KS-21972 CONICAL ANTENNA AND WAVEGUIDE SYSTEM
ANTENNA ASSEMBLY AND INSTALLATION
MICROWAVE ANTENNAS

CONTENTS PAGE

1. GENERAL

1.01 This section contains information for the assembly and installation of the KS-21972 conical antenna used in the 4-, 6-, and 11-GHz Radio Relay Systems.

1.02 This section is reissued to add a test for antenna leakage; expand assembly procedures for the List 3 support ring and the List 6 support beams; revise Fig. 8 through 11, 13, and 14; and include Part 3—Method of Installation and Fig. 15 through 18. Since this reissue is a general revision, change arrows have not been used.

1.03 The following lists for the KS-21972 conical antenna are covered in this section:

List 1 Conical Antenna
List 2 Feedhorn
List 3 Support Ring
List 4 Azimuth Tool
List 5 Elevation Tool
List 6 Support Beams
List 7 Lightning Rod
List 8 Access Ladder
List 9 Safety Rail
List 11 Hanger Rod Support Bracket

1.04 The KS-21972 conical antenna may be ordered either as individual lists with all lists shipped separately or as Lists 1, 3, 7, and 9, when specified, for one assembled unit. The lightning rod (4-foot, 0-inch pipe), part of List 7, will be shipped separately.

1.05 The KS-21972 conical antenna may also be ordered by packaged lists, which include a combination of lists as follows:

List 50 provides Lists 1, 2, 3, 9, and 11
List 51 provides Lists 1, 2, 3, 6, 9, and 11
List 52 provides Lists 1, 2, 3, 6, 7, 9, and 11
List 53 provides Lists 1, 2, 3, 4, 5, 6, 7, 8, 9, and 11.

1.06 These packaged lists will be shipped with Lists 1, 3, 7, and 9, when called for, as one assembled unit. All other lists and the lightning rod (4-foot, 0-inch pipe; part of List 7) will be shipped separately for assembly in the field.

1.07 An assembled antenna with all lists is shown in Fig. 1 and 2.

1.08 When an antenna is mounted 30 feet or more below the top of the tower deck level or on a lower deck with another deck above it, a List 7 lightning rod will not be required. The tower steel above the antenna will provide lightning protection.

1.09 When an antenna is installed on a KS-22370 side-leg mount, the List 6 support beams are not used and the List 3 support ring is mounted directly on the side-leg mount antenna deck. This lowers the bottom of the feedhorn 13-3/8 inches.

1.10 Hardware sizes and material specifications are closely controlled. It is important that no hardware other than that provided be used.

1.11 Extreme care should be taken at all times in the handling and installation of all parts. Each piece should be examined closely for dents or other deformations. Any piece that has been damaged, regardless of how minor, should be reported to the project engineer or his representative for a decision regarding its replacement or installation.

1.12 Assembly and installation of the waveguide system shall be in accordance with information contained in Sections 804-331-158 and 402-421-203, as applicable.

2. METHOD OF ASSEMBLY

A. List of Tools and Materials

2.01 A list of tools and materials needed to assemble the antenna follows.

QUANTITY	ITEM
As reqd	Alignment pins
As reqd	Ratchet and sockets
As reqd	Wrenches

B. Positioning of the Antenna for Assembly

2.02 The assembly of the List 2 feedhorn, List 3 support ring, List 7 lightning rod, List 9 safety rail, and List 11 hanger rod support brackets to the List 1 conical antenna may be accomplished in one of the following positions:

(a) With the antenna lying down on a clean, dry, and level work surface on the ground. Do not place the antenna face down on its radome. Provide adequate support so that the antenna will not be damaged or turn while being worked on.

(b) With the antenna hoisted to a vertical position near the ground. Secure tag lines to the antenna to keep it from swaying or moving while being worked on.

2.03 The assembly of the List 4 azimuth tool, List 5 elevation tool, and List 8 access ladder to the List 1 conical antenna shall be accomplished with the antenna placed in position on the antenna deck.

2.04 The assembly of the List 3 support ring to the List 1 conical antenna may be accomplished in one of the following situations:

(a) With the antenna positioned in accordance with paragraph 2.02(a)

(b) With the antenna positioned in accordance with paragraph 2.02(b)

(c) With the support ring mounted on the antenna deck in accordance with I or J in Part 2 of this section.

C. Assembly of Lists 1 and 2 (See Fig. 3)

2.05 Carefully position the antenna in accordance with paragraph 2.02.

2.06 Observe the following precautions when removing the shipping covers from the 25-inch round flanges of the antenna and feedhorn.

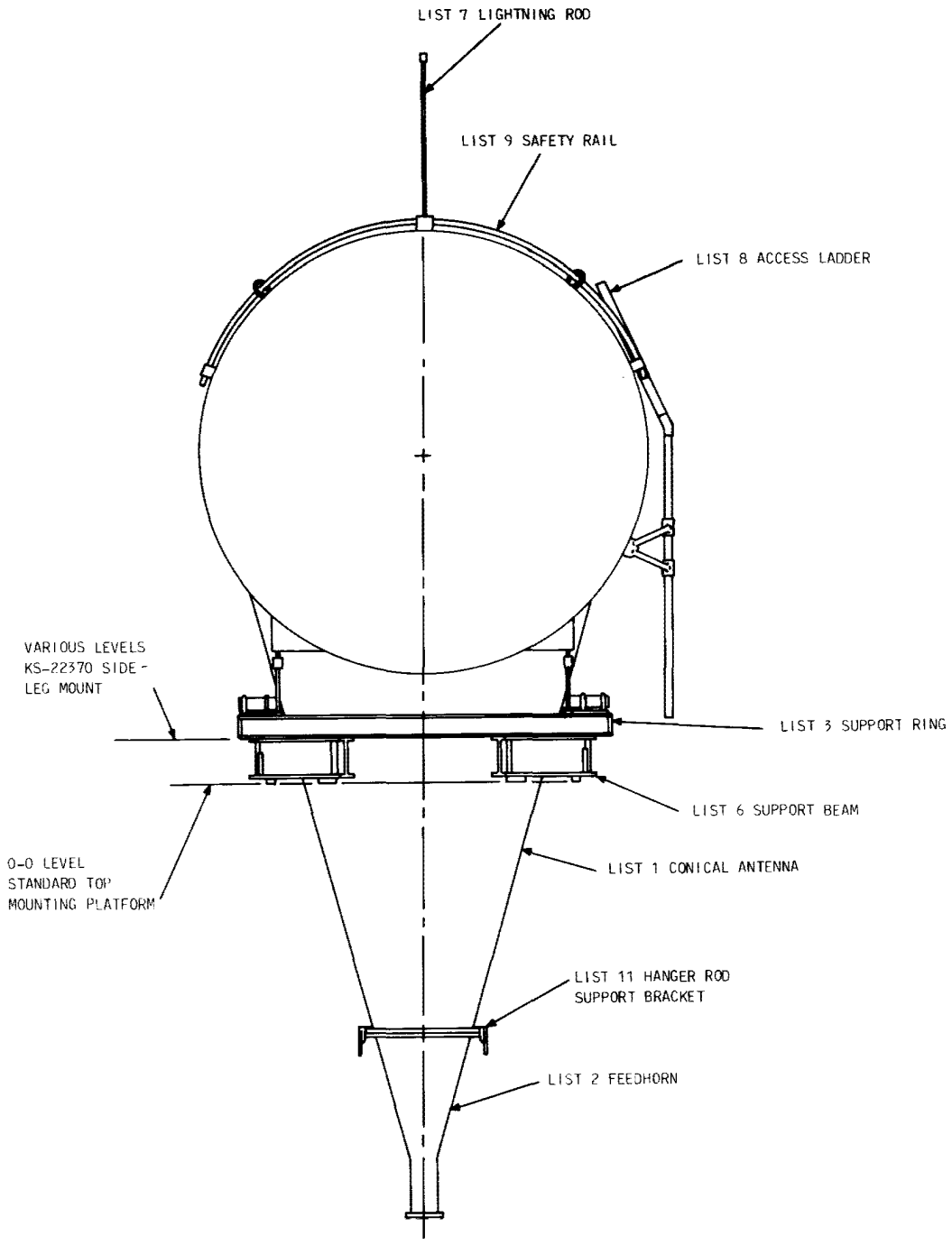


Fig. 1—KS-21972 Conical Antenna (Front View)

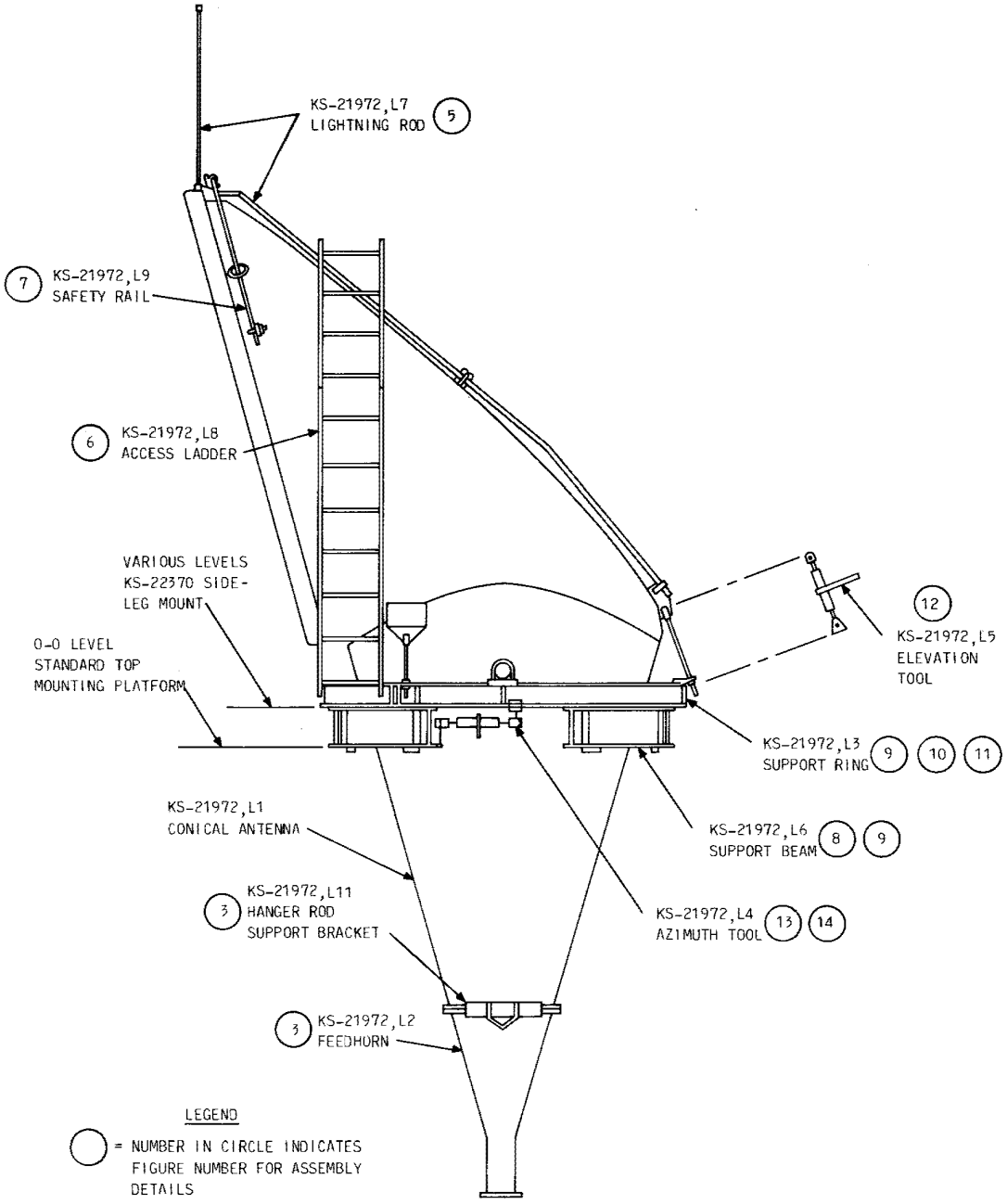


Fig. 2—KS-21972 Conical Antenna (Side View)

Caution 1: To avoid transmission impairments, be careful not to dent, mar, or otherwise damage these flanges.

