3c
Generator junction box -----	3	5-45
Launcher -----	9	2-3, 5-13, 5-19
Launcher field modification kit -----	9	5-14, 5-16
LCI -----	9	5-31 through 5-35
LCI dolly -----	9	5-31 through 5-35
Launching control station -----	1	2-2, 2-3, 5-39, 5-40
Section control-indicator -----	3	2-3b, 5-38
Section simulator group -----	3	2-3b, 5-38
Side truss -----	36	5-24, 5-25
SOET -----	3	2-3b, 5-36 through 5-38
Storage rack support assembly -----	18	5-24, 5-25
Transport modification kit -----	9	5-6 through 5-10

¹Blast deflector kits 1 through 72 are 9017840; 73 and subsequent are 9152676.

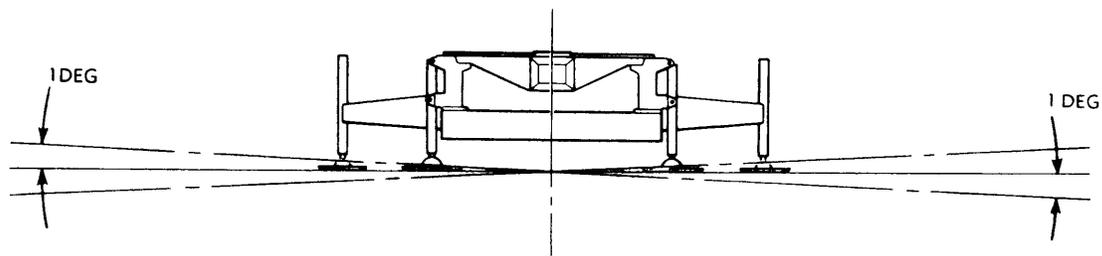
²Optional.



LAUNCHER EMPLACEMENT AREA



LONGITUDINAL LEVELING



LATERAL LEVELING

ORD G55726

Figure 5-1. Mobile launcher terrain requirements.

Table 5-2. Mobile Launcher Emplacement Data

Component	Length (in.)	Width (in.)	Height (in.)	Weight (lb)
Blast deflector kit -----	---	---	---	1,700
Blast deflector ¹ -----	116	106	21	1,230
Blast deflector ² -----	80	93	17	952
Launcher -----	261	88	32	11,941
Launcher field modification kit -----	---	---	---	4,000
Auxiliary jack -----	---	---	35-59 ³	250
Center jack -----	---	---	35-75 ³	300
Forward jack -----	---	---	35-59 ³	250
Outrigger ⁴ -----	72	5	17	150
Outrigger ⁵ -----	72	5	35	250
Transport modification kit -----	---	---	---	1,500
Kingpin support ⁶ -----	64	32	24	250
Mobile launcher axle -----	54 ⁷	120	---	---

¹Component of blast deflector kit, serial No. 1 through 72.

²Component of blast deflector kit, serial No. 73 and subsequent.

³Adjustable range.

⁴Component of launcher field modification kit, serial No. 1 through 500.

⁵Component of launcher field modification kit, serial No. 501 and subsequent.

⁶Component of transport modification kit.

⁷Center of axle to tip of towbar.

5-4. Mobile Launcher Data

Table 5-2 gives the approximate physical data of the three basic mobile kits and lists the major components required to adapt the basic launcher to mobility. Lesser components of the kits are not listed, as they pose no emplacement problems.

5-5. Receipt of Equipment

a. The equipment for adapting the basic launcher to mobility is received in crates. Preparation and emplacement of the launcher is accomplished by the using organization.

b. Launcher field modification kits 1 through 144 are received in ten shipping crates; launcher field modification kits 145 and subsequent are received in eight shipping crates.

c. The concrete launching pad emplacement kit (optional equipment), the blast deflector kit, and the transport modification kit are received in separate shipping crates, one kit to the crate.

5-6. Preparation of the Mobile Launcher Axle

Caution: Unless the mobile launcher axle is to be used for very limited service, the preservative fluid installed by the manufacturer in the axle hydraulic system must be drained and

replaced with hydraulic fluid. Refer to TM 9-1440-250-20/1 for this procedure.

a. Disconnect the cable assembly (1, fig. 5-2) from the connector (2).

b. Remove the pin assembly (3 of A) to release the right towbar arm (4 of A) from the left towbar arm (5 of A).

c. Unfold the right and left towbar arms and secure with the pin assembly (3 of B).

d. Check the tire pressure to maintain between 70 and 80 pounds of pressure.

e. Perform the hydraulic brake adjustment as outlined in TM 9-1440-250-20/1.

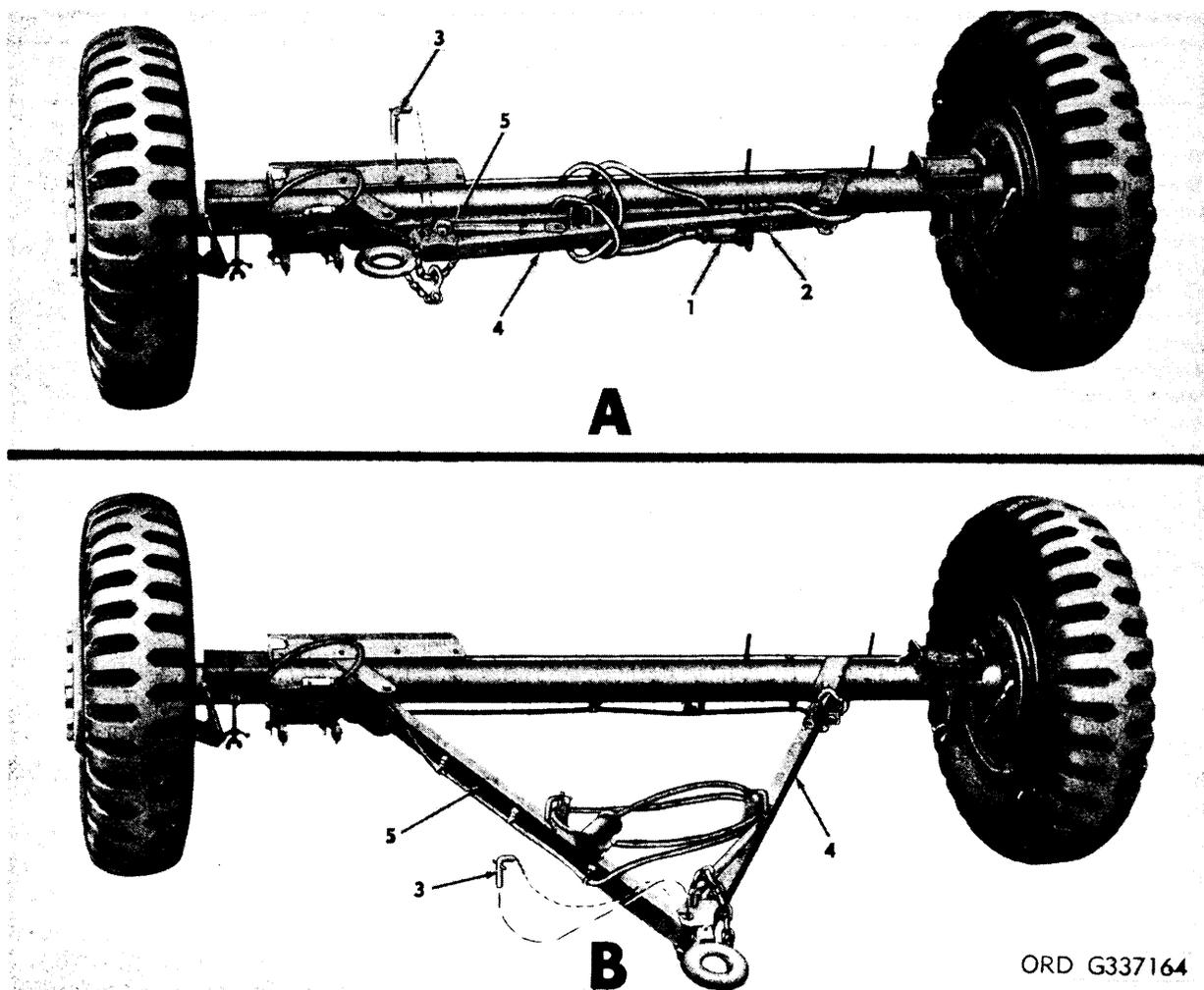
5-7. Preparation for Stowage of the Mobile Launcher Axle and Kingpin Support

Caution: If the mobile launcher axle is to be stored or is to be idle for 60 days or longer, the hydraulic brake fluid in the hydraulic brake system must be removed and preservative fluid installed. Refer to TM 9-1440-250-20/1 for this procedure.

a. Connect the mobile launcher axle (1, fig. 5-3) to truck tractor M52 (2) as outlined in steps (1) through (3) below.

(1) Connect the towbar arm (3) to the pintle (4).

(2) Connect the chain hook (5) to the clevis (6).



- 1—Cable assy
- 2—Connector
- 3—Pin assy
- 4—Right towbar arm
- 5—Left towbar arm

Figure 5-2. Preparation of the mobile launcher axle.

- (3) Connect the cable assembly (7) to the connector (8).
- b. Secure the kingpin support (9) to the mobile launcher axle as outlined in steps (1) through (7) below.
 - (1) Remove the arm pin assemblies (10) from the supports (11).
 - (2) Disconnect the connecting link (12) from the clip (13); rotate the link away from the clip.
 - (3) Attach the hoisting cable (14) to the kingpin support and to the falling hook (15).

- (4) Hoist the kingpin support into position on the mobile launcher axle with the two supports protruding through the two mating holes in the bottom of the kingpin support.
- (5) Secure the kingpin support to the mobile launcher axle with the two arm pin assemblies.
- (6) Remove the hoisting cable from the kingpin support.
- (7) Rotate the connecting link upward and position between the lugs (16) and secure with the support pin assembly (17).

5-8. Preparation for Stowage of the Marker Lights

Position the two marker lights (18, fig. 5-3) on the tubes (19) and secure with the wing nuts (20).

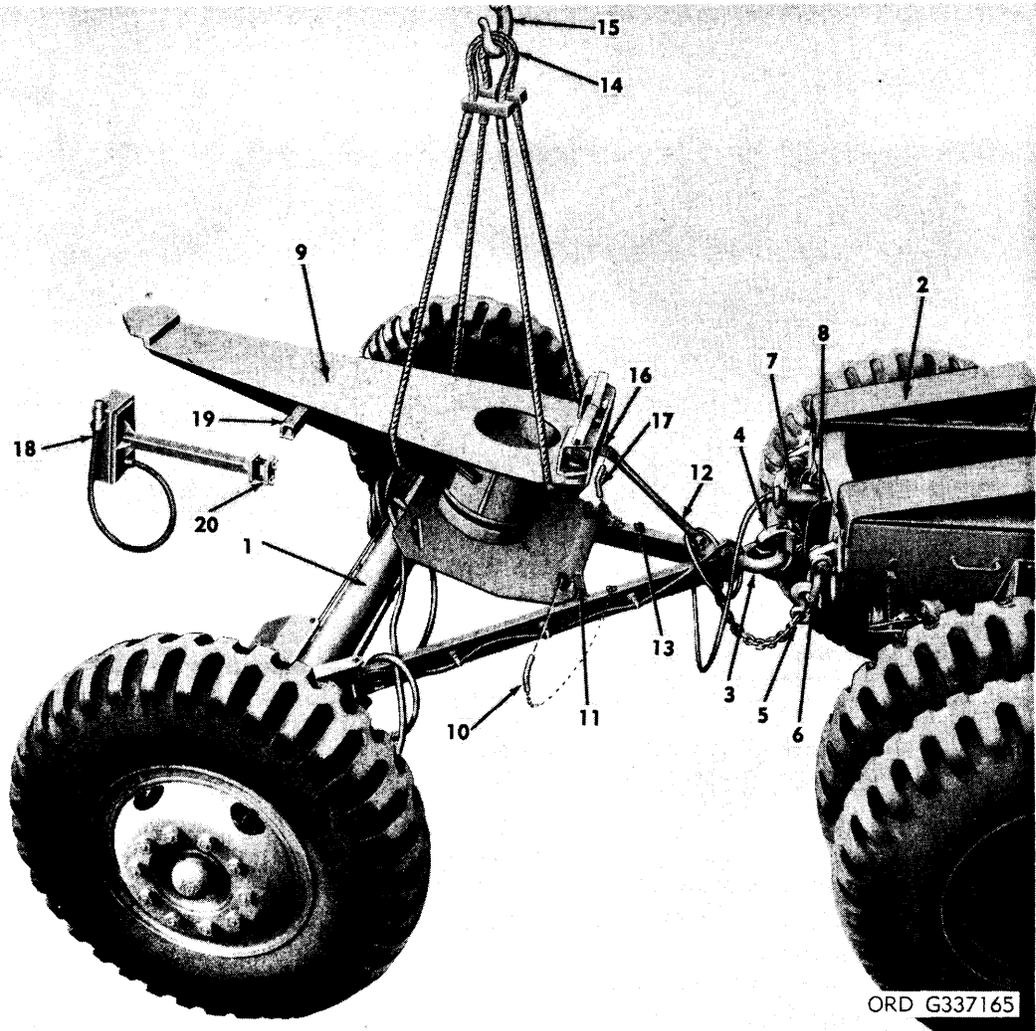
5-9. Installation of the Stop Light-Taillight on the Mobile Launcher Axle

a. Position the clamp (1, fig. 5-4) on the mobile launcher axle (2).

b. Rotate the bolt (3) upward and secure the clamp with the wing nut (4) and the hand-wheel (5).

c. Insert the spring-loaded stud of the stop light-taillight (6) in the tube section of the clamp, and rotate until the pin (7) is securely in place.

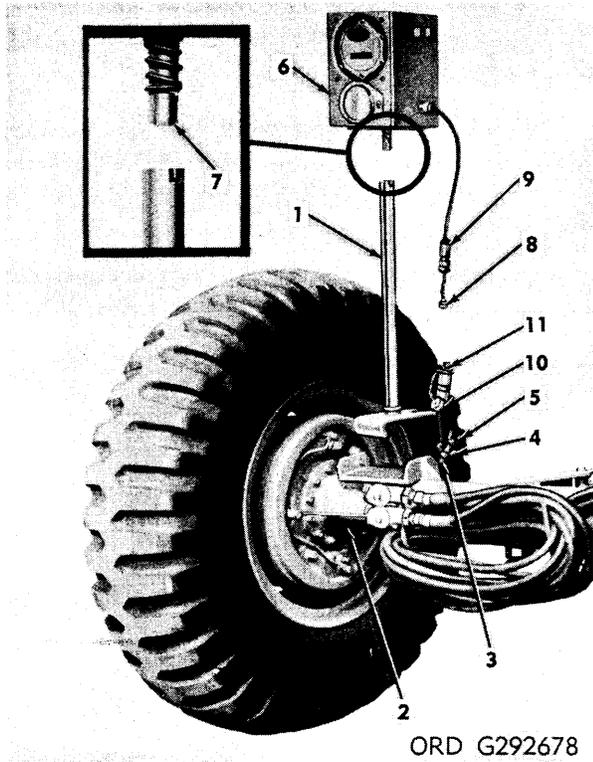
d. Remove the taillight-cable dust cover (8) from the taillight cable assembly (9).



- 1—Mobile launcher axle
- 2—Truck tractor M52
- 3—Towbar arm
- 4—Pintle
- 5—Chain hook
- 6—Clevis
- 7—Cable assy
- 8—Connector
- 9—Kingpin support
- 10—Arm pin assy (2)

- 11—Support (2)
- 12—Connector link
- 13—Clip
- 14—Hoisting cable
- 15—Falling hook
- 16—Lug (2)
- 17—Support pin assy
- 18—Marker light (2)
- 19—Tube (2)
- 20—Wing nut (4)

Figure 5-3. Preparation for stowage of the mobile launcher axle, kingpin support, and marker lights.



ORD G292678

- 1—Clamp
- 2—Mobile launcher axle
- 3—Bolt
- 4—Wing nut
- 5—Handwheel
- 6—Stop light-taillight 9021410 (left) or stop light-taillight 9021409 (right)
- 7—pin
- 8—Taillight-cable dust cover
- 9—Taillight cable assy
- 10—Axle-cable dust cover
- 11—Axle cable assy

Figure 5-4. Installation of the stop light-taillight on the mobile launcher axle.

- e. Remove the axle-cable dust cover (10) from the axle cable assembly (11).
- f. Connect the taillight cable assembly to the axle cable assembly.
- g. Connect the taillight-cable dust cover to the axle-cable dust cover.

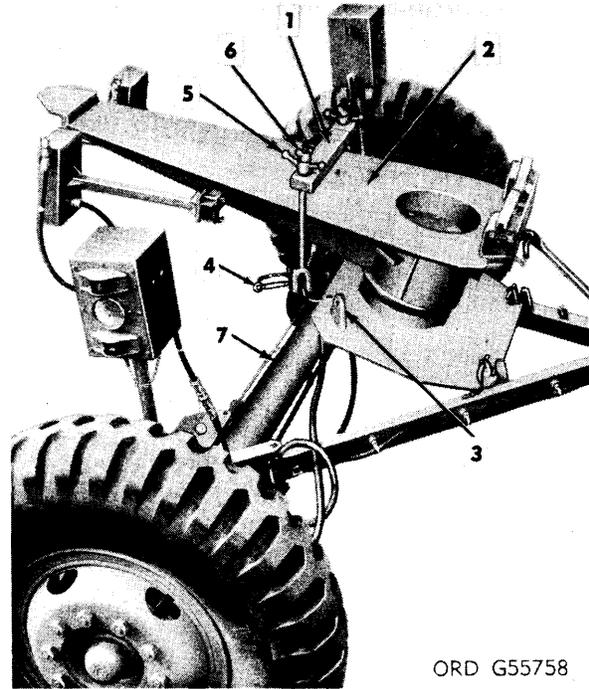
Section II. INITIAL EMPLACEMENT OF THE MOBILE LAUNCHER

5-11. General

The section provides instructions for converting the basic launcher to the mobile launcher.

Note. Paragraph 5-12 below is applicable only if installing the mobile launcher on a concrete pad.

5-6



ORD G55758

- 1—Tiedown linkage
- 2—Kingpin support
- 3—Lug (2)
- 4—Quick-release pin (2)
- 5—Large wing nut (2)
- 6—Small wing nut (2)
- 7—Mobile launcher axle

Figure 5-5. Stowage of the tiedown linkage (50 and subsequent).

5-10. Stowage of the Tiedown Linkage on the Kingpin Support

- a. Position the tiedown linkage (1, fig. 5-5) on the kingpin support (2).
- b. Install the linkage on the lugs (3) and secure with the quick-release pins (4).
- c. Secure the linkage to the kingpin support with the large and small wing nuts (5 and 6).

Note. Kingpin supports 1 through 49 do not have provisions for storing the tiedown linkage. These linkages are stowed in any convenient location.

5-12. Installation of the Concrete Launching Pad Emplacement Kit

Install the concrete launching pad emplacement kit as outlined in steps a through d below.

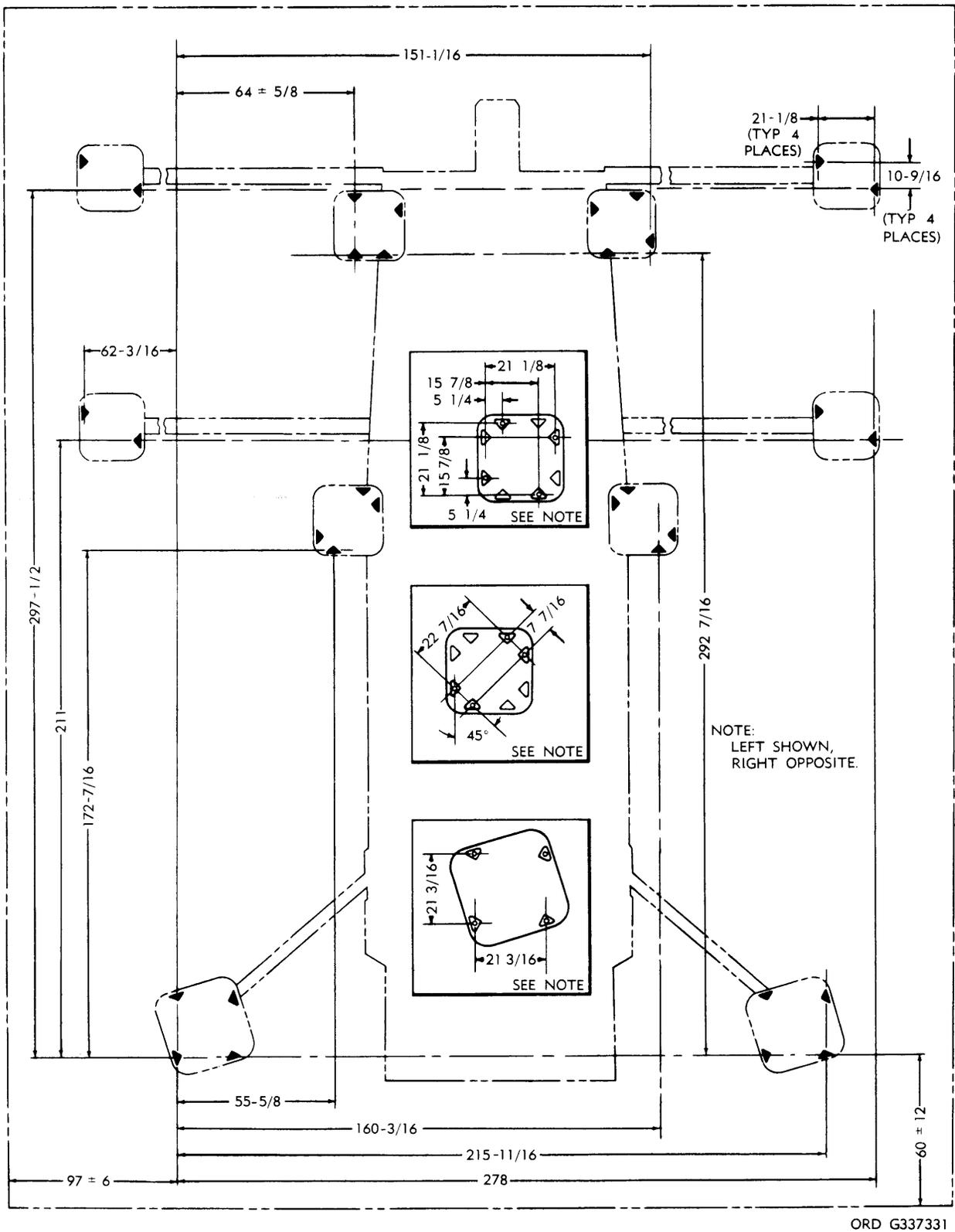


Figure 5-6. Concrete pad hole pattern for emplacement of the mobile launcher.

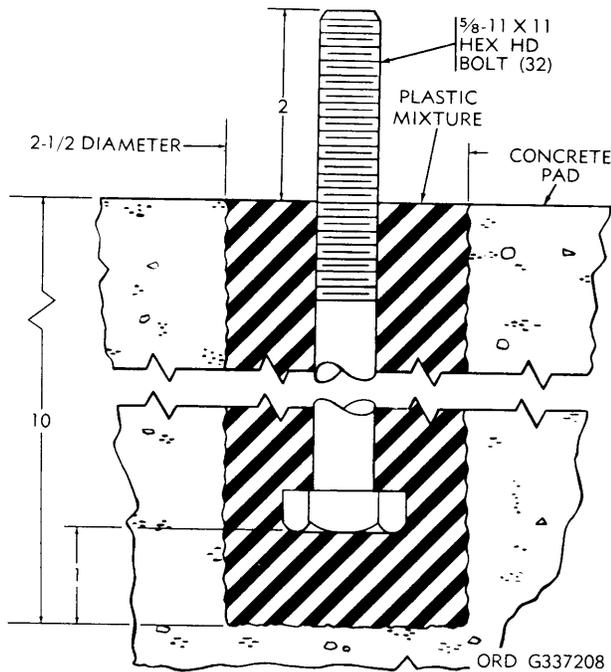


Figure 5-7. Installation of the hexagon-head bolts in the concrete pad holes.

a. Using the hole pattern shown in figure 5-6, drill 32 holes 2-1/2 inches in diameter by 10 inches deep in the concrete pad.

b. Suspend the hexagon-head bolts (fig. 5-7) in the holes drilled in the concrete pad.

c. Mix three pounds of versamid polyamid resin with seven pounds of epoxy resin (supplied with the concrete pad emplacement kit), then add 55 pounds of dry sand and mix thoroughly.

Note. The mixture in step c above must be used within 30 minutes after mixing, to achieve maximum strength. Two batches are required.

Note. The hexagon-head bolts must protrude two inches above the surface of the concrete pad after puddling the plastic mixture.

d. Pour the plastic mixture (fig. 5-7) into the holes around the suspended hexagon-head bolts. Puddle with a stick to remove air bubbles.

Caution: Allow the plastic mixture to harden for 24 hours before installing the mobile launcher.

5-13. Removal of the Launcher from the Skid Assembly

a. Remove the launcher from the skid assembly as outlined in paragraph 4-22b(1), steps (a) through (f).

b. Lower the launcher (1, fig. 5-8) onto the timbers (2) in the emplacement area so that the bottom of the launcher is 10 or more inches from ground level.

5-14. Installation of the Forward and Center Jacks

a. Installation of the Forward Jacks.

Note. Steps (1) and (2) below are applicable only to jacks 145 and subsequent.

(1) Secure the mounting plate (1, fig. 5-9) to the swivel (2) with the bolts, lock washers and hexagon nuts (3, 4, and 5).

(2) Insert the pivot (6) into the bottom of the jack and secure with the pin assembly (8).

Note. Perform step (3) below only for forward jacks 1 through 35 to be installed on the left side of the launcher.

(3) Install the forward jack (3, fig. 5-8) on the left side of the launcher as outlined in steps (a) through (c) below.

(a) Remove the support (4) from the jack by removing the screws and lock washers (5 and 6).

(b) Install one lock washer and hexagon-head bolt (7 and 8) in the support.

(c) Attach the support to the jack with the screws and lock washers (5 and 6).

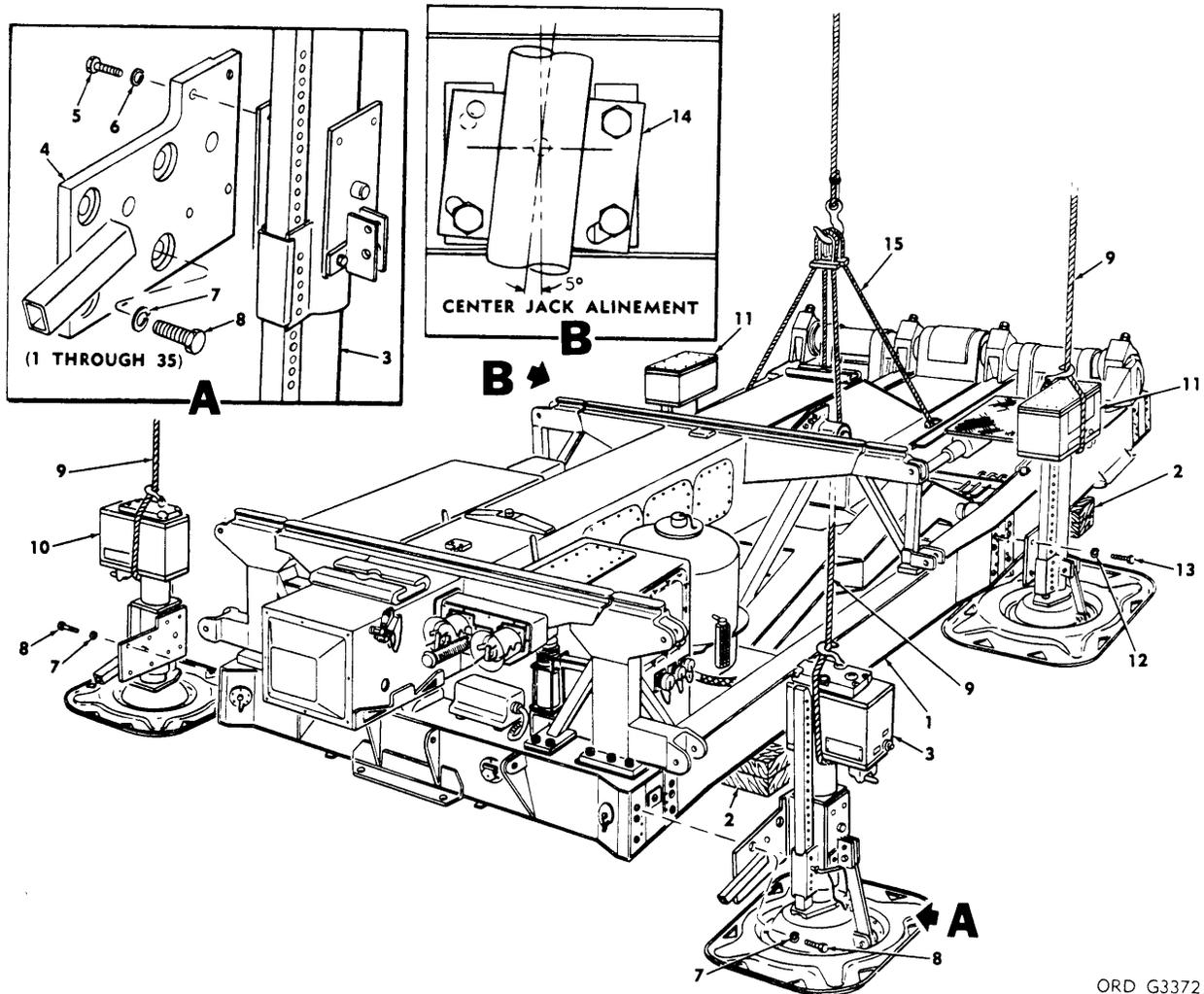
(4) Using hoisting equipment and a hoisting cable (9), position the forward jack (3) at the left side of the launcher; secure with four of the lock washers and hexagon-head bolts (7 and 8).

(5) Using hoisting equipment and a hoisting cable, position the forward jack (10) at the right side of the launcher; secure with four of the lock washers and hexagon-head bolts (7 and 8).

b. Installation of the Center Jacks.

Note. Steps (1) and (2) below are applicable only to jacks 145 and subsequent.

(1) Secure the mounting plate (1, fig. 5-9) to the swivel (2) with the bolts, lock washers and hexagon nuts (3, 4, and 5).



ORD G337212

- 1—Launcher
- 2—Timber
- 3—Forward jack (left hand)
- 4—Support (left hand)
- 5—5/8-18 x 1-1/4 hex-hd cap screw (4)
- 6—0.660-in-id lk washer (4)
- 7—1.053-in-id lk washer (8)
- 8—1-14 x 1-3/4 hex-hd bolt (8)
- 9—Hoisting cable
- 10—Forward jack (right hand)

- 11—Center jack
- 12—1.053-in-id lk washer MS35338-53 (6) for jacks 1 through 125 or 1.015-in-id lk washer AN960-1616 (6) for jacks 126 and subsequent
- 13—1-14 x 1-3/4 hex-hd bolt AN16-14A (6) for jacks 1 through 125 or 1-14 x 1-3/4 self-lkg screw 9026972 (6) for jacks 126 and subsequent
- 14—Plate (p/o center jack)
- 15—Multiple leg sling

Figure 5-8. Installation of the forward and center jacks.

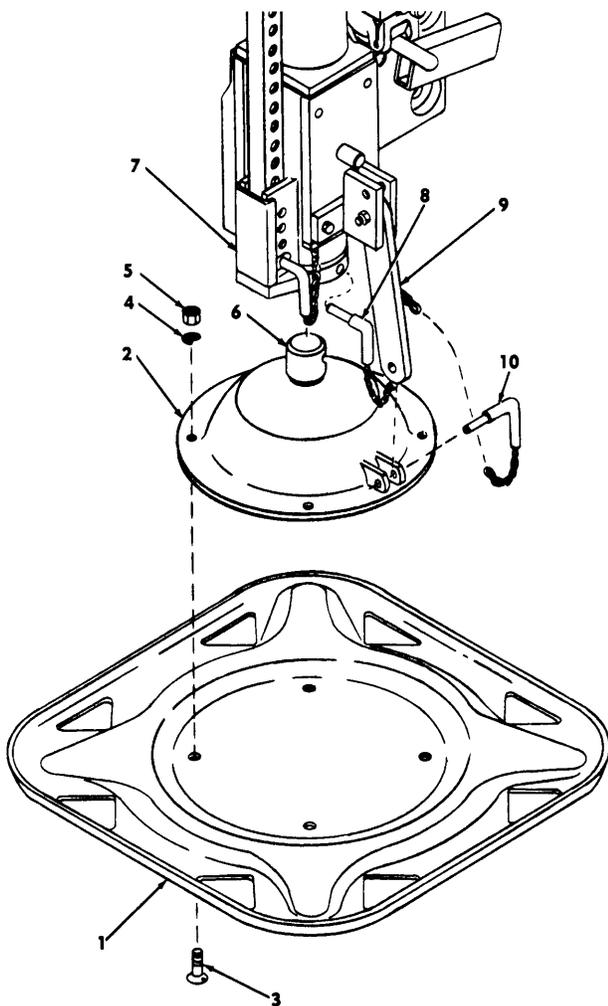
- (2) Insert the pivot (6) into the bottom of the jack and secure with the pin assembly (8).

Note. Perform steps (3) and (4) below to install the center jacks on both sides of the launcher.

- (3) Using hoisting equipment and a hoisting cable (9, fig. 5-8), position the center jack (11) so that the holes in

the plate (14) of the jack align with the tapped holes in the center section of the launcher frame. Secure the jack to the frame with three lock washers and hexagon-head bolts or screws (12 and 13). Do not tighten.

