MICROWAVE ANTENNAS
KS-16320 PASSIVE REFLECTORS
INSTALLATION
INSTALLATION OF LISTS 1 AND 2 ON THE AT-7729 B SELF-SUPPORTING TOWER

CONTENTS PAGE

1. GENERAL

1.01 This section describes the manner in which KS-16320, Lists 1 and 2 passive reflectors are to be installed on the AT-7729 B self-supporting tower.

1.01.1 *Reason For Reissue:* To include the information in the Addendum to Issue 1 which corrected Fig. 3.

1.02 Each passive reflector and associated mount will have been separately assembled in advance. Either of two options may be used for installation:

Option A: The reflector may be connected to the mount on the ground and the entire assembly hoisted and installed as a unit.

Option B: The mount may be hoisted and fastened to the tower, after which the reflector may be brought up and installed.

Option A permits all connections between the reflector and the mount to be made on the ground, leaving only the connections between the pipe mount and the supporting structure to be made aloft, and in general should require less time. Option B affords the advantages of reduced individual lift weight and less bulky assemblies, thereby facilitating handling and minimizing the possibilities of damage to the reflector or to the supporting structure. The choice of method to be employed is left to the discretion of local supervision.

1.03 Suitable hoisting tackle must be provided including power winch, winch line, slings, and hardware. Rig the tackle properly to the tower to permit hauling all parts directly to the elevation at which the installation is to be made and to facilitate positioning of the parts so that they can be connected permanently to the structure. At least two handling lines are required, of sufficient length to permit men to restrain the reflector and/or mount from the ground as it is being lifted.

2. DESCRIPTION

2.01 In Section 402-423-400, Figs. 1 and 2 show the assemblies of lists 1 and 2 passive reflectors, respectively. AT-7729 B self-supporting towers are fitted with three 9-foot O.D. rings to which the reflector assembly is to be connected; the rings are spaced as shown in Fig. 1 of this section. Each ring contains two rows of 11/16-inch holes on 3-inch vertical centers pitched 4-11/16 inches circumferentially.

2.02 The 4-inch O.D. pipe of the reflector mount (Section 402-423-400, Fig. 1 or 2, Item 26) is bolted to the upper and lower rings using the four 5/8- by 7¾-inch U bolts (Fig. 1 or 2, Items 36D) which are supplied with the reflector. Two saddles are furnished with the tower, to be installed between the pipe and the rings as shown in Fig. 2 of this section.

2.03 A formed clip, as indicated in Fig. 2 of this section, is provided with the tower; it is to be bolted to the intermediate ring to serve as a connection for the attachment bracket of the reflector stabilizing strut.

3. PREPARATION

3.01 The location on the tower ring mount at which the reflector assembly will be connected is to be determined by local supervision.

