TM 11-2614

WAR DEPARTMENT TECHNICAL MANUAL

ASSEMBLING AND ERECTING 30-FOOT GIN-POLE-TYPE TRYLON LADDER TOWERS

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WAR DEPARTMENT • 8 SEPTEMBER 1944

TECHNICAL MANUAL

ERECTION KIT MX-746/FR

CHANGES No. 2

DEPARTMENT OF THE ARMY
WASHINGTON 25, D. C., *12 April 1950*

TM 11-2614, 8 September 1944, is changed as follows:

(As changed by C 1) The title of the manual is changed to read:

ERECTION KIT MX-746/FR

Note (Added). Erection Kit MX-746/FR procured on Order No. 25638-P-49 is similar to all previous procurements of Erection Kit MX-746/FR. All information contained in the basic manual applies equally to Erection Kit MX-746/FR (Order No. 25638-P-49) except where these changes specify otherwise.

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1. Description

The trylon antenna * * * is not exceeded. Complete illustrated instructions **are forwarded** with the unassembled equipment **which is** packed in two export boxes **and one bundle (MX-746/FR (Order No. 25638-P-49)) or in two export boxes (all other procurements of MX-746/FR).** The sizes, weights, and **volume** of the boxes **and bundle** are as follows:

Box No. 1 (**all procurements**):	Size 5 by 20½ by 22 inches. Weight 126 pounds. Volume 1.4 cubic feet.
Box No. 2 (**all procurements except Order No. 25638-P-49**):	Size 3½ by 7½ by 133½ inches. Weight 212 pounds. Volume 2.0 cubic feet.
Box No. 2 (Order No. 25638-P-49 only):	**Size 3½ by 7½ by 127½ inches. Weight 183 pounds. Volume 1.9 cubic feet.**
BUNDLE (Order No. 25638-P-49 only):	**Size 6 by 9½ by 70 inches. Weight 50 pounds. Volume 2.3 cubic feet.**

It is recommended * * * are thoroughly understood.

2. Component Parts

a. Box 1.

Quantity	Item	Size
*	* * *	*
2	Front guys (H. S. 7-Str.) (with sheave on 1 end and 2 compression sleeves). **Front guys supplied with Order No. 25638-P-49 have only 1 compression sleeve.**	50'- 0"
1	Back guy (H. S. 7-Str.) (with sheave on 1 end and 2 compression sleeves). **Back guys supplied with Order No. 25638-P-49 have only 1 compression sleeve.**	80'- 0"
*	* * *	*
4	Screw anchors, detachable (**all procurements except Order No. 25638-P-49**).	6" helix
4	Anchor keys (**all procurements except Order No. 25638-P-49**).	¾ x 1 3/16 x ¼".
*	* * *	*
1	Attachment cable (with thimble and 2 compression sleeves on each end). **Attachment cables supplied with Order No. 25638-P-49 have only 1 compression sleeve on each end.**	8'
*	* * *	*

b. Box 2.

Quantity	Item	Size
*	* * *	*
4	Thimble eye anchor rods (**all procurements except Order No. 25638-P-49**).	¾" x 5'-4"

c. (Added) BUNDLE.

Quantity	Item	Size
4	Anchors, screw-type with 6" helix (Order No. 25638-P-49 only).	¾" x 66"

4. Location

The ladder face * * * inches project (fig. 5).

Note (Added). Anchors supplied with Erection Kit MX-746/FR (Order No. 25638-P-49) are one piece anchors and therefore require no assembling.

*These changes supersede C 1, 5 September 1947.

6. Maintenance (Superseded)

a. Replace any defective part (par. 3).

b. Test for mechanical strength and fitness after any repairs.

c. Examine all exposed parts, especially the hot-dip galvanized lattice-work, for rust. When this defect is detected, clean the faulty area with No. 1 sandpaper or steel wool and wipe off with a cloth. Then wipe the surface with carbon tetrachloride to remove any grease or oil that may be present. Apply two coats of zinc chromate primer such as paint (Sig C stock No. 6G1505–4). Allow the primer to dry and then apply two top coats of finisher such as paint (Sig C stock No. 6G1509). Inspect any painted-over surface periodically since enamel paint has a tendency to peel or chip.

d. Apply Oil, engine, Grade SAE 10 (OE–10) to all moving parts.