Caution 2: Before installing the feedhorn, inspect the interior of the antenna and remove any dirt, debris, foreign matter, or moisture.

Note: Do not remove the feedhorn shipping cover from the WC281 flange at this time.

2.07 Clean the mating surfaces of both flanges so they are free of any evidence of moisture, dirt, or other foreign material.

2.08 Place "R" tape, provided in List 2, in a continuous sealing circle between the bolt holes and the ridge on the feedhorn flange. See Fig. 3, view A.

2.09 Place the feedhorn in position, and use alignment pins or bolts to line up the bolt holes of the antenna and feedhorn flanges. Align a pair of bolt holes in the antenna/feedhorn flange joint and the WC281 flange with the front and rear of the antenna.

2.10 Use the 1/2-20 × 2-inch long bolts, washers, and nuts provided in List 2.

2.11 Install the hardware using a washer under the head of each screw and nut. Tighten all nuts around this flange joint evenly, so as not to distort the flange interface.

2.12 Test the antenna for leakage as follows:

(a) Remove the protecting cover from the feedhorn, and bolt the test plate (to be furnished by the contractor) to the feedhorn with a standard "O" ring gasket as shown in Fig. 4.

(b) Attach a pressure gauge, calibrated in inches of water, to the test plate.

Caution: When using a vibrator-type compressor, the following requirements must be met:

(1) ***Compressor free of foreign material from last usage***

(2) ***Use of a compressor regulator during leakage tests***

(3) ***Full purge of system after use of compressed air.***

(c) Feed dry air or dry nitrogen into the antenna through regulators and a test plate. If nitrogen is used, it shall be supplied by a nitrogen cylinder. Dry air shall be provided by a vibrator-type compressor or an approved equivalent. When the pressure in the antenna has stabilized at 5.5 inches of water, stop feeding nitrogen gas or air to the antenna by stopping the supply of gas or air and removing the hose from the test plate valve.

(d) Observe the decrease in antenna pressure, as read on the pressure gauge, for 4 minutes. A loss in pressure of less than 0.6 inch of water during this period is considered satisfactory.

(e) Antennas leaking at a rate exceeding 0.6 inch of water in 4 minutes at initial pressure of 5.5 inches of water shall be examined with a soap solution to determine the points of leakage. Retighten the bolts in these areas and retest.

(f) If the leakage is not reduced to a satisfactory rate, report the discrepancy to the project engineer or his representative for resolution.

(g) Remove the pressure testing connections and the test plate. Replace the original protecting cover on the end of the feedhorn.

D. Assembly of Lists 1, 2, and 11 (See Fig. 3)

2.13 Perform paragraphs 2.05 through 2.09.

2.14 Place the List 11 hanger rod support bracket on the antenna side of the flange joint as given in paragraph 2.09, and align the bolt holes. Place the loop facing down toward the feedhorn and aligned with the trunnions of the antenna.

2.15 Use the 1/2-20 × 2-1/4 inch long bolts (provided in List 11) and the washers and nuts (provided in List 2) at the bracket-flange bolt-hole locations. Use the 1/2-20 × 2-inch long bolts, washers, and nuts provided in List 2 at the other bolt-hole locations.

2.16 Perform paragraphs 2.11 and 2.12.

E. Assembly of List 7 to List 1 (See Fig. 5)

2.17 Carefully position the antenna as given in paragraph 2.02. Provide access to the rear of the antenna.

2.18 Place the long grounding rod (pipe), provided in List 7, so that the flat end is at the top backside of the antenna.

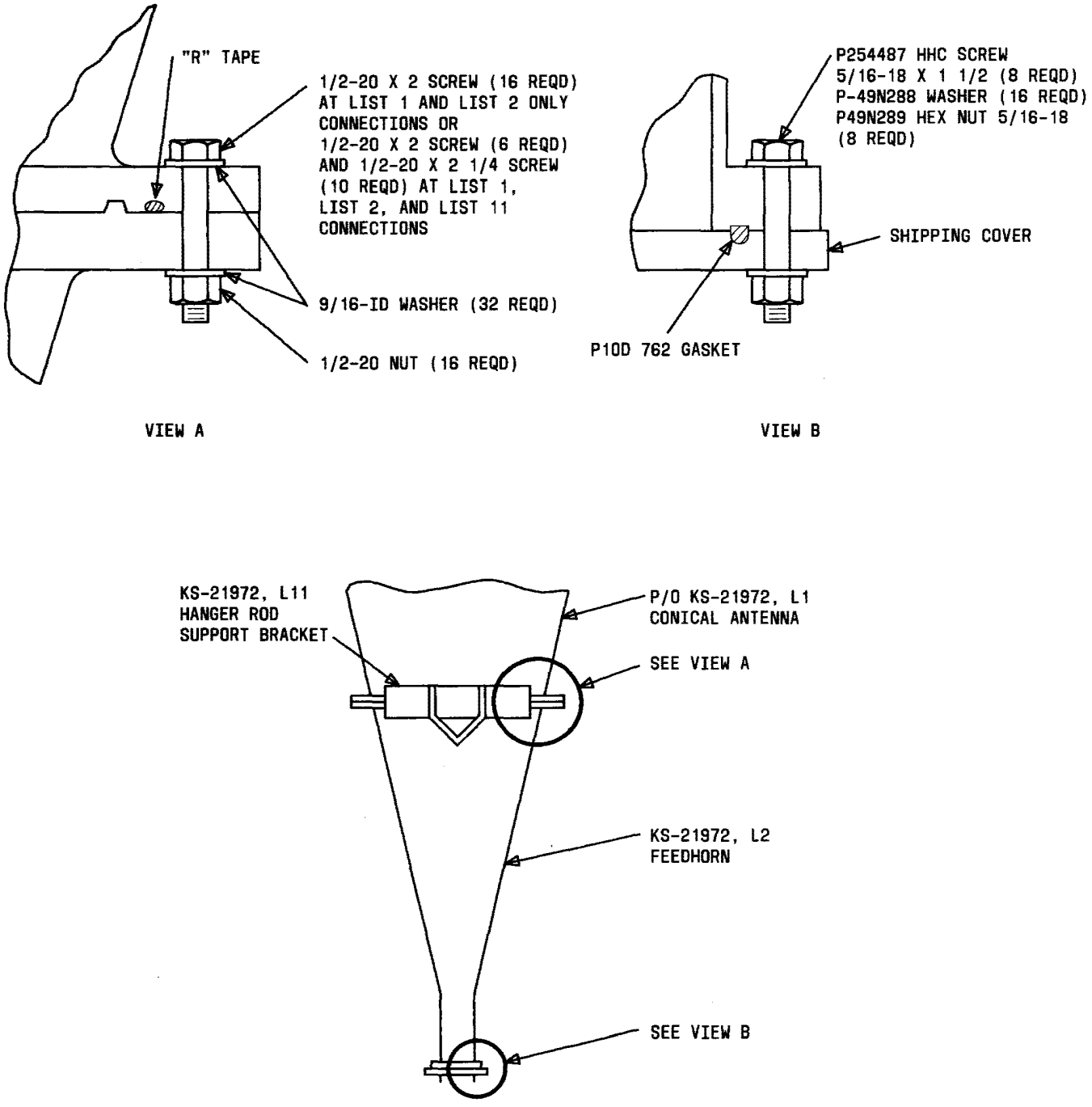


Fig. 3—Assembly of the KS-21972, L1 Conical Antenna, L2 Feedhorn, and L11 Hanger Rod Support Brackets

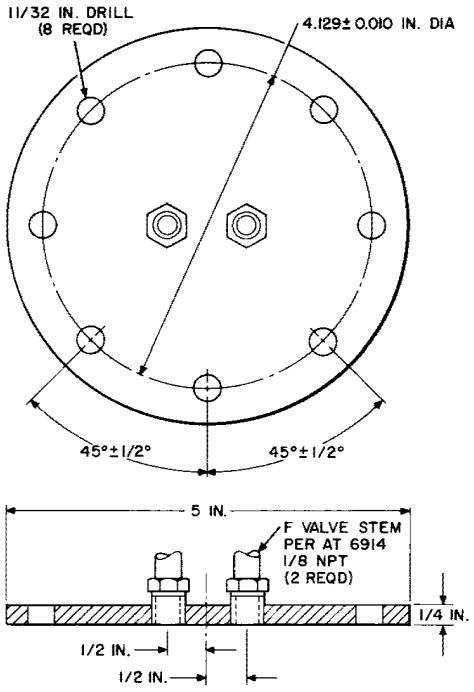


Fig. 4—Test Plate

(a) Use a 5/8-11 × 2-inch long bolt, washer, hex nut and PALNUT* (provided in List 7) and secure the top end of the grounding rod to the bottom hole (11/16 inch) in the bracket at the top backside of the antenna.

(b) Use a 5/8-11 × 2-3/4 inch long bolt, washer, hex nut, PALNUT, and U clamp (provided in List 7) and secure the bottom end of the grounding rod to the top hole (11/16 inch) of the rear elevation rod tie-down bracket.

(c) Use the 1/2-13 U bolt, washers, and hex nuts provided in List 7 to secure the middle of the ground rod to the standoff bracket on the back of the antenna.

(d) After the antenna is mounted in place on the tower, secure the lightning rod (4-foot, 0-inch pipe) to the 1/2-inch pipe coupling at the top of the antenna. Secure the 1/2-inch pipe cap to the top of the lightning rod.

(e) Verify that the ground cables (provided in List 1) between the ground rod brackets and the internal ground strips are in place and secure. Connections are to be coated with roofing pitch or some type of waterproof compound.

* Registered trademark of Palnut Division of TRW, Inc.

2.19 The List 7 lightning rod (if ordered with an antenna) will always be shipped from the factory attached to the List 1 conical antenna, except for the 4-foot, 0-inch pipe which should be attached on site.

F. Assembly of List 8 to List 1 (See Fig. 6)

2.20 Place the ladder on the desired side of the antenna, and engage fully the 3/8-inch (round) bars on each leg into the mating holes of the top ladder bracket on the antenna.

2.21 Rotate the bottom of the ladder towards the antenna, and engage both porto clamp pins into the mating holes of the bottom ladder bracket on the antenna.