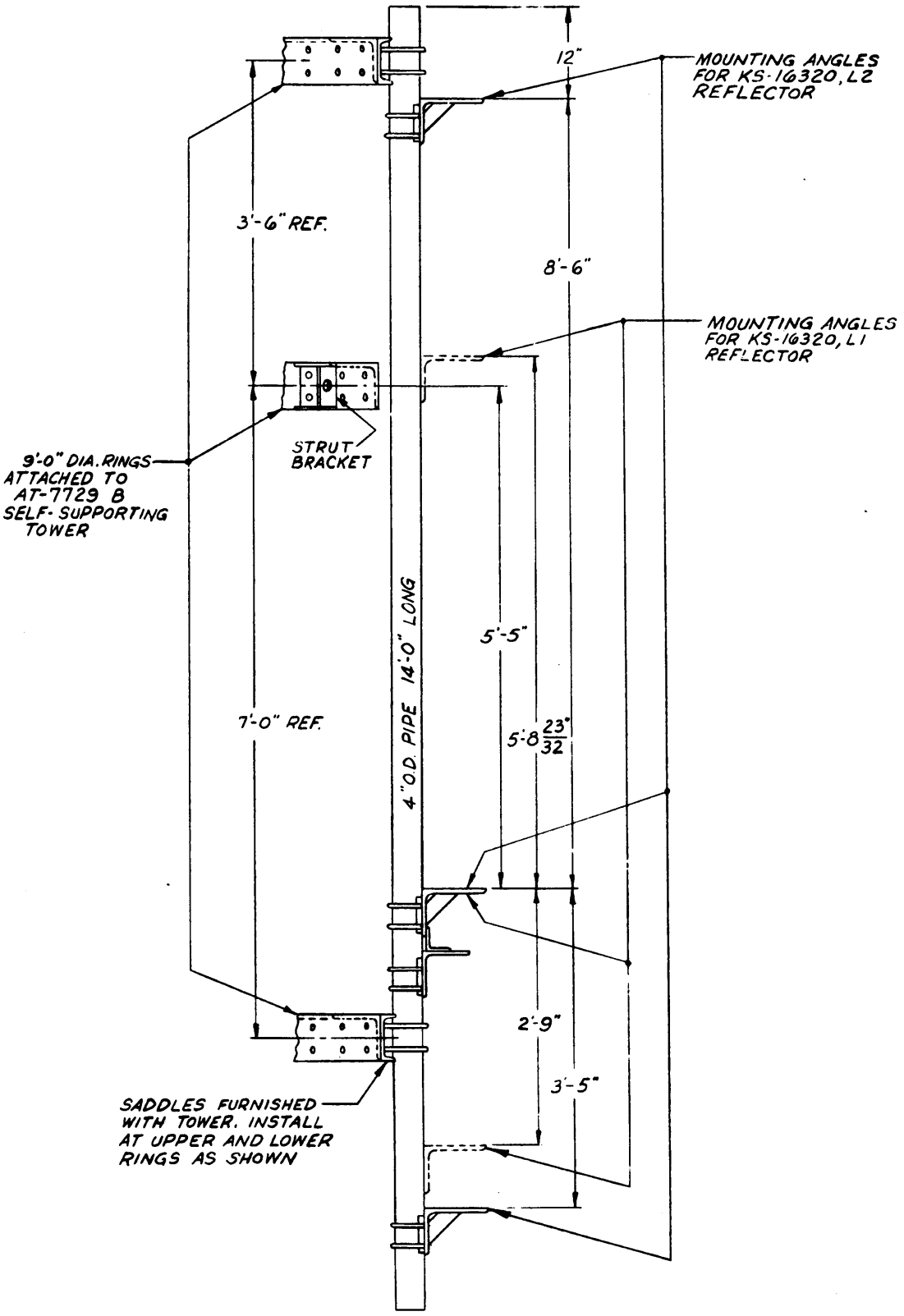

Fig. 1 – KS-16320 Pipe Mount on AT-7729 B Self-Supporting Towe

3.02 The clip for attachment of the strut bracket may be connected to the intermediate ring on either side of the reflector at a distance of seven bolt spacings from the 4-inch O.D. pipe, as shown in Fig. 2 of this section. ***Strut location will be decided by local supervision.***

3.03 Choice of the side of the reflector frame on which the strut will be connected depends on the direction in which azimuth adjustment is anticipated. The median azimuth setting, from which direction is determined, is that along the radius of the ring through the point of contact of the pipe mount. For example, if azimuth adjustment is to be to the left when facing the back of the reflector, the strut should be connected to the left of the reflector. By proper selection between the two strut locations provided, the range of azimuth adjustability is ±30 degrees about the median position noted above.

Note: It is important that the matter of strut location be considered carefully because the strut arrangement is not intended to provide for azimuth adjustment beyond the reference setting of the reflector in the direction away from the strut connection on the tower.

3.04 When the location of the clip for attachment of the strut bracket has been determined as indicated in 3.01 and 3.02, connect the clip to the ring mount, using ⅝-inch bolts, Palnuts, and nuts supplied with the tower, before the reflector is brought into position.

4. INSTALLATION

OPTION A

4.01 If Option A is followed for the installation, the reflector will be connected to the mount on the ground and the complete assembly then hoisted into position. Check the reflector carefully for correct assembly and install the top mount as described in 4.12 and 4.13 of this section. Examine the reflector mount for correct assembly as outlined in applicable Section 402-423-204 or -205; spacing of the mounting angles on the 4-inch O.D. pipe shall be as indicated in Fig. 1 of this section.