7. (Added) Forms and Records

a. The following forms will be used for reporting unsatisfactory conditions of equipment:

(1) DD Form 6 (Report of Damaged or Improper Shipment) will be filled out and forwarded as prescribed in SR 745–45–5 or AFR 71–4.

(2) DA AGO Form 468 (Unsatisfactory Equipment Report) will be filled out and forwarded to the Office of the Chief Signal Officer as prescribed in SR 700–45–5.

b. Use other forms and records as authorized.

8. (Added) Identification Table of Parts for Erection Kit MX–746/FR

a. Requisitioning Parts. The fact that a part is listed in the following table is not sufficient basis for requisitioning the item. Requisitions must cite an authorized basis, such as T/O & E's, T/A's, T/BA's, SIG 6, SIG 7, SIG 8, SIG 7 & 8, SIG 7–8–10, SIG 10, list of allowances of expendable material, or another authorized supply basis. The Department of the Army Supply Catalog applicable to the equipment covered in this manual is SIG 7 & 8–MX–746/FR. For an index of available catalogs in the Signal section of the Department of the Army Supply Catalog, see the latest issue of SIG 1.

b. Identification Table of Parts.

Ref symbol	Name of part and description	Function of part	Signal Corps stock No.
	ERECTION KIT: MX–746/FR; 30′ trylon latticed tower; steel, galv; includes 3 guys, guy attachments, 4 anchors, 3 base pins, top sheave, sling, and hardware; Wind Turbine type 1245.	Used as gin pole for erecting 73′ 7″ lattice radio towers for rhombic antennas; also for other erection purposes not exceeding its capacity.	2A1666
H–1	ANCHOR, screw: steel; 6″ diam helix and ¾″ diam x 66″ lg triple eye rod; holding power in sand 2500 lb.	Used as ground holding device for guys.	5B306
H–4	BOLT, machine: sq hd, steel; ¾″–10 NC thd; 4½″ lg U. H.; threaded 1¾″; w/one hex nut.	Used to assemble the pulley attached to the tower top plate.	6L612–4.5G
H–13	BOLT, machine: sq hd, steel; ⅝″–18 NC thd; ¾″ lg U. H.; threaded ½″; w/one hex nut.	Used to secure together the members of the tower.	5B1505–7
H–14	BOLT, machine: sq hd, steel; ⅝″–18 NC thd; 1″ lg U. H.; threaded ¾″; w/one hex nut.	Used to secure together the members of the tower.	5B1505–1A
H–15	BOLT, machine: sq hd, steel; ⅜″–16 NC thd; 1″ lg U. H.; threaded 1 1/16″; w/one hex nut.	Used to attach the guys to the tower clips.	5B1506–1
H–16	BOLT, machine: sq hd, steel; ½″–13 NC thd; 1½″ lg U. H.; threaded 1¼″; w/one hex nut.	Secures the tower top casting to the tower.	5B1508–1.5
H–17	BOLT, machine: sq hd, steel; ½″–13 NC thd; 1¾″ lg U. H.; threaded 1¼″; w/one hex nut.	Secures foot casting to base plate assembly.	5B1508–1.7
H–18	BOLT, machine: sq hd, steel; ⅝″–11 NC thd; 1½″ lg U. H.; threaded 1⅛″; w/one hex nut.	Secures pulley assembly to tower top casting.	5B1510–1.5