- (4) Position the center jack to cant the mounting plate to the rear as far as permitted by the slots in the plate



ORD G55760

- 1—Mounting plate
- 2—Swivel
- 3—9/16-18 x 1.186 fl-hd shear bolt (4)
- 4—9/16-in-id lk washer (4)
- 5—9/16-18 hex. nut (4)
- 6—Pivot (p/o swivel)
- 7—Jack
- 8—Pin assy
- 9—Connecting link
- 10—Pin assy

Figure 5-9. Typical forward or center jack mounting plate and swivel attachment (145 and subsequent).

(fig. 5-8). Tighten the hexagon-head bolts installed in step (3) above.

Note. Do not extend the jacks at this time.

5-15. Installation of the Outrigger and Blast Deflector Linkage

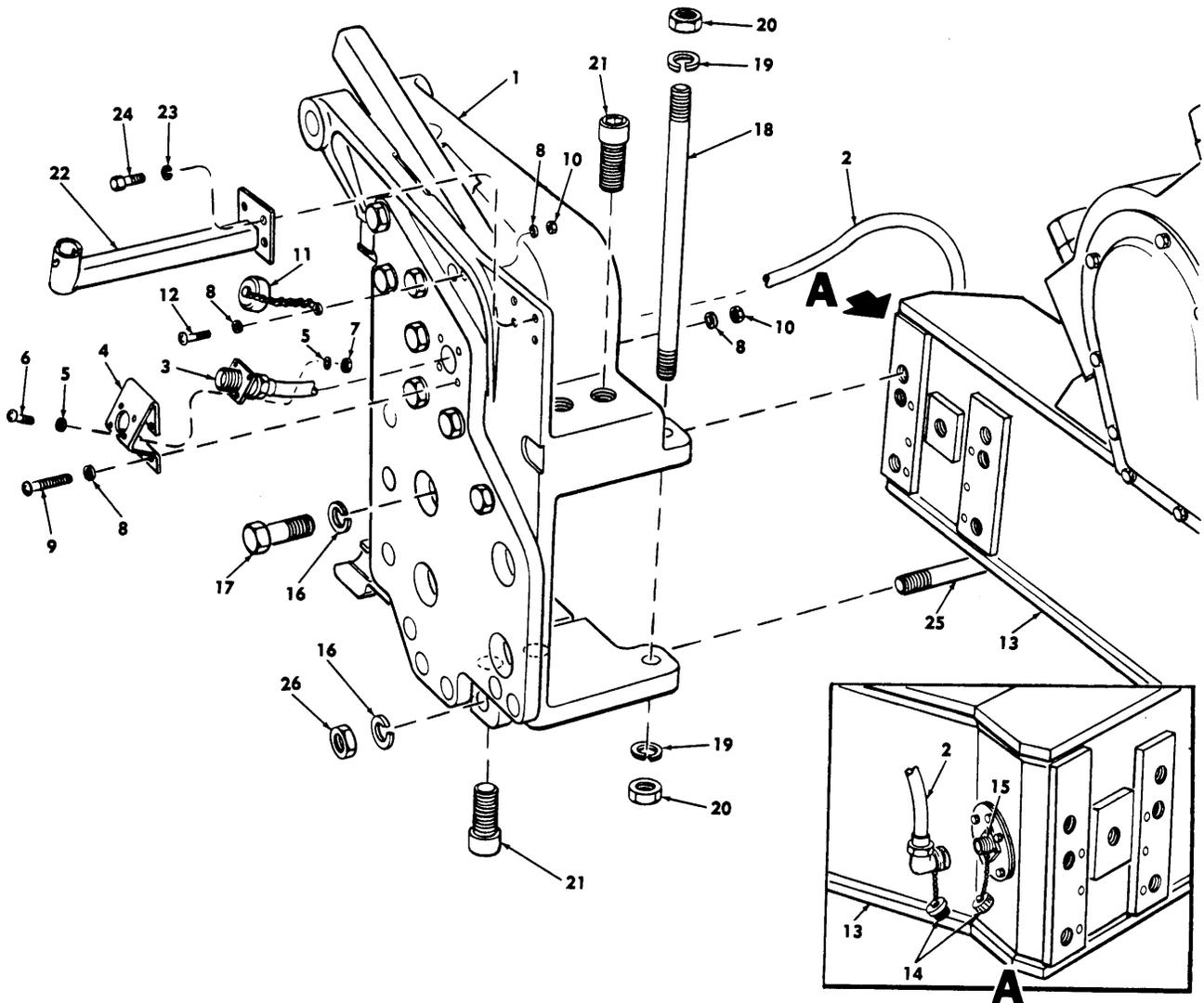
a. Installation of the Brackets (Brackets 1 through 125).

5-10

- (1) Position the bracket (1, fig. 5-10) near the rear right corner of the launcher and thread the conductor-conduit (2) through the bracket.
- (2) Attach the connector (3) to the connector bracket (4) with the flat washers, pan-head screws and hexagon nuts (5, 6, and 7).
- (3) Secure the connector bracket to the bracket with eight flat washers, and four pan-head screws and self-locking hexagon nuts (8, 9, and 10).
- (4) Attach the dust cover (11) to the bracket with the two remaining flat washers, the round-head screw and the remaining self-locking hexagon nut (8, 12, and 10).
- (5) Position the bracket on the launcher base (13); remove the dust covers (14) and connect the conductor-conduit (2) to the connector (15).
- (6) Secure the bracket to the launcher base with four lock washers and the hexagon-head bolts (16 and 17).
- (7) Install the rod (18) in the bracket and secure with the lock washers and hexagon nuts (19 and 20).
- (8) Install the self-locking screws (21) in the bracket and torque to 55 pound-feet.
- (9) Position the stop light-tailight bracket (22) on the bracket and secure with the lock washers and hexagon-head cap screws (23 and 24).
- (10) Repeat the procedures in steps (1) through (9) above for installing the bracket on the left rear corner of the launcher.
- (11) Connect the right and left brackets with the rod (25) and secure each end with a lock washer and hexagon nut (16 and 26).

b. Installation of the Brackets (Brackets 126 and Subsequent).

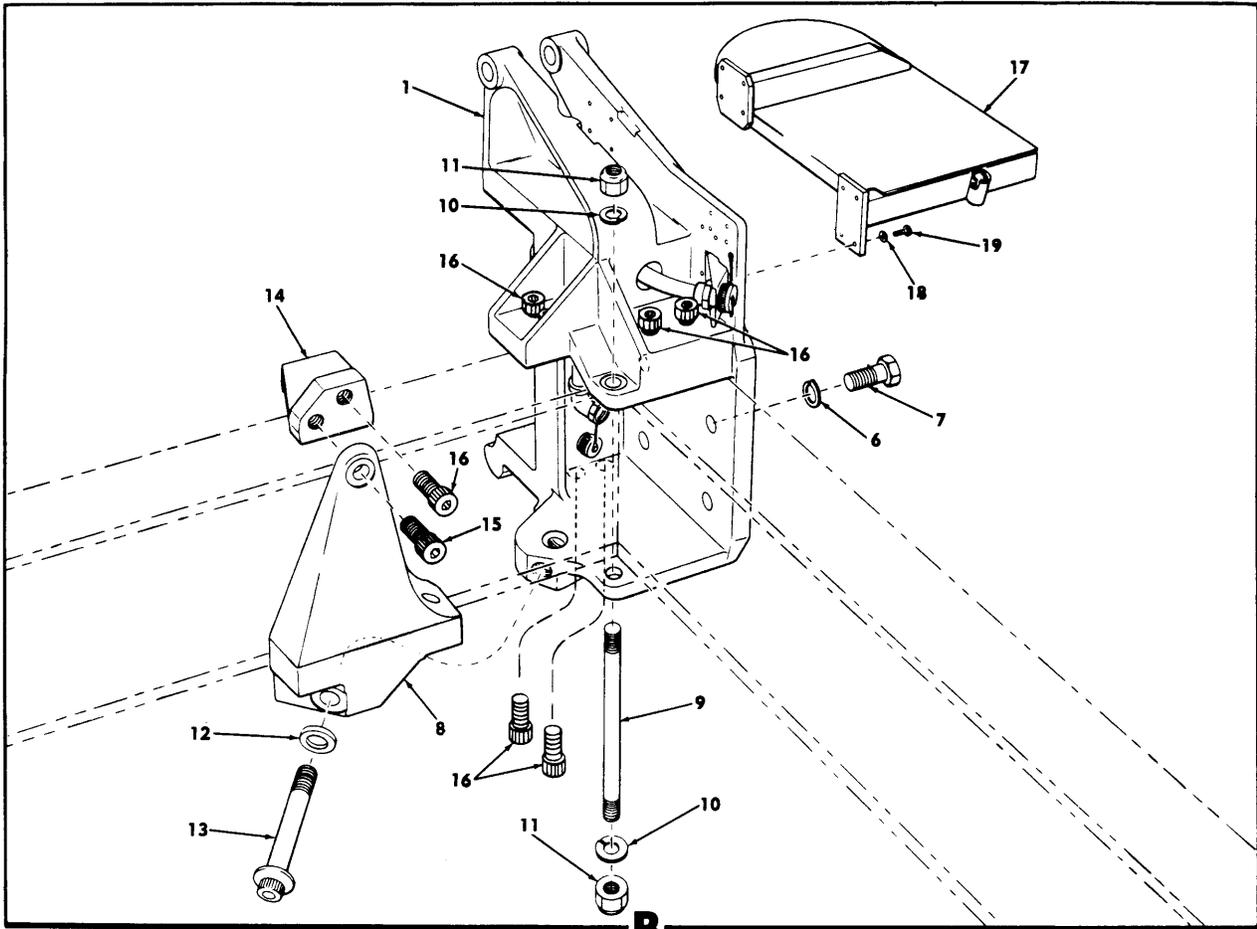
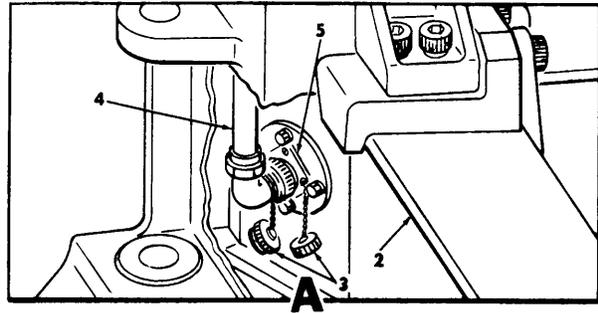
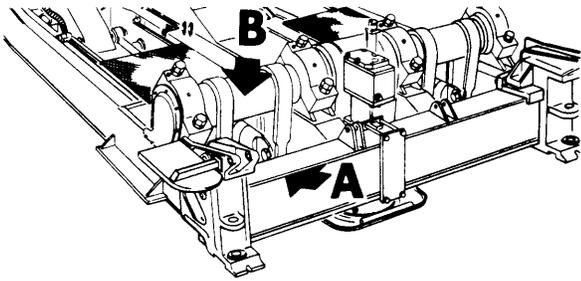
- (1) Position the bracket (1, fig. 5-11) on the rear left corner of the launcher base (2).
- (2) Remove the dust covers (3) and connect the conductor-conduit (4) to the connector (5).
- (3) Position the bracket so that the four large mounting holes in the side of the bracket align with the four tapped



ORD G337166

- | | |
|--|--|
| <p>1—Bracket 9021484 (right) or bracket 9021487 (left)
 2—Conductor-conduit 9022338 (right) or conductor-conduit 9022339 (left)
 3—Connector (p/o conductor-conduit)
 4—Connector bracket
 5—No. 4 fl washer (8)
 6—No. 4-40 x 5/8 pan-hd screw (4)
 7—No. 4-40 self-lkg hex. nut (4)
 8—No. 10 fl washer (10)
 9—No. 10-32 x 1-1/4 pan-hd screw (4)
 10—No. 10-32 self-lkg hex. nut (5)
 11—Dust cover
 12—No. 10-32 x 1-1/4 rd-hd screw
 13—Launcher base
 14—Dust cover</p> | <p>15—Connector
 16—1.053-in-id lk washer (5)
 17—1-14 x 1-3/4 hex-hd bolt (4) (1 through 72) or 1-14 x 2-1/8 hex-hd bolt (4) (73 through 125)
 18—Rod
 19—3/4-in-id lk washer
 20—3/4-16 hex. nut
 21—1-8 x 2-3/4 self-lkg screw (4)
 22—Stop light-taillight bracket 9978599 (right) or stop light-taillight bracket 9978596 (left)
 23—1/4-in-id lk washer (4)
 24—1/4-28 x 3/4 hex-hd cap screw (4)
 25—Rod
 26—1-8 hex. nut</p> |
|--|--|

Figure 5-10. Typical bracket installation (brackets 1 through 125).



ORD G337211

- | | |
|---|--|
| 1—Bracket 9153289 (left) or bracket 9152893 (right) | 11—3/4-16 hex. nut |
| 2—Launcher base | 12—1-3/16-in-id concave washer |
| 3—Dust cover | 13—1-1/8-12 x 9.587 12-pt bolt |
| 4—Conductor-conduit 9022339 (left) or conductor-conduit 9022338 (right) | 14—Link 9153425 or 9153336 (left) or link 9153429 or 9153441 (right) |
| 5—Connector | 15—1-12 x 1-3/4 self-lkg screw (126 through 500) or 1-8 x 1-7/16 self-lkg screw (501 and subsequent) |
| 6—1.053-in-id lk washer (4) | 16—1-8 x 2-3/4 self-lkg screw |
| 7—1-14 x 2-1/8 hex-hd bolt (4) | 17—Fender 9153463 (left) or fender 9153326 (right) |
| 8—Link 9153426 or 9153337 (left) or link 9153430 or 9153442 (right) | 18—5/16-in-id lk washer (8) |
| 9—Rod | 19—5/16-24 x 27/32 hex-hd bolt (8) |
| 10—3/4-in-id lk washer | |

Figure 5-11. Typical bracket installation (brackets 126 and subsequent).

holes in the side of the launcher base; secure the alignment with the lock washers and hexagon-head bolts (6 and 7).

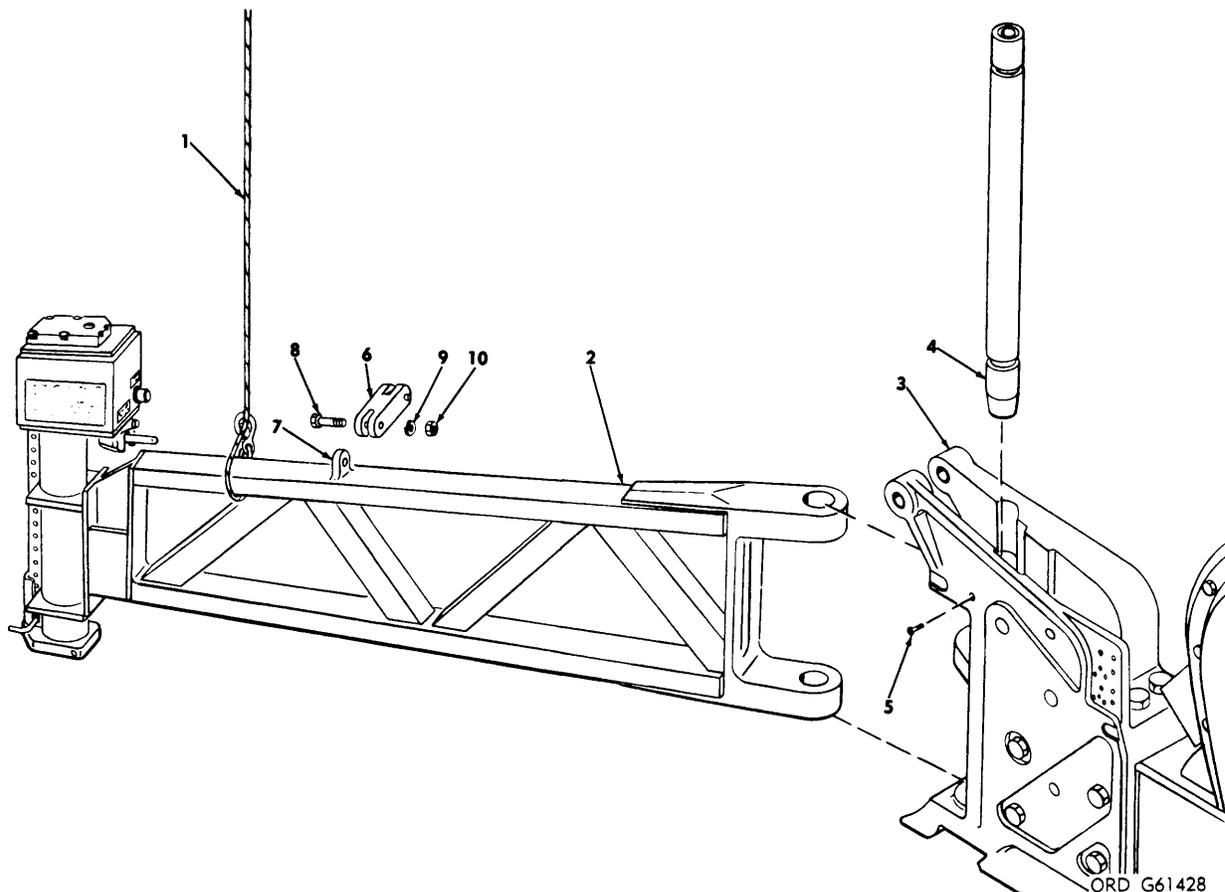
- (4) Install the link (8) on the bracket and secure with the rod, lock washers and hexagon nuts (9, 10, and 11).
- (5) Install the concave washer and 12-point bolt (12 and 13) through the link and into the bracket.
- (6) Position the link (14) in the clearance between the top of the launcher base frame and the flanged boss of the bracket; align so that the lower tapped hole in the link aligns with the hole in the top of the link (8); secure the alignment with the self-locking screw (15).

(7) Install a self-locking screw (16) in the upper tapped hole in the link (14); run the screw in to bottom firmly against the bracket.

- (8) Install the remaining six self-locking screws (16) in the bracket; torque to 55 pound-feet.
- (9) Install the fender (17) on the bracket and secure with the lock washers and hexagon-head bolts (18 and 19).
- (10) Repeat the procedures in steps (1) through (9) above for installing the bracket on the right rear corner of the launcher.

5-16. Emplacement of the Outriggers

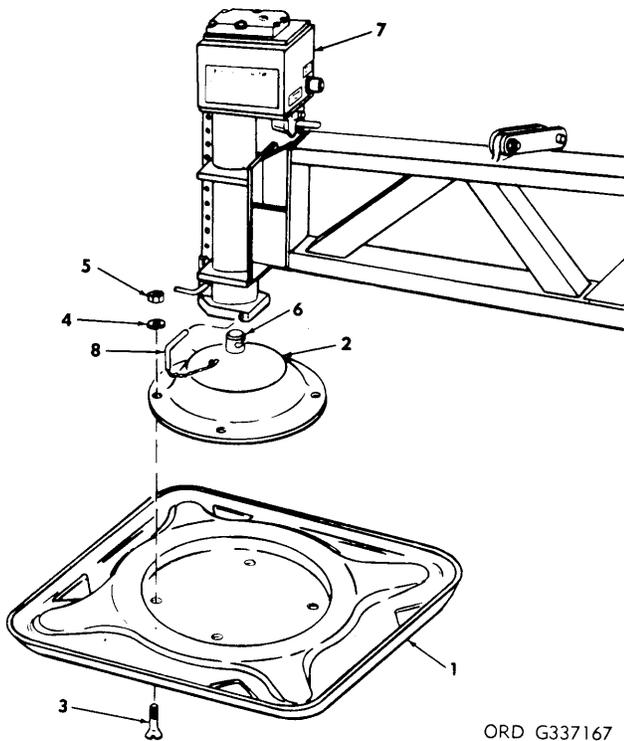
- a. Attach the hoisting cable (1, fig. 5-12) to the outrigger and jack (2).



- 1—Hoisting cable
- 2—Outrigger and jack
- 3—Bracket
- 4—Pin
- 5—3/8-24 x 3/4 set screw

- 6—Link plate
- 7—Pin plate (p/o outrigger)
- 8—3/8-24 x 2-21/64 hex-hd bolt
- 9—3/8-in-id lk washer
- 10—3/8-24 hex. nut

Figure 5-12. Typical outrigger emplacement.



- 1—Mounting plate
- 2—Swivel plate
- 3—9/16-18 x 1.136 fl-hd shear bolt (4)
- 4—9/16-in-id lk washer (4)
- 5—9/16-18 hex. nut (4)
- 6—Pivot (p/o swivel plate)
- 7—Outrigger jack
- 8—Pin assy

Figure 5-13. Typical outrigger jack mounting plate and swivel plate attachment.

b. Using a hoist capable of lifting 600 pounds, position the outrigger and jack at the rear of the bracket (3) and install with the pin (4) and the set screw (5).

c. Install the link plate (6) on the pin plate (7) and secure with the hexagon-head bolt, lock washer and hexagon nut (8, 9, and 10).

d. Remove the hoisting cable from the outrigger.

e. Attach the mounting plate (1, fig. 5-13) to the swivel (2) with the flat-head shear bolts, lock washers and hexagon nuts (3, 4, and 5).

f. Insert the pivot (6) into the base of the outrigger jack (7) and secure with the pin assembly (8).

g. Swing the outrigger (3, fig. 5-55) out from the rear of the launcher to the limit of travel, allowing the corner castings to act as stops.

h. Remove the cork plug (1, fig. 5-14) from the outrigger jack.

i. Extend the outrigger jack to the ground as outlined in steps (1) through (9) below.

(1) Install the slotted end of the handle (7) on the RELEASE VALVE (8) and turn clockwise to the closed position.

(2) Remove the pin assembly (6).

(3) Turn the RELEASE VALVE counter-clockwise to the open position.

Note. Perform steps (4) and (6) below only if installing the launcher on a concrete pad.

(4) Aline the holes in the mounting plate (11) with the hexagon bolts (12) embedded in the concrete pad.

(5) Depress the CONTROL VALVE BUTTON (10) and extend the outrigger jack to the ground.

Note. Rotate each flat washer (13) to be installed in step (6) below to seat in the triangular openings in the mounting plate.

(6) Secure the alinement in step (4) above by installing a flat washer (13), a reinforcing plate (14), a flat washer (15), and a hexagon nut (16) on each of the embedded bolts.

(7) Turn the RELEASE VALVE clockwise to the closed position.

(8) Install the pin assembly (6).

(9) Turn the RELEASE VALVE counter-clockwise to the open position.

j. Repeat the procedures in steps a through i above to install the outrigger jack on the opposite side of the launcher.

5-17. Removal of the Timbers

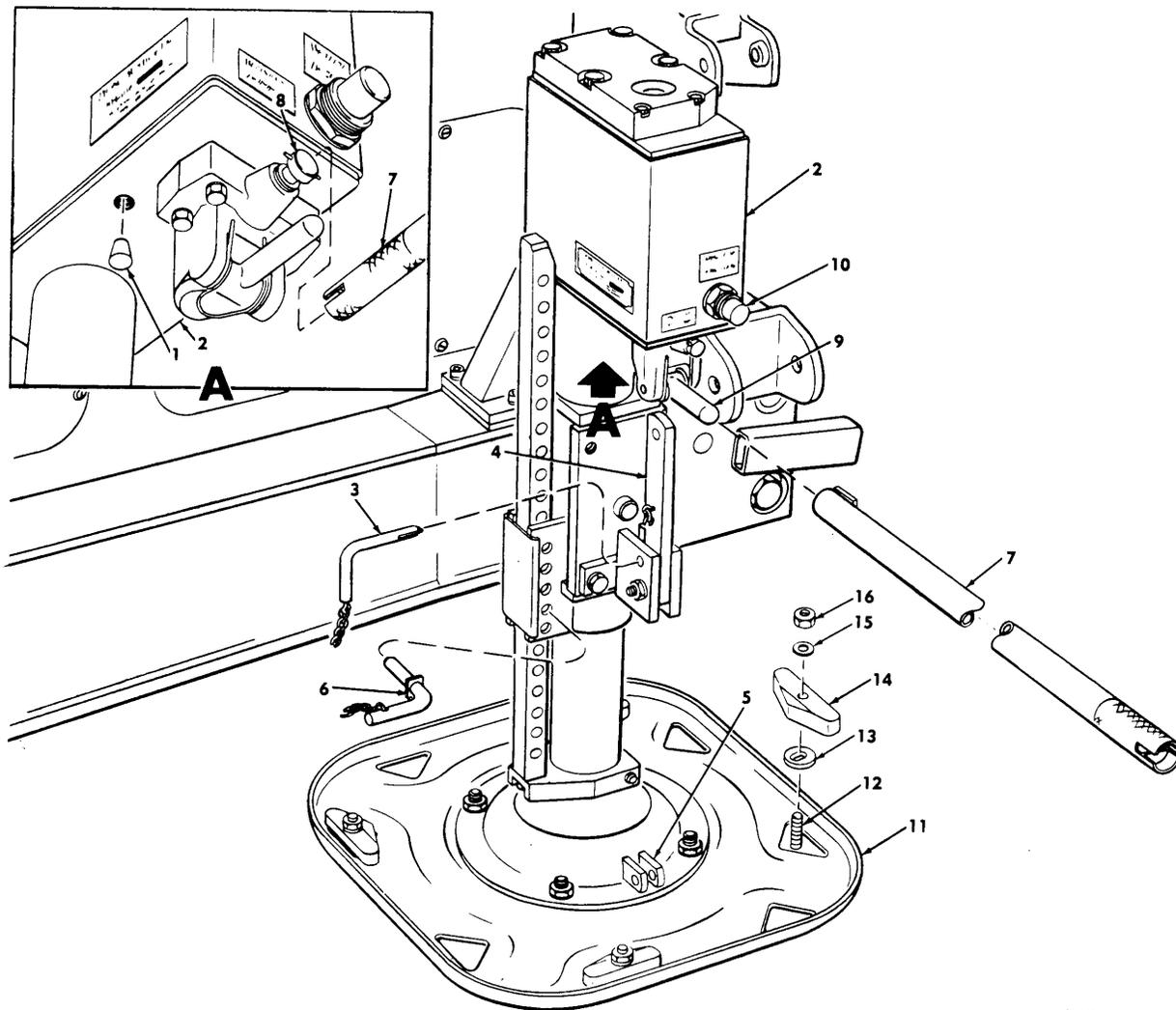
Caution: To prevent warping of the launcher base, jacks under load must be extended or retracted simultaneously.

a. Remove the cork plug (1, fig. 5-14) from each of the forward jacks.

b. Remove the pin (3) and raise the connecting link (4) to the vertical position; secure the connecting link with the pin.

c. Extend the forward jacks to raise the launcher off the timbers as outlined in steps (1) through (8) below.

(1) Install the slotted end of the handle (7) on RELEASE VALVE (8) and



- 1—Cork plug
- 2—Jack
- 3—Pin
- 4—Connecting link
- 5—Lug (2)
- 6—Pin assy
- 7—Handle
- 8—RELEASE VALVE

- 9—Pump handle
- 10—CONTROL VALVE BUTTON
- 11—Mounting plate
- 12—5/8-11 x 11 hex-hd bolt (4)
- 13—11/16-in-id fl washer (4)
- 14—Reinforcing plate (4)
- 15—5/8-in-id fl washer
- 16—5/8-11 hex. nut (4)

ORD G61432

Figure 5-14. Typical forward (shown), center, and outrigger jack operation.

- turn clockwise to the closed position.
- (2) Remove the pin assembly (6).

Note. Perform steps (3) and (7) below only if installing the launcher on a concrete pad.

- (3) Aline the holes in the mounting plate (11) with the hexagon bolts (12) embedded in the concrete pad.

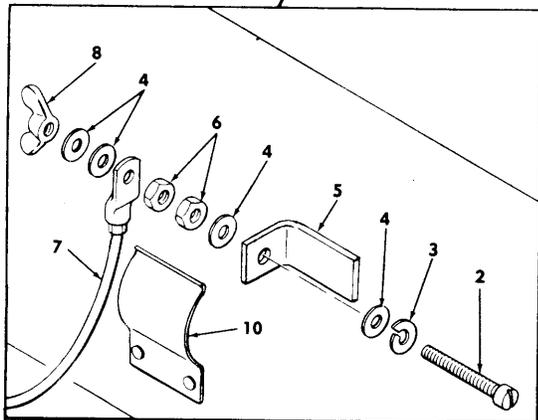
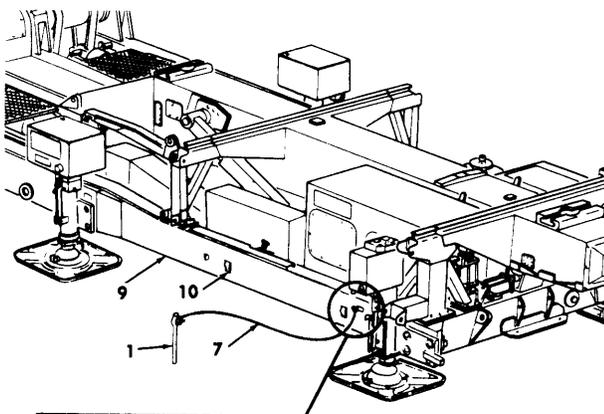
- (4) Install the handle on the pump handle (9) and operate to extend the jack to the required height.
- (5) Install the pin assembly.
- (6) Install the handle in the RELEASE VALVE and turn counterclockwise to the open position.

Note. Rotate each flat washer (13), to be installed in step (7) below, to seat in the triangular openings in the mounting plate.

- (7) Secure the alinement in step (3) above by installing a flat washer (13), a reinforcing plate (14), a flat washer (15), and a hexagon nut (16) on each of the embedded bolts.
- (8) Remove the timbers (2, fig. 5-8) and the multiple leg sling (15).

5-18. Installation of the Ground Rod

a. Install the fillister-head screw, lock washer, and flat washer (2, 3, and 4, fig. 5-15) on the stud (5); secure with a flat washer and the hexagon nuts (4 and 6).



ORD G337168

- 1—Steel rod (p/o ground rod)
- 2—1/4-20 x 1-1/2 fil-hd screw
- 3—1/4-in-id lk washer
- 4—0.312-in-id fl washer
- 5—Stud
- 6—1/4-20 hex. nut
- 7—Copper cable (p/o ground rod)
- 8—1/4-20 wing nut
- 9—Launcher
- 10—Clamp (2)

Figure 5-15. Installation of the ground rod.

b. Install the copper cable (7) on the fillister-head screw and secure with two flat washers and the wing nut (8).

c. Drive the steel rod (1) into the ground.

Note. In dry climates, dig a trench around the steel rod. Fill the trench with water daily to provide a good ground.

5-19. Leveling of the Launcher

a. Lower the launcher (1, fig. 5-8) with the forward and outrigger jacks as outlined in steps (1) and (2) below.

Caution: To prevent accidental collapse of a jack under load when the hydraulic pressure is released, the pin assembly is to be installed each time after a jack is extended or retracted.

Caution: To prevent warping of the launcher base, jacks under load must be extended or retracted simultaneously.

- (1) Retract the forward jacks (3 and 10) simultaneously under load as outlined in steps (a) through (e) below.
 - (a) Install the slotted end of the handle (7, fig. 5-14) on the RELEASE VALVE (8) and turn clockwise to the closed position.
 - (b) Install the keyed end of the handle on the pump handle (9) and operate sufficiently to free the pin assembly (6). Remove the pin assembly.
 - (c) Repeat the installation in step (a) above and turn the RELEASE VALVE counterclockwise to the open position until the required height of the launcher is reached; then, turn the RELEASE VALVE clockwise to the closed position.
 - (d) Install the pin assembly.
 - (e) Turn the RELEASE VALVE counterclockwise to the open position.

(2) Retract the outrigger jacks using the procedures outlined in steps (1)(a) through (1)(e) above.

b. Turn the SYSTEM BY-PASS valve and the EQUILIBRATOR SYSTEM BY-PASS valve (17 and 16, fig. 4-38) counterclockwise to their open positions.

Note. If power is available, omit steps c and d below.

c. Place a jack capable of lifting 4,000 pounds under the front end of the launcher erecting beam. Raise the beam enough to insert the 1/16-inch shims (21, fig. 4-38) between the front outriggers on the beam and the rack support assemblies (15).

d. Retract and remove the jack.

e. Precharge the launcher hydraulic accumulator and compressed gas cylinder as outlined in paragraph 4-22e.

f. Raise the erecting beam enough to insert the 1/16-inch shims between the front outriggers on the beam and the rack support assemblies.

g. Lower the erecting beam.

h. Check that the center jacks (11, fig. 5-8) are not under load and position gunner's quadrant M1 (fig. 4-39) on the erecting beam leveling blocks parallel to the erecting beam trunnion shaft axis.

i. Level the launcher laterally to within five mils by adjusting the outrigger jacks as outlined in paragraphs 5-16h and i above.

j. Position gunner's quadrant M1 on the erecting beam leveling blocks parallel to the centerline of the erecting beam.

k. Level the launcher longitudinally to within five mils by adjusting the forward jacks as outlined in paragraph 5-14a above.

l. Check the lateral level of the launcher by measuring the gap between the front outriggers of the launcher erecting beam (18, fig. 4-38) and the rack support assemblies (15). If there is more than 1/16-inch gap between the right or left side of the outrigger and its associated support assembly, adjust the forward jack supporting the misadjusted side until both gaps are approximately 1/16-inch.

m. Recheck the lateral level at the erecting beam leveling blocks (B, fig. 4-39) and make adjustments if necessary.

n. At the rear outriggers (19, fig. 4-38), place 1/8-inch shims as required under the supports (20) so that the top of the track section on the supports is not more than 1/4-inch lower than the top of the track section on the rear outriggers.

o. Extend the center jacks (11, fig. 5-8) to the ground as outlined in steps (1) through (10) below.

Note. The top of the track sections on the supports (20, fig. 4-38) must be flush to 1/32-inch high with

respect to the top of the track section on the rear outriggers, after the center jacks have been extended.