4.02 Support the reflector mount horizontally or vertically, as preferred, allowing ample space for the safe and convenient handling of the reflector. The lower mount should extend vertically upward if the 4-inch O.D. pipe is horizontal. If the pipe is vertical, the assembly should be in its normally upright position as shown in Section 402-423-400, Fig. 1 or 2 as applicable; in that case the lower mount will be horizontal. Install the azimuth adjusting tool as shown in Fig. 3 of this section, lash it in place using marline or heavy twine, and leave in place until the assembly has been installed on the tower.

Note: The reflector must be carefully supported, either manually or by suitable lifting tackle, while it is being connected to the mount.

4.03 In Section 402-423-400, refer to applicable Fig. 1 or 2 and place the reflector on the mount as shown. Connect the clamp assembly loosely (Fig. 1, Items 11B, 12B, and 13B; or Fig. 2, Items 9B, 10B, and 11B) and bolt the top mount loosely (Fig. 1, 10B; or Fig. 2, 12B) to the swivel (Fig. 1, 9B; or Fig. 2, 8B). ***Remove the ⅜- by 1½-inch cap screw from the top mount.*** Position the pointer on clamp 12B or 10B to the approximate elevation setting; if no estimate can be made, set the pointer at midscale. Clamp the reflector to the lower mount. Tighten the bolts connecting the top mount to the reflector and to the swivel.

4.04 Install the strut as described in 4.14 to 4.17 of this section.

4.05 The two saddle clamps and the four ⅝- by 7¾-inch U bolts with nuts and lockwashers must be available at the top of the tower when the reflector is hoisted.

Caution: Hoisting of the reflector should not be attempted if strong winds or heavy gusts are prevalent.

4.06 Attach the hauling line to the 4-inch O.D. pipe. Rig the assembly for hoisting so that it assumes the normal, upright position (see Section 402-423-400, Fig. 1 or 2) during the ascent; the approximate weight is 785 pounds for list 1 reflectors or 960 pounds for list 2 reflectors.