Ref symbol	Name of part and description	Function of part	Signal Corps stock No.
H–21	CLAMP: guy wire; malleable iron and steel; one U-bolt ¼″ x 1½″, threaded 1″ each end; w/one saddle to accommodate ¼″ guy strand and 2 hex nuts.	Used as wire rope clamp to secure ¼″ guy strand.	5B3480
H–5	CLAMP: guy wire; malleable iron and steel; one U-bolt ½″ x 3″, threaded 1¼″ each end; w/one saddle to accommodate ⅝″ guy strand and 2 hex nuts.	Used as wire rope clamp to secure ⅝″ guy strand.	5B4024
H–6	CLAMP: guy wire; malleable iron and steel; one U-bolt 5/16″ x 2″, threaded 1″ each end; w/one saddle to accommodate ½″ guy strand and 2 hex nuts.	Secures wire rope used to raise 73′ 7″ tower.	5B4108
H–7	CLAMP: steel; 2 pieces, each 1¾″ wd x 2⅝″ lg x 1/16″ thk; rounded one end with 60° bend approx 1½″ from rounded end; formed U other end; one 13/32″ diam hole; one sq hd machine bolt ⅜″ diam, 1″ lg U. H., threaded 1 1/16″; w/one hex nut and palnut.	Used with sheave to form tower clip assembly to attach guys to tower.	5B3482
WR–1	GUY: galv steel; 7 strand; ¼″ diam; approx 50′ lg; fixed ¼″ sheave, spliced one end, w/one compression-type sleeve.	Used as side guy to prevent lateral motion of the tower.	2A1344–66
WR–2	GUY: galv steel; 7 strand; ¼″ diam; approx 80′ lg; fixed ¼″ sheave, spliced one end, w/one compression-type sleeve.	Used as back guy to prevent lateral motion of the tower.	2A1344–67
O–1	HOOK: used with two Crosby clips as strand grip; steel; ½″ diam rod, approx 13″ lg o/a; one end half ovaleye, 1½″ lg x 1¼″ wd; ½″ bend other end.	Provides a means of attachment for the block and fall used to tighten the back guy.	2A3186.2–1
H–8	NUT, lock: palnut type; steel; for ½″–13 NC thd bolt.	Secures associated hexagonal nut..	6L2651–13
H–9	NUT, lock: palnut type; steel; for 5/16″–18 NC thd bolt.	Secures associated hexagonal nut..	6L3675–18–9G
H–2	PULLEY: semisteel; 6″ OD, 1½″ thk o/a; bore 2 5/32″ diam through 1 2 5/32″ thk hub; single groove, 1⅛″ wd x 1 1/16″ d; 6 weight-reduction holes.	Used to change the direction of the pulling force during the erection of the 73′ 7″ tower.	6Z7682–15
H–3	SHACKLE: steel; ½″ diam stock; approx 3½″ lg o/a, 2½″ wd tapering to 1¾″ wd; one hole drilled and one hole drilled and tapped in upper portions of U for pin; one 5/16″ diam pin, 2¾″ lg o/a, 1⅞″ lg U. H., threaded ⅝″.	Used to attach the sling to the back anchor.	5B15508
H–11	THIMBLE, guy: steel; for ½″ guy strand; 3″ lg x 1⅞″ wd o/a; 5/16″ thk across score.	Protects guy strand from sharp bend and abrasion.	5B18044
H–12	THIMBLE, guy: steel; for ¼″ guy strand; 2″ lg x 1⅛″ wd o/a; 5/16″ thk across score.	Projects guy strand from sharp bend and abrasion.	5B18054
H–10	WASHER, flat: steel; round, 2″ OD, 1 1/16″ ID----	----------	6L60012

Figure 5. Anchor Installation. **(Anchors supplied with Erection Kit MX–746/FR (Order No. 25638–P–49) are one piece and therefore require no assembling.**

[AG 461 (21 Mar 50)]

BY ORDER OF THE SECRETARY OF THE ARMY:

J. LAWTON COLLINS
Chief of Staff, United States Army

OFFICIAL:

EDWARD F. WITSELL
Major General, USA
The Adjutant General

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WAR DEPARTMENT TECHNICAL MANUAL

TM 11-2614

ASSEMBLING AND ERECTING 30-FOOT GIN-POLE-TYPE TRYLON LADDER TOWERS

WAR DEPARTMENT • 8 SEPTEMBER 1944

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WASHINGTON 25, D. C., 8 September 1944.

TM 11–2614, Assembling and Erecting 30-Foot Gin-Pole-Type Trylon Ladder Towers, is published for the information and guidance of all concerned.

[A. G. 300.7 (10 Apr. 44).]

BY ORDER OF THE SECRETARY OF WAR:

G. C. MARSHALL,
Chief of Staff.

OFFICIAL:

J. A. ULIO,
Major General,
The Adjutant General.

DISTRIBUTION:

IBn11(2); IC11(5).
(For explanation of symbols see FM 21–6.)