(1) Install the slotted end of the handle (7, fig. 5-14) on the RELEASE VALVE (8) and turn clockwise to the closed position.

(2) Remove the pin assembly (6).

(3) Turn the RELEASE VALVE counterclockwise to the open position.

Note. Perform steps (4) and (10) below only if installing the launcher on a concrete pad.

(4) Aline the holes in the mounting plate (11) with the hexagon-head bolts (12) embedded in the concrete pad.

(5) Depress and hold the CONTROL VALVE BUTTON (10) to accelerate the extension of the center jack to the desired position.

(6) Turn the RELEASE VALVE clockwise to the closed position.

(7) Install the keyed end of the handle on the pump handle (9) and operate until the center jack is extended to the desired position.

(8) Install the pin assembly.

(9) Install the handle on the RELEASE VALVE and turn counterclockwise to the open position.

Note. Rotate each flat washer (13) to be installed in step (10) below to seat in the triangular opening in the mounting plate.

(10) Secure the alinement in step (4) above by installing a flat washer (13), a reinforcing plate (14), a flat washer (15) and a hexagon nut (16) on each of the embedded bolts.

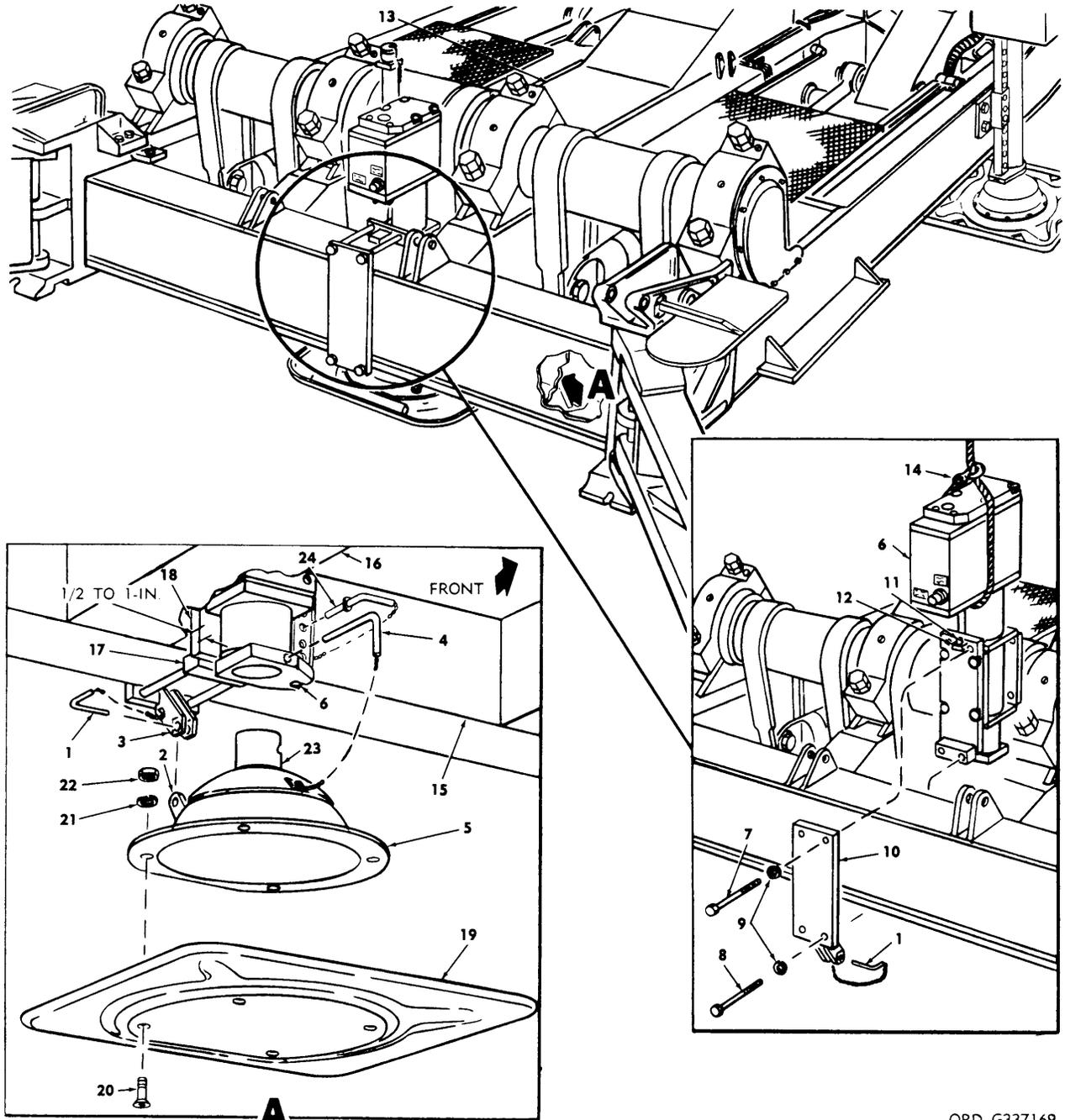
p. Readjust the blast deflector linkage (par. 5-15) if necessary.

Note. Omit step q below if the launcher is being installed on a concrete pad.

q. Stake the forward, center, and outrigger jack mounting plates to the ground using four stakes (2, fig. 5-28) at each jack.

5-20. Installation of the Auxiliary Jack

a. Remove the pin assembly (1, fig. 5-16) to release the connecting link (2) from the bars (3).



ORD G337169

- | | |
|------------------------------------|---|
| 1—Pin assy | 13—Launcher erecting beam |
| 2—Connecting link | 14—Hoisting cable |
| 3—Bar (2) | 15—Launcher base |
| 4—Pin assy | 16—Right inside frame section |
| 5—Swivel plate | 17—Leg |
| 6—Jack | 18—Support |
| 7—5/8-18 x 7-49/64 hex-hd bolt (2) | 19—Mounting plate |
| 8—5/8-18 x 6-25/64 hex-hd bolt (2) | 20—9/16-18 x 1.136 fl hd shear bolt (4) |
| 9—5/8-in-id lk washer (4) | 21—9/16 lk washer (4) |
| 10—Strap | 22—9/16-18 hex. nut (4) |
| 11—1/2-20 x 1 setscrew | 23—Pivot (p/o swivel plate) |
| 12—Lug | 24—Pin |

Figure 5-16. Installation of the auxiliary jack.

b. Remove the pin assembly (4) to release the swivel plate (5) from the jack (6).

c. Remove the hexagon-head bolts and lock washers (7, 8, and 9) and remove the strap (10).

d. Retract the setscrew (11) so that the point is flush or underflush with the underside of the lug (12).

e. Depress the indexing pins (5, fig. 5-59) to activate the interlock switches and raise the erecting beam 10 to 15 degrees.

f. Using hoisting equipment and the hoisting cable (14, fig. 5-16) hoist the jack over the forward portion of the launcher base (15).

g. Tilt the jack slightly and lower until the lug supports the jack on the top edge of the launcher base.

h. Position the edge of the support (18) 1/2 inch to 1 inch inside the right inside frame sections (16).

i. Rotate the jack to the vertical position and install the strap; secure the strap with the hexagon-head bolts and lock washers (7, 8, and 9). Tighten the bolts fingertight.

j. Adjust the setscrew so that the leg (17) is drawn into contact with the bottom of the launcher base.

k. Tighten the hexagon-head bolts installed in step *i* above.

Note. Perform step *l* below only for jacks 145 and subsequent.

l. Install the swivel plate onto the mounting plate (19) with the four flat-head shear bolts, lock washers and hexagon nuts (20, 21, and 22).

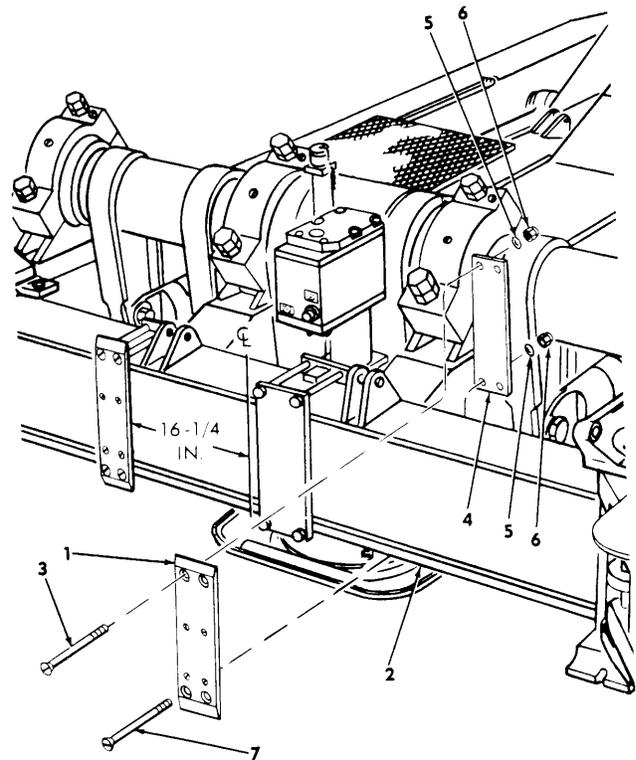
m. Install the swivel plate and the mounting plate by inserting the pivot (23) in the jack; secure with the pin assembly (4).

n. Install the pin assembly (1) through the bars and the connecting link.

5-21. Installation of the Guides

a. Position the guide (1, fig. 5-17) on the outside of the launcher base (2) 16-1/4 inches from the center line of the launcher base and insert the two flat-head shear bolts (3) in the upper holes of the guide.

b. Position the support (4) directly behind the guide and inside of the launcher base and install two flat washers (5) and two self-locking nuts (6) fingertight on the two flat-head shear bolts (7).



ORD G292975

- 1—Guide
- 2—Launcher base
- 3—1/2-20 x 7.343 fl-hd shear bolt (2)
- 4—Support
- 5—1/2-in-id fl washer (4)
- 6—1/2-20 self-lkg hex. nut (4)
- 7—1/2-20 x 7.969 fl-hd shear bolt (2)

Figure 5-17. Installation of the guides—typical.

c. Install the two flat-head shear bolts through the bottom holes of the guide and the support, and secure with two flat washers and two self-locking nuts.

d. Torque the nuts to 15 to 20 pound-feet.

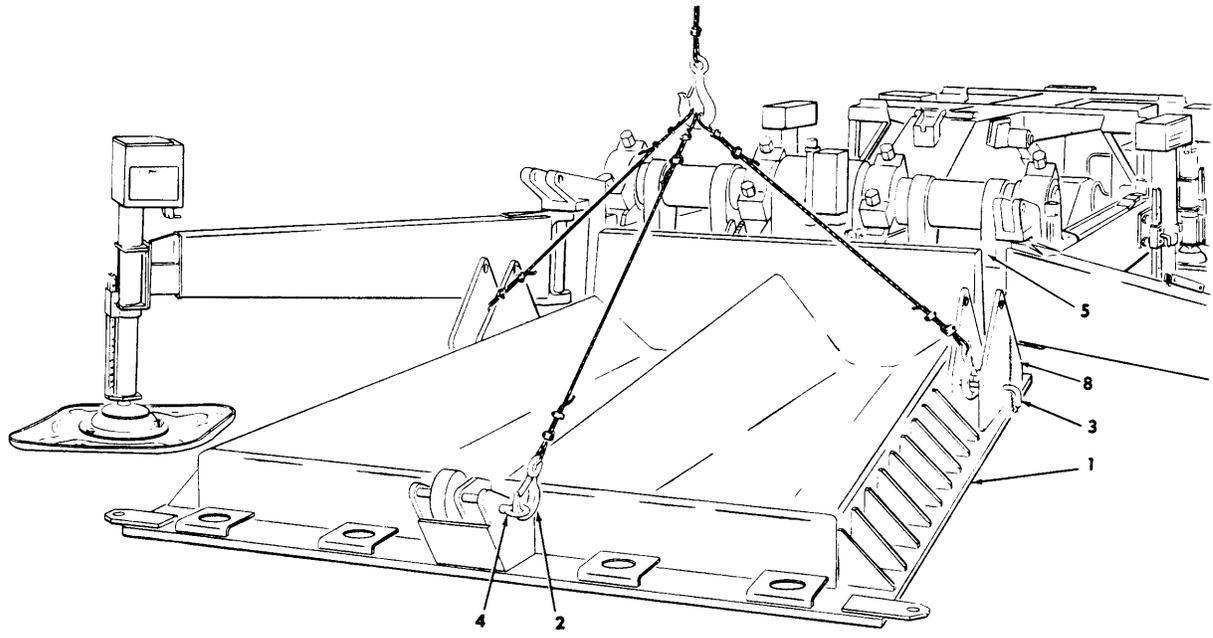
e. Install the guide on the opposite side of the center-line of the launcher base as outlined in steps *a* through *d* above.

5-22. Emplacement of the Blast Deflector

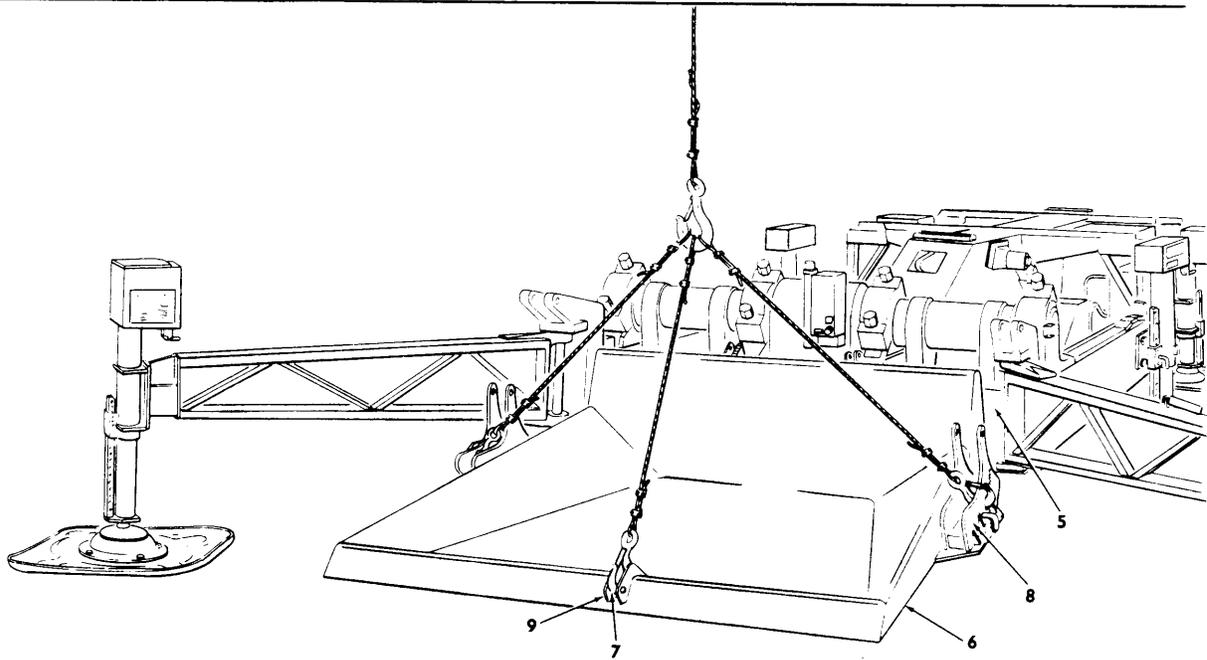
Note. Perform steps *a* and *b* below for blast deflectors 1 through 72 or perform steps *c* and *d* below for blast deflectors 73 and subsequent.

a. Position the blast deflector (1, fig. 5-18) as outlined in steps (1) and (2) below.

- (1) Using hoisting equipment capable of lifting 1,500 pounds, attach the cable hooks (2) to the pin assemblies (3) and the eyebolt (4).



(1 THROUGH 72)



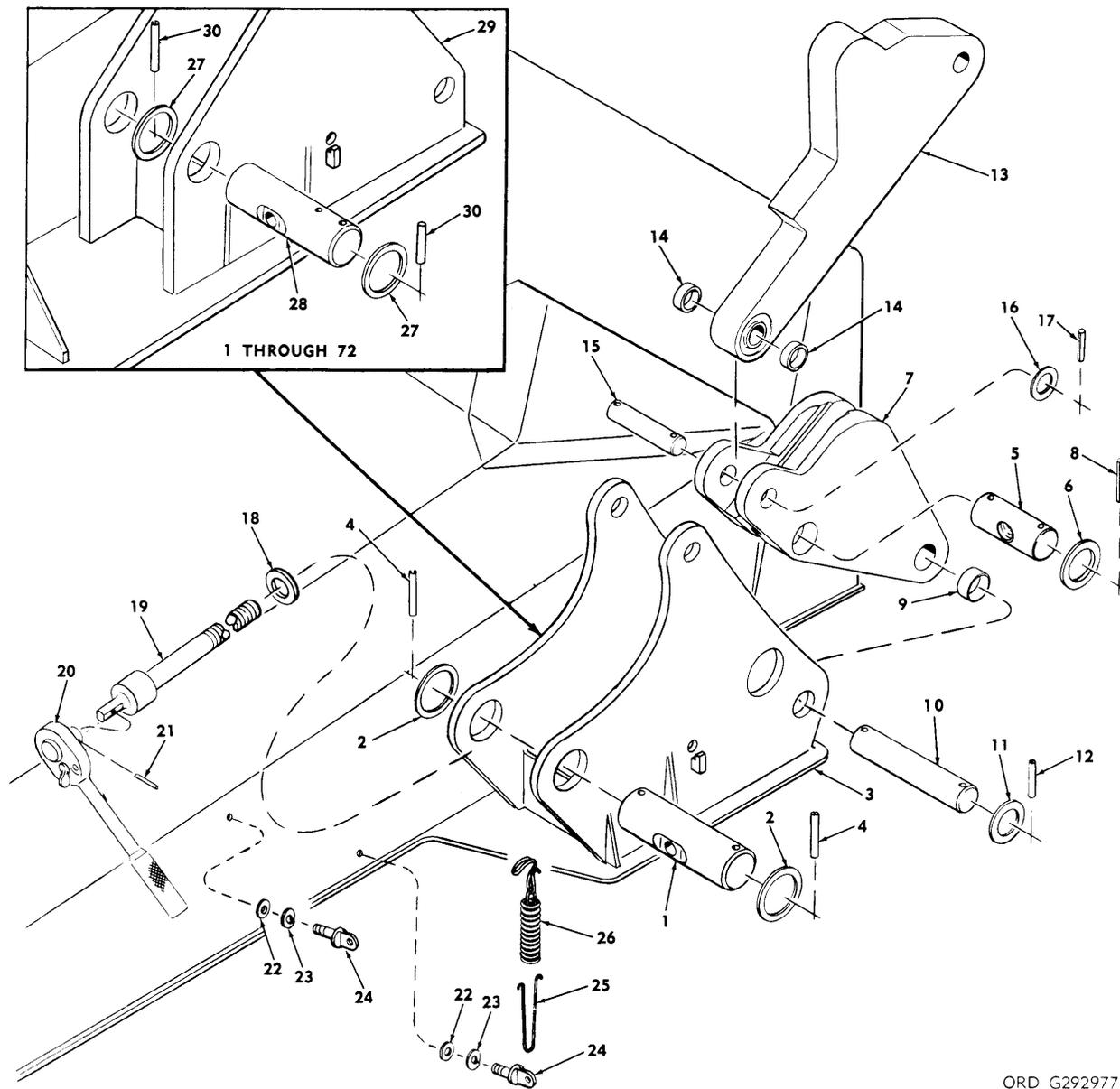
(73 AND SUBSEQUENT)

ORD G337171

- 1—Blast deflector (1 through 72)
- 2—Cable hook (3)
- 3—Pin assy (2)
- 4—Eyebolt
- 5—Launcher base

- 6—Blast deflector (73 and subsequent)
- 7—Cable hook (3)
- 8—Plate (2)
- 9—Support

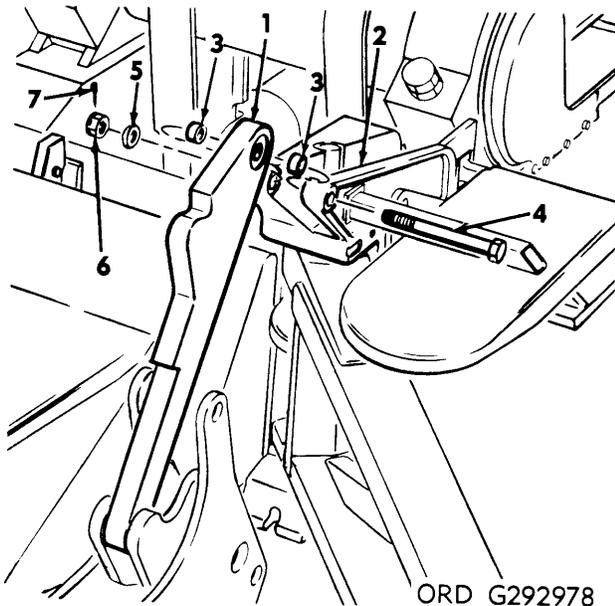
Figure 5-18. Emplacement of the blast deflectors.



ORD G292977

- | | |
|--------------------------------|--|
| 1—Pin | 16—1-1/4-in-id fl washer (2) |
| 2—2-1/2-in-id fl washer | 17—1/4 x 1-1/2 spg pin (2) |
| 3—Plate | 18—1.015-in-id fl washer |
| 4—1/4 x 2-3/4 spg pin | 19—Rod |
| 5—Pin | 20—Ratchet wrench |
| 6—2-1/16-in-id fl washer (2) | 21—1/8 x 1 spg pin |
| 7—Arm | 22—No. 10 fl washer |
| 8—1/4 x 2-1/2 spg pin (2) | 23—No. 10 lk washer |
| 9—Sleeve spacer (2) | 24—No. 10-32 x 15/32 eyebolt |
| 10—Pin | 25—Lower spg bar (p/o handle retainer) |
| 11—1-13/16-in-id fl washer (2) | 26—Handle retainer |
| 12—1/4 x 2 spg pin (2) | 27—2-1/2-in-id fl washer |
| 13—Arm | 28—Pin |
| 14—Sleeve spacer | 29—Plate |
| 15—Pin | 30—1/4 x 2-3/4 spg pin |

Figure 5-19. Typical installation of the blast deflector group.



- 1—Arm
- 2—Bracket
- 3—Sleeve spacer
- 4—1-1/4-12 x 6.958 hex-hd bolt
- 5—1-1/4-in-id fl washer (as required)
- 6—1-1/4-12 hex. nut
- 7—1/8 x 2 cotter pin

Figure 5-20. Typical installation of the blast deflector group—Continued.

(2) Hoist the deflector and position it against the launcher base (5).

b. Install the blast deflector group as outlined in steps (1) through (7) below.

(1) Install the two flat washers (27, fig. 5-19) and the pin (28) in the plate (29); secure with the two spring pins (30).

(2) Install the pin and the two flat washers (5 and 6) in the arm (7) and secure with the two spring pins (8).

(3) Install the arm in the plate with the two sleeve spacers (9) and secure with the pin, two flat washers and two spring pins (10, 11, and 12).

(4) Position the arm (13) and the two sleeve spacers (14) in the arm (7) and attach with the pin, two flat washers and two spring pins (15, 16, and 17).

(5) Position the flat washer (18) on the rod (19) and insert the rod through the pin (28). Thread the rod into

the pin (5) and attach the ratchet wrench (20) with the spring pin (21).

(6) Install the two flat washers, two lock-washers, and two eyebolts (22, 23, and 24). Remove the lower spring bar (25) from the handle retainer (26) and thread it through the lower eyebolt. Install the lower spring bar on the handle retainer.

Note. The handle retainer is used to retain the ratchet wrench when not in use. Hook the retainer on the upper eyebolt when the wrench is in use.

(7) Attach the arm (1, fig. 5-20) to the bracket (2) with the two sleeve spacers, hexagon-head bolt, flat washer, hexagon nut, and cotter pin (3, 4, 5, 6, and 7).

c. Using hoisting equipment capable of lifting 1000 pounds, attach the hoisting hook (fig. 5-21) to the handle; hoist the blast deflector off the base of the shipping crate and rotate to the upright position.

d. Position the blast deflector (6, fig. 5-18) as outlined in steps (1) and (2) below.

(1) Attach the cable hooks (7) to the plates (8) and the support (9).

(2) Hoist the deflector and position it against the launcher base.

e. Install the deflector group as described in steps (1) through (4) below.

(1) Install the pin (1, fig. 5-19) and the two flat washers (2) in the plate (3) and secure with the two spring pins (4).

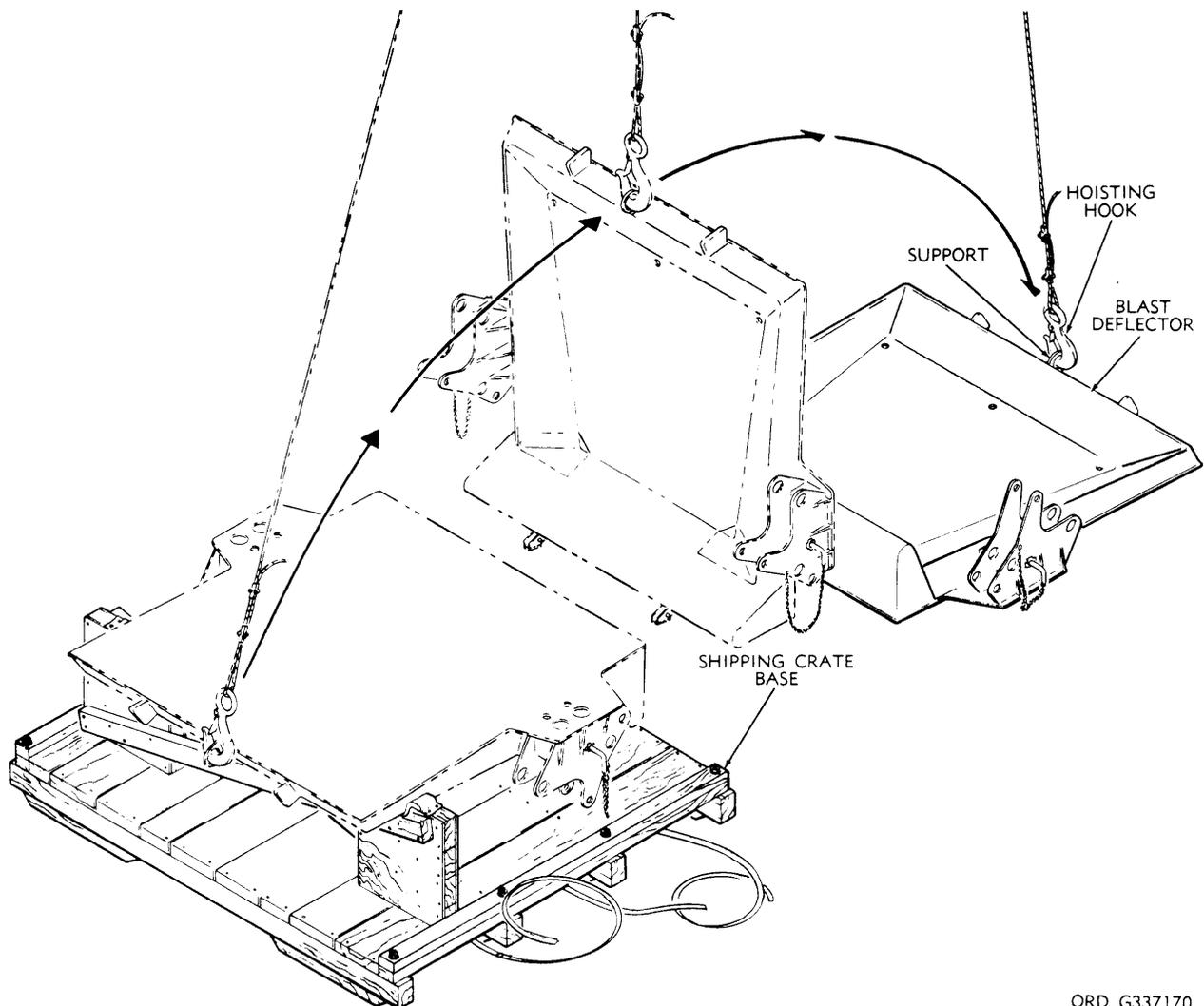
(2) Perform steps b(2) through (4) above.

(3) Position the washer (18) on the rod (19) and insert the rod through the pin (1). Thread the rod into the pin (5) and attach the ratchet wrench (20) with the spring pin (21).

(4) Perform steps b(6) and (7) above.

5-23. Installation of the Housing and Wheel Retainer Arm or Plate

Note. Perform steps a through f below for installing the housing and wheel retainer arm for blast deflectors 1 through 72 or perform steps g and h below for installing the plate only for blast deflectors 73 and subsequent.



ORD G337170

Figure 5-21. Removal of the blast deflector from the crate (73 and subsequent).

a. Remove the four hexagon-head bolts and four of the lock washers (1 and 2, fig. 5-22) from the launcher erecting beam (3).

b. Position the housing (4) on the erecting beam and secure with four lock washers (2) and hexagon-head screws (5).

c. Position the eyebolt (6) in the housing and align the head to an angle of $58 (\pm 1)$ degrees as shown in figure 5-22. Secure the eyebolt with the lock washer and hexagon nut (7 and 8, fig. 5-22).

d. Install the retainer (1, fig. 5-23) in the bracket (2) and secure with the flat washers, straight pin and spring pins (3, 4, and 5).

e. Install the wheel retainer arm (6) on the retainer.

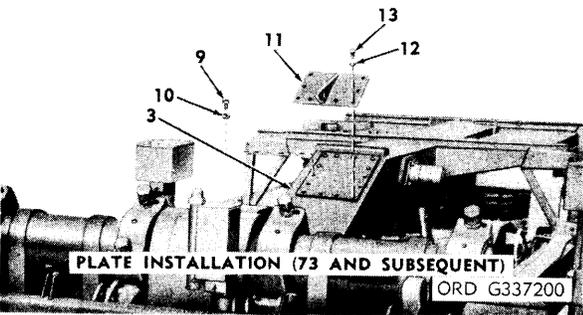
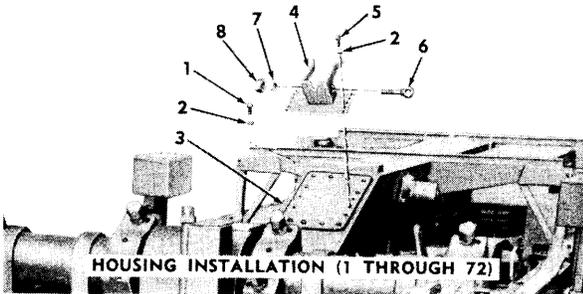
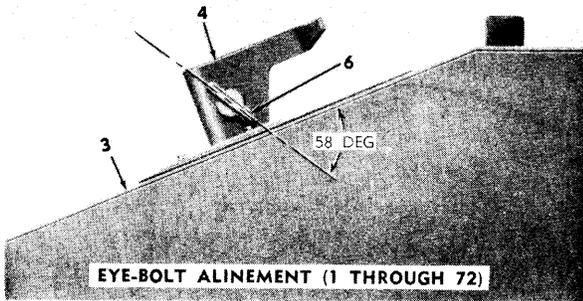
f. Install the wing nuts (7) on the wheel retainer arm; secure the outer wing nut with the spring pin (8).

g. Remove the hexagon-head bolts and lock washers (9 and 10, fig. 5-22) from the launcher erecting beam (3).

h. Position the plate (11) on the launcher erecting beam and secure with the lock washers and hexagon-head bolts (12 and 13).

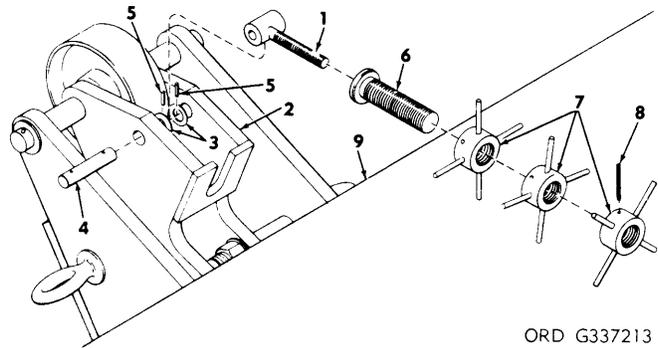
5-24. Emplacement of the Storage Racks

Note. Perform steps a through g below for launcher emplacements not utilizing the concrete pad or perform steps h through m below for launcher emplacements utilizing the concrete pad.



- 1—5/16-24 x 7/8 hex-hd bolt (4)
- 2—5/16-in-id lk washer (16)
- 3—Launcher erecting beam
- 4—Housing
- 5—5/16-24 x 1-1/8 hex-hd screw (4)
- 6—Eyebolt
- 7—1.035-in-id lk washer
- 8—1-in. hex. nut
- 9—5/16-24 x 7/8 hex. hd bolt (8)
- 10—5/16-in-id lk washer (8)
- 11—Plate
- 12—5/16-in-id lk washer (8)
- 13—5/16-24 x 1-3/32 hex-hd bolt (8)

Figure 5-22. Installation of the housing or plate.



ORD G337213

- 1—Retainer
- 2—Bracket (p/o blast deflector)
- 3—0.640-in-id fl washer
- 4—Straight pin
- 5—0.188 x 3/4 spg pin
- 6—Wheel retainer arm
- 7—Wing nut
- 8—0.188 x 2 spg pin
- 9—Blast deflector

Figure 5-23. Installation of the wheel retainer arm (1 through 72).

a. Attach the mounting plate (1, fig. 5-24) with the flat-head shear bolts, lock washers, and hexagon nuts (2, 3, and 4) to each of the four support columns (5).

b. Position the side truss (6) at the support (7) and secure with the pin assemblies (8 and 9).

c. Position the side truss (10) at the rack support assembly (11) and secure with the pin assemblies (8 and 9).