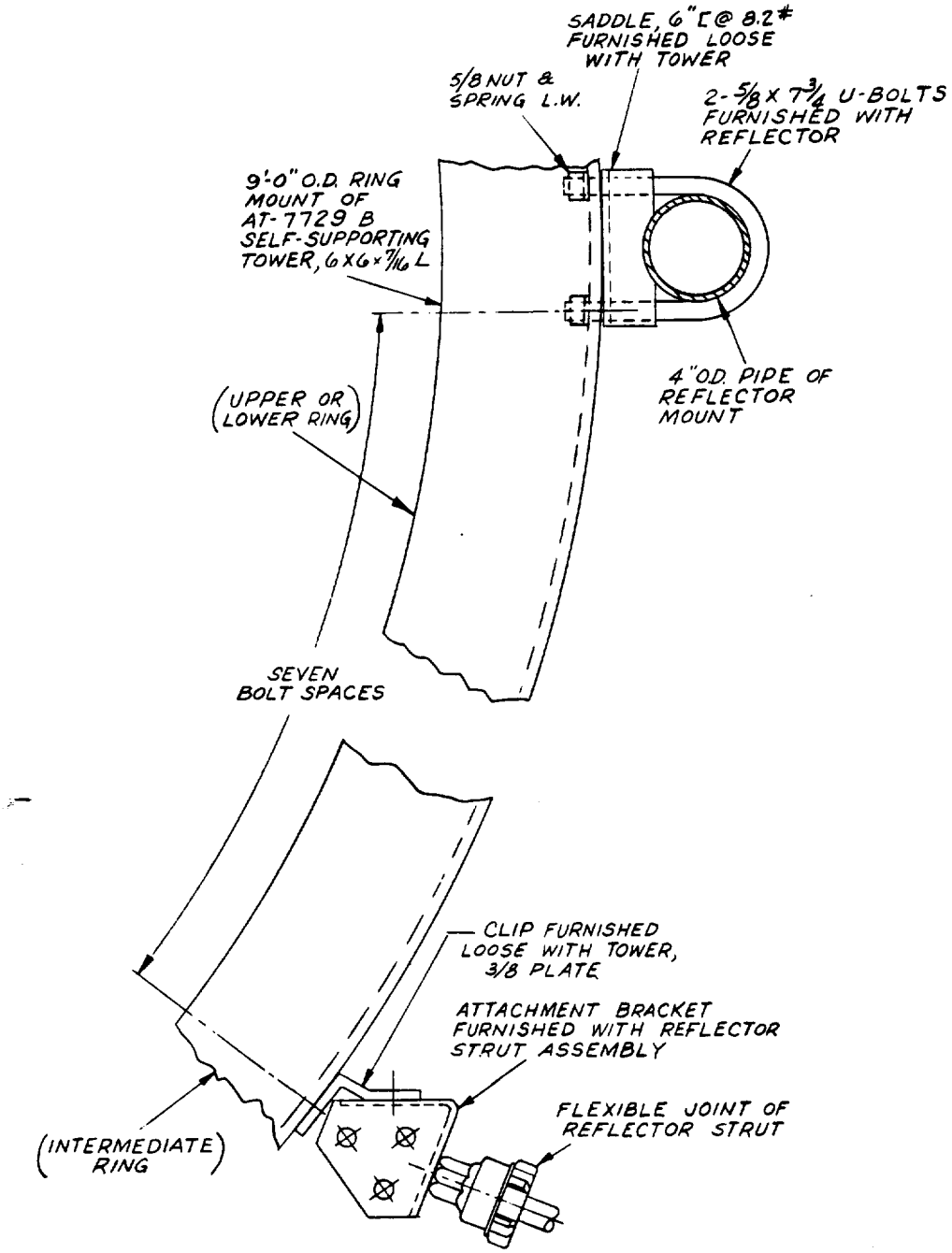

Fig. 2 – Mount for KS-16320 Passive Reflector on AT-7729 B Self-Supporting Tower

Connect at least two handling lines near the bottom of the assembly and deploy men on the ground to handle the lines in the best manner to minimize erratic motion and prevent collision with the tower or other adjacent obstacles. Guide the assembly into the predetermined location on the ring mount; use the handling lines to control the assembly without restricting placement. Position and clamp it as described in 4.10 of this section; follow the procedure in 4.24 for connecting the strut, then remove all lifting and handling tackle and support slings.

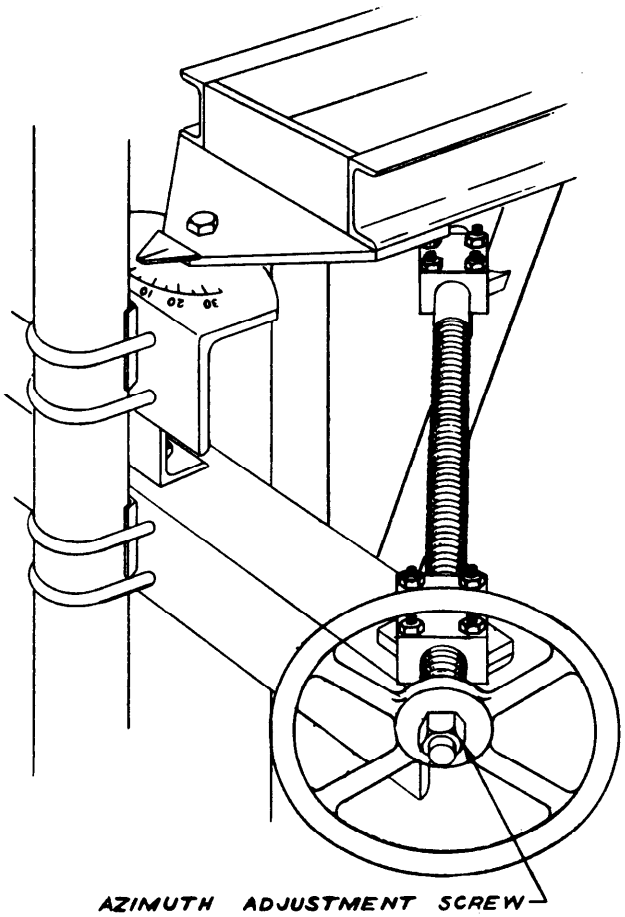

Fig. 3 – KS-16320, List 8 Azimuth Adjustment Screw Assembly in Operating Position