2.22 This ladder is for use as a tool to gain access to the top of the antenna. It shall not be left attached to the antenna when not in use.

2.23 It is recommended that this ladder not be attached to the antenna until the antenna is mounted in place on the tower.

G. Assembly of List 9 to List 1 (See Fig. 7)

2.24 Carefully position the antenna as given in paragraph 2.02. Provide access to the top and sides of the antenna.

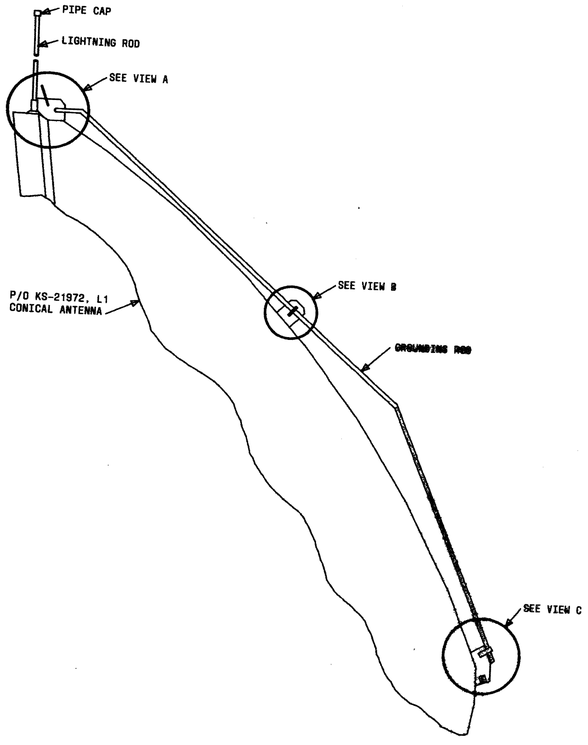
2.25 Place the safety rail (pipe), provided in List 9, across the forward top of the antenna.

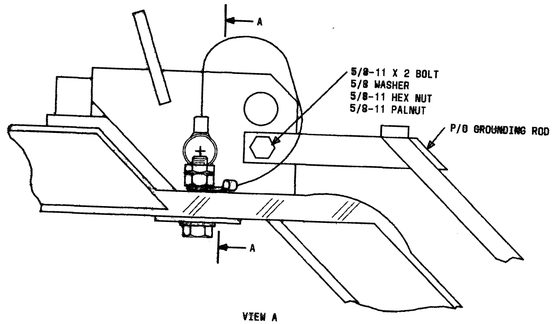
(a) Use two 1/2-13 U bolts, washers, hex nuts, and PALNUTs (provided in List 9) and secure the safety rail loosely to the top center bracket on the antenna.

(b) Add one ring, provided in List 9, to the safety rail on each side of the top center bracket.

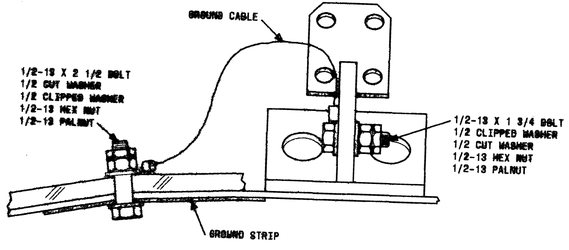
(c) Use one 1/2-13 U bolt, washers, hex nuts, and PALNUTs (provided in List 9) and secure the safety rail loosely to both sides of the antenna at the side brackets of the antenna.

(d) Tighten all hardware.

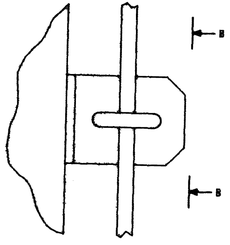




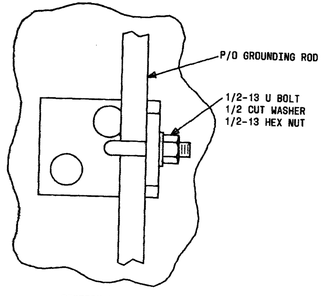
VIEW A



SECTION A-A



VIEW B



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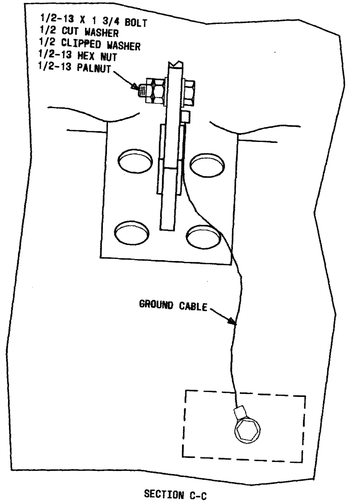
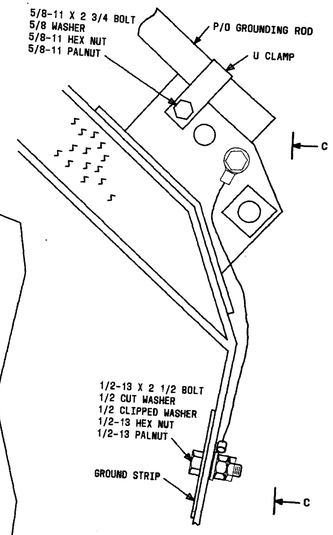


SECTION C-C



VIEW C

Fig. 5—Assembly of the KS-21972, L1 Conical Antenna and L7 Lightning Rod

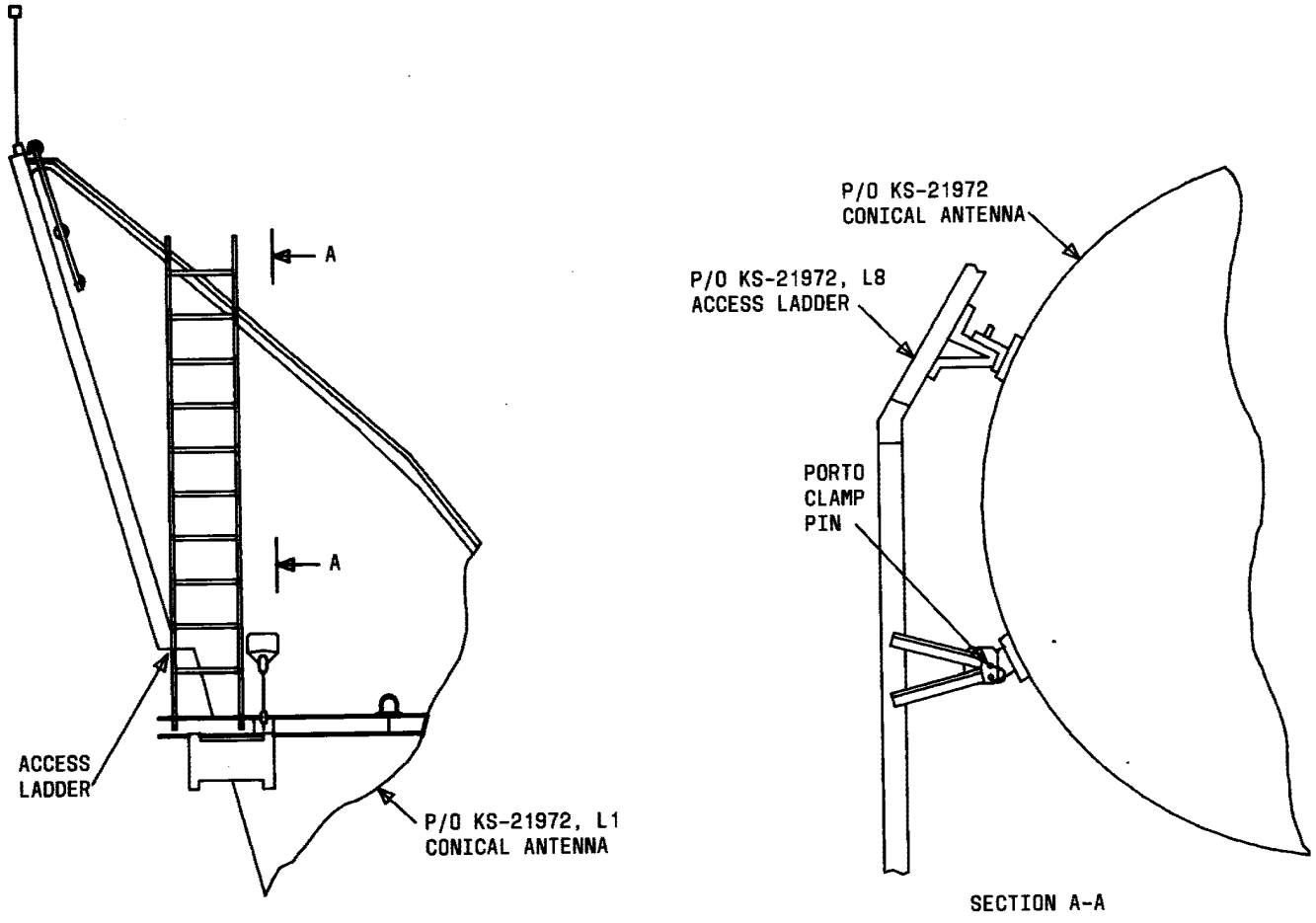


Fig. 6—Assembly of the KS-21972, L1 Conical Antenna and L8 Access Ladder

2.26 The List 9 safety rail (if ordered with an antenna) will always be shipped from the factory attached to the List 1 conical antenna.

H. Assembly of List 6 to Tower (See Fig. 8)

2.27 Hoist the support beams (four required), provided in List 6, to the antenna deck. Check to be sure that each of the four framing members which form the sides of the antenna deck are level and flat within ±1/16 inch of each other. Also check to be sure that the deck opening has the correct dimensions in accordance with Fig. 9. The clip angles will permit adjustment where required.

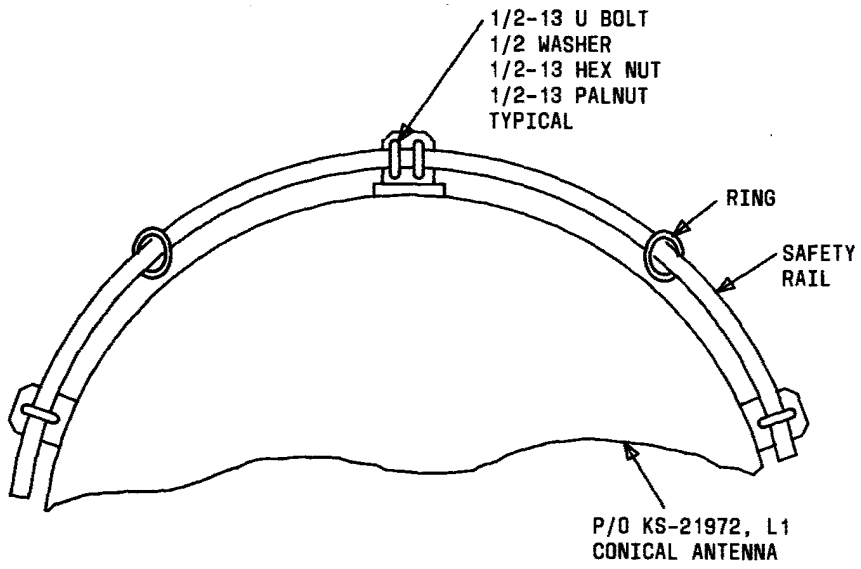
(a) Place one support beam across each corner of the square opening in the antenna deck, and align the bottom two outer holes in each support beam with the two existing holes in the antenna deck. Using the support beam as a template, locate and drill two 13/16-inch holes in the antenna deck opposite the bottom two inner holes in each support beam.