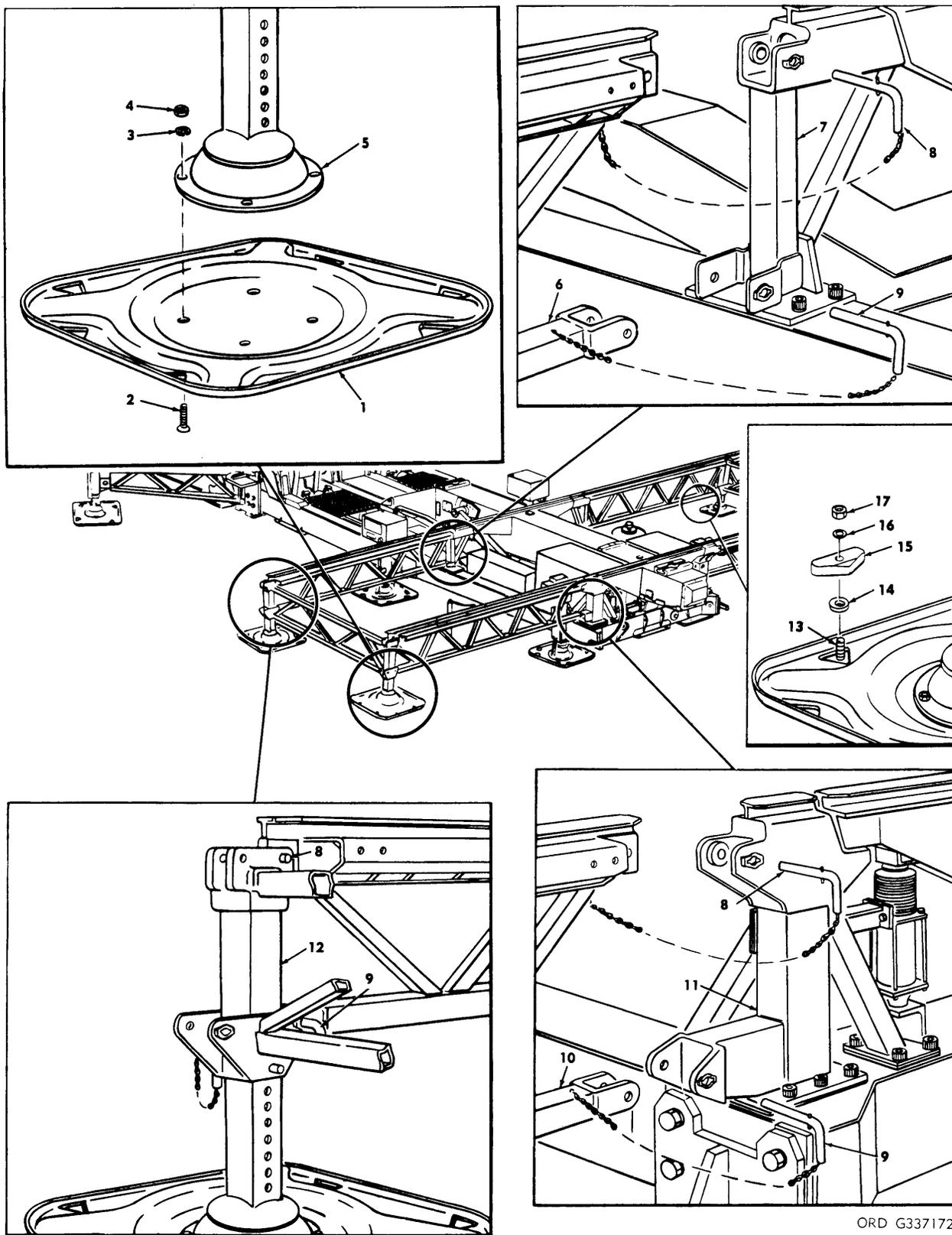
d. Position the storage rack support (12) at the other ends of the side trusses (6 and 10) and secure with the pin assemblies (8 and 9).

e. Install the two side trusses and the two storage rack supports on the opposite side of the launcher as outlined in steps b through d above.

Caution: To avoid binding, raise or lower both ends of the storage rack supports simultaneously.

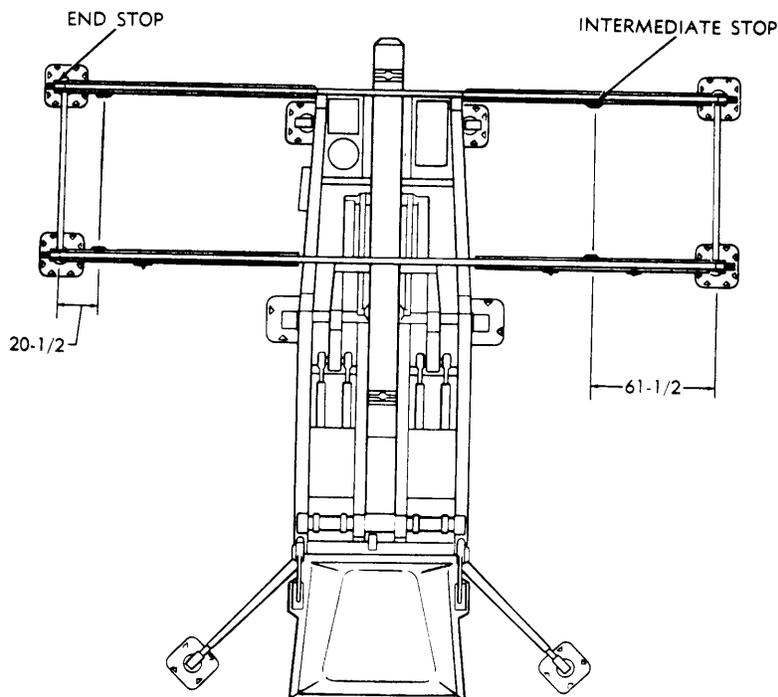
- 1—Mounting plate (2)
- 2—9/16-18 x 1.136 fl-hd shear bolt (4)
- 3—9/16-in-id lk washer (4)
- 4—9/16-18 hex. nut (4)
- 5—Support column
- 6—Side truss (2)
- 7—Support
- 8—Headless angle pin assy
- 9—Pin assy
- 10—Side truss (2)
- 11—Rack support assy
- 12—Storage rack support
- 13—5/8-11 x 11 hex-hd bolt (2)
- 14—11/16-in-id fl washer (2)
- 15—Reinforcing plate (2)
- 16—5/8-in-id fl washer (2)
- 17—5/8-11 hex. nut (2)

Figure 5-24. Typical side emplacement of the side trusses and storage rack support—legend.



ORD G337172

Figure 5-24. Typical side emplacement of the side trusses and storage rack support.



ORD G337191

Figure 5-25. Location of the stops on the storage racks.

f. Level the storage racks by removing the pin assemblies (fig. 4-40) and raising or lowering the end truss to the desired height on the support columns and inserting pin assemblies in the aligned holes.

g. Use gunner's quadrant M1 to check the level of the loading racks.

h. Attach the mounting plate (1) with the flat-head shear bolts, lock washers and hexagon nuts (2, 3, and 4) to each of the two support columns (5).

i. Aline the holes in the mounting plate with the hexagon-head bolts (13) embedded in the concrete pad.

j. Perform steps b through d above.

k. Place the flat washers (14) over the hexagon-head bolts and rotate until the washers drop into the triangular opening in the mounting plate, then install the reinforcing plates, flat washers, and hexagon nuts (15, 16, and 17).

l. Install the two side trusses and one storage rack support on the opposite side of the launcher as outlined in steps h through k above.

m. Perform steps f and g above.

5-25. Installation of the Storage Rack Stops

Note. Refer to figure 5-25 for location of the end stops and intermediate stops.

a. Position and install the four intermediate stops (1, fig. 4-51) with the hexagon-head bolts, lock washers, and hexagon nuts (2, 3, and 4).

b. Position and install the four end stops (9) with the pin assemblies (10 and 11).

5-26. Installation of the Electrical Test Station and Loudspeaker with Cable Assembly

a. Install the electrical test station (14, fig. 5-26) for the mobile launcher as outlined in steps (1) through (5) below.

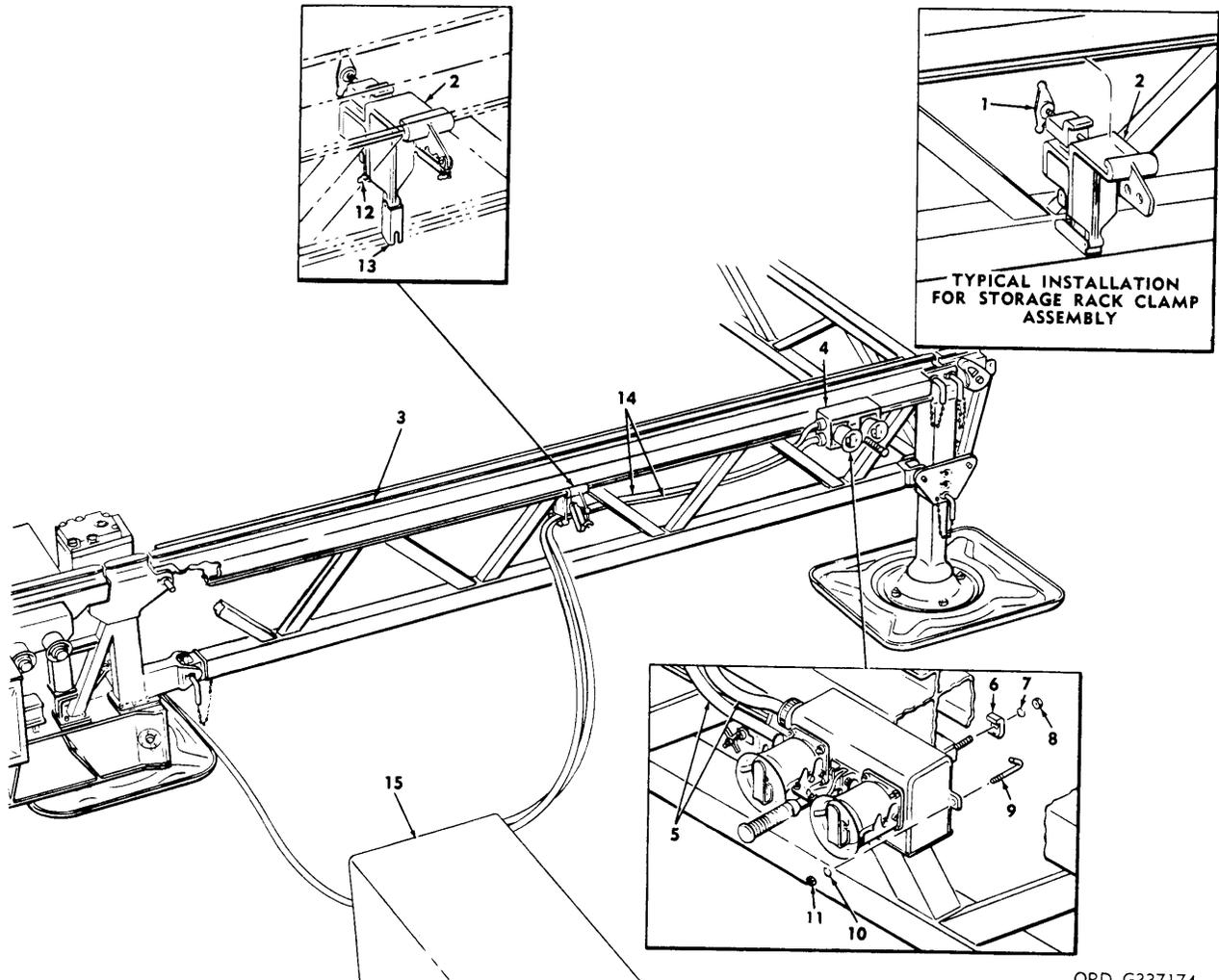
(1) Loosen the wing nut (1) on the storage rack clamp assembly (2); position the clamp assembly on the side truss (3) and secure with the wing nut.

(2) Install the electrical test station on the side truss using the clamp, lock washer, hexagon nut, studs, lock washers, and hexagon nuts (6, 7, 8, 9, 10, and 11).

- (3) Loosen the wing nut (12) and swing the retainer assembly (13) down.
- (4) Position the cables (14) in the storage rack clamp assembly and secure by swinging the retainer assembly to the up position and tightening the wing nut.
- (5) Connect the cables to connectors J70A and J83A (fig. 4-81) at the LCI (28).

b. Install the loudspeaker with cable assembly (5, fig. 5-27) as outlined in steps (1) through (12) below.

- (1) Remove the hexagon-head bolts, flat washers and self-locking hexagon nuts (1, 2, and 3), and remove the plate (4) from the loudspeaker with cable assembly.
- (2) Position the loudspeaker on the rack support assembly (6) and secure with

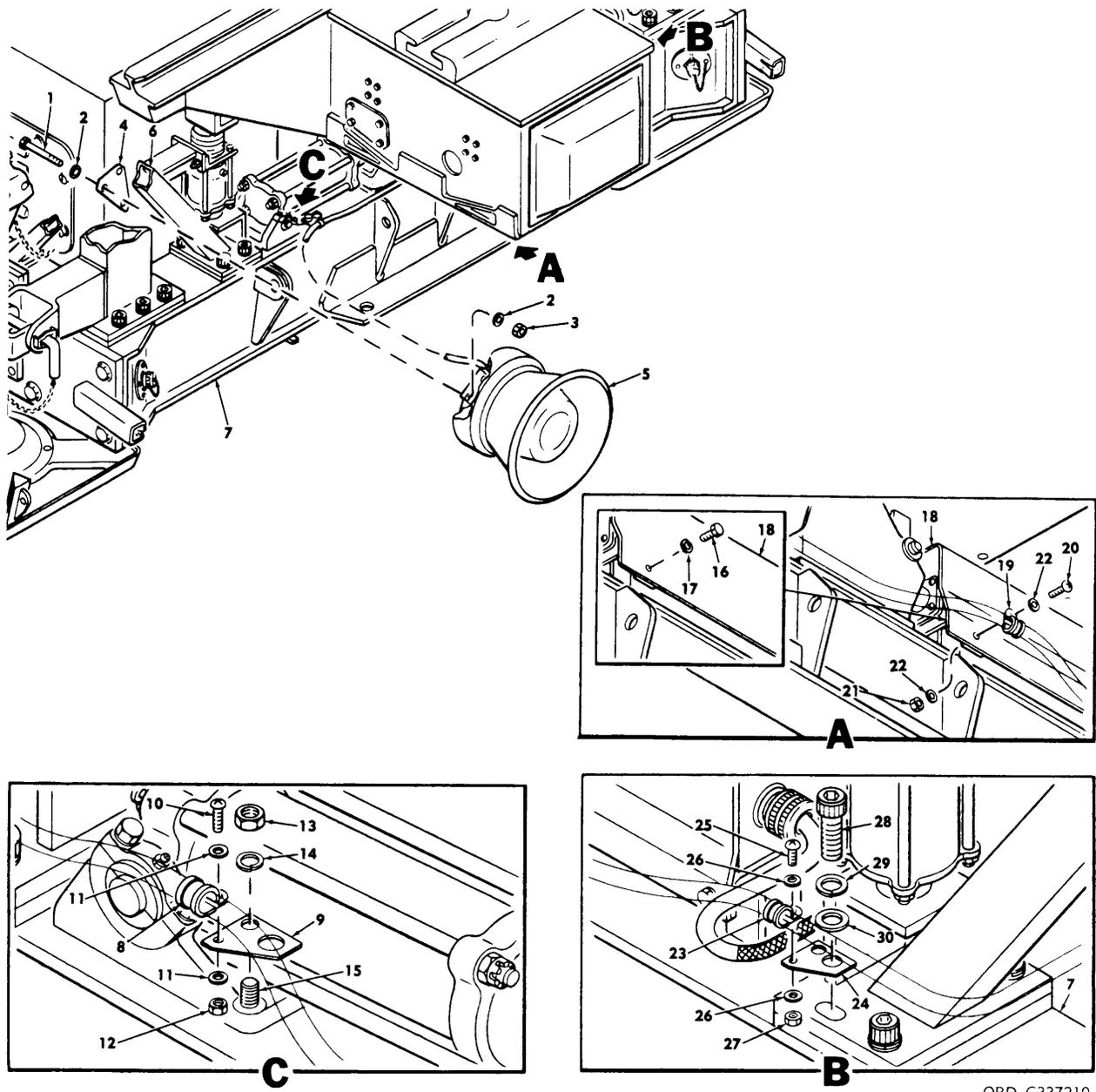


ORD G337174

- 1—Wing nut
- 2—Storage rack clamp assy
- 3—Side truss
- 4—Electrical test station
- 5—Cable assy (p/o electrical test station)
- 6—Clamp
- 7—3/8-in-id lk washer
- 8—3/8-16 hex. nut

- 9—Stud (2)
- 10—5/16-in-id lk washer (2)
- 11—5/16-18 hex. nut (2)
- 12—Wing nut
- 13—Retainer assy
- 14—Cable (p/o cable assy)
- 15—LCI

Figure 5-26. Installation of the electrical test station.



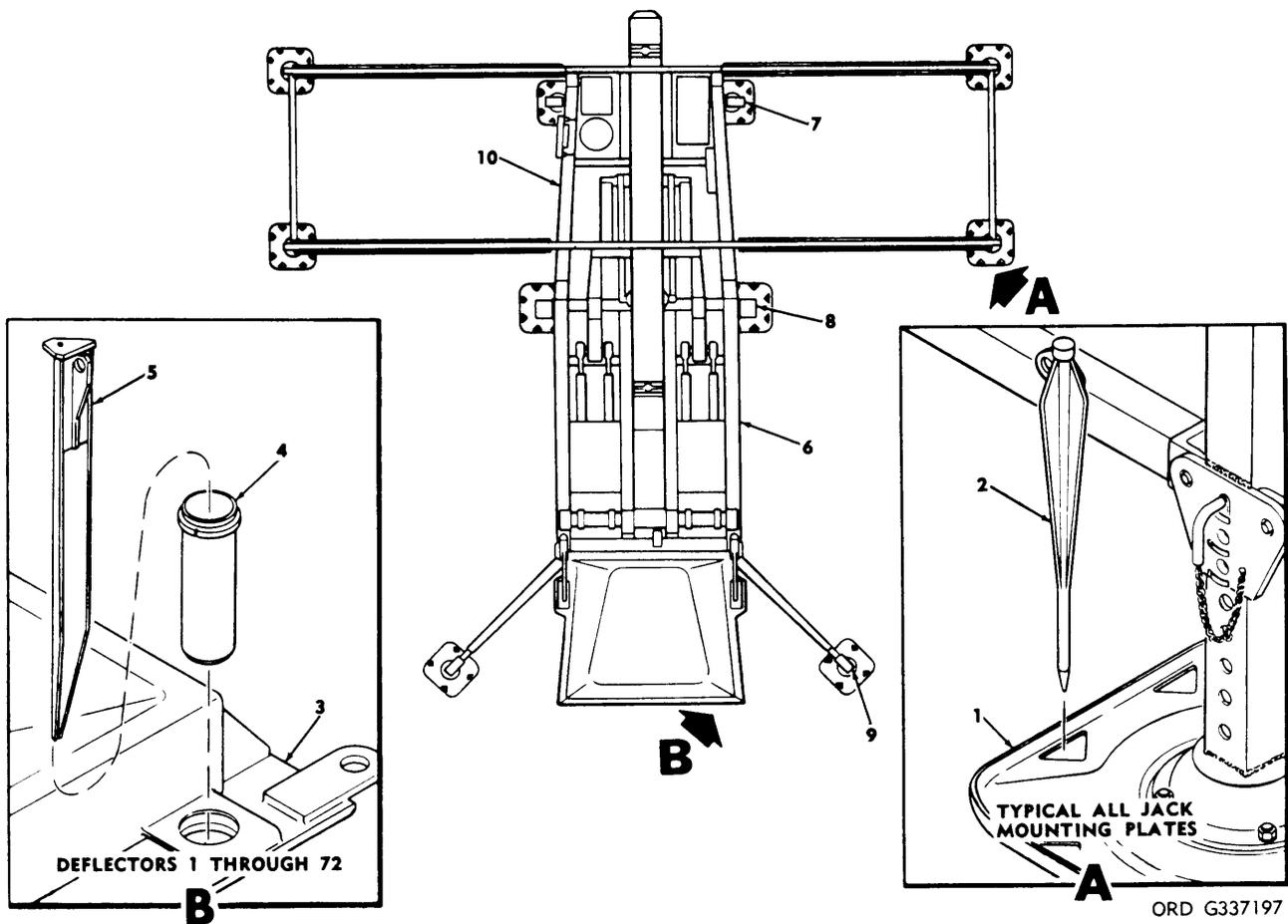
ORD G337210

- 1—3/8-24 x 2-37/64 hex-hd bolt (3)
- 2—3/8-in-id fl washer (6)
- 3—3/8-24 self-lkg hex. nut (3)
- 4—Plate
- 5—Loudspeaker with cable assy
- 6—Rack support assy
- 7—Launcher base
- 8—1/2-in-id clamp
- 9—Clamp plate
- 10—No. 10-32 x 5/8 rd-hd screw
- 11—No. 10 fl washer
- 12—No. 10-32 self-lkg hex. nut
- 13—3/8-16 hex. nut
- 14—3/8-in-id lk washer
- 15—Stud

- 16—1/4-20 x 1/2 hex-hd cap screw
- 17—1/4-in-id lk washer
- 18—Downlock switch cover
- 19—1/2-in-id clamp
- 20—No. 10-32 x 3/4 rd-hd screw
- 21—No. 10-32 self-lkg hex. nut
- 22—No. 10 fl washer
- 23—1/2-in-id clamp
- 24—Clamp plate
- 25—No. 10-32 x 5/8 rd-hd screw
- 26—No. 10 fl washer
- 27—No. 10-32 self-lkg hex. nut
- 28—1/2-13 x 1-1/4 socket-hd cap screw
- 29—1/2-in-id lk washer
- 30—0.551-in-id fl washer

Figure 5-27. Installation of the loudspeaker with cable assembly.

- the plate, bolts, nuts and washers removed in step (1) above.
- (3) Position the cable assembly of the loudspeaker along the launcher base (7).
 - (4) Position the clamp (8) around the cable assembly and secure to the clamp plate (9) with the round-head screw, flat washers, and self-locking hexagon nut (10, 11 and 12).
 - (5) Remove the hexagon nut and lock washer (13 and 14) from the stud (15).
 - (6) Install the clamp plate (9) on the stud with the lock washer and nut removed in step (5) above.
 - (7) Remove the hexagon-head cap screw and lock washer (16 and 17), from the downlock switch cover (18).
 - (8) Position the clamp (19) around the cable assembly of the loudspeaker and secure to the downlock switch cover with the round-head screw, self-locking hexagon nut and two flat washers (20, 21, and 22).
 - (9) Position the clamp (23) around the cable assembly of the loudspeaker and secure to the clamp plate (24) with the round-head screw, flat washers, and self-locking nut (25, 26, and 27).
 - (10) Remove the socket-head cap screw, lock washer, and flat washer (28, 29, and 30) from the launcher base.



ORD G337197

- | | |
|---|----------------------|
| 1—Mounting plate | 6—Launcher |
| 2—Stake 9154097 (20) (units 1 through 304) or stake 8160661 (20) (units 305 and subsequent) | 7—Forward jack (2) |
| 3—Blast deflector | 8—Center jack (2) |
| 4—Sleeve (4) | 9—Outrigger jack (2) |
| 5—Stake 8160661 (4) | 10—Stake stowage box |

Figure 5-28. Installation of the stakes.

- (11) Position the clamp plate (24) and secure with the flat washer, lock washer, and socket-head cap screw removed in step (10) above.
- (12) Connect the cable assembly of the loudspeaker to connector J12A (fig. 4-76) on the power distribution box.

5-27. Installation of the Stakes

Note. Perform the procedures outlined in steps a through d below only if installing the launcher on the ground.

- a. Remove the stakes from the stake stowage box (10, fig. 5-28) and secure the mounting plates (1) by driving stakes through two of the triangular holes in each plate.
- b. Secure the plates of the forward jacks, center jacks, and outrigger jacks (7, 8, and 9) with two stakes through each plate.
- c. Stake the blast deflector (3) (1 through 72) by inserting the sleeves (4) and driving the stake (5) through each sleeve.
- d. Check the level of the launcher (6) after staking, as outlined in paragraph 5-19 above, and make adjustments if necessary.

5-28. Installation of the Steel Angles

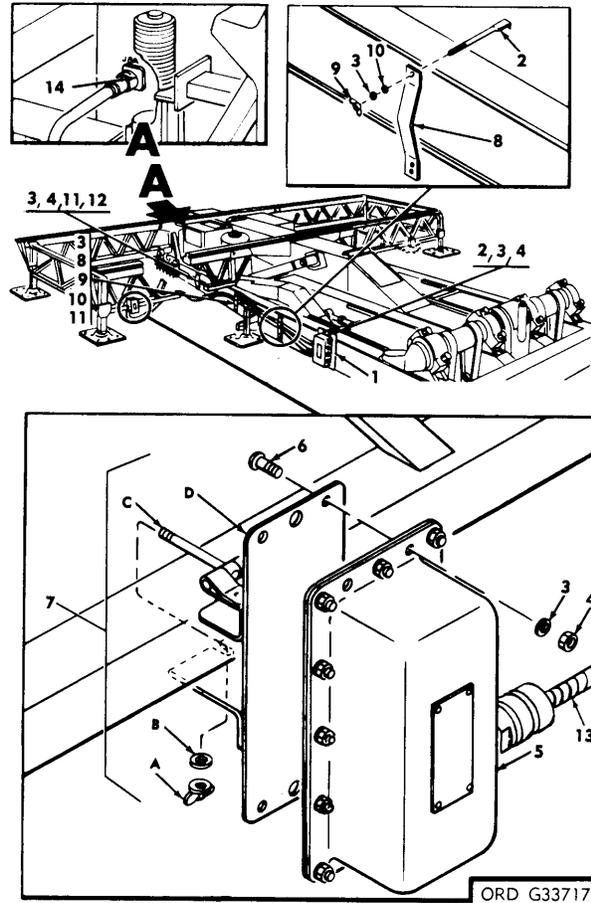
Two steel angles, components of the transport modification kit, must be installed by depot or direct support maintenance personnel on cross members of the launcher base frame. Angle 9977278 is installed on the rear side of the cross member located at station 309.000 and angle 9977279 is installed on the forward side of the cross member located at station 260.000. Refer to field installation drawings 9021683R and 9021577F for detailed installation procedures.

5-29. Installation of the Winterization Kits

a. Install the launcher winterization distribution box (1, fig. 5-29) with four of the hook bolts, flat washers and self-locking hexagon nuts (2, 3, and 4).

Note. The test station winterization distribution box (5) may be installed on either the right- or left-side storage rack.

b. Install the test station winterization distribution box in the mounting bracket assembly (7) with the four pan-head screws (6) and four of the flat washers and self-locking hexagon nuts (3 and 4).



- 1—Launcher winterization distribution box
- 2—1/4-28 x 7-1/4 hook bolt (6)
- 3—1/4-in-id fl washer (14)
- 4—1/4-28 self-lkg hex. nut (10)
- 5—Test station winterization distribution box
- 6—1/4-28 x 3/4 pan-hd screw (4)
- 7—Mounting bracket assy
 - A—1/4-28 wing nut
 - B—1/4-in-id fl washer
 - C—1/4-28 x 4.560 stud
 - D—Bracket
- 8—Strap 9152074
- 9—1/4-28 wing nut (4)
- 10—1/4-in-id lk washer (4)
- 11—1/4-28 x 5-1/4 hook bolt (4)
- 12—Strap 9152073
- 13—Cable assy (p/o test station winterization distribution box)
- 14—Cable assy (p/o launcher winterization distribution box)

Figure 5-29. Installation of the winterization kits.

c. Install the mounting bracket assembly on the storage rack and secure with the wing nut, flat washer and stud (7A, 7B, and 7C).

d. Connect the cable assembly (13) of the test station winterization distribution box to

connector J114 on the launcher winterization distribution box.

e. Connect the cable assembly (14) of the launcher winterization distribution box to connector J8A on the launcher power distribution box.

f. Secure the cable assemblies of the launcher winterization distribution box and the test station winterization distribution box to the launcher base with the straps (8 and 12).

5-30. Installation of the Jumper Wire and Instruction Plate

Note. The jumper wire allows the launcher erecting beam to be raised during blast deflector emplacement with no launching-handling rail on the launcher. The instruction plate sets forth the requirement for removal of the jumper wire prior to elevating the launching rail.

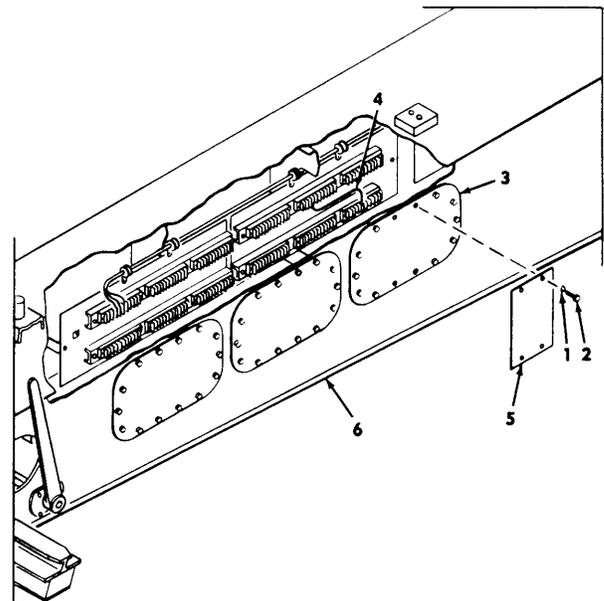
a. Remove the gasket cover assembly (3, fig. 5-30).

b. Install the jumper wire (4) to connect between terminal 115 on terminal board E30E and terminal 44 on terminal board E30D on the launcher erecting beam (6).

c. Install the gasket cover assembly and secure with ten of the hexagon-head bolts and lock washers (2 and 1).

d. Install the instruction plate (5) on the gasket cover assembly and secure with the re-

maining four hexagon-head bolts and lock washers.



ORD G266036

- 1—1/4-in-id lk washer (14)
- 2—1/4-20 x 21/32 hex-hd bolt (14)
- 3—Gasket cover assy
- 4—Jumper wire
- 5—Instruction plate
- 6—Launcher erecting beam

Figure 5-30. Installation of the jumper wire and instruction plate.

Section III. EMPLACEMENT OF THE LAUNCHER CONTROL-INDICATOR (LCI)

5-31. General

This section provides procedures for emplacement of the LCI which is mounted on a dolly to facilitate movement. A ramp is provided for loading and unloading the dolly-mounted LCI from its transporting vehicle.

5-32. Service Upon Receipt

a. Remove the LCI dolly and associated equipment from the crate and install the towbar (fig. 5-31) on the dolly.

b. Remove the LCI from the skid assembly using applicable procedures in paragraph 4-21h.

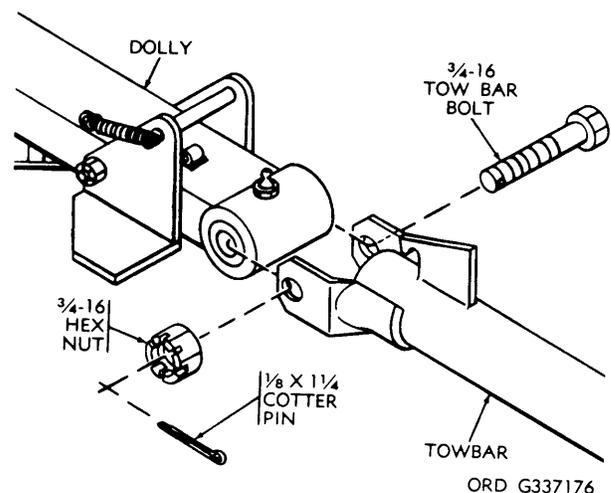
c. Remove the remote indicator from the LCI and install as outlined in paragraph 4-21i.

5-33. Emplacement Data

Table 5-3 gives the approximate emplacement data for the dolly-mounted LCI.

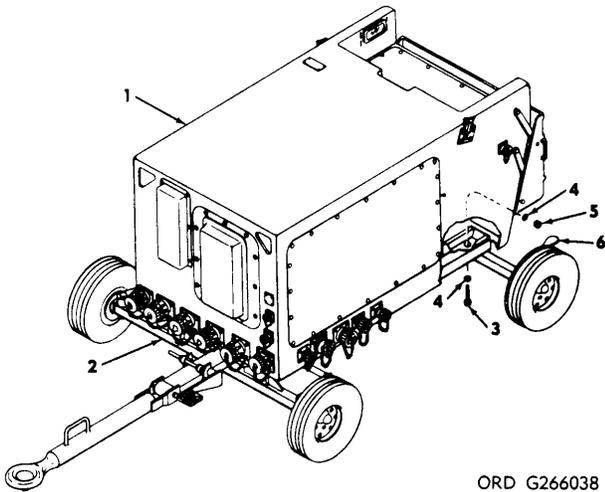
5-34. Initial Emplacement

a. Using the hoisting device (par. 4-21h), install the LCI (1, fig. 5-32) on the dolly (2)



ORD G337176

Figure 5-31. Installation of the towbar.



ORD G266038

- 1—LCI
- 2—Dolly
- 3—1/4-28 x 2-17/32 hex-hd bolt (12)
- 4—1/4-in-id fl washer (24)
- 5—1/4-28 self-lkg hex. nut (12)
- 6—Brake

Figure 5-32. Installation of the LCI.

and secure with the hexagon-head bolts, flat washers, and self-locking hexagon nuts (3, 4, and 5).