OPTION B

4.07 Following Option B in 1.02, be certain that the reflector mount has been fully assembled as described in applicable Section 402-423-204 or -205; set the spacing of the mounting angles on the 4-inch O.D. pipe, as shown in Fig. 1 of this section. ***The two saddle clamps furnished with the tower and the four ⅝- by 7¾-inch U bolts with nuts and lockwashers (furnished with the reflector) must be available at the top of the tower when the reflector mount is hoisted.***

4.08 Referring to Section 402-523-400, Fig. 1 or 2 as applicable, fit the clamp assembly (Fig. 1, Item 11B; or Fig. 2, Item 9B) to the lower mount (Fig. 1, 7B; or Fig. 2, 13B), place the clamps (Fig. 1, 12B and 13B; or Fig. 2, 10B and 11B) over the studs, and fasten them temporarily. The clamps must be removed when the reflector is brought into place in the final assembly; therefore, attach them now only to prevent loss while the mount is being hoisted. Make them reasonably easy to detach for placement of the reflector, but screw the nuts on at least to their full thickness. Position the clamp assembly as closely as possible to the 45 degree reading on the elevation scale of the lower mount, and lash securely as shown in Fig. 4 of this section.

4.09 Rig the mount for hoisting so that it assumes the normal upright position during the ascent (see Section 402-423-400, Fig. 1 or 2); the approximate weight is 260 pounds. Connect at least two handling lines near the bottom of the mount and deploy men on the ground to handle the ropes in the best manner to minimize erratic motion and prevent collision with the supporting structure or other obstacles as the assembly is being hoisted.

> ***Note:*** As the assembly rises, it may be necessary for the men on the handling lines to move farther from the structure in order to exert satisfactory control.

4.10 When the reflector mount reaches the installation level, guide it into position at the predetermined location on the ring mount; use the handling lines to control the mount without restricting placement. Place the saddles between the 4-inch O.D. pipe and the upper and lower rings, and install the U bolts as shown in Fig. 2 of this section. Adjust the distance between the intermediate mounting angle and the center line of the intermediate ring to 5 feet 5 inches as shown in Fig. 1 of this section. After the spacing has been adjusted, fully tighten the U-bolt connections to the upper and lower rings before releasing tension on the winch line and removing all lines from the reflector mount.

4.11 Check the reflector carefully for correct assembly in accordance with Section 402-423-202 or -203 as applicable. Place the reflector face downward on wooden skids at a point from which it can be rigged conveniently for lifting; arrange the skids to protect the metal face and also to provide a rest for the bottom

of the frame as the reflector is drawn upward into its normal position in the first stage of hoisting.

4.12 Connect the top mount (Section 402-423-400, Fig. 1, Item 10B; or Fig. 2, Item 12B) to the 1-1/32 inch hole in the casting at the back of the reflector. There are two positions on the top mount at which it might be connected to the reflector as shown in Fig. 5 of this section. ***The choice depends on the desired range of elevation adjustability and is to be determined by local supervision.***

4.13 Join the top mount to the reflector at the correct bolting position, using a 1- by 5-inch bolt with lockwasher and nut. Run the nut up as far as possible without immobilizing the mount. Install the ⅜- by 1½-inch cap screw (Section 402-423-400, Figs. 1 and 2, Item 16) through the small hole in the top mount, adjacent to the bolting position, and into the tapped hole in the reflector casting as shown in enlarged view D-D of the above figures. The top mount is now positioned at the proper angle with respect to the back of the reflector to receive the top swivel when the reflector is placed on the tower.