(b) Place two 1-1/8 inch fill plates under each support beam and align the four holes in the support beam, fill plates, and antenna deck.

(c) Use the 3/4-10 × 3-3/4 inch long bolts, beveled washers, washers, hex nuts, and PALNUTs provided in List 6 and secure each of the support beams to the antenna deck.

I. Assembly of List 3 to List 6 (See Fig. 9)

2.28 Hoist the support ring and support beams to the antenna deck. Install the support beams in accordance with paragraph 2.27.



SECTION A-A

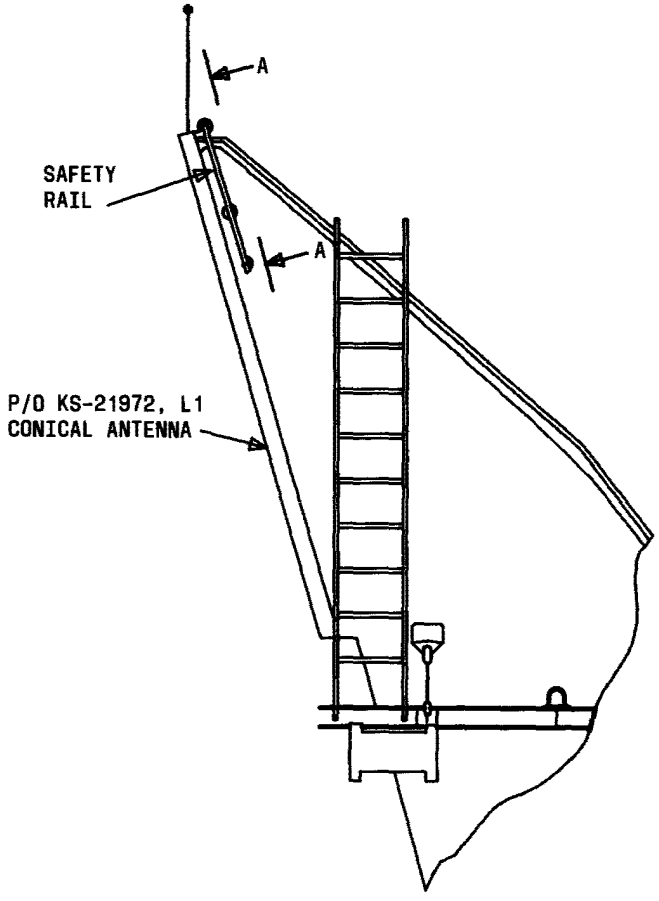


Fig. 7—Assembly of the KS-21972, L1 Conical Antenna and L9 Safety Rail

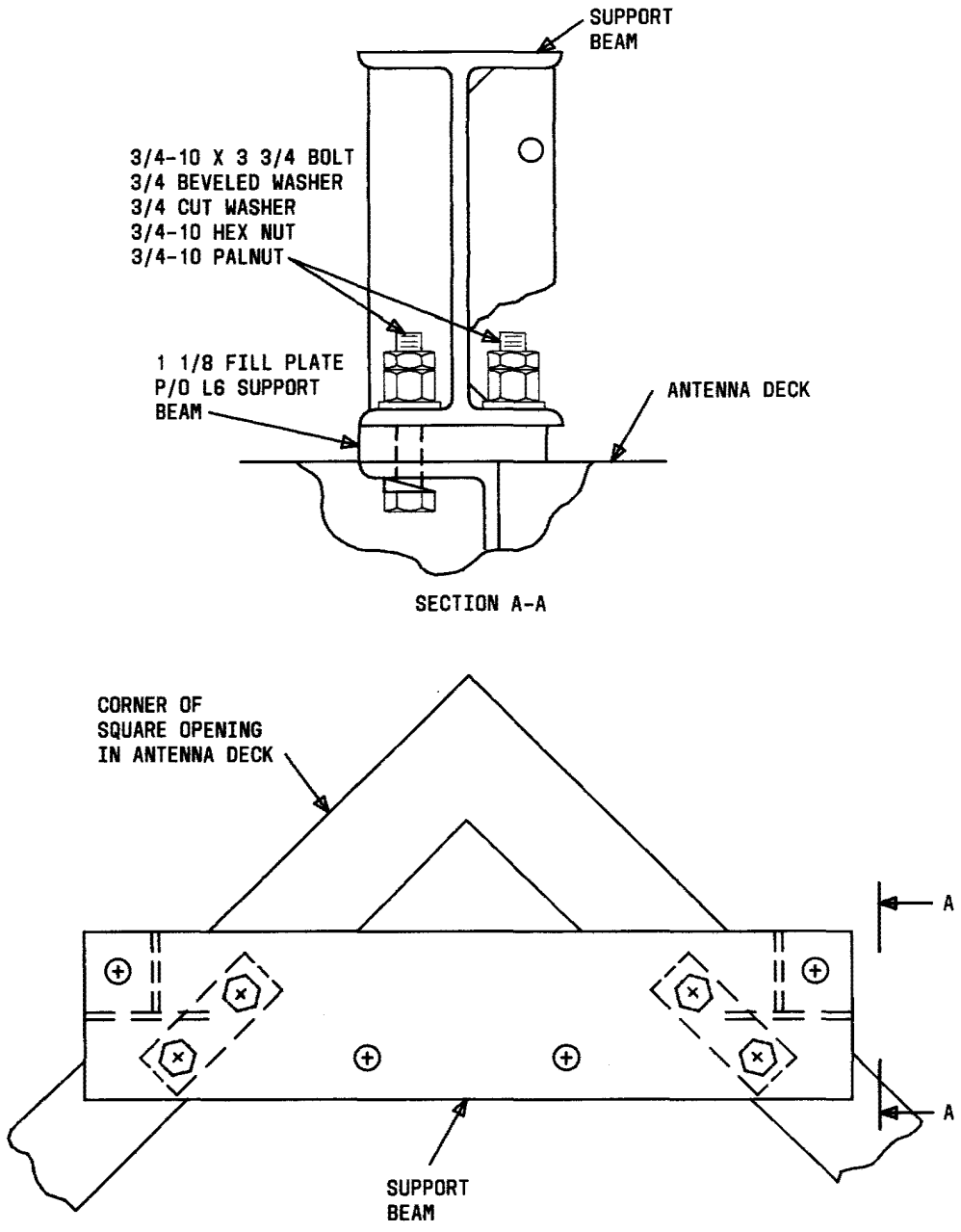


Fig. 8—Assembly of the KS-21972, L6 Support Beams to the Antenna Deck

2.29 Coat the top surface of the support beams and the bottom surface of the support ring with antiseize compound. This will facilitate making antenna azimuth adjustments.

2.30 Place the support ring on the support beams and orient the support ring so that the elevation support plate, part of List 3, is to the rear and approximately in line with the desired antenna azimuth. Use the rail clips (sixteen required), 5/8-11 × 2-1/4 inch long bolts, washers, hex nuts, and PALNUTs provided in List 6 and secure the support ring to the support beams.

2.31 The List 3 support ring may be ordered attached to the List 1 conical antenna at the factory.

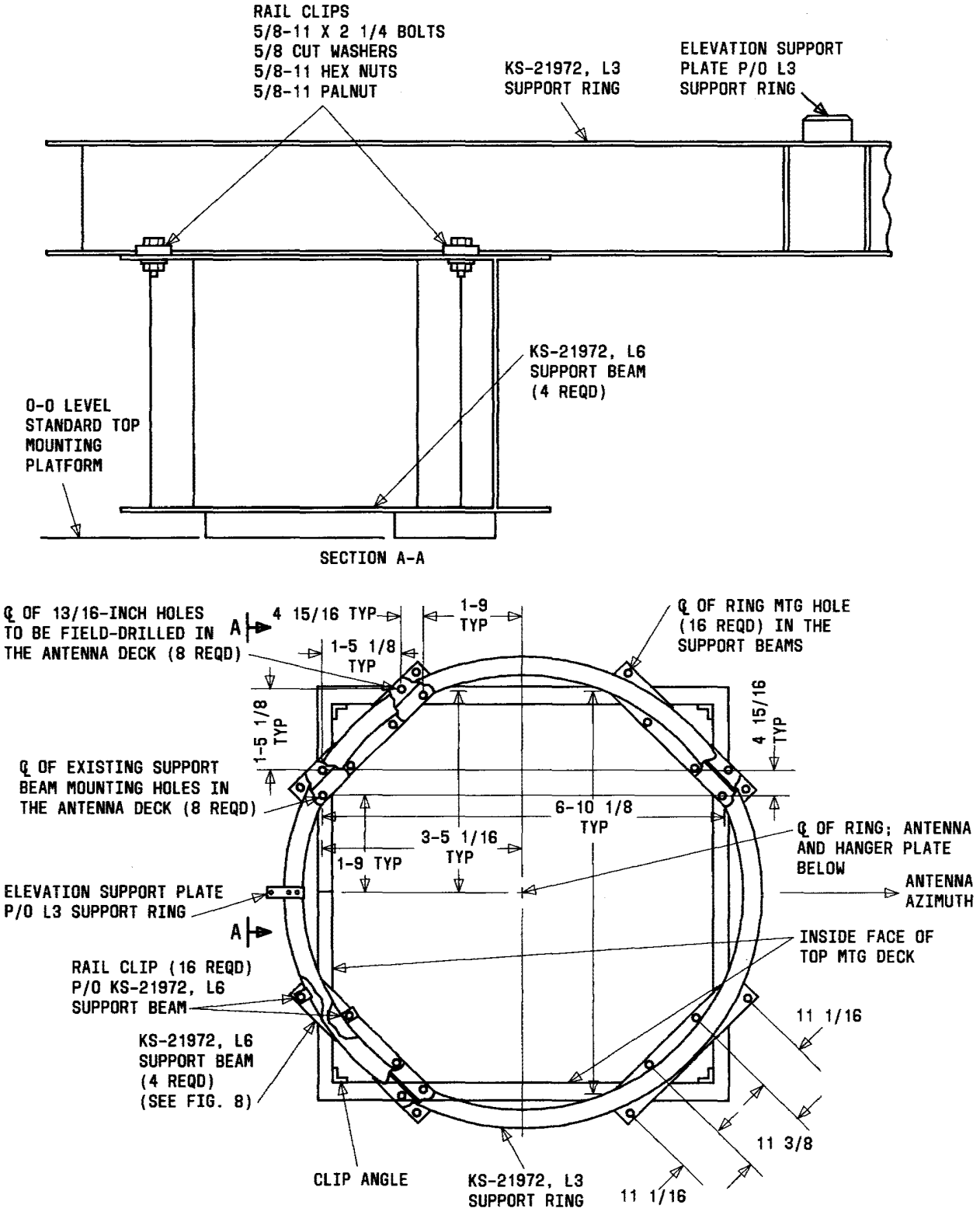


Fig. 9—Assembly of the KS-21972, L3 Support Ring to L6 Support Beams Mounted on a Top Antenna Deck

J. Assembly of List 3 to a KS-22370 (See Fig. 10)

2.32 Hoist the support ring to the antenna deck. The List 6 support beams are not used on side-leg mountings. Check to be sure that each of the four framing members which form the sides of the antenna deck are level and flat within ±1/16 inch of each other. Also check to be sure that the deck opening has the correct dimensions in accordance with Fig. 10. The clip angles will permit adjustment where required.