Table 5-3. LCI Emplacement Data

Component	Length (in.)	Width (in.)	Height (in.)	Weight (lb)
LCI -----	52	26	33	515
LCI dolly -----	102	53	16	263
LCI dolly wheelbase	48-1/2			

b. Remove the hoisting device.

c. Emplace the dolly-mounted LCI in front of and to the left of the launcher erecting beam.

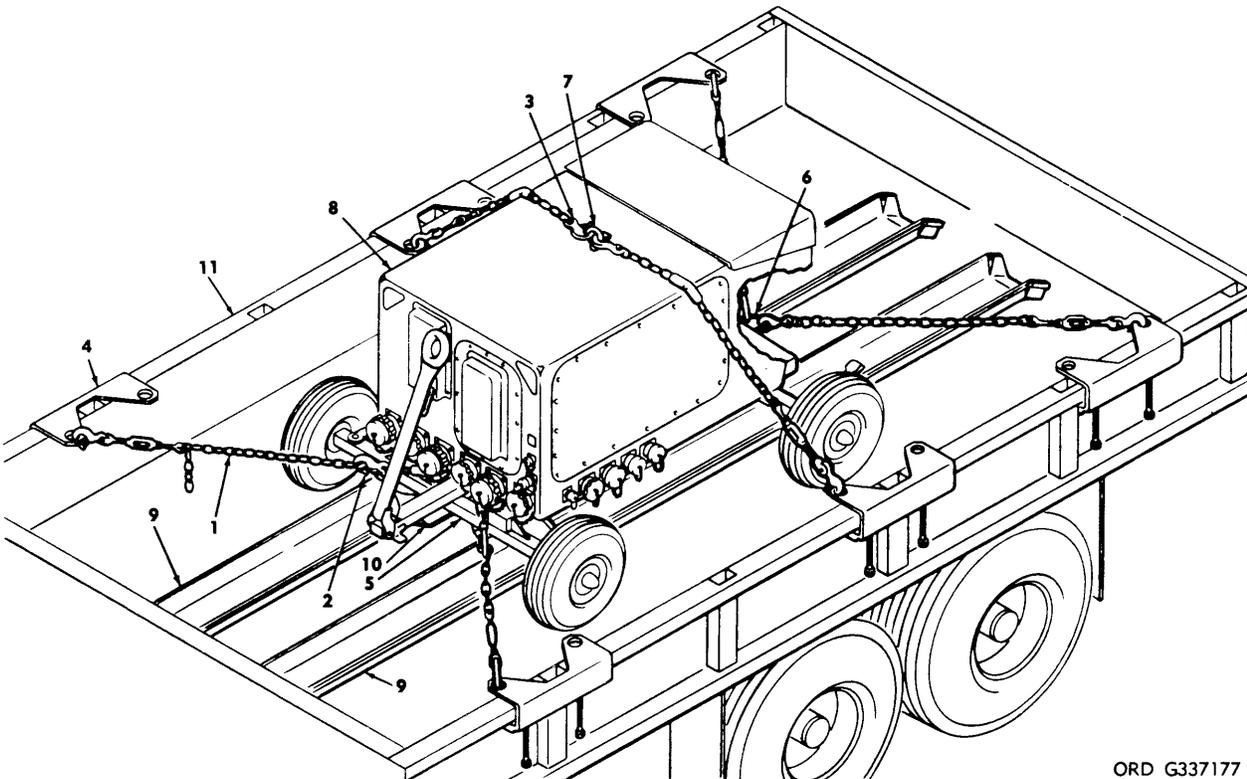
d. Set the brakes (6) on the dolly.

5-35. Emplacement after Travel

Warning: To prevent injury to personnel or damage to equipment, partially set the brakes on the dolly so that it will not roll down the loading ramp without being pushed.

a. Remove the tiedown chains (1, fig. 5-33) from the dolly-mounted LCI.

b. Push the dolly-mounted LCI (8) down the loading ramp (9).



ORD G337177

Figure 5-33. Tiedown and removal of the dolly-mounted LCI.

- 1—Tiedown chain (6)
- 2—Grab hook (2)
- 3—Safety hook (10)
- 4—Tiedown bracket (6)
- 5—Front axle
- 6—Rear eye

- 7—Lifting eyebolt
- 8—Dolly-mounted LCI
- 9—Loading ramp
- 10—U-bolt
- 11—Truck

Figure 5-33. Continued

Note. In inclement weather, connect the tiedown chains (1) at the safety hooks (3) and take up the slack at the turnbuckles. Secure a rope to the U-bolt (10) on the front of the dolly and use the joined tiedown chains as a "dead man." Unload the dolly-mounted LCI from the rear of the truck (11) by having two

men slowly pay out the rope and one man steer the dolly down the loading ramps.

c. Emplace the dolly-mounted LCI as outlined in paragraph 5-34.

Section IV. EMPLACEMENT OF THE SECTION OPERATING EQUIPMENT TRAILER (SOET)

5-36. Receipt of Equipment

The section operating equipment trailer (SOET) (fig. 2-6) is towed by a prime mover into position approximately 425 to 500 feet directly behind mobile launcher No. 2 of each launching section.

5-37. Emplacement Data

Table 5-4 gives the approximate emplacement data for the SOET.

Table 5-4. SOET Emplacement Data

Component	Length (in.)	Width (in.)	Height (in.)	Weight (lb)
Trailer -----	185	96	98-1/2	4,700
Track -----		80		

5-38. Emplacement

a. Apply the parking brake (fig. 5-34).

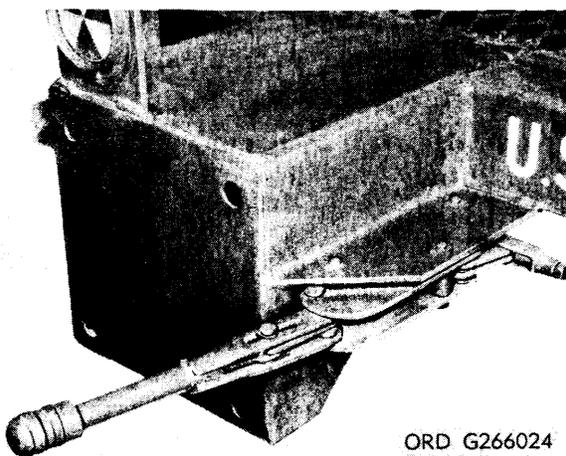


Figure 5-34. Parking brake handle in the applied position.

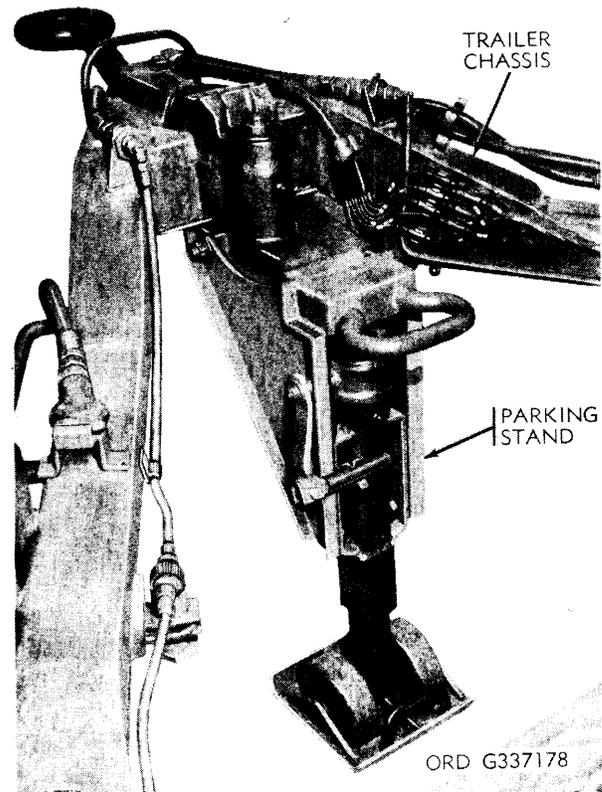
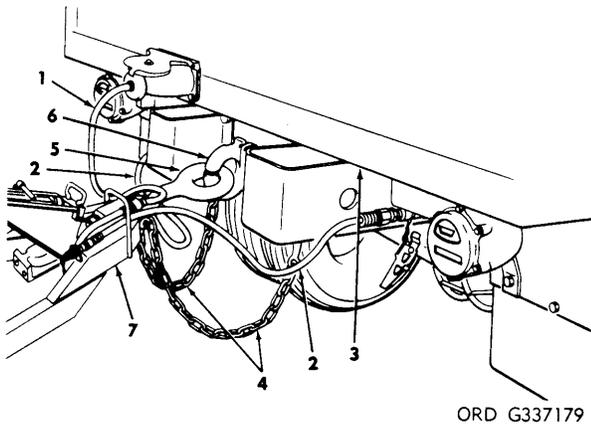


Figure 5-35. Emplacement of the parking stand.

b. Unlock and lower the parking stand to the ground (fig. 5-35).

c. Disconnect the SOET from the prime mover as outlined in steps (1) through (4) below.

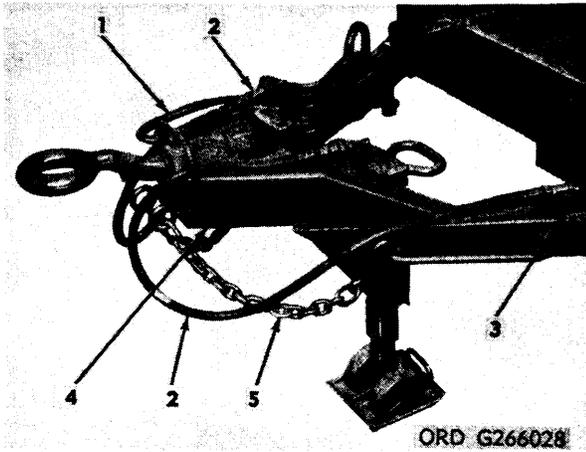
- (1) Disconnect the intervehicular electrical cable and intervehicular air hose assemblies (1 and 2, fig. 5-36).



- 1—Intervehicular electrical cable
- 2—Intervehicular air hose assy
- 3—Prime mover
- 4—Safety chain
- 5—Lunette
- 6—Pintle hook
- 7—Drawbar

Figure 5-36. Connection of the SOET to the prime mover.

- (2) Coil the intervehicular electrical cable and the intervehicular air hose assemblies and stow in the hose coupling stowage hangers (fig. 5-37) on the drawbar.
- (3) Disconnect the safety chains (4, fig. 5-36) from the prime mover (3) and stow on the drawbar (fig. 5-37).

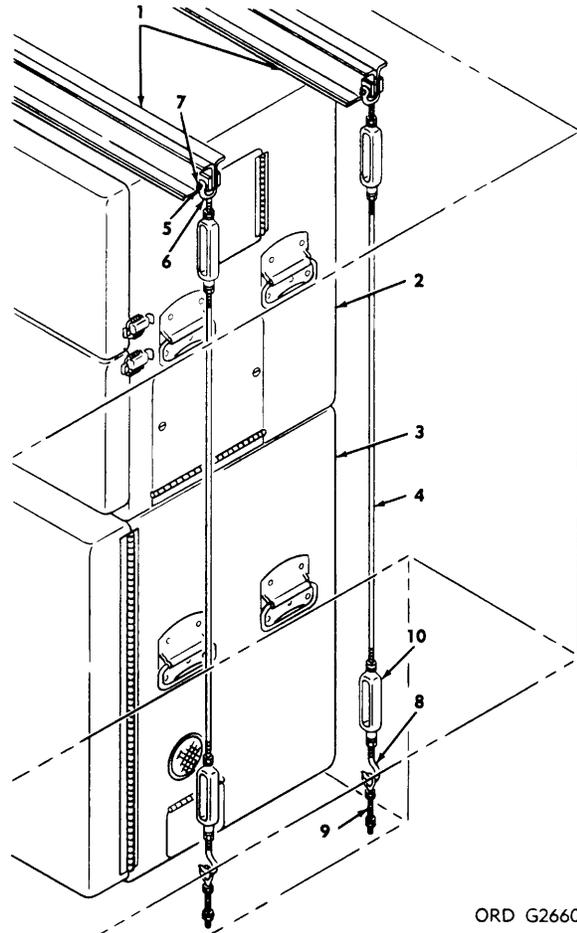


- 1—Intervehicular electrical cable
- 2—Intervehicular air hose assy
- 3—Hose coupling stowage hanger (3)
- 4—Trailer drawbar
- 5—Safety chain (2)

Figure 5-37. Disconnection of the SOET from the prime mover.

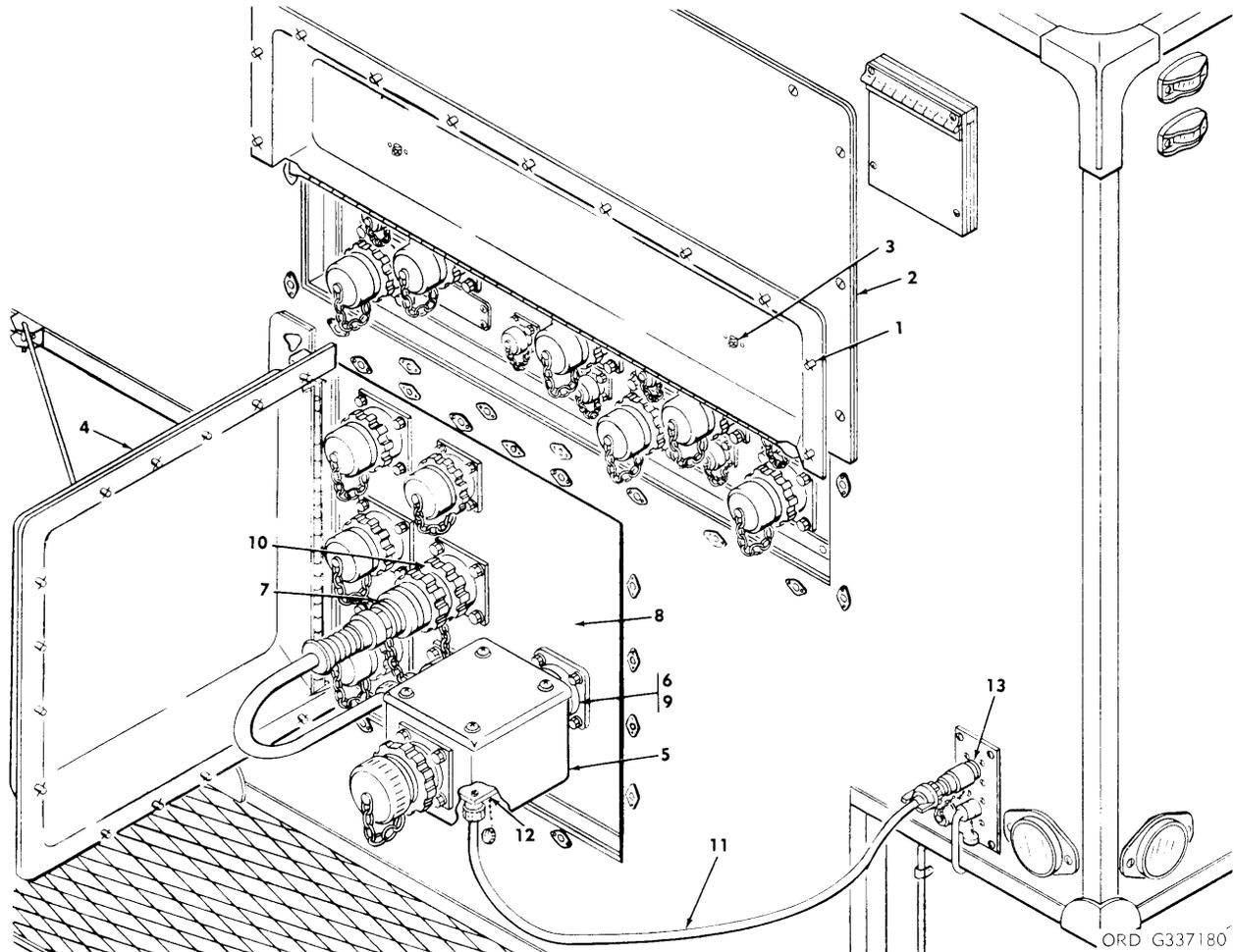
- (4) Disconnect the lunette (5, fig. 5-36) from the pintle hook (6) on the prime mover.
- d. Move the prime mover out of the working area.
- e. Extend the jacks to level the SOET within 35 mils.
- f. Emplace the boarding ladder at the rear of the SOET.
- g. Open and secure the entry door.
- h. Release the operator's chair.

Note. If the section control-indicator (SCI) and the section simulator group (SSG) have not been installed in the SOET, perform steps i, j and k below.



- 1—Beam
- 2—SCI
- 3—SSG
- 4—Rod assy (4)
- 5—1/4 x 0.984 fl-hd stgt pin (4)
- 6—5/16-18 lht clevis (4)
- 7—1/16 x 1/2 cotter pin (4)
- 8—5/16-18 x 4-21/32 hook bolt (4)
- 9—5/16-18 x 4-25/32 eyebolt (4)
- 10—5/16-18 x 5-7/16 turnbuckle (8)

Figure 5-38. Tiedown of the section control group.



- 1—Captive fastener (25)
- 2—Upper access door
- 3—Stud fastener (2)
- 4—Lower access door
- 5—Power cabinet junction box
- 6—Connector P6B
- 7—Connector P1M

- 8—SSG
- 9—Connector J6B
- 10—Connector J1M
- 11—Adapter cable
- 12—Connector J150A
- 13—Power plug

Figure 5-39. Power cabinet junction box connection.

i. Install the air intake and exhaust components for the SSG as outlined in steps (1) through (6) below.

Note. The air intake and exhaust components are shipped loose with the trailer.

- (1) Open the air intake door on the SSG.
- (2) Install a pipe on the inside of the air intake port on the lower right side of the SOET looking forward with four No. 8-32 x 5/8 pan-head screws and four No. 8 lock washers.
- (3) Remove the air exhaust door on the SSG.
- (4) Install a new air exhaust door on the SSG.

(5) Install a flange on the inside of the air exhaust port on the left side of the SOET looking forward with four No. 8-32 x 5/8 pan-head screws and four No. 8 lock washers.

(6) Install a flexible hose between the new exhaust door and the flange.

j. Position the SSG and the SCI in the front of the SOET (fig. 2-6).

k. Tie down the SCI and the SSG as outlined in steps (1) through (4) below.

Note. The tiedown equipment is shipped loose with the SOET.

(1) Position the beams (1, fig. 5-38) on top of the equipment. Assure that the

rubber cushion side is in contact with the equipment.

- (2) Install each rod assembly (4) by installing the flat-head straight pin (5) through the clevis (6) and the beam and securing with the cotter pin (7).
 - (3) Insert the hook bolts (8) in the eye-bolts (9) which are installed in the floor.
 - (4) Adjust each turnbuckle (10) to securely tie down the equipment.
- l. Open and secure the access doors on the front of the SOET as outlined in steps (1) and (2) below.

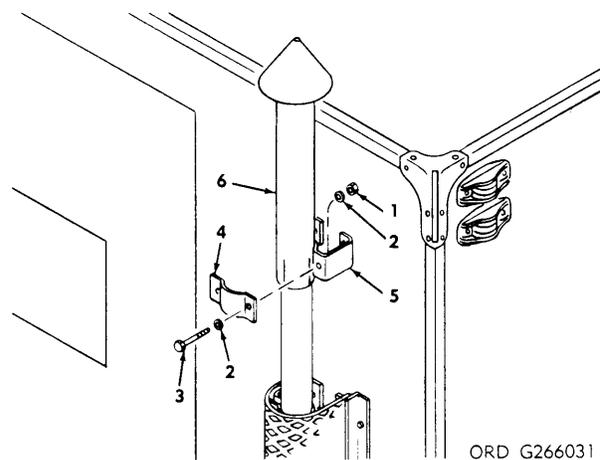
- (1) Loosen the 11 captive fasteners (1, fig. 5-39) on the hinged portion of the upper access door (2). Swing the hinged portion up and secure with the two stud fasteners (3) in the upper part of the door.
- (2) Loosen 14 captive fasteners on the lower access door (4). Swing the door back and secure.

m. Remove the power cabinet junction box (5) from the straps on the left side of the SOET and connect connectors P6B and P1M (6 and 7) to the SSG connectors J6B and J1M (9 and 10), respectively.

n. Connect the adapter cable (11) from junction box connector J150A (12) to the power plug (13) on the front of the SOET.

o. Remove cable runs 10 and 11 (fig. 4-70) from the straps on the right side of the SOET. Connect cable run 10 from SCI connector J4N to SSG connector J5D, and connect cable run 11 from SCI connector J69F to SSG connector J69E.

p. Raise the heater exhaust pipe (6, fig. 5-40) at the rear of the SOET as outlined in steps (1) through (3) below.



- 1—1/4-28 self-lkg hex. nut (2)
- 2—1/4-in-id fl washer (4)
- 3—1/4-28 x 1-3/8 hex-hd capscrew (2)
- 4—Clamp
- 5—Bracket
- 6—Heater exhaust pipe

Figure 5-40. Raising and lowering the heater exhaust pipe.

- (1) Remove the self-locking hexagon nuts (1), flat washers (2), and cap screws (3), and remove the clamp (4) from the bracket (5).
- (2) Slide the heater exhaust pipe up until the top of the pipe is above the level of the roof of the SOET.
- (3) Install the nuts, washers, and screws removed in step (1) above and secure the clamp to the bracket.

q. Fill the fuel tank at the front of the SOET with gasoline up to 100 octane grade or diesel fuel conforming to specification VV-F-800, class DF-1, DF-2, or DF-A.

Section V. EMPLACEMENT OF THE TRAILER MOUNTED LAUNCHING CONTROL STATION

5-39. Emplacement Data

Refer to table 4-3 for emplacement data pertaining to the trailer mounted launching control station.

5-40. Emplacement

a. Using a prime mover, place the trailer mounted launching control station at least 800

feet behind the launchers with the entry door facing them.

b. Disconnect the trailer mounted launching control station from the prime mover as outlined in paragraph 4-10c.

c. Move the prime mover out of the working area.

d. Emplace the spring-bridging link rods as outlined in paragraph 4-10e.

e. Position the jacks and level the trailer mounted launching control station as outlined in paragraph 4-10i.

f. Emplace the platform assembly (11, fig. 4-6) by releasing the platform latches (13) on the entry door (14) and lowering to the horizontal position.

g. Open and secure the entry door.

h. Install the boarding ladder on the platform assembly as outlined in steps (1) and (2) below.

(1) Remove the boarding ladder from the lower and upper supports on the inside of the entry door (fig. 5-41).

(2) Install the boarding ladder by inserting the two hooks at the top of the ladder in either one of two sets of ladder attach brackets (15, fig. 4-6).

i. Release each chair.

j. Open the AIR INTAKE, EXHAUST, and EMERGENCY EXIT doors.

k. Emplace the siren as outlined in paragraph 4-12i.

l. Assemble and install the mast group as outlined in paragraph 4-12j and 4-12o.

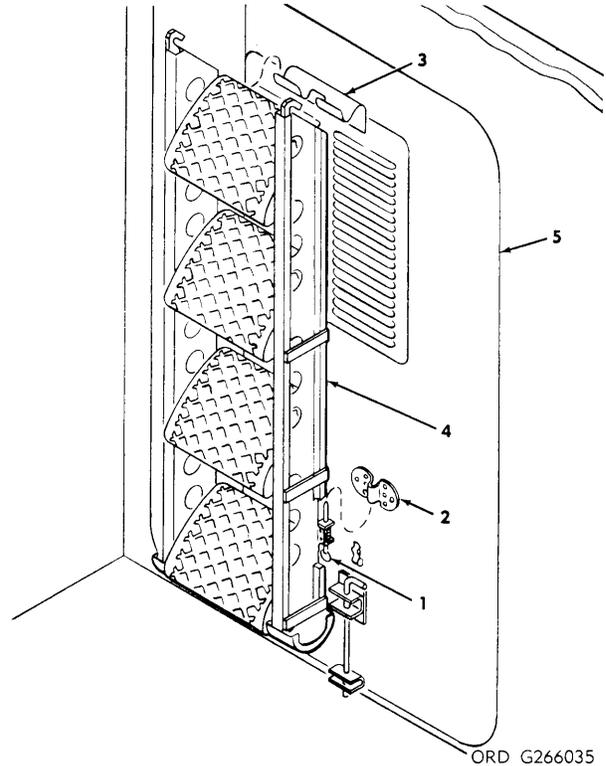
m. Install the flight simulator group and antenna support assembly as outlined in paragraph 4-12k and 4-12p.

n. Install the radar target simulator as outlined in paragraph 4-12l and 4-12q.

o. Install the ground rod as outlined in paragraph 4-12r.

p. Prepare the storage batteries as outlined in paragraph 4-13.

q. Install the dry cell batteries and release the pendulum in the ringing converter as outlined in paragraph 4-14.



- 1—Locking pin (2)
- 2—Lower support (2)
- 3—Upper support
- 4—Boarding ladder
- 5—Entry door

Figure 5-41. Removal and stowage of the boarding ladder.

Section VI. EMPLACEMENT OF THE CABLE REEL RACKS

5-41. General

Cable reel racks are provided for laying and retrieving the launching area cables. Nomenclature is determined by the number of axles and the number of reels per axle. One 1 × 2 rack is used to carry the generator power cables, and nine 3 × 2 and two 3 × 3 racks are used to carry the signal and power cables. The racks may be received in crates without the cables and reels installed, or they may be issued with these items installed. Procedures

for installing reels on racks, and for transporting loaded racks are given in TM 9-1450-250-12. For the procedures in this section, it is assumed that the reels have been installed on the racks and the racks have been transported to the launching area.

5-42. Emplacement Data

Table 5-5 gives emplacement data for the cable reel racks.

Table 5-5. Cable Reel Rack Emplacement Data

Component	Length (in.)	Width (in.)	Height (in.)	Weight ¹ (lb)
1 × 2 cable reel rack	45	21	18	70
3 × 2 cable reel rack	60	62	41	410
3 × 3 cable reel rack	64	62	41	500

¹Empty weight.

5-43. Emplacement

Note. For cable emplacement and identification data, refer to tables 5-6 and 5-7.

Note. Assure that two reel and cable assemblies 7612362 used in cable runs 5 and 6 are installed on the 1 × 2 cable reel rack.

a. 1 × 2 Cable Reel Rack.

(1) Install the cable reel rack (1, fig. 5-42) on the M200A1 generator trailer (2) adjacent to the trailer mounted launching control station with the four U bolts, four plates, eight lock washers, eight flat washers, and eight hexagon nuts (3, 4, 5, 6, and 7).

(2) Remove the cable end retainer (8) from the reel (9) to free the cable (10) for unreeling.

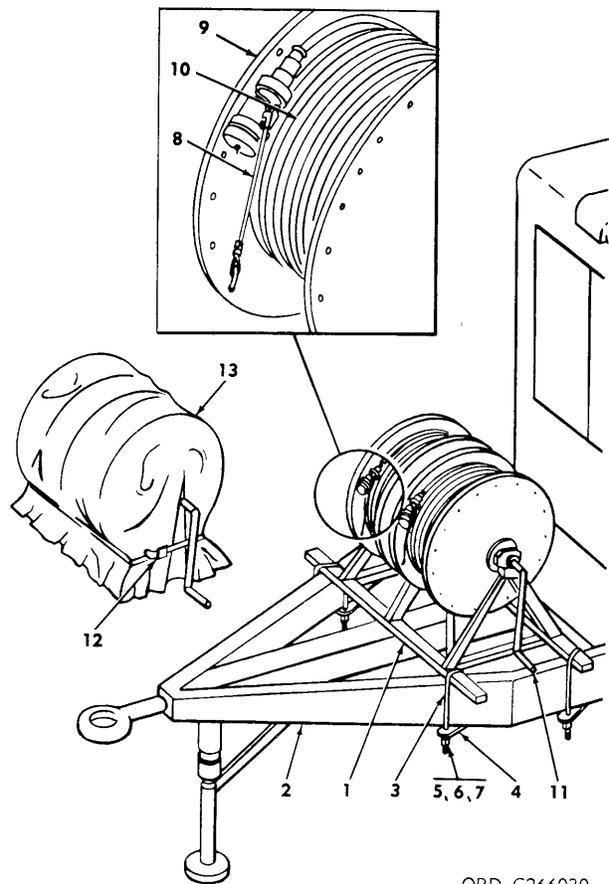
(3) Turn the hand crank (11) to unreel the cable.

b. 3 × 2 and 3 × 3 Cable Reel Racks.

Note. For the location of the cable runs mentioned in steps (1) through (5) below, refer to figure 5-44 and table 5-6.

(1) Assure that three reel and cable assemblies 7612371 and three reel and cable assemblies 8524207 used in cable runs 7 and 8 are installed on one 3 × 2 rack for each launching section.

(2) Assure that nine reel and cable assemblies 7612362 used in cable run 54 in launching sections A and B and cable run 55 for launchers No. 1, 2, and 3 in section A are installed on one 3 × 3 rack.



ORD G266030

- 1—1 × 2 cable reel rack
- 2—M200A1 generator trailer
- 3—3/8-24 U bolt (4)
- 4—Plate (4)
- 5—3/8-in-id lk washer (8)
- 6—3/8-in-id fl washer (8)
- 7—3/8-24 hex. nut (8)
- 8—Cable end retainer
- 9—Reel
- 10—Cable
- 11—Hand crank
- 12—Strap (2)
- 13—Protective cover

Figure 5-42. Installation and removal of the 1 × 2 cable reel rack.

(3) Repeat step (2) above for cable run 54 in launching section C and cable run 55 in sections B and C.

(4) Assure that six reel and cable assemblies 7612365 and six reel and cable assemblies 8524207 used in cable runs 15J and 16I in launching section A are installed on two 3 × 2 racks so that the corresponding cable assemblies in runs 15J and 16I can be unreeled simultaneously.

(5) Repeat step (4) above for launching sections B and C.

(6) Remove the cable end retainer (8, fig. 5-42) from the reel to free the cable for unreeling.

Note. Since only two hand cranks are supplied with 3-axle racks, perform steps (7) and (8) below to move a crank from one axle to another.

(7) Rotate the stop so that the hand crank slides off the end of the axle (fig. 5-43).

(8) Install the hand crank on the axle and rotate the stop to retain the crank.

(9) Turn the crank to unreel the cable.

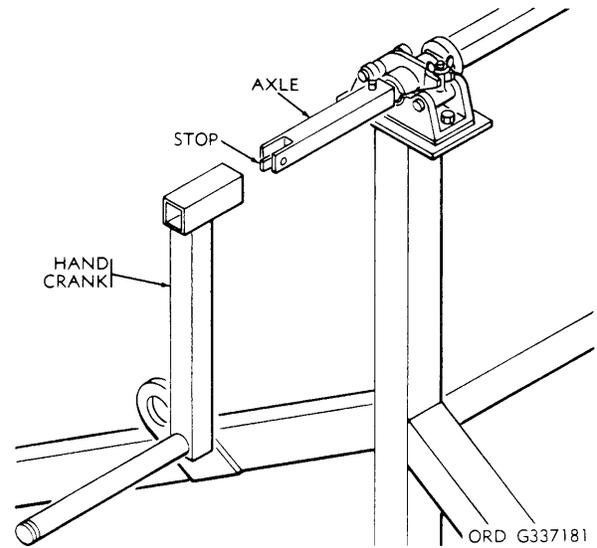


Figure 5-43. Removal and installation of the hand crank.

Section VII. INSTALLATION OF THE CABLE ASSEMBLIES

5-44. General

a. To facilitate cable emplacement, mating receptacles and plugs are painted identical colors, and plug backshells are painted identical in color to the areas on the equipment panels surrounding the mating receptacles. Refer to table 5-6 for the color coding of these connectors.

b. The abbreviations used in table 5-6 are defined below.

- blk ----- black
- blu ----- blue
- brn ----- brown
- FSG ----- flight simulator group
- gen J-box ----- generator junction box
- grn ----- green
- gy ----- gray

- Lchr ----- launcher
- LCI ----- launcher control-indicator
- LCS ----- launching control station
- od ----- olive drab
- pr ----- purple
- pwr distr ----- power distribution
- SCI ----- section control-indicator
- SSG ----- section simulator group
- TS ----- test station
- wht ----- white
- yel ----- yellow

5-45. Installation

Install the cable assemblies as shown in table 5-6 and figure 5-44.

Note. For location of the electrical connectors on the connector adapter, generator junction box, and SSG junction box, refer to figures 5-45, 5-46, and 5-47 respectively.