4.14 Remove all shipping protection from the strut assembly (Section 402-423-400, Fig. 1 or 2, Item 32B). See that the insertion tube and sleeve of the strut move freely with respect to each other. The ball joints at the ends of the strut have been factory set; ***do not disassemble them,*** but examine the recess between the nut and the ball for dirt or foreign material. Remove any deposit carefully using a clean, dry, lint-free cloth; if a probe is required, use a suitably shaped stick and be careful to avoid entrapment of splinters in the joint. Take precaution to keep the joints clean during assembly. The joints have been preloaded to require 20 to 30 pound-feet of applied torque for movement; therefore, they will not move freely by hand. However, a check is to be made of the freedom of the joint by carefully restraining the end (the octagonal flats on the body provide a convenient clamping point); the ball should move in its seat under

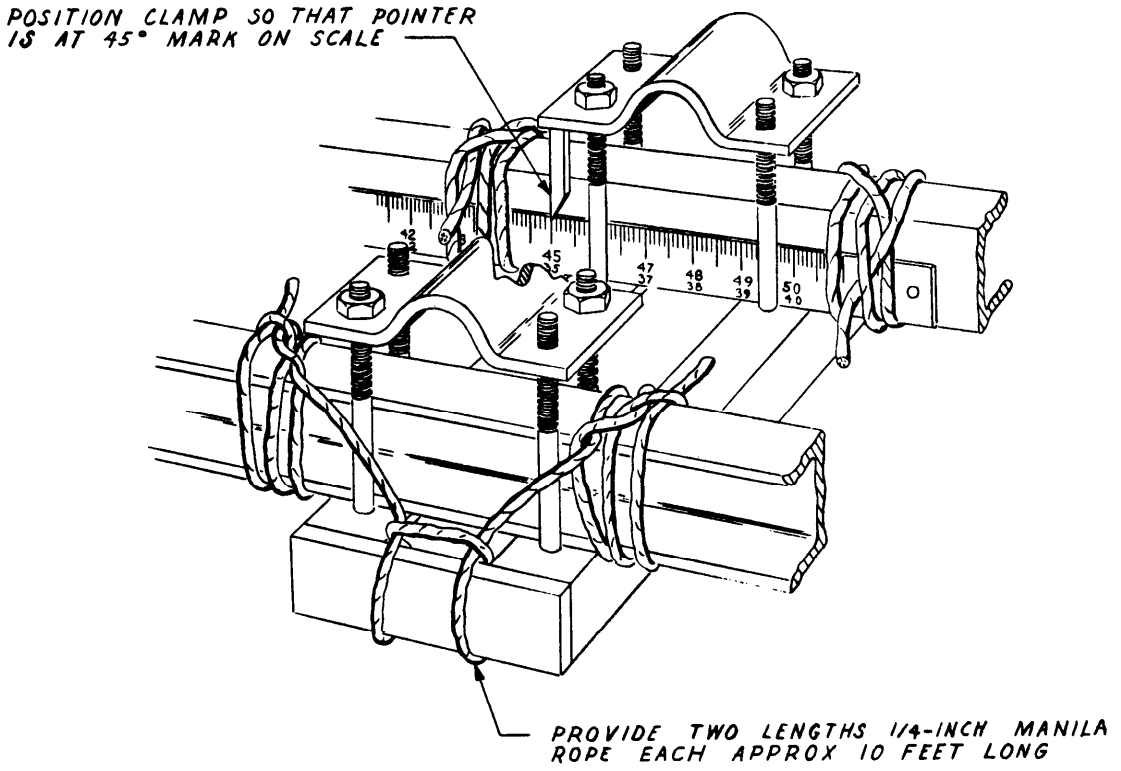

Fig. 4 – Temporary Attachment of Clamp Assembly to Lower Mount — KS-16320 Passive Reflector

moderate force applied by hand along the strut. Work each ball around through its full cone of movement.

4.15 When the joints have been carefully checked for cleanliness and freedom of movement, apply grease equally to each joint from the metal container supplied with the strut. Pack the grease into the recess between the nut and the ball, as indicated in Section 402-423-400, Figs. 1 and 2. Using a flat blade, work the grease in evenly around the circular cavity and pack it down firmly. Keep the joints off the ground and away from gritty dust, etc, after the grease has been applied.

4.16 Connect the ball joint at the end of the sleeve to the bracket (Section 402-423-400, Fig. 3, Item 29 or 30; or Fig. 4, Item 27 or 28) on the side of the reflector frame which has been selected in accordance with the discussion in 3.02 of this section. Connection is made by placing the open end of the joint against the raised face on the front of the bracket. Place the lockwasher under the head of the 1- by 2-inch bolt, install it from the back of the bracket, and tighten the bolt firmly in place. Arrange the split clamps so that the bolts are upright when the split ends are facing toward the reflector.