2.33 Coat the bottom surface of the support ring and the top surface of the mating antenna deck with antiseize compound. This will facilitate making antenna azimuth adjustments.

2.34 Place the support ring on the antenna deck and orient the support ring so that the elevation support plate, part of List 3, is to the rear and approximately in line with the desired antenna azimuth. Use sixteen rail clips, twelve 5/8-11 × 2-1/4 inch long bolts, four 5/8-11 × 2-inch long bolts, twelve beveled washers, sixteen washers, sixteen hex nuts, and sixteen PALNUTs (provided in KS-22370) and secure the support ring to the antenna deck. The twelve 2-1/4 inch long bolts and beveled washers are for use at the C8 × 11.5 channels. The four 2-inch long bolts are for use at the 8WF × 15 beam without beveled washers.

K. Assembly of List 3 to List 1 (See Fig. 11)

2.35 Assemble the trunnion mounts, provided in List 3, to the ring as follows:

(a) Place the two trunnion mounts over the two 4-bolt-hole patterns on the ring, and align the holes.

(b) Use the 5/8-11 × 2-inch long bolts, washers, hex nuts, and PALNUTs provided in List 3 and secure the trunnion mounts to the support ring.

2.36 Assemble the elevation support plate to the ring as follows:

(a) Place the elevation support plate (provided in List 3) over the 2-bolt-hole pattern on the rear of the ring, and align the holes.

(b) Use the 5/8-11 × 1-3/4 inch long bolts, washers, hex nuts, and PALNUTs provided in List 3 and secure the elevation support plate to the ring.

2.37 Stabilizer rods and associated hardware are provided in List 3. Assemble the stabilizer rods to the ring as follows:

(a) Take the rear stabilizer rod (longer rod) and the two front stabilizer rods (shorter rods) and run a 3/4-10 hex nut all the way up the threaded end.

(b) Take the rear stabilizer rod and place a washer next to the hex nut; then insert the threaded end through the remaining hole in the elevation support plate. Add a washer and hex nut, and run the hex nut all the way up the threads.

(c) Take the front stabilizer rods and place a washer next to the hex nuts; then insert the threaded end through each of the two remaining forward holes in the ring. Add a washer and hex nut to each rod, and run the hex nut all the way up the threads.

2.38 If the support ring has been previously mounted on the antenna deck in accordance with paragraph 2.04(c) and after paragraphs 2.35 through 2.37 have been completed, proceed as follows:

(a) Carefully hoist the antenna to the antenna deck and lower into position over the support ring.

(b) Orient the antenna so that the trunnions on the antenna align with the trunnion mounts on the support ring and the rear stabilizer rod on the support ring aligns with the rear stabilizer bracket on the antenna.

2.39 With the antenna and support ring in position as given in paragraph 2.38, proceed as follows:

(a) Slowly mate the trunnions on the antenna with the trunnion mounts on the support ring.

(b) Use the 5/8-11 U bolts, washers, hex nuts, and PALNUTs provided in List 3 and secure the support ring to the antenna.

(c) Loosen the bottom hex nuts on the front and rear stabilizer rods so that they will easily

engage the antenna stabilizer brackets. Use the clevis pins, washers, and cotter pins provided in List 3 and secure the stabilizer rods to the antenna.

Warning: Perform the three steps of (d) in the order given. If the bottom hex nuts are tightened securely first, the antenna/ stabilizer bracket joint may be damaged.

(d) Tighten the hex nuts on the front and rear stabilizer rods as follows:

(1) Finger tighten the bottom hex nuts.

(2) Tighten the top hex nuts securely.

(3) Tighten the bottom hex nuts securely.

Note: The List 3 support ring will always be shipped from the factory attached to the List 1 conical antenna, unless ordered as a separate replacement item.

L. Assembly of List 5 to Lists 1 and 3 (See Fig. 12)

2.40 Mount the antenna and support ring on the antenna deck in accordance with I, J, or K of Part 2.

2.41 Remove the rear stabilizer rod by disconnecting it from the rear stabilizer bracket on the antenna.

2.42 Remove the elevation support plate from the support ring.

2.43 Attach the clevis (jaw) end of the elevation tool to the rear stabilizer bracket on the antenna with the clevis pin provided in List 5.

2.44 Secure the jaw beam end of the elevation tool to the support ring with the 5/8-11 × 2-1/4 inch long bolts, washers, and hex nuts provided in List 5.

2.45 Back off the top and bottom hex nuts on both front stabilizer rods to their extreme position, and orient the antenna to the desired elevation (elevation orientation is done simultaneously with azimuth orientation).

2.46 After the antenna is oriented, tighten the front stabilizer rods in accordance with paragraph 2.39(d).

2.47 Remove the elevation tool and reinstall the elevation support plate and rear stabilizer rod as given in paragraphs 2.36 through 2.39.

Note: Do not leave the elevation tool in place overnight, exposed to the elements.

M. Assembly of List 4 to Lists 3 and 6 (See Fig. 13)

2.48 Mount the antenna, support ring, and support beams on the antenna deck in accordance with H, I, and J in Part 2, as required.

2.49 Remove the eight rail clips nearest the position where the azimuth tool (List 4) attaches to the support ring. Install the two track wheels using the 5/8-11 × 2-inch long bolts, thrust washers, bearings, washers, and hex nuts and install the six cam followers using the 5/8-11 × 2-3/4 inch long bolts, washers, and hex nuts provided in List 4. The two track wheels shall be installed at the rear of the antenna, with one on each side of the elevation tool position, on the outside of the support ring (List 3). The remaining eight rail clips must be loosened or removed during orientation of the antenna.

2.50 Attach the bar end of the azimuth tool to the 11/16-inch hole in the side of the support beam with the 5/8-11 × 1-1/2 inch long bolt and washer provided in List 4.

2.51 Attach the clamping-jaw end of the azimuth tool to the bottom flange of the support ring with the four 1/2-13 × 1-inch bolts provided in List 4.

2.52 Orient the antenna to the desired azimuth.

2.53 After the antenna is oriented, remove the cam followers and track wheels and reinstall the rail clips as given in paragraph 2.30.

2.54 Remove the azimuth tool.

Note: Do not leave the azimuth tool in place overnight, exposed to the elements.

N. Assembly of List 4 to List 3 and KS-22370 (See Fig. 14)

2.55 Mount the antenna and support ring on the side-leg mount antenna deck in accordance with paragraphs 2.02 through 2.04 and 2.32 through 2.34.

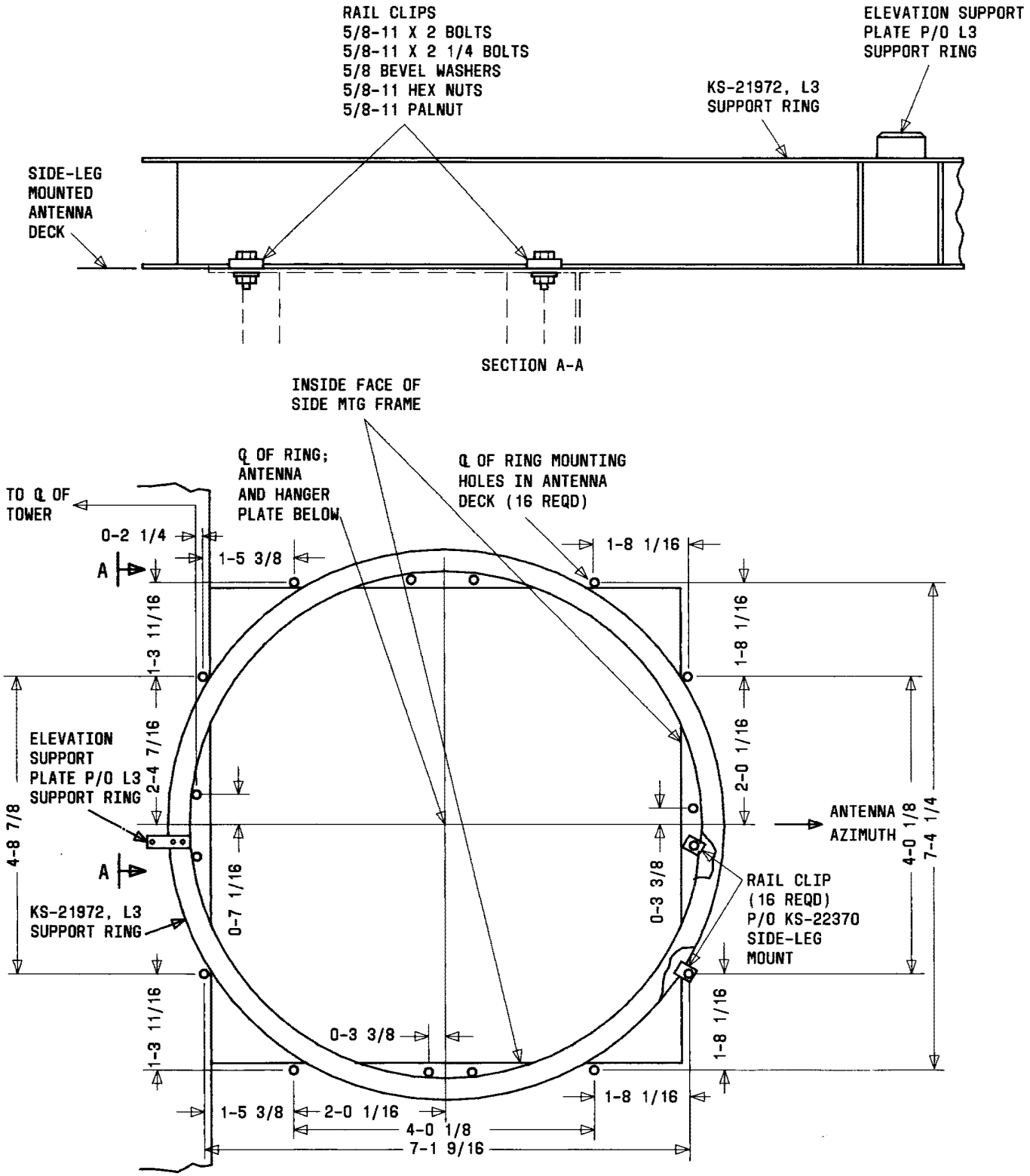
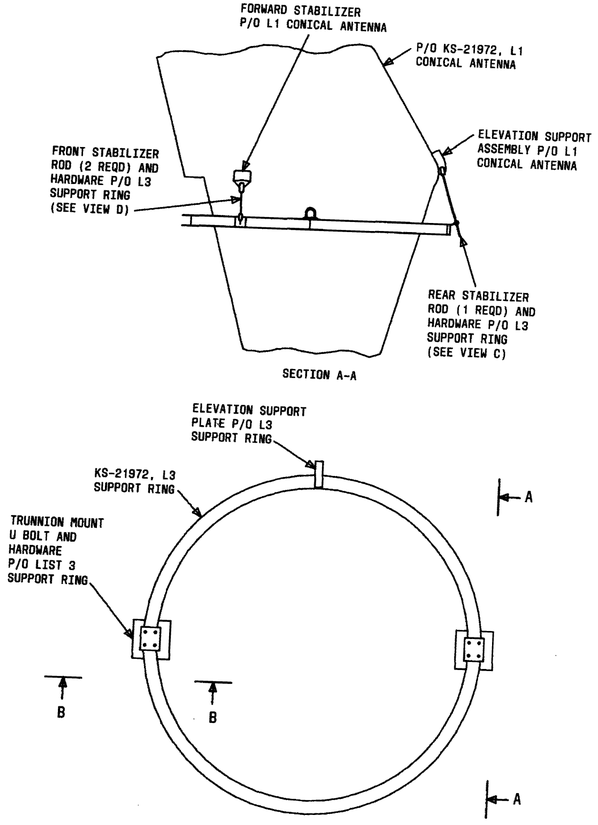
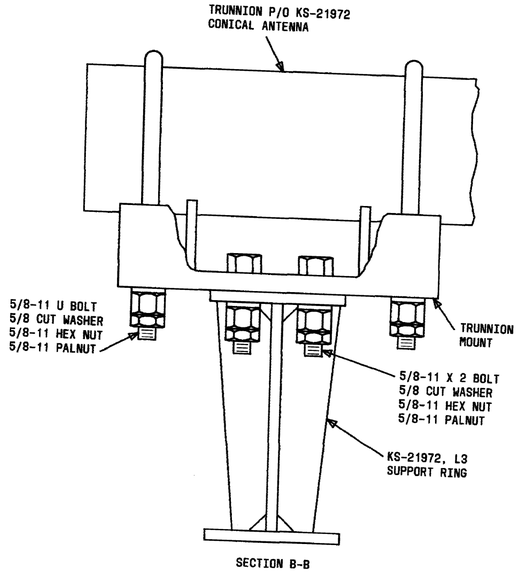
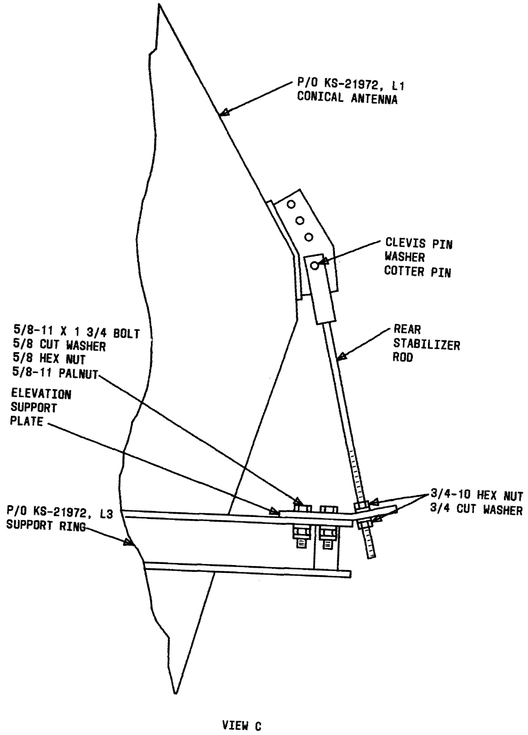