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DESTRUCTION NOTICE

WHY --To prevent the enemy from using or salvaging this equipment for his benefit.

WHEN—When ordered by your commander.

HOW —1. Smash—Use sledges, crowbars, heavy tools.

2. Cut —Use axes.

3. Burn —Use gasoline, kerosene, oil, flame-throwers.

4. Explosives—Use firearms, grenades, TNT.

5. Disposal —Bury in slit trenches, fox holes, other holes, wherever possible. Throw in streams. Scatter.

USE ANYTHING IMMEDIATELY AVAILABLE FOR DESTRUCTION OF THIS EQUIPMENT

WHAT—1. Smash—Ladder tower, base plate assembly, etc.

2. Cut —Guy wires, ladder tower, other components.

3. Burn —Technical manual.

4. Bend —Base plate, anchor rods, ladder tower.

5. Bury or scatter—Any or all of the above pieces, after destroying their usefulness.

DESTROY EVERYTHING

ASSEMBLING AND ERECTING
30-FOOT GIN-POLE-TYPE TRYLON LADDER TOWER

1. DESCRIPTION.

The trylon antenna ladder tower is made of galvanized copper bearing steel. These towers are three sided and are built with legs of specially formed strip steel, shaped like a wedge. Adequate diagonal angle braces are provided for all three faces to balance the stress. Horizontal braces are attached on each face at each panel point, while on the ladder side intermediate horizontal braces are added, spaced 15 inches apart, forming a convenient ladder for climbing. The 30-foot trylon ladder tower is to be used especially as a gin pole for the erection of the 73-foot, 7-inch lattice radio towers for rhombic antennas. It may be used for other purposes where its capacity is not exceeded. Complete illustrated instructions, along with the unassembled equipment are packed in two export boxes. The sizes, weights, and cubage of the boxes are as follows:

Box No. 1: Size 5 by 20½ by 22 inches.
Weight 126 pounds.
Volume 1.4 cubic feet.

Box No. 2: Size 3½ by 7½ by 133½ inches.
Weight 212 pounds.
Volume 2.0 cubic feet.

It is recommended that the instructions be read completely as soon as they are unpacked. Do not attempt to set up the tower until these instructions are thoroughly understood.

2. COMPONENT PARTS.

a. Box 1.

Quantity	*Item*	*Size*
51	Horizontals	1/16 x 12″
1	Base plate	¼″
3	Base plate attachment plates	¼″
3	Foot castings (bottom leg supports)	
2	Front guys (H.S. 7-Str.) (with sheave on 1 end and 2 compression sleeves)	50′–0″
1	Back guy (H.S. 7-Str.) (with sheave on 1 end and 2 compression sleeves)	80′–0″
6	Tower guy attachment clips	
1	Top plate	¼″
3	Top castings (top leg connectors)	
1	Sheave (pulley)	6″ OD
2	Sheave support angles 6″ OD	3½ x 5 x 5/16″
1	Bolt and nut (for sheave)	⅝ x 4½″
4	Screw anchors detachable	6″ helix
4	Anchor keys	⅝ x 1 3/16 x ¼″
1	Oval eyebolt, unthreaded bolt with hood end	½″ x 14″
1	Attachment cable (with thimble and 2 compression sleeves on each end)	8′
1	Anchor shackle	½″
6	Crosby type cable clips	¼″
2	Crosby type cable clips	⅜″
2	Crosby type cable clips	½″
6	Palnuts	½″
115	Palnuts	5/16″
3	Washers for ⅝″ bolt	1 9/16″ ID
4	Thimbles, open type	½″
2	Thimbles, open type	¼″
95	Square head galvanized bolts with hex nuts	5/16 x ⅝″
20	Square head galvanized bolts with hex nuts	5/16 x 1″
3	Square head galvanized bolts with hex nuts	⅜ x 1″
7	Square head galvanized bolts with hex nuts	½ x 1½″
7	Square head galvanized bolts with hex nuts	½ x 1¾″
4	Square head galvanized bolts with hex nuts	⅝ x 1½″
1	Technical manual	

b. Box 2.