4.17 Connect the attachment bracket furnished with the strut to the ball joint on the insertion tube. Assemble the strut and lash the two pieces together to prevent them from separating. Apply another lashing to hold the strut approximately in the installed position (see Section 402-423-400, Fig. 1 or 2) and to prevent it from swinging uncontrollably while the reflector is being hoisted. Tighten the bolts in the split clamps to the point where they still permit the tubes to telescope but require a minimum of tightening for full clamping.

Note: In applying rope lashings, keep the knots toward the back of the reflector assembly where they will be accessible for

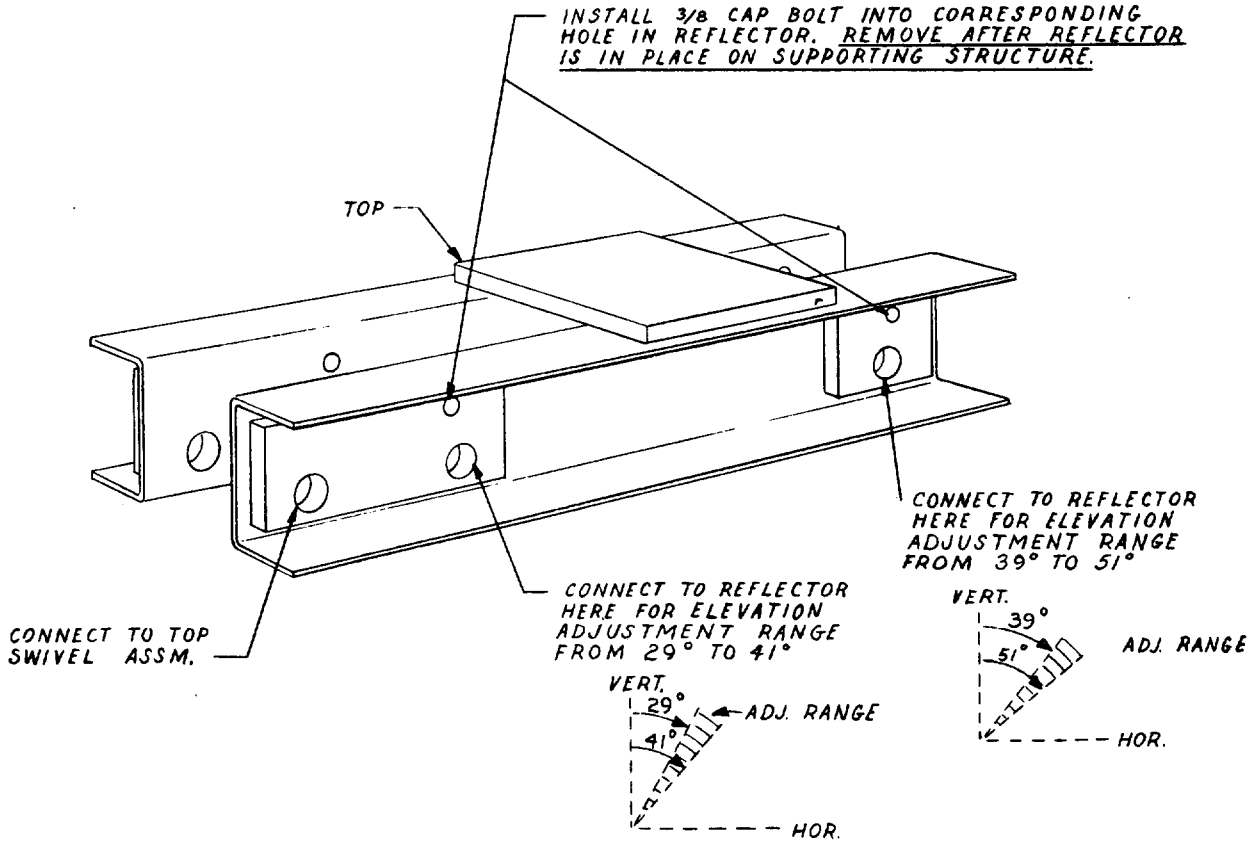

Fig. 5 – Top Mount Assembly — KS-16320 Passive Reflector

untying when the reflector is in place on the tower. Where lashings are passed around sections of the reflector assembly which will later be inaccessible, be sure that they can be pulled away without jamming the rope or stressing the reflector.