Fig. 10—Assembly of the KS-21972, L3 Support Ring to a KS-22370 Side-Leg Mounted Antenna Deck







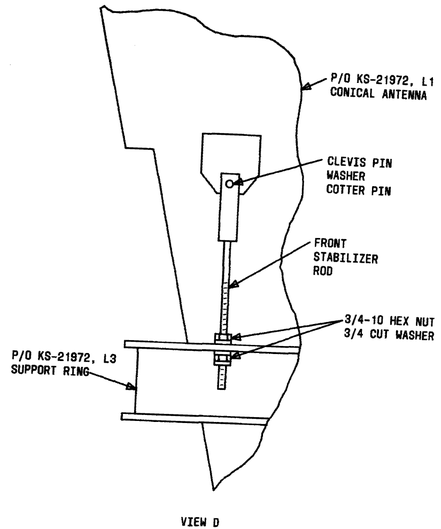


Fig. 11—Assembly of the KS-21972, L3 Support Ring to the L1 Conical Antenna

2.56 Refer to paragraph 2.49 and Fig. 14 for installation of track wheels and cam followers.

2.57 Attach the bracket to the W8 × 15 beam, using the 5/8-11 × 2-inch long bolts, washers, hex nuts, and PALNUTs provided in KS-22370.

2.58 Attach the bar end of the azimuth tool to the 11/16-inch hole in the bracket, using the 5/8-11 × 1-1/2 inch long bolt and washer provided in List 4.

2.59 Attach the clamping-jaw end of the azimuth tool to the bottom flange of the support ring with the four 1/2-13 × 1-inch long bolts provided in List 4.

2.60 Orient the antenna to the desired azimuth.

2.61 After the antenna is oriented, remove the cam followers and track wheels and reinstall the rail clips in accordance with paragraph 2.34.

2.62 Remove the azimuth tool.

Note: Do not leave the azimuth tool in place overnight, exposed to the elements.

3. METHOD OF INSTALLATION

A. List of Equipment and Tools

3.01 The following is a list of equipment and tools needed to install the antenna.

EQUIPMENT

(a) Equipment capable of hoisting the antenna, which weighs approximately 2000 pounds, to the desired location on the tower

(1) Gin pole and winch engine

(2) Crane

(3) Helicopter

(4) Other suitable lifting equipment.

(b) Hoisting sling in accordance with Fig. 15, or equivalent

(c) Antenna sling in accordance with Fig. 16, or equivalent

(d) Three-sheave tackle block assembly

(e) Tag lines as required

(f) Communications equipment for coordinating the installation between the ground or helicopter and the top of the tower.

TOOLS

(a) Alignment pins

(b) Ratchets and sockets

(c) Wrenches.

B. Location of Hoisting Equipment

3.02 Position the hoisting equipment as follows:

(a) Place the gin pole or crane so that access to the antenna mounting position is clear and not obstructed.

(b) When using a helicopter, provide a clear space free of loose debris at the pickup area and antenna mounting location.

C. Preparation for Hoisting Antennas

3.03 Prepare the antenna for hoisting as follows:

(a) Using 1/2-inch screw pin shackles, attach the hoisting sling (Fig. 15) to the lifting holes on the back of the antenna. Attach the 6-foot leg to the top antenna lifting hole; attach the 14-foot leg to the bottom antenna lifting hole. Attach the 4-foot leg to the load line from the hoisting equipment.

(b) Attach the top block of a reeved 3-sheave tackle block assembly to the top ring of the hoisting sling.

(c) Wrap the antenna sling (Fig. 16) around the antenna, just above the antenna feedhorn flange as shown in Fig. 17. Locate the ends of the sling so that they may be attached to the bottom block of the 3-sheave tackle block assembly. Attach the antenna sling to the block assembly.

(d) Attach guide lines to the antenna support ring for control of the load while hoisting.

(e) Prepare the antenna deck for installation of the antenna in accordance with H, I, or J of Part 2.

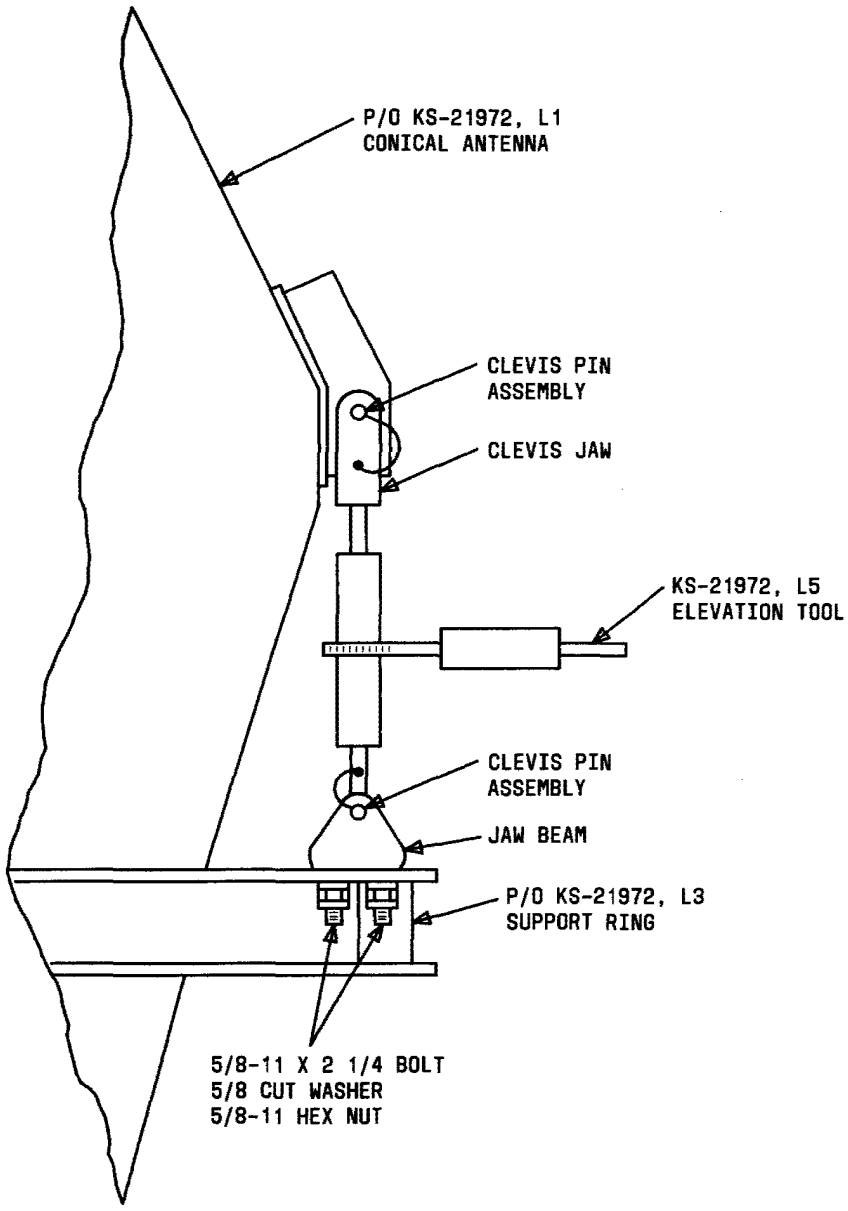


Fig. 12—Assembly of the KS-21972, L5 Elevation Tool to the L1 Conical Antenna and L3 Support Ring

D. Hoisting Antennas

3.04 Observe the following precautions when hoisting antennas.

Danger 1: Do not attempt to hoist antennas unless wind velocities are gentle and weather conditions are expected to remain stable. Wind loading on the antenna can make control difficult during hoisting, especially when winds are gusting. Remember that wind velocities are usually greater at the top of the tower than at ground level.