Table 5-6. Typical Mobile Launching Section—Cable Emplacement Data

Run no.	Cable assembly part no.	From	Color code			To	Color code		
			Panel ¹	Recp	Plug		Panel ¹	Recp	Plug
5	8292842	LCS-J1P	blk	wht	wht	FSG-J6D	gy	wht	gy
6	8292842	LCS-J6C	gy	wht	wht	Gen-J1J	blk	wht	wht
7 ²	8292839	LCS-J4H, J4J, J4K	gy	od	od	SCI-J5B	red	od	od
8 ²	8523884	LCS-J92A, J92B, J92C	gy	od	od	SCI-J88B	red	od	od
15-J ₁ ³	8292838	SCI-J4D	red	gy	gy	LCI-J5A	brn	gy	gy
15-J ₂ ³	8292838	SCI-J4E	red	wht	wht	LCI-J5A	blu	wht	wht
15-J ₃ ³	8292838	SCI-J4F	red	grn	grn	LCI-J5A	yel	grn	grn

Table 5-6. Typical Mobile Launching Section—Cable Emplacement Data—Continued

Run no.	Cable assembly part no.	From	Color code			To	Color code		
			Panel ¹	Recp	Plug		Panel ¹	Recp	Plug
16-I ₁ ⁴	8523884	SCI-J90E	red	gy	gy	LCI-J88A	brn	gy	gy
16-I ₂ ⁴	8523884	SCI-J90F	red	wht	wht	LCI-J88A	blu	wht	wht
16-I ₃ ⁴	8523884	SCI-J90G	red	grn	grn	LCI-J88A	yel	grn	grn
18-1	8525033	LCI-J69A	brn	red	red	Pwr distr box-J69B	od	red	red
18-2	8525033	LCI-J69A	blu	red	red	Pwr distr box-J69B	od	red	red
18-3	8525033	LCI-J69A	yel	red	red	Pwr distr box-J69B	od	red	red
19-1	8167732	LCI-J69D	brn	blk	blk	Pwr distr box-J69C	od	blk	blk
19-2	8167732	LCI-J69D	blu	blk	blk	Pwr distr box-J69C	od	blk	blk
19-3	8167732	LCI-J69D	yel	blk	blk	Pwr distr box-J69C	od	blk	blk
20-1	8167668	LCI-J81B	brn	od	od	Lchr base-J81A	od	od	od
20-2	8167668	LCI-J81B	blu	od	od	Lchr base-J81A	od	od	od
20-3	8167668	LCI-J81B	yel	od	od	Lchr base-J81A	od	od	od
21-1	9978604 ⁵	LCI-J70A	brn	pr	pr	Test station	—	—	—
21-2	9978604 ⁵	LCI-J70A	blu	pr	pr	Test station	—	—	—
21-3	9978604 ⁵	LCI-J70A	yel	pr	pr	Test station	—	—	—
22-1	9978604 ⁵	LCI-J83A	brn	gold	gold	Test station	—	—	—
22-2	9978604 ⁵	LCI-J83A	blu	gold	gold	Test station	—	—	—
22-3	9978604 ⁵	LCI-J83A	yel	gold	gold	Test station	—	—	—
27	9020354	Pwr distr box-J12A	—	—	—	Loudspeaker	—	—	—
—	9978430-1 ⁶	SSG-J1M	red	blu	—	SSG J-box P1M	—	—	blu
—	—	SSG-J6B	red	blk	—	SSG J-box P6B	blk	—	blk
54	8292842	SSG J-box-J1R	blk	wht	wht	Gen J-box J6E	gy	wht	wht
—	9978530 ⁷	Gen J-box-P1H	—	—	gy	Generator-J1H	gy	gy	—
55	8292842	Gen J-box-J1S, J1T, J1U	blk	wht	wht	Pwr distr box-J6A	gy	wht	wht
—	9021275 ⁸ 10	Pwr distr box-J8A	—	—	—	Lchr winterization kit	—	—	—
—	9021332 ⁹ 10	Lchr winterization kit J114	—	—	—	TS winterization kit	—	—	—

¹ Panel colors identical to backshell colors on connecting plugs except that for cable assembly 8167668 (run 20) the backshell color of the plugs is od.
² Typical for Sections A, B, and C.
³ Subnumbers after runs 15-J and 16-I indicate the connecting LCI number.
⁴ Connector adapter 9978431 used to adapt J90 connectors on the SCI to receive cable assembly connectors.

⁵ Replaces 8167662 after application of MWO 9-1440-252-30/19.
⁶ Part of SSG J-box 9978430.
⁷ Part of generator J-box 9978429.
⁸ Part of launcher winterization kit 9027165.
⁹ Part of test station winterization kit 9978720.
¹⁰ One required at each launcher.

Table 5-7. Typical Mobile Launching Section—Cable Identification Data

Run no.	Cable assembly part no.	Cable and reel assembly part no.	Lg (ft)	Wt ¹ (lb)	No. of term. ²	No. req'd in run
5	8292842	7612362	126	135	28A	1
6	8292842	7612362	126	135	28A	1
7	8292839	7612371	250	207	38C	3 ³
8	8523884	8524207	250	100	9	3 ³
15-J	8292838	7612365	250	207	38B	2 ³
16-I	8523884	8524207	250	100	9	2 ³
18	8525033	—	15	13	47	1 ³
19	8167732	—	15	13	47	1 ³
20	8167668	—	15	13	47	1 ³
21	9978604 ⁴	—	15	27	38C	1 ³
27	9020354	—	8	—	4	1 ³
54	8292842	7612362	126	135	28A	3 ³
55	8292842	7612362	126	135	28A	1 ³

¹Applies to cable and reel assembly when listed; otherwise, to cable assembly.
²The alpha suffix to an entry indicates polarization of connector with respect to keyway. Example: the entry "28A" means 28 pins or sockets polarized at "A" with respect to keyway.
³Typical for launchers 1, 2, 3 of each section (A, B, C).
⁴Replaces 8167662 after application of MWO 9-1440-252-30/19.
⁵Typical for sections A, B, C.

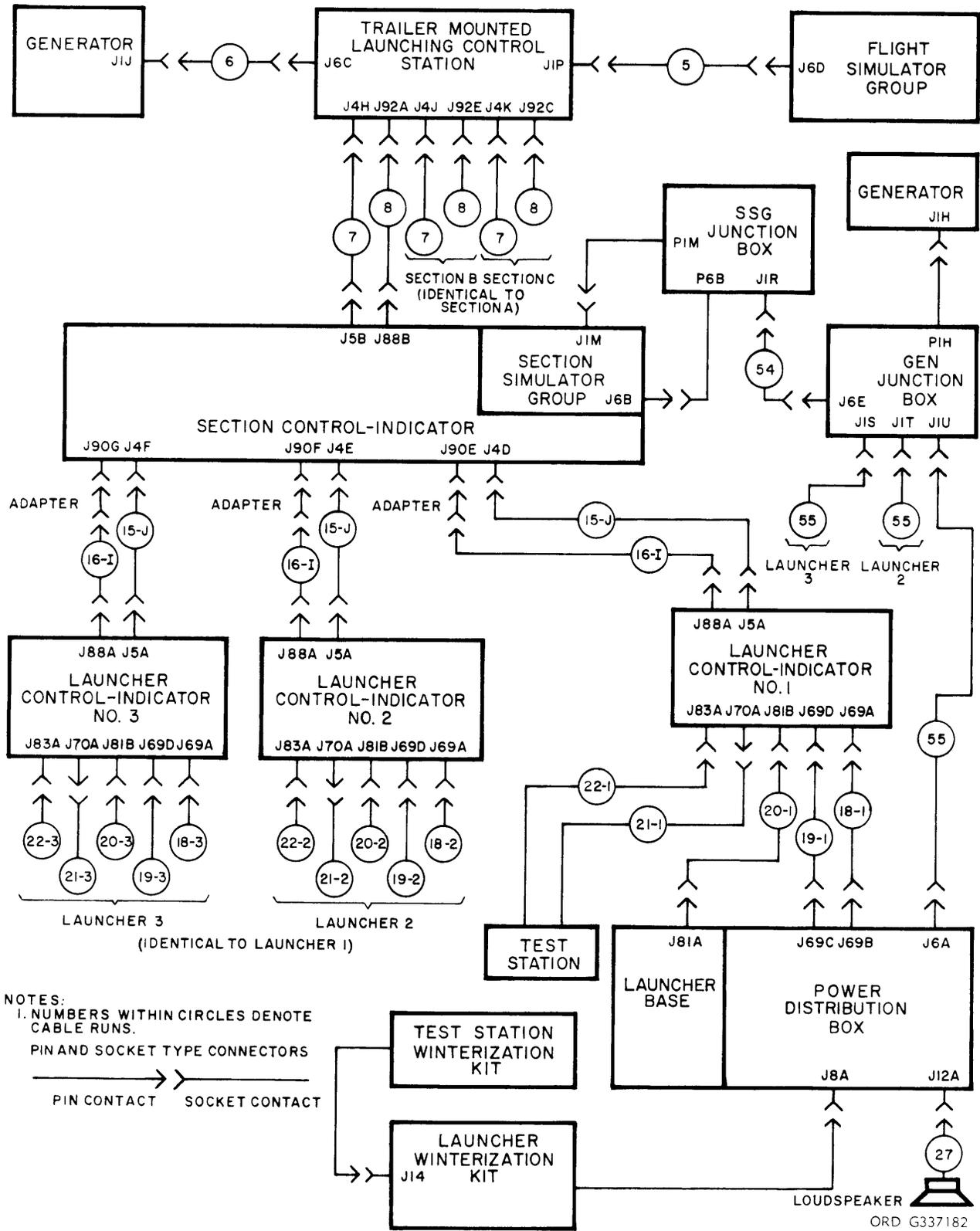


Figure 5-44. Cable layout diagram for a typical mobile section.

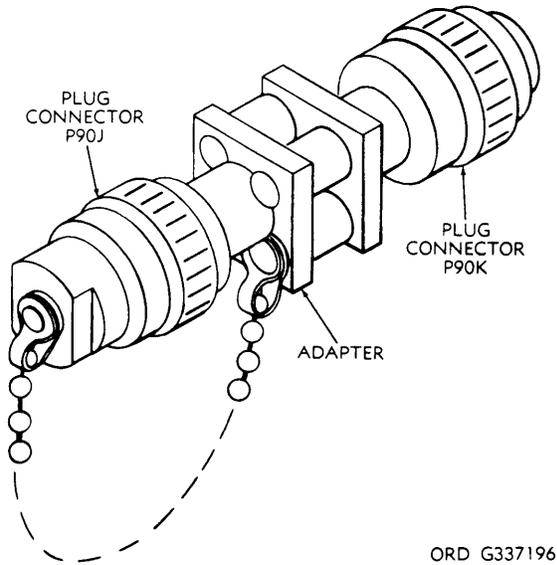
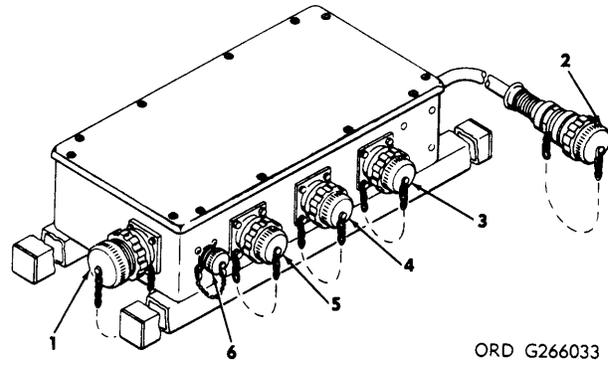


Figure 5-45. Connector adapter for electrical connectors.



- 1—Connector J6E
- 2—Connector P1H
- 3—Connector J1U
- 4—Connector J1T
- 5—Connector J1S
- 6—Connector J125A

Figure 5-46. Electrical connectors of the generator junction box.

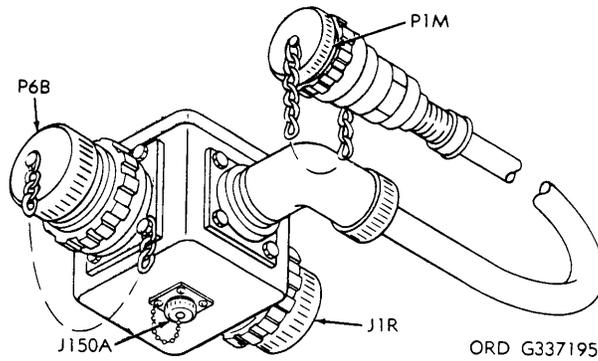


Figure 5-47. Electrical connectors for the SSG junction box.

Section VIII. EMPLACEMENT OF THE MOBILE LAUNCHER AFTER TRAVEL

5-46. General

This section provides procedures for the emplacement of the mobile launcher after travel.

5-47. Receipt of Equipment

The mobile launcher is towed to the launching site by truck tractor M52 (fig. 2-3) or truck M54 and dolly M197A1 (fig. 2-4), or equivalent.

5-48. Emplacement of the Mobile Launcher

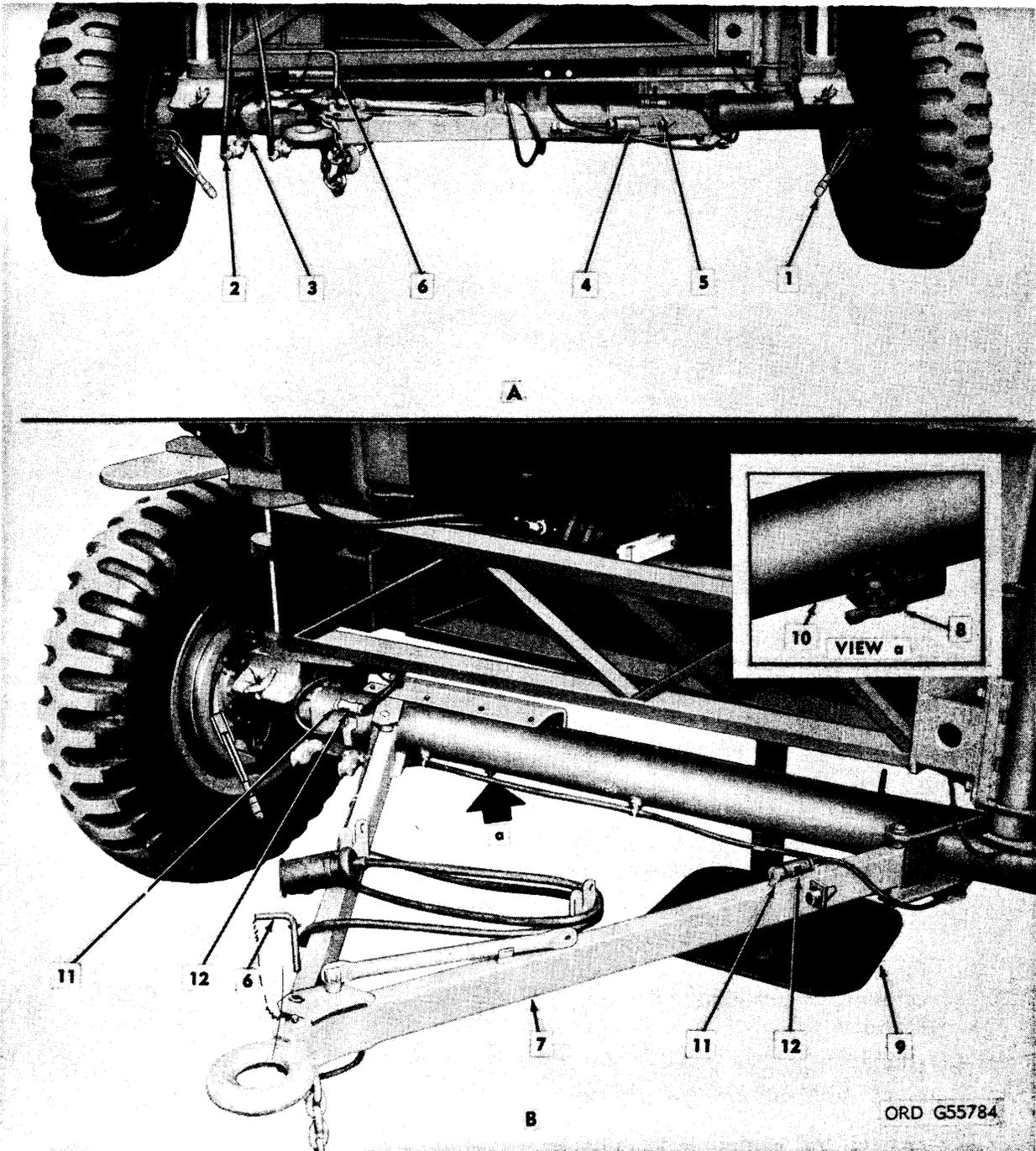
Tow the mobile launcher into the emplacement area.

Note. Paragraph *a* below is applicable only if installing the mobile launcher on a concrete pad (fig. 2-5).

a. Installation of the Concrete Launching Pad. Install the concrete launching pad emplacement kit as outlined in paragraph 5-12.

b. Emplacement of the Mobile Launcher. Emplace the mobile launcher (9, fig. 5-49) as outlined in steps (1) through (18) below.

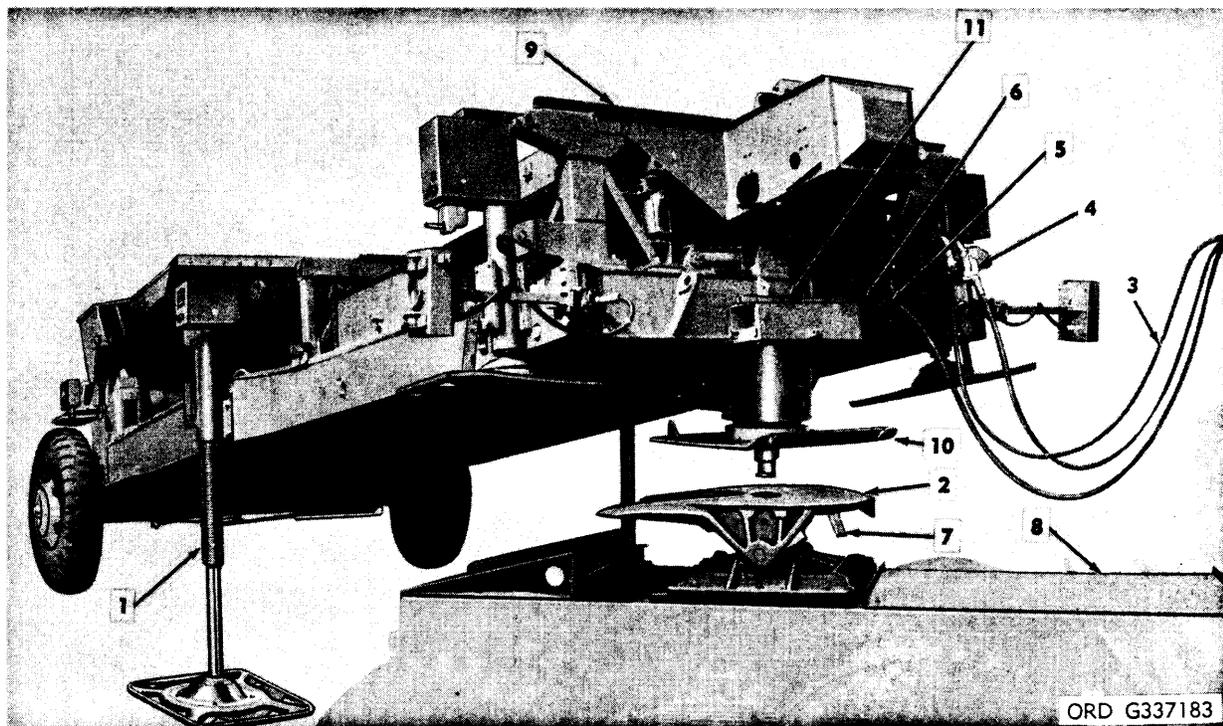
- (1) Set the brake levers (1, fig. 5-48) to the down and locked position.
- (2) Disconnect the hose assemblies (2) from the couplers (3).



- 1—Brake lever (2)
- 2—Hose assy (2)
- 3—Coupler (2)
- 4—Plug connector
- 5—Receptacle connector
- 6—Pin assy

- 7—Towbar arm (2)
- 8—Drain cock
- 9—Auxiliary jack
- 10—Mobile launcher axle
- 11—Plug connector
- 12—Clip

Figure 5-48. Preparation for removal of the mobile launcher axle.



- 1—Center jack (2)
- 2—Fifth wheel
- 3—Hose assy (2)
- 4—Coupler (2)
- 5—Plug connector
- 6—Receptacle connector

- 7—Release lever
- 8—Truck tractor M52 or dolly M197A1
- 9—Launcher
- 10—Kingpin support
- 11—Handle (2)

Figure 5-49. Emplacement of the mobile launcher.

(3) Remove truck tractor M52 or dolly M197A1 (8, fig. 5-49) as outlined in steps (a) through (h) below.

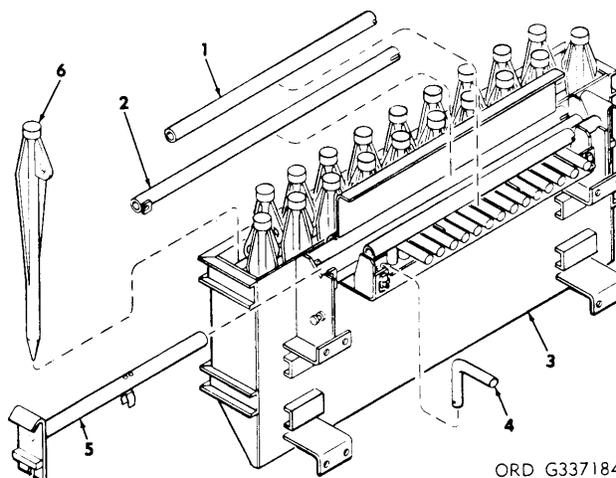
(a) Remove the pin assembly (6, fig. 5-14); rotate the connecting link (4) from the lugs (5) to the vertical position and secure with the pin assembly (3).

(b) Remove the two handles (1, fig. 5-50) from the stowage box (3).

(c) Extend the center jacks (1, fig. 5-49) simultaneously as outlined in paragraph 5-190 to release the weight on the fifth wheel (2).

(d) Disconnect the hose assemblies (3) from the couplers (4).

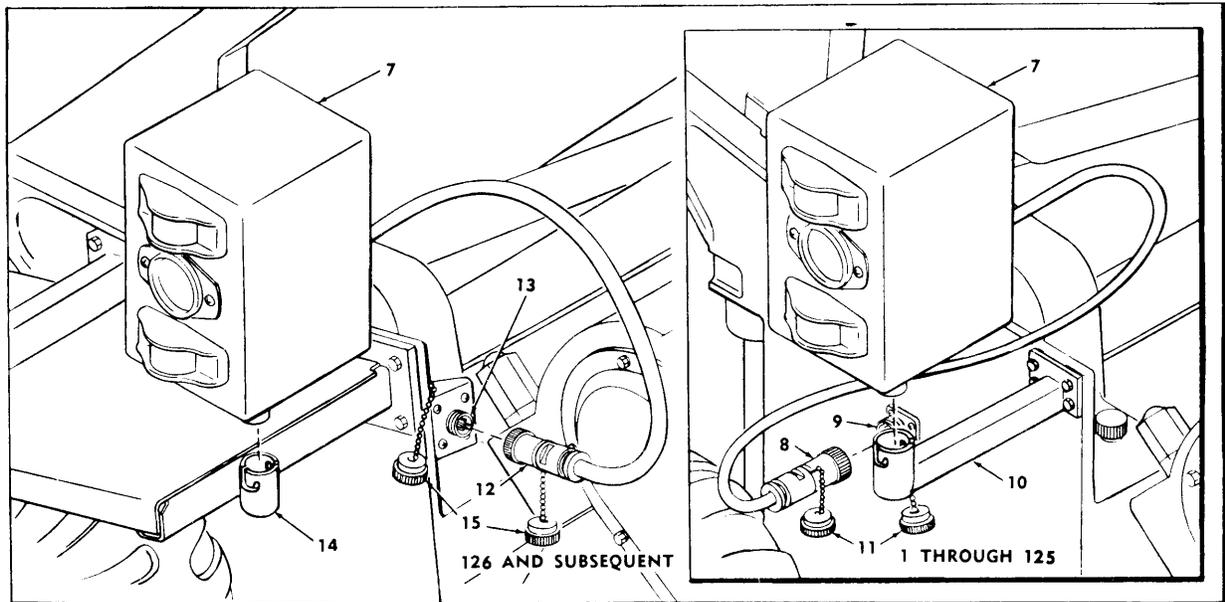
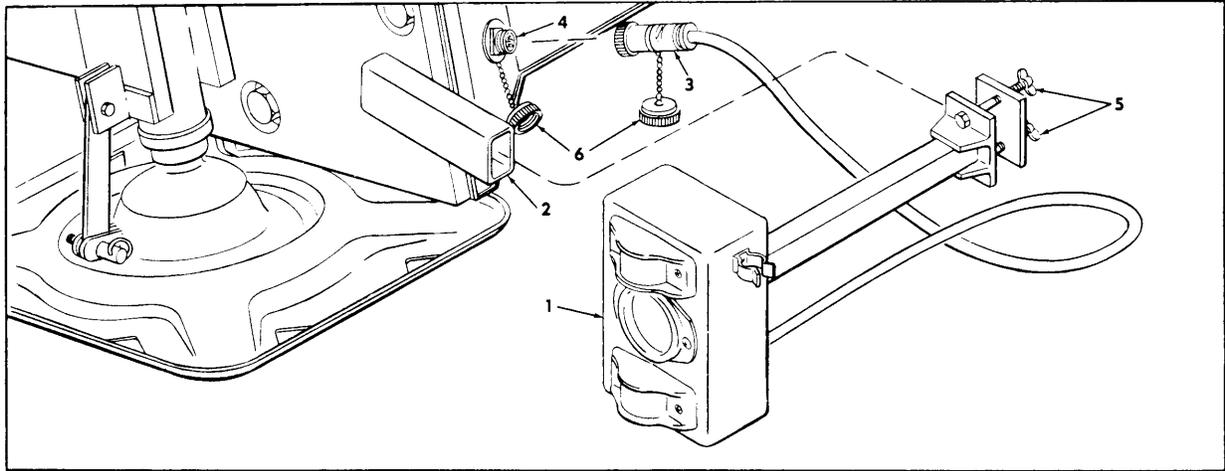
(e) Disconnect the plug connector (5) from the receptacle connector (6).



ORD G337184

- 1—Handle 9153381 (5)
- 2—Handle 9152889 (2)
- 3—Stake stowage box
- 4—Pin assy (misc)
- 5—Clamp (2)
- 6—Stake (20)

Figure 5-50. Removal and installation of the stake stowage box contents.



ORD G337185

- 1—Marker light
- 2—Forward jack
- 3—Plug connector
- 4—Receptacle connector
- 5—Wing nut
- 6—Dust cover
- 7—Stop light-taillight 9021410 (left) or 9021409 (right)

- 8—Plug connector
- 9—Receptacle connector
- 10—Holder
- 11—Dust cover
- 12—Plug connector
- 13—Receptacle connector
- 14—Holder
- 15—Dust cover

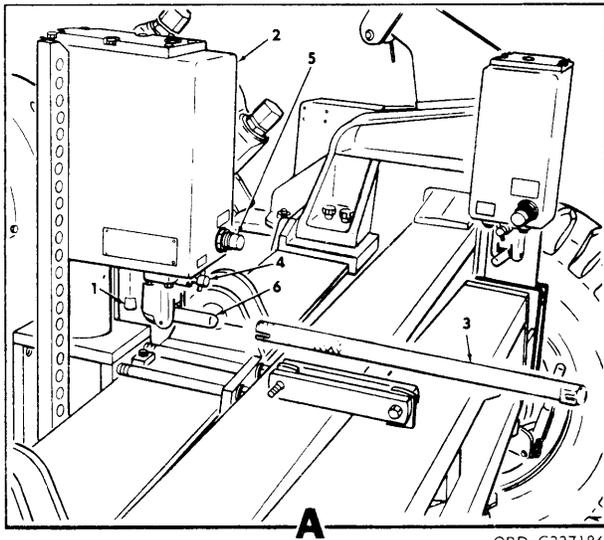
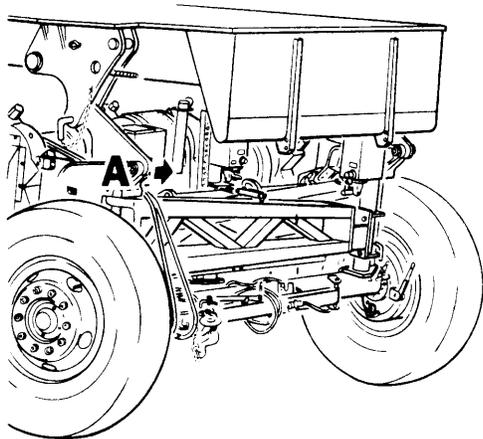
Figure 5-51. Removal and installation of the marker light and stop light-taillight—typical.

Caution: Do not allow the launcher (9) to move forward when removing truck tractor M52 or dolly M197A1. The center jacks may be bent and rendered inoperative.

Note. If dolly M197A1 is being used for transporting the launcher, perform step (g)

below. If truck tractor M52 is being used for transporting the launcher, perform step (f) below.

(f) Pull the release lever (7) and move truck tractor M52 clear of the launcher.



ORD G337186

- 1—Cork plug
- 2—Auxiliary jack
- 3—Handle
- 4—RELEASE VALVE
- 5—CONTROL VALVE BUTTON
- 6—Pump handle

Figure 5-52. Operation of the auxiliary jack.

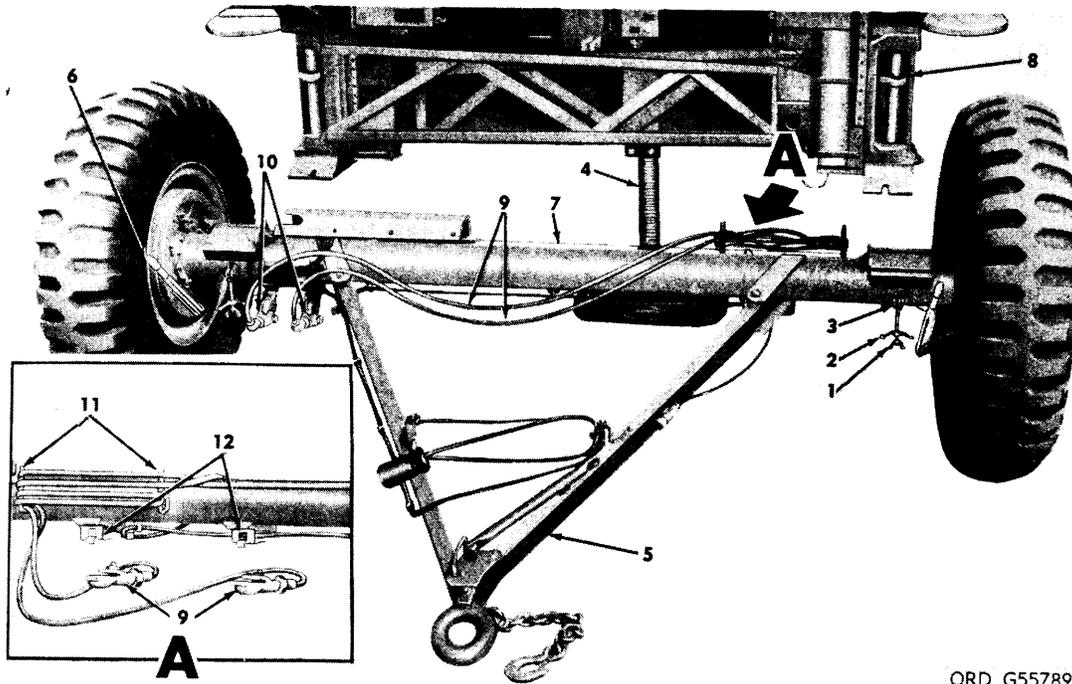
- (g) Rotate the handles (11) to the vertical position and move dolly M197A1 with the kingpin support (10) clear of the launcher.
- (h) Retract the center jacks simultaneously as outlined in steps 1 through 5 below until the launcher is approximately level.
 1. Install the handle (7, fig. 5-14) on the RELEASE VALVE (8) and turn clockwise to the closed position.

2. Install the handle on the pump handle (9) and operate sufficiently to remove the pin (6).
3. Install the handle on the RELEASE VALVE and turn counterclockwise to the open position until the required height is reached, then turn the RELEASE VALVE clockwise to the closed position.
4. Install the pin.

Caution: Do not perform step 5 below if the second stage ram of the jack (2) is extended.

5. Turn the RELEASE VALVE counterclockwise to the open position.
 - (4) Remove the marker lights (1, fig. 5-51) from the forward jacks (2) as outlined in steps (a) through (c) below.
 - (a) Disconnect the plug connector (3) from the receptacle connector (4).
 - (b) Loosen the wing nuts (5) and remove the marker lights from the forward jacks.
 - (c) Install the dust covers (6).
 - (5) Remove the stop light-taillight (7) (1 through 125) as outlined in steps (a) through (c) below.
 - (a) Disconnect the plug connector (8) from the receptacle connector (9).
 - (b) Push down, rotate, and pull up the stop light-taillight until it is free of the holder (10).
 - (c) Install the dust covers (11).
 - (6) Remove the stop light-taillight (126 and subsequent) as outlined in steps (a) through (c) below.
 - (a) Disconnect the plug connector (12) from the receptacle connector (13).
 - (b) Push down, rotate, and pull up the stop light-taillight until it is free of the holder (14).
 - (c) Install the dust covers (15).
 - (7) Remove the plug connector (4, fig. 5-48) from the receptacle connector (5).
 - (8) Remove the pin assembly (6) and unfold the towbar arms (7).
 - (9) Secure the towbar arms with the pin assembly.