Caution: Damage to the reflecting surface shall be avoided. If it is necessary to step on the reflector for any reason, this shall be done only by permission of supervision and with the exercise of extreme care. Use a scaling ladder or platform which:

(1) ***Provides for the complete safety of the user in that it is capable of being firmly attached to the reflector, affords the user adequate support, and when installed can be safely and readily mounted and dismounted by the user.***

(2) ***Assures complete protection of the reflector from damage. Do not in any case apply concentrated loads directly to the sheet metal reflecting surface.***

4.18 Sling the reflector so that the lifting load will be taken by the tubular member at the back of the frame (Section 402-423-400, Fig. 3, Item 13; or Fig. 4, Item 18). The approximate weight is 525 pounds for list 1 reflectors or 700 pounds for list 2 reflectors. ***Do not transmit any of the lifting load to the casting at the top of the frame and avoid bending any welded connection.*** Attach at least two handling lines near the bottom of the reflector, of sufficient length to permit men to be deployed on the ground to suitable positions from which the motion of the reflector can be effectively controlled throughout the ascent.

Note: As the assembly rises, it may be necessary for the men on the handling lines to move farther from the structure in order to exert satisfactory control.

Keep the reinforcing pads clear at the center of the base (Section 402-423-400, Fig. 3, Items 8; or Fig. 4, Items 35) so that the reflector can be rested on the lower mount when it has been hoisted into position.

Caution: Hoisting of the reflector should not be attempted if strong winds or heavy gusts are prevalent. In general, wind velocity is considerably greater near the top of a structure than at ground level.

4.19 The clamp assembly which will hold the bottom of the reflector has been temporarily lashed to the lower mount which is now in place, as shown in Fig. 4 of this section. Before the reflector is hoisted into position, be certain that the clamps (which have been bolted loosely to the studs) are removed and kept readily available. The necessary ½-inch nuts and lockwashers must be available to complete the assembly.

4.20 Install an azimuth adjusting tool on the reflector mount, as shown in Fig. 3 of this section, before the reflector is hoisted.

4.21 Lift the reflector into place, being careful to avoid collision with the supporting structure or other obstacles.

4.22 As the reflector reaches the installation position, guide it carefully in over the lower mount; use the handling lines to control the reflector without restricting placement. Set the reinforced sections of the base on the rails between the projecting studs of the clamp assembly. ***While this operation is in progress, avoid any impact on the top mount which is projecting from the back of the reflector frame.*** Immediately put the clamps in place and install the lockwashers and nuts. Leave the clamps just loose enough to permit the base to rotate.

4.23 Remove the bolt which had been placed temporarily in the hole of the top swivel. Bring the top of the reflector back carefully so that the swivel passes into the space between the two sides of the top mount, and install the 1- by 5-inch bolt through the top mount and the swivel. Leave the nut loose enough to permit the top mount to rotate with respect to the swivel, but not so loose that there is excessive side movement between the parts. ***Immediately remove the ⅜-inch cap screw which locks the top mount to the reflector.***

Note: The winch line and handling lines are still in place and have not been slacked.

4.24 Remove the lashing which had held the strut contracted, taking care to avoid separation of the tube and sleeve. If possible, leave a portion of the support sling in place to take the weight of the strut until it is connected to the tower; if this is impossible or inconvenient, before the original lashing is removed rig an auxiliary sling to take the weight of the strut. Carefully extend the strut and bolt to the strut bracket on the backstay.

4.25 Remove all lifting and handling tackle and support slings.

5. PRECAUTIONS

5.01 If elevation, azimuth, and curvature adjustments are to proceed immediately, perform the work in accordance with the practices described in Sections 402-423-209-, -210, and -211, respectively. Then immobilize the reflector in accordance with Section 402-423-212.

5.02 If the reflector is to be left overnight or longer before adjustment, immobilize the assembly as described in Section 402-423-212.