Danger 2: Deploy personnel and equipment on the ground to handle guide lines to minimize erratic motion of the antenna

and prevent collision with the tower or other obstacles.

Danger 3: Be very careful to avoid contact with guy wires when installing antennas on guyed towers.

Danger 4: Be very careful to prevent contact between rigging equipment on the antenna being hoisted and previously installed antennas and associated equipment.

3.05 Refer to Fig. 17, and hoist the antenna as follows:

(a) After taking up the slack in the load line, use the 3-sheave tackle block assembly to raise the feedhorn several inches.

(b) Slowly raise the antenna, while slacking off on the 3-sheave tackle block assembly line, until the antenna is high enough to rotate into a vertical position without making contact with the ground.

(c) With the antenna in the vertical position near the ground, remove the antenna sling. The 3-sheave tackle block assembly, if not removed, should be secured so that it will not cause any damage to the antenna during hoisting.

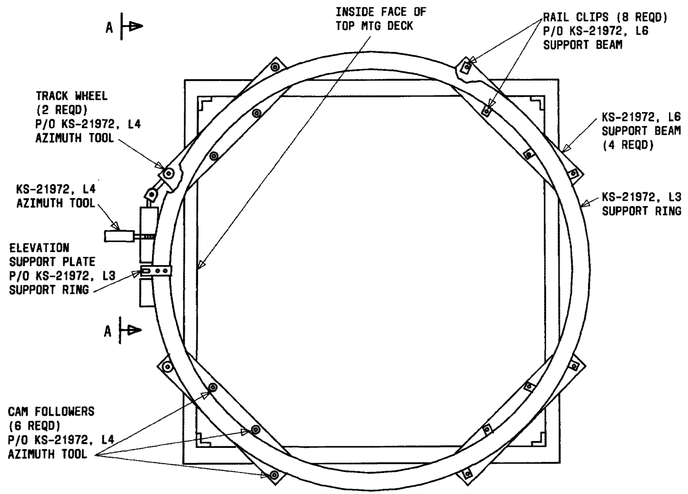
(d) Position personnel on the tower and ground for control of the antenna during hoisting.

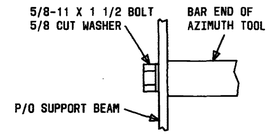
(e) Hoist the antenna to the desired mounting level on the tower (Fig. 18). If the antenna is to be mounted on the lower platform of a dual-platform tower and the hoisting equipment is located on the upper platform, a tackle block assembly or a come-along may be required to pull the antenna into position.

(f) Use the hoisting equipment to support the weight of the antenna until it is given a preliminary orientation to the approximate desired azimuth.

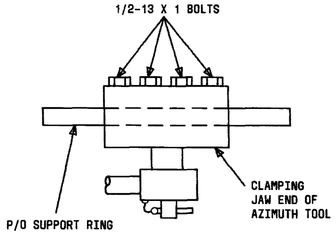
(g) After preliminary orientation, lower the antenna to the antenna platform. Lock the antenna in place with the rail clips and stabilizer rods in accordance with I or J and K of Part 2.

(h) Detach the hoisting sling from the antenna lifting holes, and lower the load line to the ground for dismantling or hoisting of another antenna.

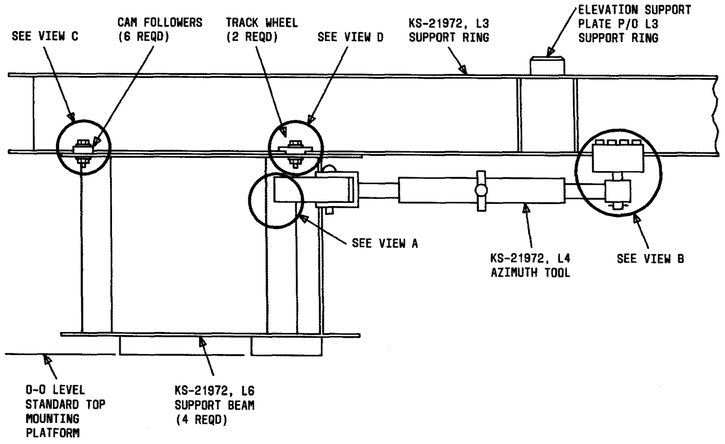




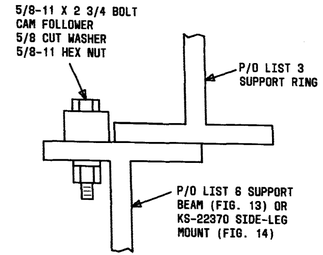
VIEW A



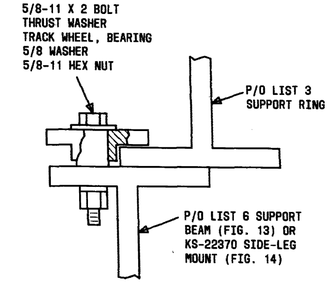
VIEW B



SECTION A-A

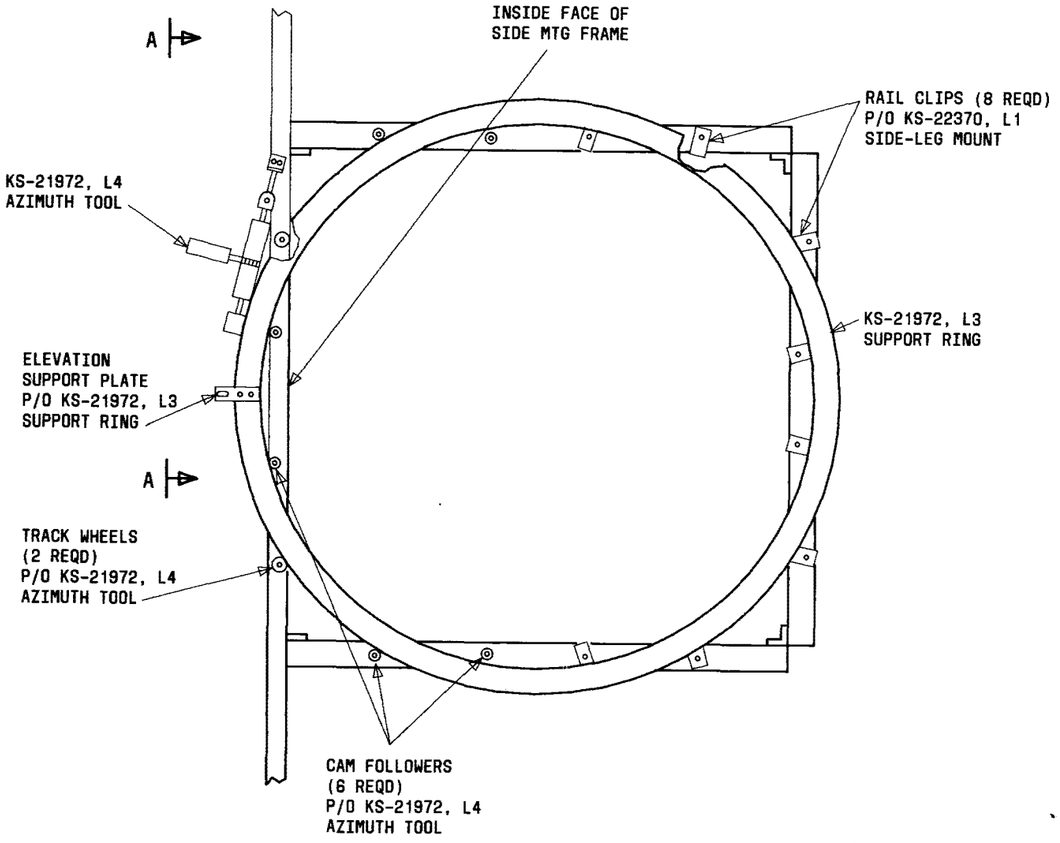


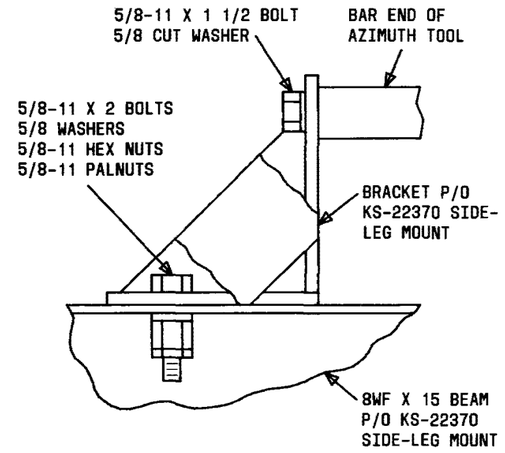
VIEW C



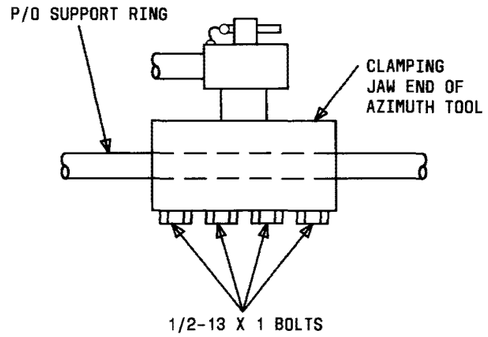
VIEW D

Fig. 13—Assembly of the KS-21972, L4 Azimuth Tool to the L3 Support Ring and L6 Support Beam





VIEW A



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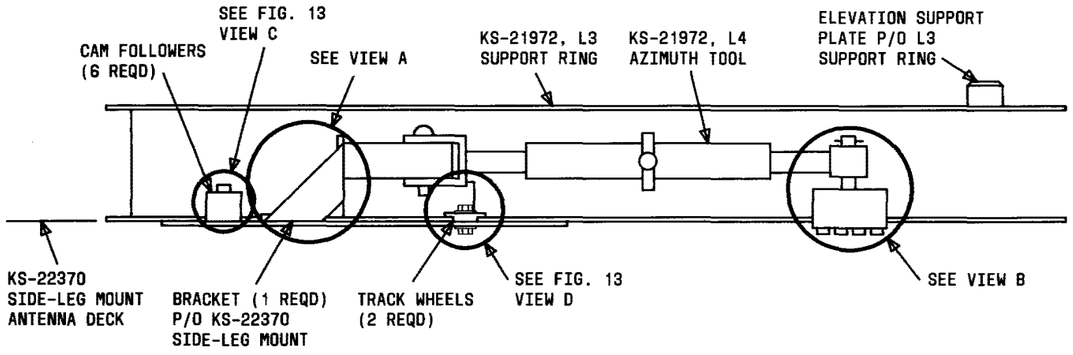

SECTION A-A

Fig. 14—Assembly of the KS-21972, L4 Azimuth Tool to the L3 Support Ring and KS-22370 Side-Leg Mount