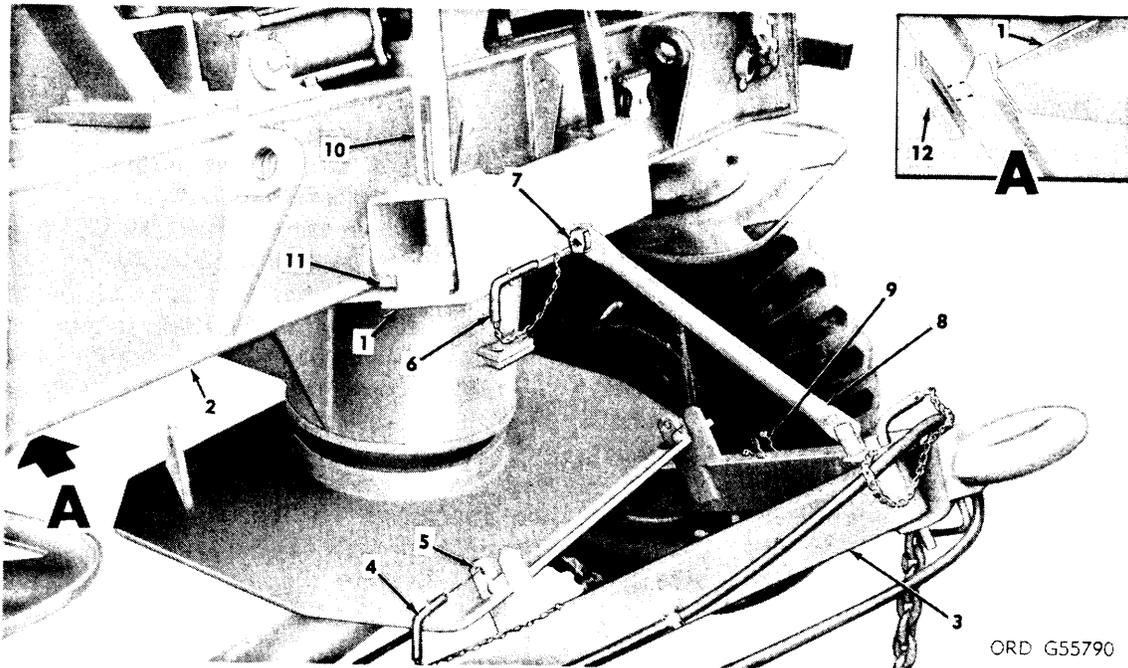
- (10) Open the drain cock (8) and release the air pressure; then close the drain cock.
- (11) Extend the auxiliary jack (9) to the ground as outlined in steps (a) through (g) below.
- (a) Remove the pin assembly (1, fig. 5-16) from the bars (3) and remove the connecting link (2).
 - (b) Install the handle (3, fig. 5-52) to the RELEASE VALVE (4) and turn clockwise to the closed position.
 - (c) Remove the pin (24, fig. 5-16) from the auxiliary jack (6).
 - (d) Remove the cork plug (1, fig. 5-52) from the auxiliary jack (2).
 - (e) Turn the RELEASE VALVE counterclockwise to the open position.
 - (f) Depress the CONTROL VALVE BUTTON (5) to accelerate the jack extension until the jack reaches the ground.
 - (g) Release the CONTROL VALVE BUTTON and turn the RELEASE VALVE clockwise to the closed position.
- (12) Loosen the large and small wing nuts (1 and 2, fig. 5-53) and rotate the eye bolts (3) down.
- Warning:** To prevent injury to personnel, extreme care should be taken when the auxiliary jack (4) is extended. The towbar arms (5) will rotate down as the auxiliary jack is extended.
- (13) Extend the auxiliary jack four inches and rotate the towbar arms down. Set the brake levers (6) in the vertical position and remove the mobile launcher axle (7).
- (14) Stow the hose assemblies (9) as outlined in steps (a) through (c) below.
- (a) Connect one end of the hose assemblies to the couplers (10).
 - (b) Wrap the hose assemblies around the hangers (11).
 - (c) Connect the other end of the hose assemblies to the hose coupling hangers (12).
- (15) Remove the kingpin support (1, fig. 5-54) from the launcher (2) as outlined in steps (a) through (h) below.
- (a) Position the mobile launcher axle (3) under the kingpin support (1).
 - (b) Remove the arm pin assemblies (4) from the supports (5).
 - (c) Lower the launcher to the level of the mobile launcher axle by retracting the center jacks (1, fig. 5-49) simultaneously as outlined in step (3)(h) above.
 - (d) Insert the supports (5, fig. 5-54) to the kingpin support and secure with the arm pin assemblies.
 - (e) Remove the support pin assembly (6) from the lugs (7).
 - (f) Remove the connecting link (8) from the clip (9); position the link between the lugs and secure with the support pin assembly.
 - (g) Rotate the handles (10) to the vertical position.
 - (h) Pull the mobile launcher axle (3) forward to clear the kingpin support from the steel angles (11 and 12) and to clear the axle from the launcher (2).
 - (i) Remove the clamps (5, fig. 5-50) from the stowage box (3).
 - (j) Stow the marker lights and install the stop light-tailight to the kingpin support as outlined in paragraphs 5-8 and 5-9.
- (16) Remove the two handles (1, fig. 5-50) from the stowage box (3).
- (17) Fully extend the forward jacks (2, fig. 5-14) as outlined in paragraphs 5-17b and c.
- (18) Release the pressure on both center jacks (1, fig. 5-49) simultaneously as outlined in step (3)(h) above.
- c. Emplacement of the Outriggers.* Emplace the outriggers (3, fig. 5-55) as outlined in steps (1) through (4) below.
- (1) Remove the pin assembly (1) from the link plate (2) and rotate the link plate away from the pin plate (8).
 - (2) Swing the outriggers out from the rear of the launcher (4) to the limit of travel, allowing the corner castings to act as stops.



ORD G55789

- | | | |
|----------------------|------------------------|-------------------------|
| 1—Small wing nut (2) | 5—Towbar arm (2) | 9—Hose assy |
| 2—Large wing nut (2) | 6—Brake lever (2) | 10—Coupler |
| 3—Eye bolt (2) | 7—Mobile launcher axle | 11—Hanger |
| 4—Auxiliary jack | 8—Launcher | 12—Hose coupling hanger |

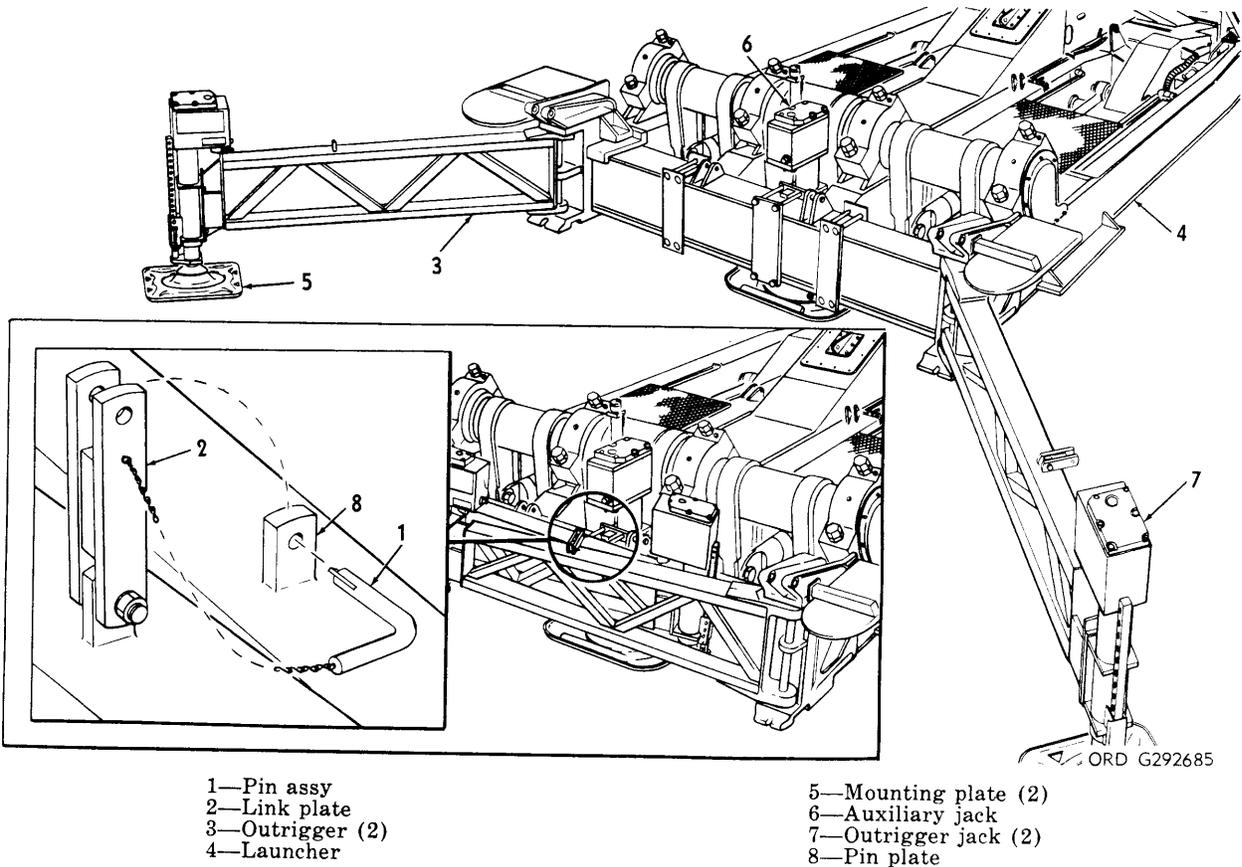
Figure 5-53. Removal of the mobile launcher axle.



ORD G55790

- | | | |
|------------------------|--------------------|---------------|
| 1—Kingpin support | 5—Support (2) | 9—Clip |
| 2—Launcher | 6—Support pin assy | 10—Handle (2) |
| 3—Mobile launcher axle | 7—Lug (2) | 11—Stl angle |
| 4—Arm pin assy (2) | 8—Connecting link | 12—Stl angle |

Figure 5-54. Removal of the kingpin support.



- 1—Pin assy
- 2—Link plate
- 3—Outrigger (2)
- 4—Launcher

- 5—Mounting plate (2)
- 6—Auxiliary jack
- 7—Outrigger jack (2)
- 8—Pin plate

Figure 5-55. Emplacement of the outriggers.

- (3) Remove the pin assemblies (fig. 5-56) and remove the two mounting plates from the retainers.

- (4) Install the mounting plates (5, fig. 5-55) as outlined in paragraph 5-16e.

Note. Perform steps (5) and (7) below only if installing the mobile launcher on a concrete pad.

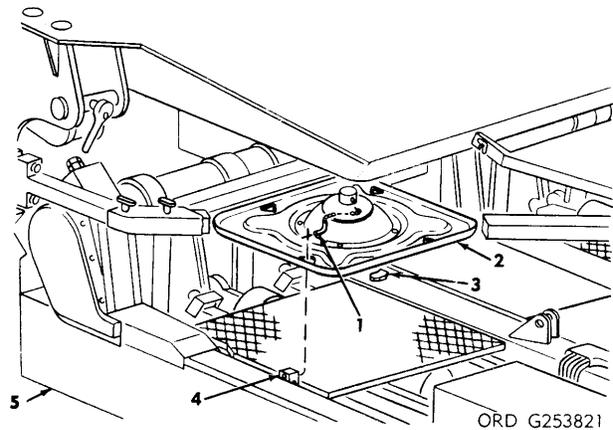
- (5) Align the holes in the mounting plate (11, fig. 5-14) with the hexagon-head bolts (12) embedded in the concrete pad.

- (6) Fully retract the auxiliary jack (2, fig. 5-52) as outlined in steps (a) through (h) below.

(a) Install the handle (3) on the RELEASE VALVE (4) and turn clockwise to the closed position.

(b) Install the handle on the pump handle (6) and operate sufficiently to release the weight on the pin (24, fig. 5-16); remove the pin.

(c) Install the handle (3, fig. 5-52) on the RELEASE VALVE and turn



- 1—Pin assy
- 2—Mounting plate
- 3—Plate retainer
- 4—Pin retainer
- 5—Rear of launcher

Figure 5-56. Typical removal and installation of the mounting plate.

counterclockwise to the open position until the weight is released from the auxiliary jack.

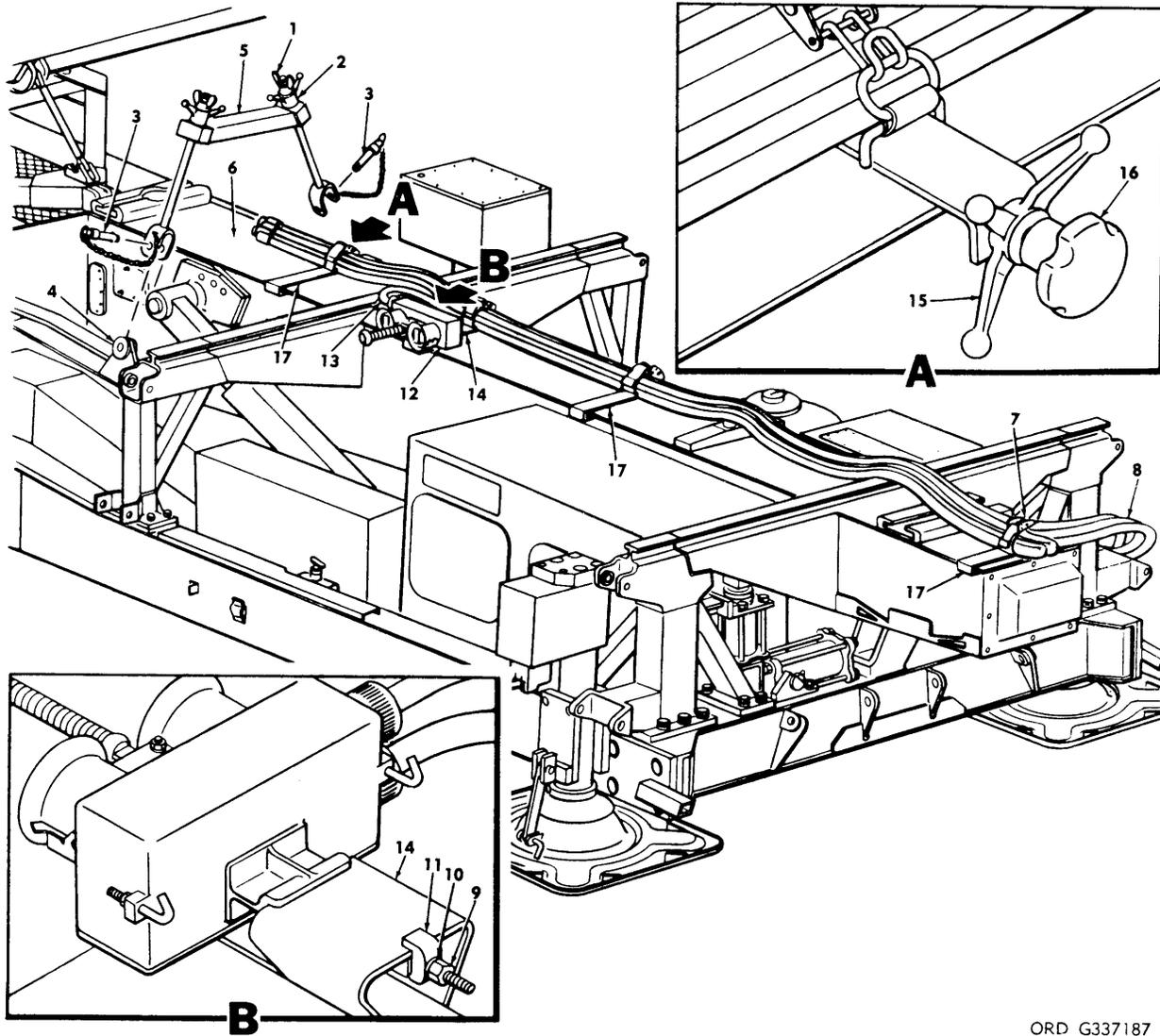
(d) Turn the RELEASE VALVE clockwise to the closed position.

(e) Depress the CONTROL VALVE BUTTON (5).

(f) Install the handle on the pump handle (6) and operate until the auxiliary jack is fully retracted.

(g) Install the pin (24, fig. 5-16) in the jack (6).

(h) Install the handle (3, fig. 5-52) on the RELEASE VALVE and turn



ORD G337187

- 1—Small wing nut (2)
- 2—Large wing nut (2)
- 3—Quick-release pin
- 4—Lug (2)
- 5—Tiedown linkage
- 6—Launcher erecting beam
- 7—Strap assy (4)
- 8—Power cable assy (3)
- 9—Hexagon nut

- 10—Lock washer
- 11—Clamp
- 12—Electrical test station
- 13—Cable assy
- 14—Test station stowage clamp
- 15—Wing nut (4)
- 16—Knob (4)
- 17—Cable clamp

Figure 5-57. Removal and installation of the tiedown linkage cable clamps and accessories.

counterclockwise to the open position.

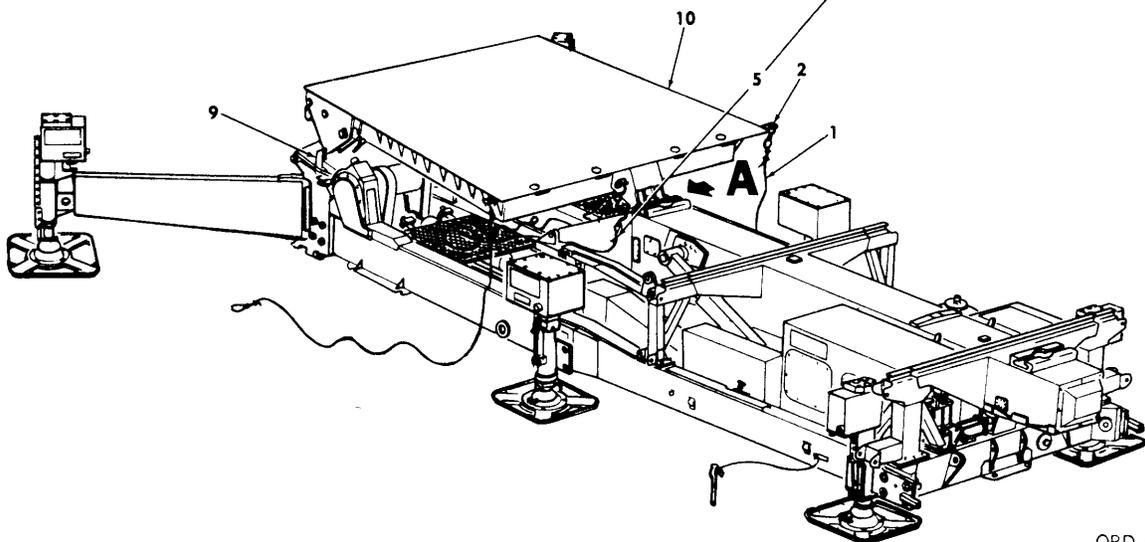
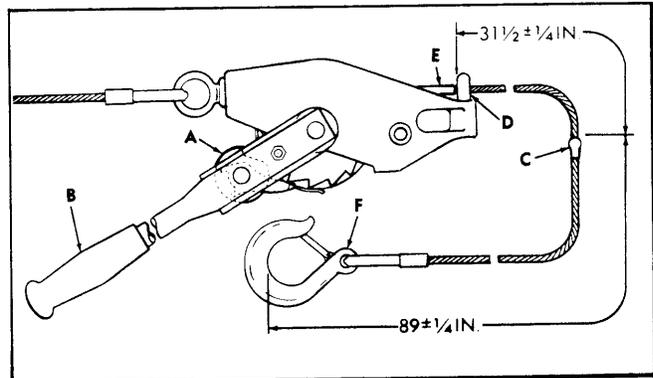
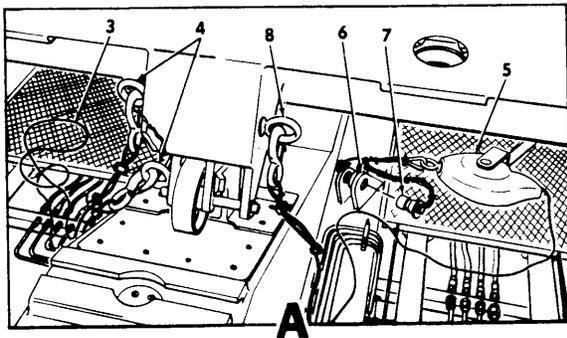
- (7) Place the flat washers (13, fig. 5-14) over the hexagon-head bolts (12) and rotate until the flat washers drop into the triangular openings in the mounting plate (11); then install the reinforcing plates, flat washers, and hexagon nuts (14, 15 and 16).
- (8) Retract the forward jacks (3 and 10, fig. 5-8) and the outrigger jacks (7,

fig. 5-55) simultaneously until the launcher (4) is as close to the ground as possible but still approximately level.

d. Emplacement of the Ground Rod. Emplace the ground rod as outlined in paragraph 5-18.

e. Removal of the Tiedown Linkage. Remove the tiedown linkage (5, fig. 5-57) as outlined in steps (1) through (3) below.

- (1) Loosen the small wing nuts (1) and the large wing nuts (2).



- 1—Wire rope assy 9021478 (2)
- 2—Plate (2)
- 3—Wire rope assy 9021836
- 4—Eyebolt
- 5—Wire rope hoist
- A—Control disc
- B—Handle
- C—Swaged ball

- D—Cable guide and stop
- E—Red area
- F—Hook
- 6—Lug (2)
- 7—Shoulder pin
- 8—Eyebolt
- 9—Pin assy
- 10—Blast deflector

ORD G337194

Figure 5-58. Emplacement of the blast deflector (1 through 72).

- (2) Remove the quick-release pins (3) from the lugs (4) and remove the tie-down linkage.
- (3) Stow the tiedown linkage as described in paragraph 5-10.

f. Removal of the Cable Clamps and Accessories.

- (1) Release the strap assemblies (7, fig. 5-57) on the clamps (14 and 17).
- (2) Remove the power cable assemblies (8).
- (3) Loosen the hexagon nut (9) on the electrical test station (12).
- (4) Remove the electrical test station and the cable assembly (13) and stow in the front of the launcher.
- (5) Loosen the wing nuts (15) and the knobs (16) and remove the cable clamps.

g. Installation of the Cable Assemblies. Install the cable runs as described in paragraph 5-45.

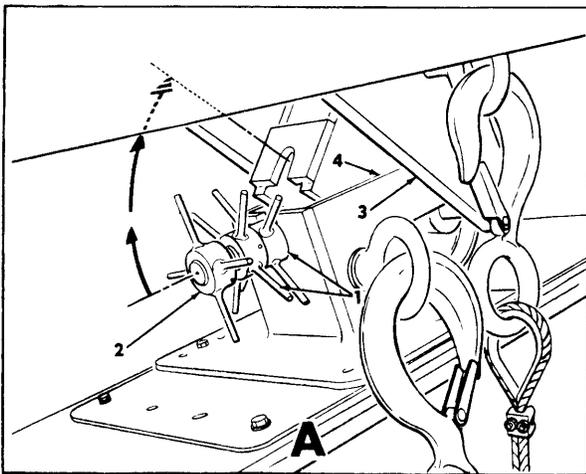
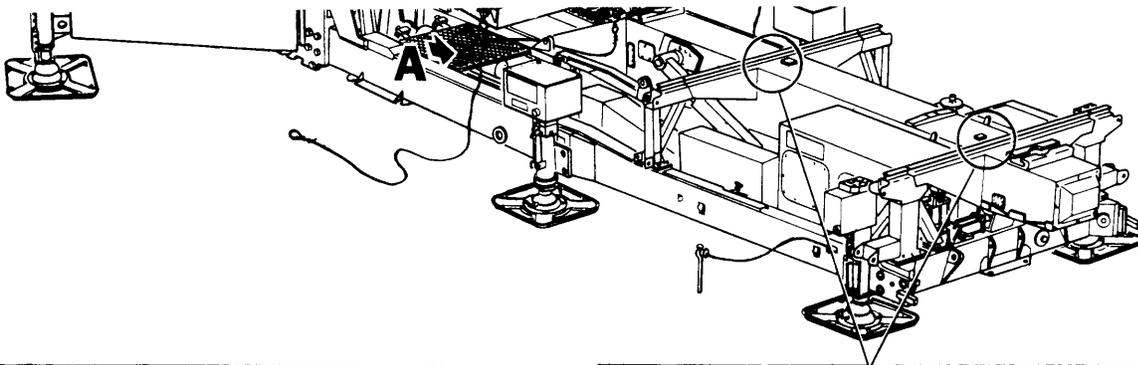
h. Leveling of the Mobile Launcher. Level the mobile launcher (1, fig. 5-8) as described in paragraph 5-19.

i. Emplacement of the Blast Deflector (1 through 72). Emplace the blast deflector (10, fig. 5-58) as outlined in steps (1) through (22) below.

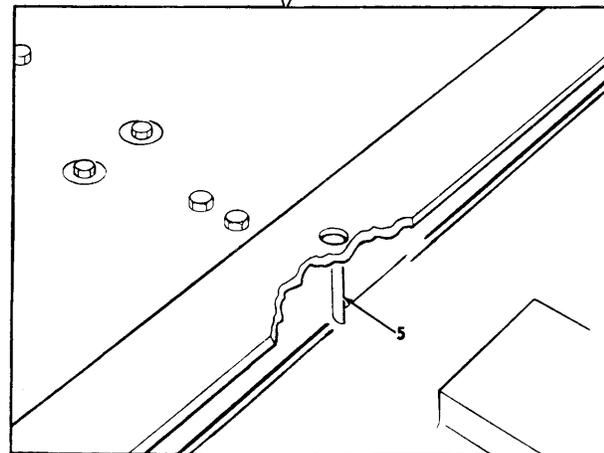
- (1) Attach the wire rope assemblies (1) to the plates (2).

Caution: The length of the wire rope assembly (3) is critical. The correct length is $162 \pm 1/4$ inches measured between the inside edge of the hooks.

- (2) Attach the wire rope assembly (3) to the eye bolts (4).



- 1—Inner wing nut
- 2—Outer wing nut
- 3—Blast deflector



- 4—Housing
- 5—Indexing pin (2)

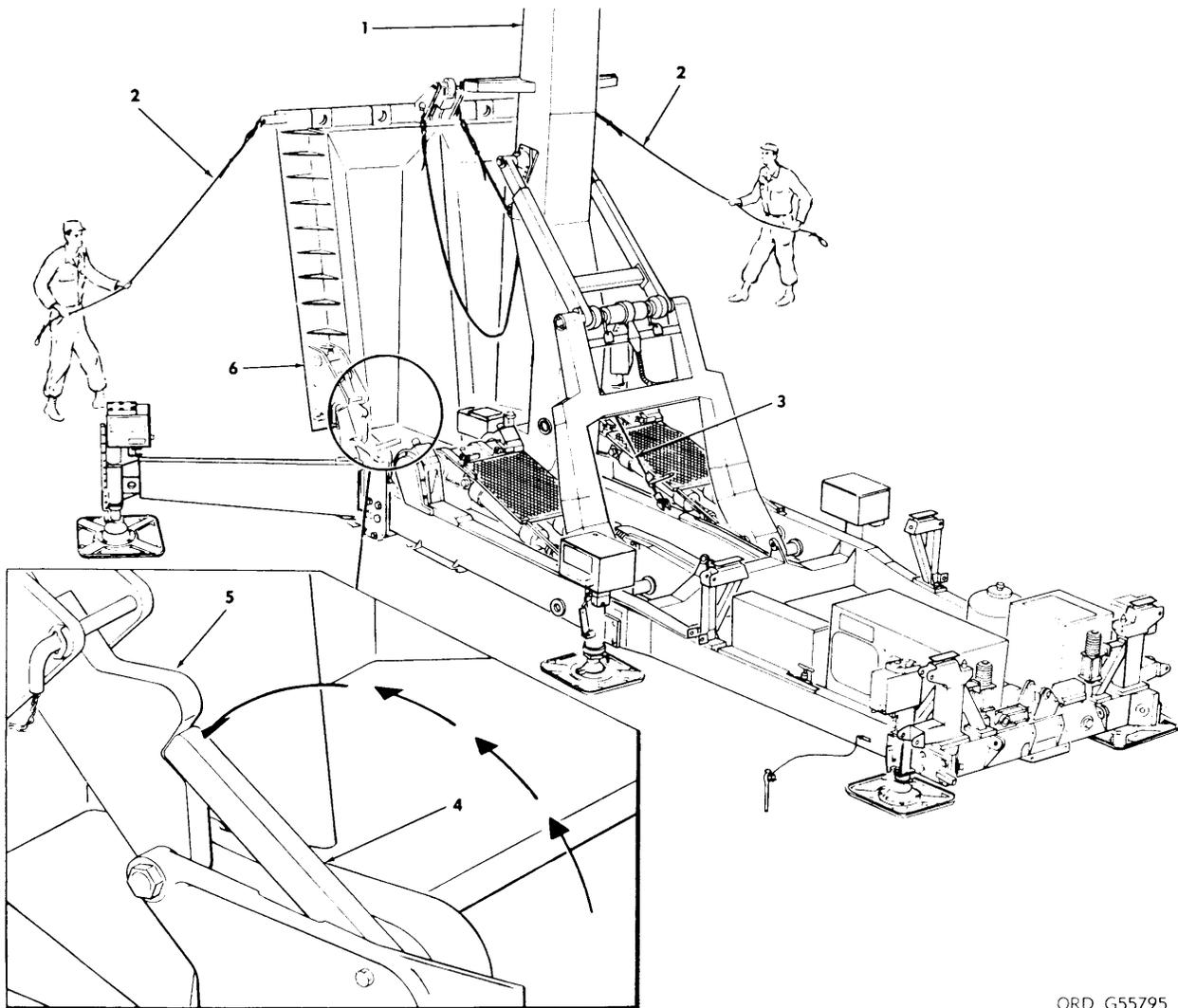
ORD G55794

Figure 5-59. Emplacement of the blast deflector (1 through 72)—Continued.

Caution: The length of the wire rope hoist (5) is critical. The working length is from the swaged ball (5C) to the red area (5E). The swaged ball must be $89 \pm 1/4$ inches from the inside of the hook (5F). The red area begins $31-1/2 \pm 1/4$ inches from the swaged ball.

- (3) Position one end of the wire rope hoist between the lugs (6) and secure with the shoulder pin (7). Attach the other end to the eyebolt (8).
- (4) Shorten the wire rope hoist as outlined in steps (a) and (b) below.

- (a) Turn the control disc (5A) as shown in figure 5-58.
- (b) Operate the handle (5B) until the swaged ball contacts the cable stop and guide (5D).
- (5) Turn the inner wing nuts (fig. 5-59) counterclockwise.
- (6) Turn the outer wing nut clockwise to release the blast deflector from the housing.
- (7) Rotate the wing nuts upward and secure by turning the outer wing nut counterclockwise and the inner wing nuts clockwise.



- 1—Launcher erecting beam
- 2—Wire rope assy
- 3—Wire rope hoist

- 4—Safety arm
- 5—Arm
- 6—Blast deflector

ORD G55795

Figure 5-60. Emplacement of the blast deflector (1 through 72)—Continued.

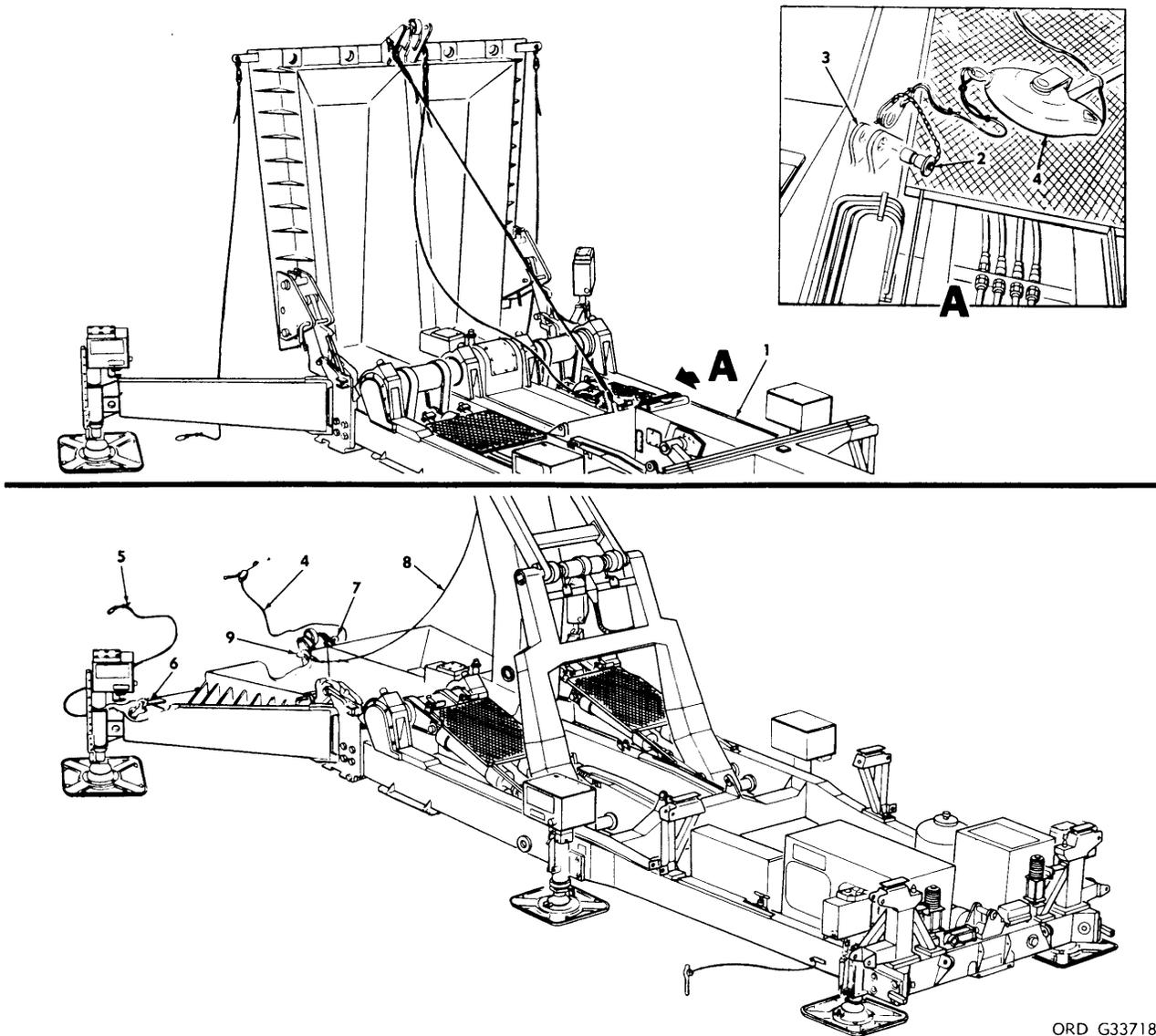
Caution: Insure that the EQUILIBRATOR SYSTEM BY-PASS valve is open.