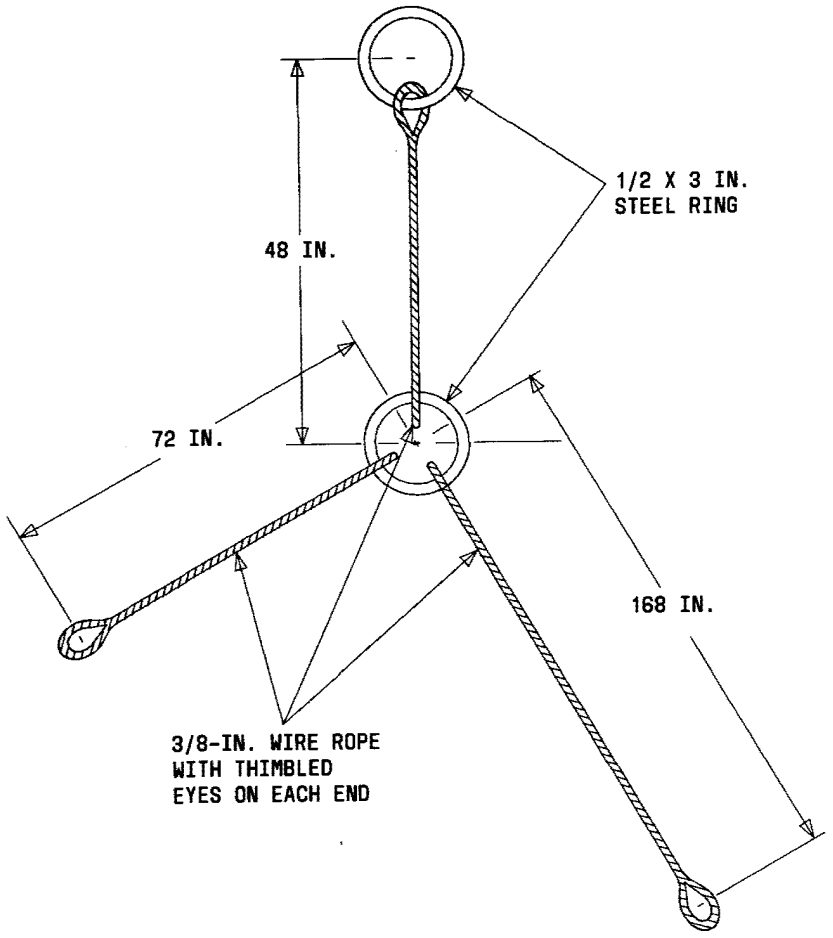

Fig. 15—Hoisting Sling

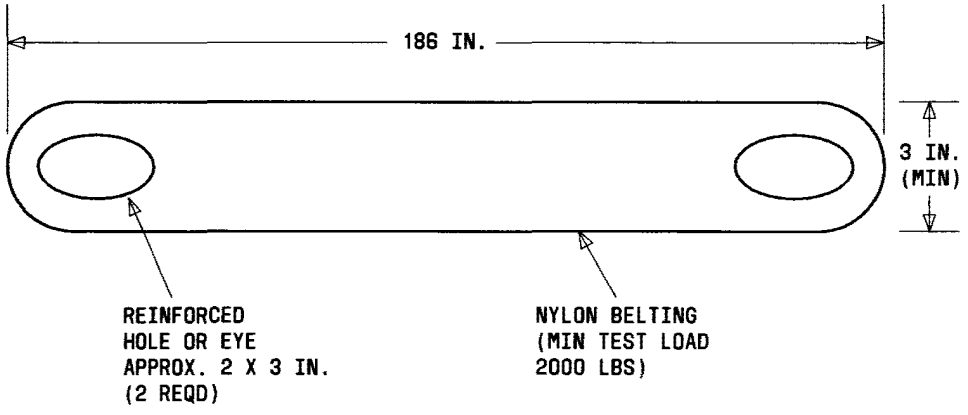

Fig. 16—Antenna Sling

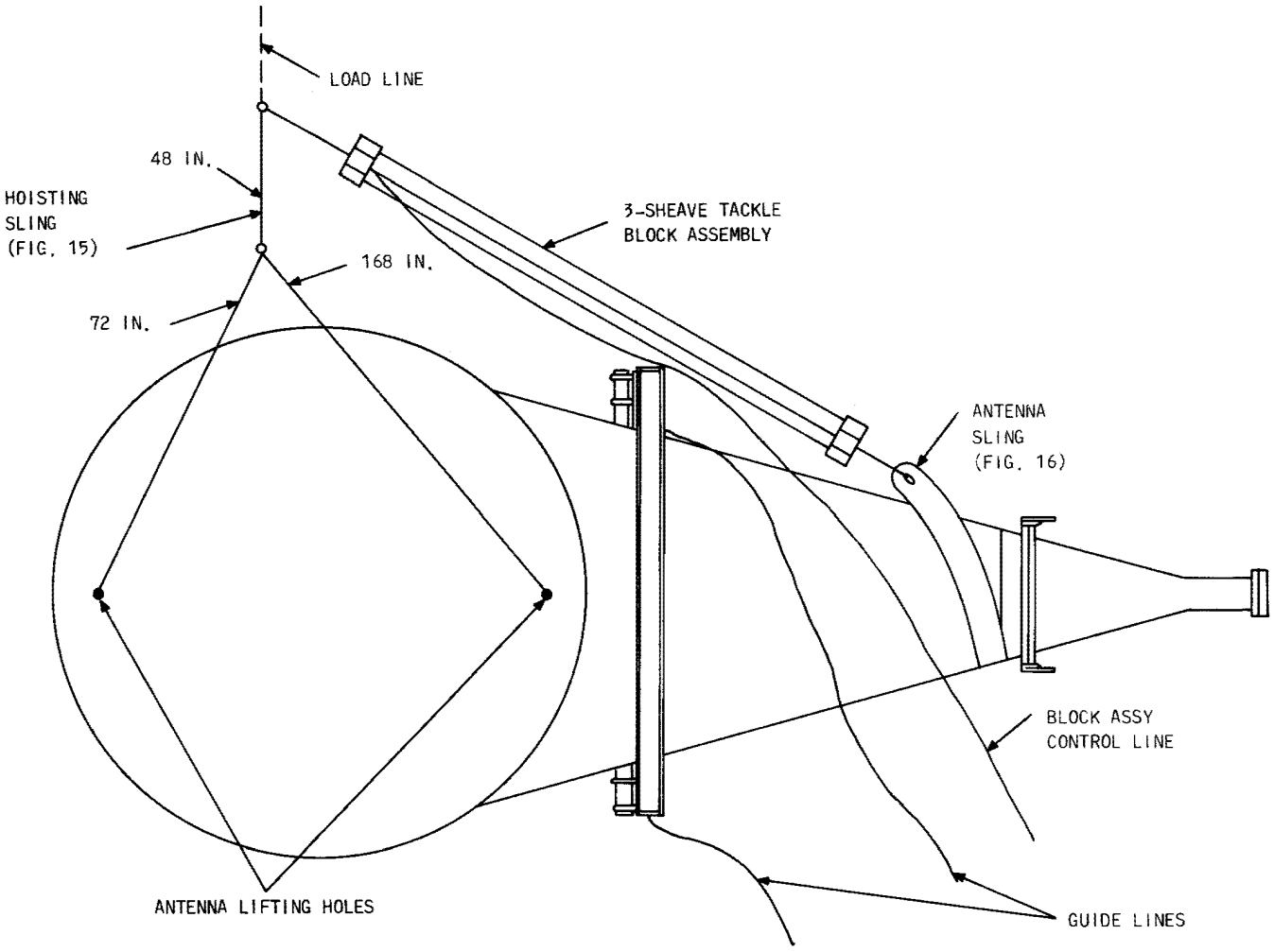

Fig. 17—Hoisting the Antenna (Horizontal Position)

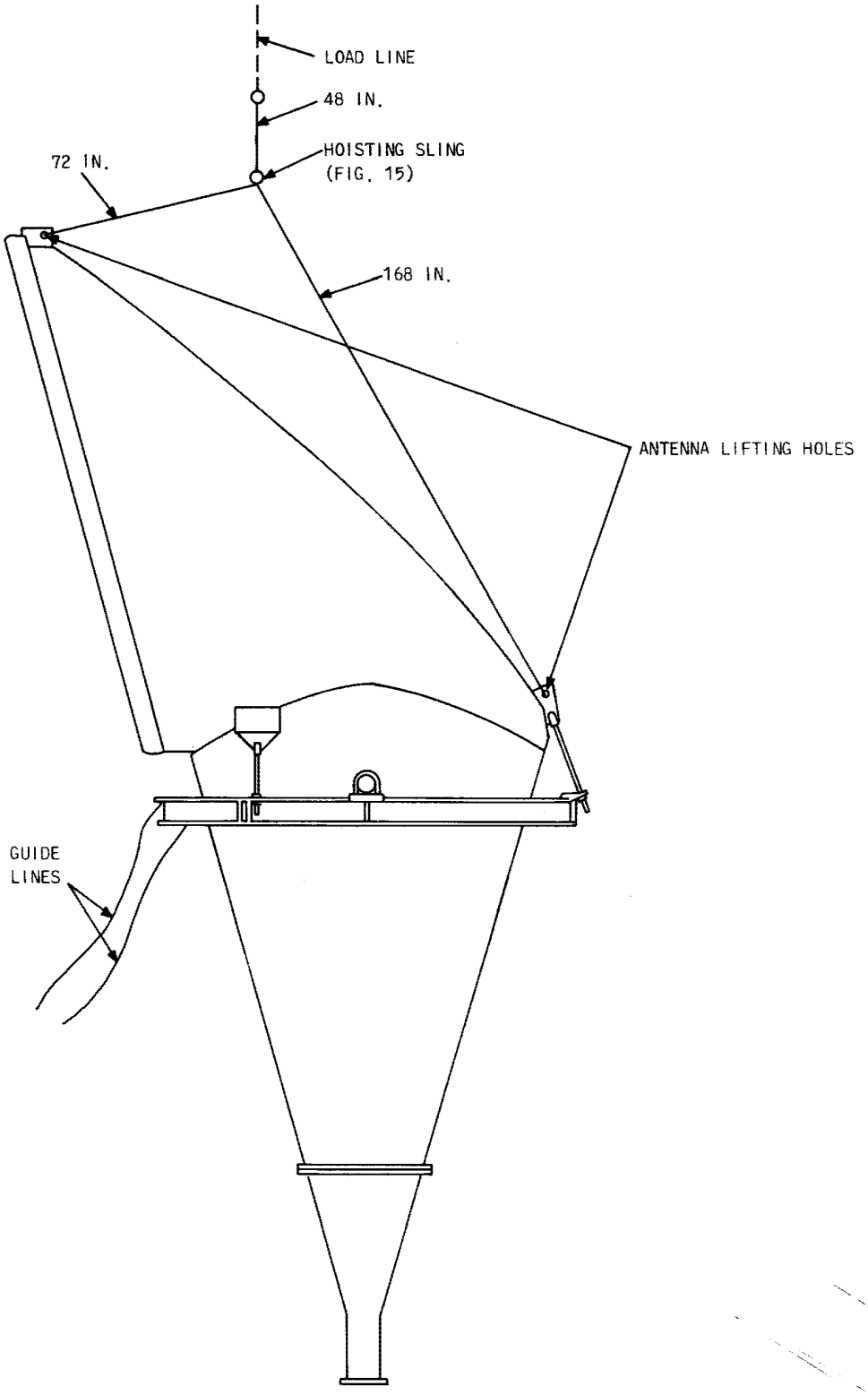

Fig. 18—Hoisting the Antenna (Vertical Position)