- (8) Depress the indexing pins to activate the interlock switches.

Caution: All wire rope assemblies (1 and 3, fig. 5-58) and the wire rope hoist (5) must be positioned to clear

the equipment while raising or lowering the blast deflector (6, fig. 5-60).

Caution: Pin assemblies (9, fig. 5-58) must be securely engaged before raising the blast deflector (10). A disengaged pin assembly will allow the blast deflector to collapse into an unmanageable position.

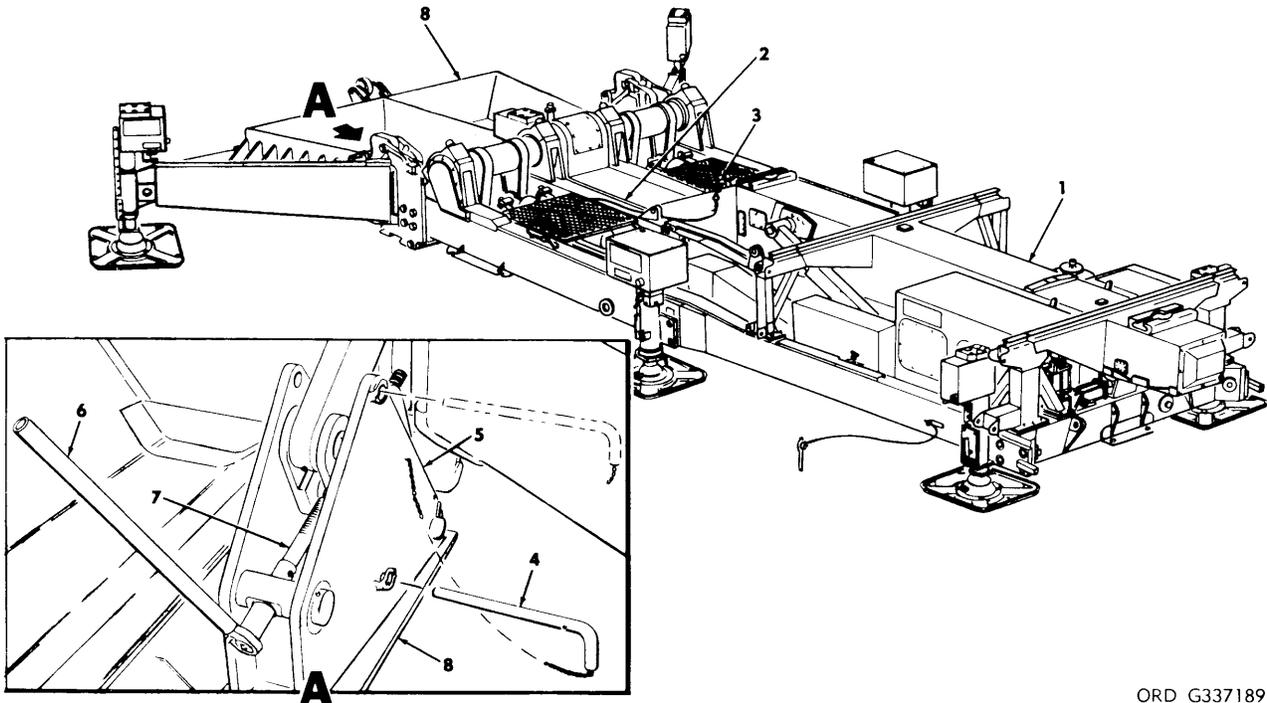


- 1—Launcher erecting beam
- 2—Shoulder pin
- 3—Lug (2)
- 4—Wire rope hoist
- 5—Wire rope assy 9021478 (2)

- 6—Plate (2)
- 7—Eyebolt
- 8—Wire rope assy 9021836
- 9—Eyebolt

ORD G337188

Figure 5-61. Emplacement of the blast deflector (1 through 72)—Continued.



- | | |
|--------------------------|----------------------|
| 1—Launcher erecting beam | 5—Mount (2) |
| 2—Wire rope assy | 6—Ratchet wrench (2) |
| 3—Eyebolt | 7—Rod (2) |
| 4—Pin assy (2) | 8—Blast deflector |

ORD G337189

Figure 5-62. Emplacement of the blast deflector (1 through 72)—Continued.

- (9) Elevate the launcher erecting beam (1, fig. 5-60) to the up and locked position.
- (10) Turn the control disc (5A, fig. 5-58) until the flat portion is exposed.

Warning: To prevent death or injury to personnel, clear all personnel from the blast deflector line of fall.

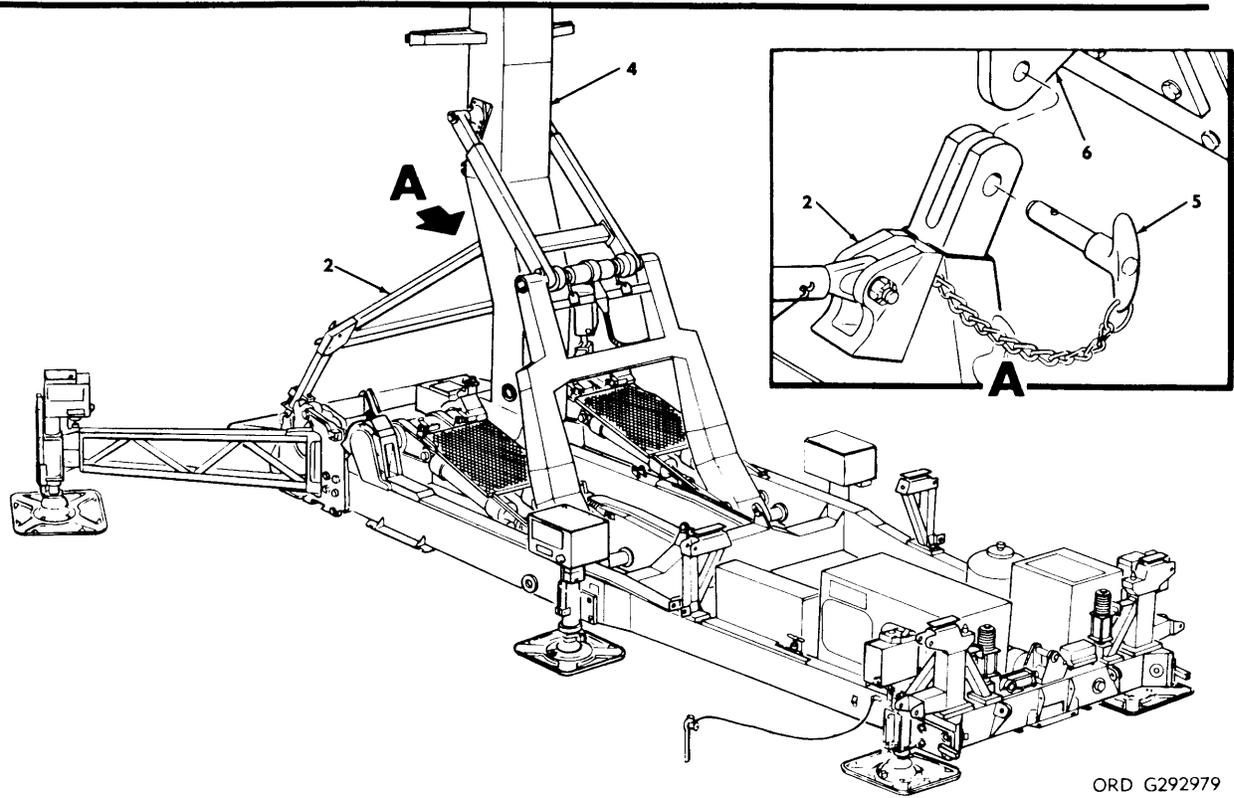
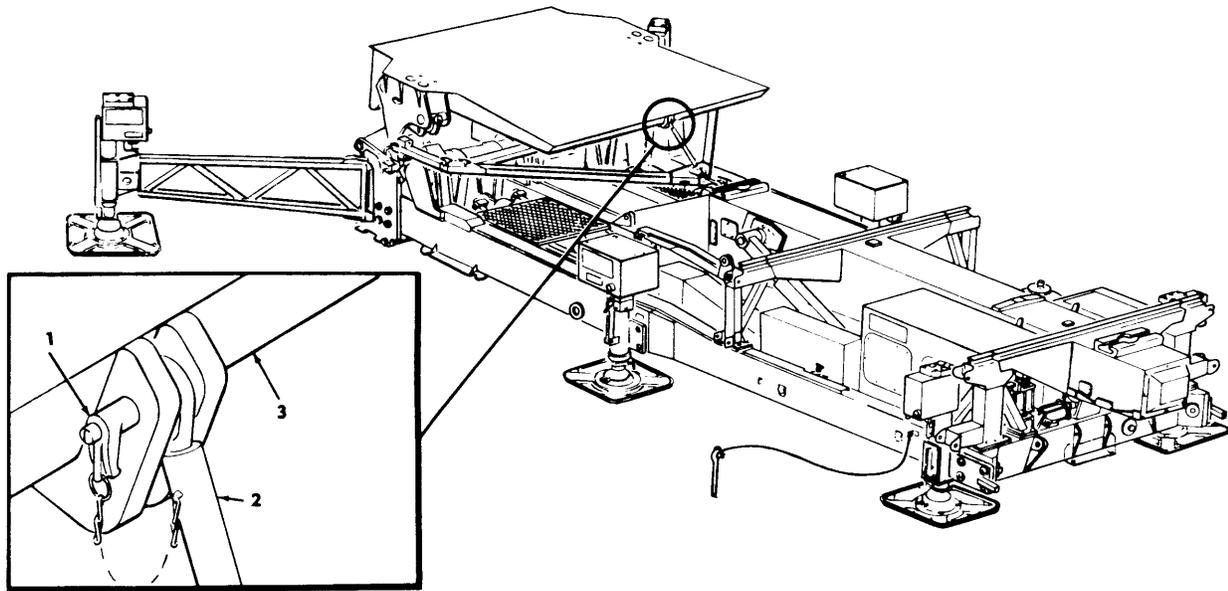
Caution: It is critical that the safety arms (4, fig. 5-60) be engaged during step (11) below.

Caution: To prevent damage to equipment, do not allow the red area (5E, fig. 5-58) to extend past the cable guide and stop (5D).

- (11) Pull on the wire rope assemblies (2, fig. 5-60) and operate the handle (5B, fig. 5-58) until wire rope hoist (3, fig. 5-60) is lengthened sufficiently to engage the safety arm (4) against the arm (5) locking the blast deflector (6) over the center position.

Caution: Do not lower the launcher erecting beam until step (11) above has been completed.

- (12) Lower the launcher erecting beam (1, fig. 5-61) to the down and locked position.
- (13) Remove the shoulder pin (2) from the lugs (3) and remove the wire rope hoist (4).
- (14) Raise the launcher erecting beam to the up and locked position.
- (15) Remove the wire rope assemblies (5) from the plates (6).
- (16) Remove the wire rope hoist from the eyebolt (7).
- (17) Remove the wire rope assembly (8) from the eyebolt (9).
- (18) Lower the launcher erecting beam (1, fig. 5-62) to the down and locked position.
- (19) Release the indexing pins (5, fig. 5-59).



ORD G292979

- 1—Quick-release pin (p/o positioner)
- 2—Positioner
- 3—Blast deflector

- 4—Launcher erecting beam
- 5—Quick-release pin (p/o positioner)
- 6—Plate

Figure 5-63. Emplacement of the blast deflector (73 and subsequent).

- (20) Remove the wire rope assembly (2, fig. 5-62) from eyebolt (3).
- (21) Remove the pin assembly (4) from the upper position and insert in the lower position in the mount (5).

Caution: To prevent bending of the rods (7) operate both ratchet wrenches (6) simultaneously.

- (22) Operate the wrenches counterclockwise and extend the rods until the blast deflector (8) rests on the ground.

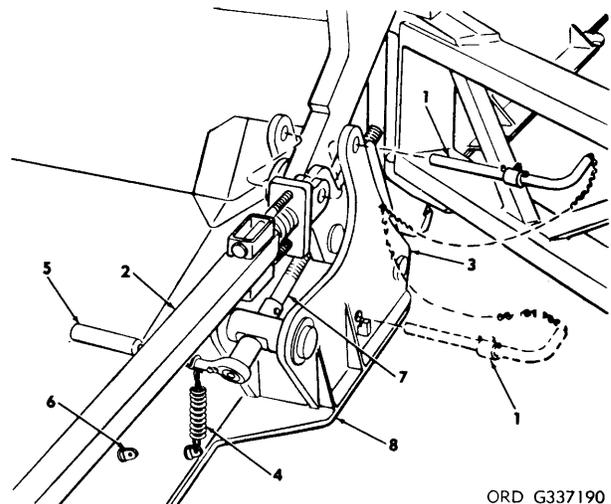
j. Emplacement of the Blast Deflector (73 and Subsequent). Emplace the blast deflector (3, fig. 5-63) as outlined in steps (1) through (9) below.

- (1) Remove the quick-release pin (1) to disengage the positioner (2) from the blast deflector (3).

Caution: The pin assemblies (1, fig. 5-64), as shown in the upper position, must be securely engaged before raising the blast deflector. A disengaged pin assembly will allow the blast deflector to collapse into an unmanageable position.

Caution: Insure that the EQUILIBRATOR SYSTEM BY-PASS valve is open.

- (2) Raise the launcher erecting beam (4, fig. 5-63) to the up and locked position.
- (3) Remove the quick-release pin (5) and remove the positioner from the plate (6).
- (4) Rotate the positioner (2, fig. 5-64) down to the horizontal position.
- (5) Lower the launcher erecting beam to the down and locked position.
- (6) Remove the pin assemblies (1) from the upper position and insert in the lower position in the plates (3). Remove the positioner.
- (7) Remove the handle retainers (4) from the ratchet wrenches (5) and hook the retainers into the upper eyebolts (6).
- (8) Operate the wrenches counterclockwise and extend the rods (7) until



ORD G337190

- 1—Pin assy (2)
- 2—Positioner
- 3—Plate (2)
- 4—Handle retainer (2)
- 5—Ratchet wrench (2)
- 6—Upper eyebolt (2)
- 7—Rod (2)
- 8—Blast deflector

Figure 5-64. Emplacement of the blast deflector (73 and subsequent)—Continued.

the blast deflector (8) rests on the ground.

- (9) Remove the retainers from the eyebolts and replace them on the wrenches.

k. Emplacement of the Storage Racks.

- (1) Remove the pin assemblies (4, fig. 5-50) from the stake stowage box (3).
- (2) Emplace the storage racks as outlined in paragraph 5-24.

l. Installation of the Stakes.

- (1) Remove the stakes (6, fig. 5-50) from the stake stowage box (3).
- (2) Install the stakes in the mounting plates as outlined in paragraph 5-27.

m. Stowage of the Handles and Clamps. Stow the handles (1 and 2, fig. 5-50) and the clamps (5) in the stowage box (3).

n. Installation of the Electrical Test Station. Install the electrical test station as outlined in paragraph 5-27.

o. Installation of the Winterization Kits. Install the winterization kits as outlined in paragraph 5-29.

CHAPTER 6

ALINEMENT OF THE LAUNCHING SET

6-1. General

The launching set must be electrically and mechanically alined after emplacement to insure proper functioning when placed in operation. This chapter contains the launcher orientation correction angle (A_L angle) checks and adjustments, the launcher erecting beam checks and adjustments, and references to other procedures necessary for alinement of the launching set.

6-2. Preliminary Procedures

a. Prior to the application of power, check that all controls and indicators are in the shut-down condition as outlined in TM 9-1440-250-10/1.

b. Check that the intake and exhaust doors (7 and 10, fig. 4-31) on the section simulator group (SSG) are open.

c. Check that the AIR EXHAUST-FILTER HEATER FUEL INTAKE, REFRIGERATION and EXHAUST, and personnel AIR-INTAKE doors on the launching-control station are open.

d. Check that the 400-cps power source cables are connected securely to the SSG and the launching control station (fig. 4-70).

e. Check that the hydraulic system is filled as outlined in TM 9-1440-250-20/1.

6-3. Alinement Procedures

Tables 6-1 and 6-2 contain a sequential listing of the checks and adjustments which must be performed during the alinement of a launching set equipped with HERCULES missiles and AJAX missiles respectively. Procedures outlined in this TM are referenced to the applicable paragraph. Procedures not included in this TM are referenced to the applicable TM.

Table 6-1. Checks and Adjustments of the Launching Set Equipped with HERCULES Missiles

Sequence	Checks and adjustments	Reference
1	Missile and launcher checks	TM 9-1440-250-12/1
2	Launcher erecting beam checks and adjustments	Par. 6-4
3	Power checks of the launching section	TM 9-1440-250-12/1
4	Elevator checks and adjustments	TM 5-1450-201-10, TM 5-1450-201-20
5	Launcher leveling checks and adjustments	TM 9-1440-250-20/1
6	Launcher orientation correction angle (A_L angle) checks and adjustments	Par. 6-5
7	Manual and automatic gyro preset alinement	TM 9-1440-250-20/1
8	Launcher-igniter circuit stray-voltage and continuity checks	TM 9-1440-250-12/1
9	Launcher-control group checks	TM 9-1440-250-12/1
10	Launching-section fire and reject checks	TM 9-1440-250-12/1
11	Fire and launch check from the section control-indicator	TM 9-1440-250-12/1
12	Fire and launch check from the launching-control console to the sections	TM 9-1440-250-12/1
13	Automatic fire and launch checks	TM 9-1440-250-12/1
14	Launcher acquire and command checks	TM 9-1440-250-12/1
15	Flight simulator system check	TM 9-1440-250-12/1

Table 6-2. Checks and Adjustments of the Launching Set Equipped with AJAX Missiles

Sequence	Checks and adjustments	Reference
1	Missile and launcher checks	TM 9-1440-250-12/3
2	Launcher erecting beam checks and adjustments	Par. 6-4
3	Power checks of launching section	TM 9-1440-250-12/3
4	Elevator checks and adjustments	TM 5-1450-201-10, TM 5-1450-201-20
5	Launcher leveling checks and adjustments	TM 9-1440-250-20/1
6	Launcher orientation correction angle (A_L angle) checks and adjustments	Par. 6-5
7	Manual and automatic gyro preset alinement	TM 9-1440-250-20/1
8	Launcher-igniter circuit stray-voltage and continuity check	TM 9-1440-250-12/3
9	Launcher operating control-indicator (LOCI)	TM 9-1440-250-12/3
10	Launching-section fire and launch check	TM 9-1440-250-12/3
11	Fire and launch checks from the launching-control console to the sections	TM 9-1440-250-12/3
12	Automatic fire-command check	TM 9-1440-250-12/3
13	Launcher-acquire and command check	TM 9-1440-250-12/3
14	Flight-simulator system check	TM 9-1440-250-12/3

6-4. Launcher Erecting Beam Checks and Adjustments

The launcher erecting beam angle of elevation determines the area where the rocket motor cluster will fall after it separates from the missile during flight. The erecting beam can be adjusted to 85° , $87\text{-}1/2^\circ$, or 90° from the horizontal plane as described in step *a* below. Adjustment is made by changing the location of the strut bearings (10, fig. 6-1) on the bearing plates (11) as outlined in step *b* below.

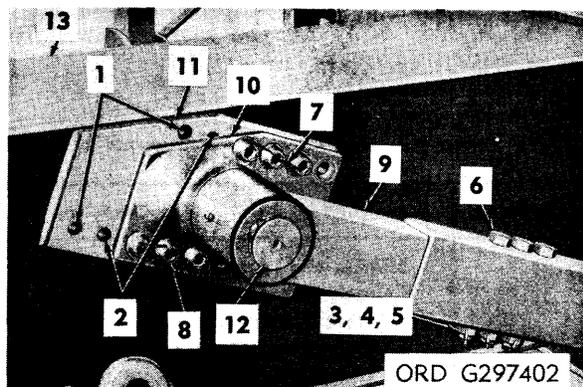
a. The launcher erecting beam angle of elevation is determined by the position of the strut bearings (10, fig. 6-1) on the bearing plates (11) as outlined in steps (1) through (3) below.

- (1) If holes A and B (1 and 2) are visible, the erecting beam angle of elevation is set at 85° .
- (2) If only holes A are visible, the erecting beam angle of elevation is set at $87\text{-}1/2^\circ$.
- (3) If holes A and B are visible, the erecting beam angle of elevation is set at 90° .

b. Perform the procedures outlined in steps (1) through (14) below to change the erecting beam angle of elevation.

- (1) With the erecting beam in the down position, open the EQUILIBRATOR SYSTEM BY-PASS valve.

- (2) Place two hydraulic jacks, each capable of lifting 6,000 pounds, under the front end of each launcher strut. Raise the jacks until they are equally snug under the struts.
- (3) Remove the three cotter pins (3, fig. 6-1), hexagon nuts (4), and flat



- 1—Holes A
- 2—Holes B
- 3—9/64 x 2 cotter pin (3)
- 4—3/4-16 hex. nut (3)
- 5—3/4-in-id fl washer (3)
- 6—3/4-16 x 5-5/8 hex-hd bolt (3)
- 7—Lock wire
- 8—3/4-16 x 2-1/8 int wrenching bolt (6)
- 9—Strut arm
- 10—Strut bearing
- 11—Bearing plate
- 12—Strut arm shaft
- 13—Launcher erecting beam

Figure 6-1. Adjustment of the launcher erecting beam angle of elevation—typical.

washers (5) from the hexagon-head bolts (6) on the strut arm (9) on one side of the launcher.

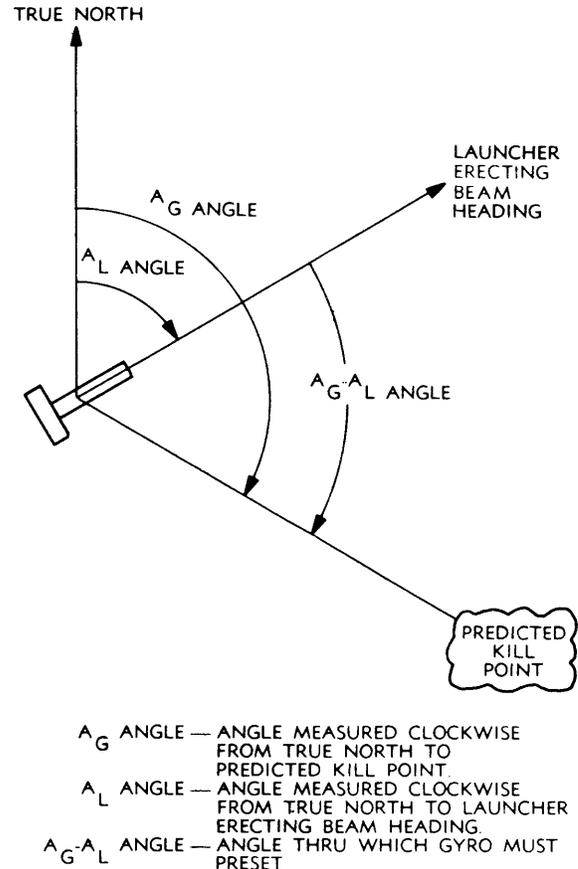
- (4) Using the jacks to relieve the pressure on the bolts, remove the three bolts from the strut arm.
- (5) Remove the lock wire (7) and the six internal wrenching bolts (8) and free the strut bearing (10) from the bearing plate (11).
- (6) Repeat steps (3) through (5) above for the strut arm on the opposite side of the launcher.

Caution: Both of the strut bearings must be free to move at the same time, since the strut arm shaft (12) passes through both bearings and the slotted hole in the erecting beam. Use a rubber mallet to perform the operation in step (7) below to avoid damaging the bearings.

- (7) On one side of the launcher move the strut bearing and the strut arm shaft to the new position, aligning the holes in the bearing with the holes in the bearing plate.
- (8) Install the six internal wrenching bolts and secure the bearing to the bearing plate.
- (9) Use the jacks, if necessary, to align the holes on the strut arm, and install the three hexagon-head bolts.
- (10) Secure the bolts with the three flat washers, hexagon nuts, and cotter pins.
- (11) Repeat steps (7) through (10) above for the strut bearing and the strut arm on the opposite side of the launcher.
- (12) Secure the internal wrenching bolts with the lock wire.
- (13) Lower the jacks and remove them from the launcher struts.
- (14) Close the EQUILIBRATOR SYSTEM BY-PASS valve.

6-5. Launcher Orientation Correction Angle (A_L Angle) Checks and Adjustments

The launchers are oriented (fig. 6-2) with their erecting beams directed toward the primary target line. This area can be located at any azimuth heading. Before gyro azimuth



ORD G297403

Figure 6-2. Calculation of the launcher orientation correction angle (A_L angle).

information is sent to a missile, the roll amount gyro is caged and the roll amount gyro motor is spinning in the same plane as the erecting beam heading. To position the roll amount gyro in the plane of the predicted kill point, the computer calculates an A_G angle. The A_G angle is measured clockwise from true north to the plane of the predicted kill point. The launcher erecting beam heading is not taken into consideration; therefore, the azimuth heading of the roll amount gyro, caused by the erecting beam heading (A_L angle), must be subtracted from the A_G angle. The A_L angle is defined as the angle measured clockwise from true north to the erecting beam heading. The value of the A_L angle is set manually on its corresponding launcher orient resolver at the section control-indicator (SCI) to compensate automatically for the erecting beam heading. This enables the roll amount gyro to preset

through the A_G - A_L angle to the plane of the predicted kill point.

Note. The launcher orientation checks must be performed with the erecting beam down and the launching-handling rail removed from the launcher.

a. Calculation of the A_L Angle with a Direct Line of Sight (A, fig. 6-3) between the Missile Tracking Antenna and the Launcher.

- (1) Mount aiming circle M2 (fig. 6-4) into the aiming circle mount at the rear of the erecting beam.

Note. For detailed operating instructions of the aiming circle, refer to TM 9-6166.

- (2) Request the azimuth of the missile tracking antenna with its telescope sighted directly on the aiming circle

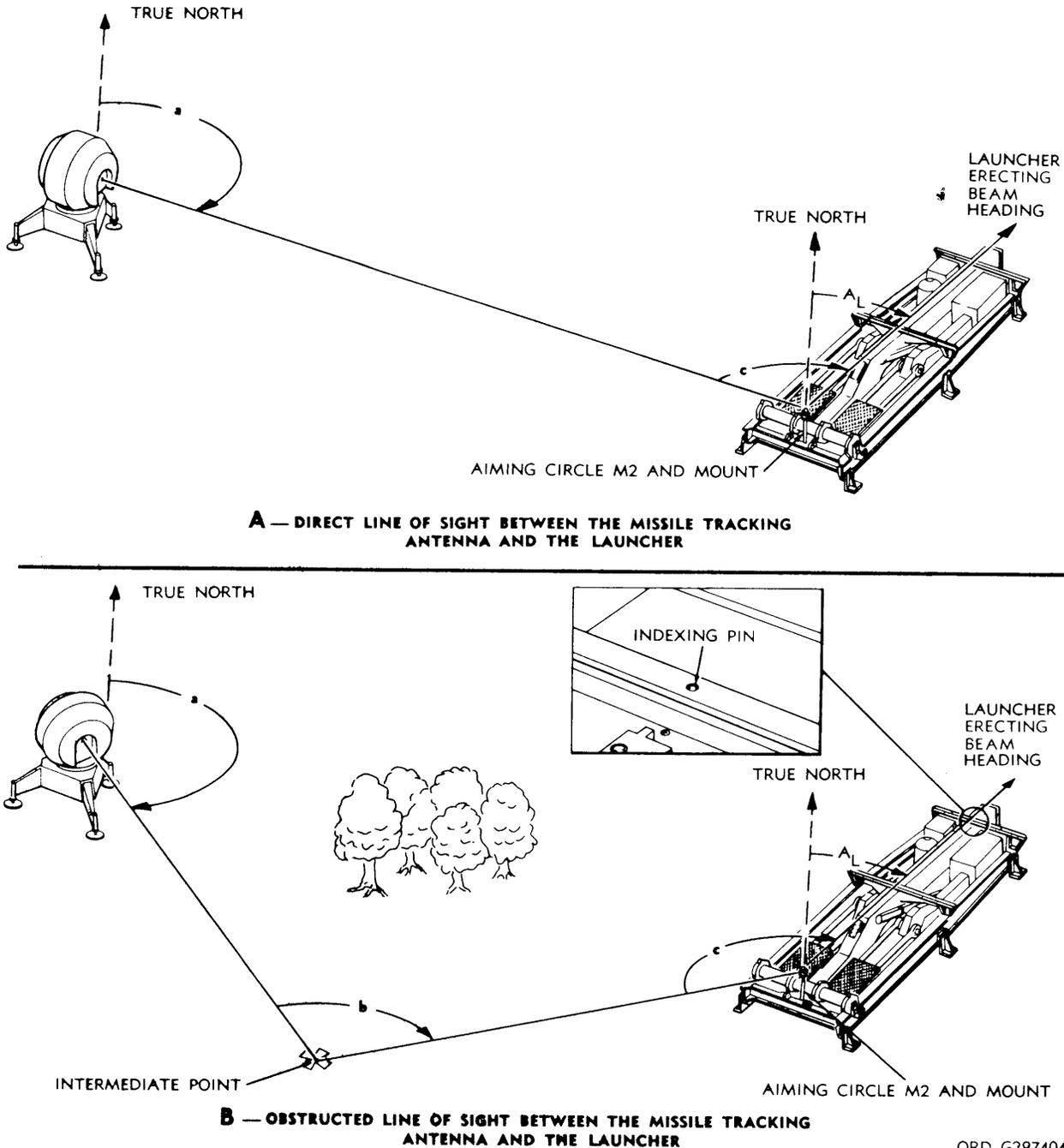


Figure 6-3. Calculation of the A_L angle using a direct line of sight and an obstructed line of sight.

ORD G297404

telescope at the rear of the launcher (angle a of A, fig. 6-3). If this value is greater than 3,200 mils, subtract 3,200 mils. If this value is less than 3,200 mils, add 3,200 mils. Record the result.

- (3) Sight the aiming circle telescope directly at the telescope on the missile tracking antenna. Set the value recorded in step (2) above on the azimuth scale of the aiming circle.
- (4) Rotate the aiming circle until the telescope hairlines are directly centered on the indexing pins of the erecting beam (angle b of A, fig. 6-3).
- (5) Record the value on the azimuth scale of the aiming circle. This value is the A_L angle in mils, and must be set manually on the appropriate launcher orient resolver in the SCI.
- (6) Repeat steps (1) through (5) above for each launcher in each section.

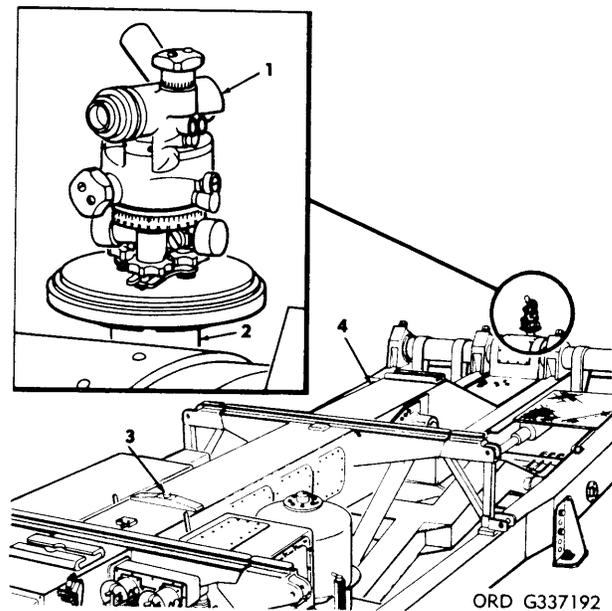
b. *Calculation of the A_L Angle with an Obstructed Line of Sight (B, fig. 6-3) between the Missile Tracking Antenna and the Launcher.*

Note. Two aiming circles M2 are needed to perform the following calculation.

- (1) Mount one aiming circle (fig. 6-4) into the aiming circle mount at the rear of the erecting beam.

Note. For detailed operating instructions of the aiming circle refer to TM 9-6166.

- (2) Select an intermediate point (B, fig. 6-3) that is within a direct line of sight of the launcher and the missile tracking antenna. Mount the second aiming circle on a tripod at the designated intermediate point.
- (3) Request the azimuth of the missile tracking antenna with its telescope sighted directly on the aiming circle telescope at the intermediate point (angle a of B, fig. 6-3). If this value is greater than 3,200 mils, subtract 3,200 mils. If this value is less than 3,200 mils, add 3,200 mils. Record the results.
- (4) Sight the intermediate point aiming circle telescope directly at the tele-



1—Aiming circle M2
2—Aiming circle mount
3—Indexing pin (2)
4—Launcher erecting beam

Figure 6-4. Installation of aiming circle M2.

scope on the missile tracking antenna. Set the value recorded in step (3) above on the azimuth scale of the aiming circle.

- (5) Rotate the aiming circle telescope at the intermediate point until the hairlines are directly centered on the aiming circle telescope at the rear of the erecting beam (angle b of B, fig. 6-3).
- (6) Observe the reading on the azimuth scale of the aiming circle at the intermediate point. If this reading is greater than 3,200 mils, subtract 3,200 mils. If this reading is less than 3,200 mils, add 3,200 mils to find the back azimuth. Record the result.
- (7) Sight the aiming circle telescope on the launcher directly on the aiming circle at the intermediate point. Set the result recorded in step (6) above on the azimuth scale of the aiming circle on the launcher.
- (8) Rotate the aiming circle telescope on the launcher until the hairlines are

directly centered on the indexing pin on the erecting beam (angle c of B, fig. 6-3).

- (9) Record the value on the azimuth scale of the aiming circle. This value is the

A_L angle in mils, and must be set manually on the appropriate launcher orient resolver in the SCI.

- (10) Repeat steps (1) through (9) above for each launcher in each section.