3	Leg channels, right (marked "R")	10′ 3″
3	Leg channels, left (marked "L")	10′ 3″
3	Leg channels, center (marked "C")	10′ 3″
36	Diagonals	1/16 x 33″
3	Square head ground pins	1 x 30″
4	Thimble eye anchor rods	¾″ x 5′–4″

3. ASSEMBLY.

a. General. As the gin pole is light, it should be assembled at any convenient place where ground is level so that the minimum amount of blocking

will be necessary. When assembled, it may be easily carried to the desired location. Fasten a foot casting to one right leg and one left leg (leg channels are marked inside and at bottom of splice area) with one 5/16- by 1-inch bolt at the bottom hole. Insert a 5/16- by 1-inch bolt on one face, place a horizontal brace upon it, and assemble the full length of the ladder face (figs. 4 and 8). When complete, lay the ladder face to ground and level same by **blocking** (fig. 7). Attach foot casting to the center leg and assemble the remaining two faces of the gin pole (figs. 4 and 8). Assembly is facilitated if all the members are loose-bolted, that is, the nuts are placed on the bolts and are turned until they are finger-tight. When all members are in place, the assembled section is lined up and the nuts are tightened with a wrench. When tightening the bolt be careful not to use too much force, since overtightening either strips the threads or breaks the bolt. A 4-inch wrench is sufficiently long to adequately tighten a 5/16-inch bolt. When the gin pole has been completely assembled and all bolts and nuts have been properly tightened, the Palnut type locknuts are placed on the bolt ends and are tightened with the fingers until the locknut is snug against the regular nut. Take care to apply the locknut with the open side out. It is then tightened with a wrench about one-quarter turn. The wrench should only engage the Palnut and not the regular nut. Maximum holding power of the locknut is developed at one-quarter turn beyond the finger-tight position (fig. 10).

b. Base Plate. Attach the base plate and base plate attachments to the foot casting using 1/2- by 1¼-inch bolts and nuts (fig. 3).

c. Top Plate and Pulley Assembly. Assemble the pulley and attach it to the top plate. Then attach this plate to the top leg coupling castings, using 1/2- by 1½-inch bolts and nuts (fig. 2).

d. Guy Attachments. The guys are attached to the tower at the top of the 27.5-foot panel by the use of the tower clip assembly so that they rest on the top side of horizontals (fig. 1). Fasten same by inserting the 3/8- by 1-inch bolt through the holes of the **clip, sheave,** and **clip.** Fasten the nut tightly (fig. 1). Take care to attach the proper guys to the proper leg angles (fig. 1). The 80-foot guy wire runs back to the permanent anchor for the guyed tower to be erected.

4. LOCATION.

The ladder face of the gin pole is placed toward the tower to be erected. When used for erecting a latticed radio tower, place the ladder face of the gin pole 3 feet, 6 inches back of the tower as shown in figure 9. The center of the gin pole should be kept in exact line with the center of the mast or tower to be erected. At a distance of 30 feet from base of the gin pole and 60° to the right and left, place one assembled 6-inch screw anchor and screw the anchor into the ground until not more than 6 inches project (fig. 5).

5. ERECTION.

a. General. Set the assembled gin pole in the proper location so that it will be erected according to the instructions in paragraph 4 and so that the center line of both the gin pole and the latticed tower coincide. To prevent the gin pole from skidding, while it is being raised, place a ground pin on the ground in front of the base plate and drive the remaining pins into the ground at each end so that the three form a **blocking** (fig. 6). When the pole is erect and before the guys are tightened, be sure center lines of both the tower and gin pole are correct. Tighten the guys by aid of a **come-along** and a small block and fall. When in place, drive ground pins through the holes of the base plate attachments.

b. Eight-foot Sling. This sling anchors the tackle block used in raising the guyed towers. Insert one end of the 8-foot 7-wire guy strand sling through body of the 12-inch turnbuckle. Protect the strand from the sharp edges of the turnbuckle body by inserting the 1/2-inch thimble so that the strand lays in the groove of the thimble. See that both ends of the sling are equal, then attach the ends to the 1/2-inch anchor shackle.

c. Guy Clamp. The oval-eye rod attaches to the 3/8-inch guy by using the two 3/8-inch Crosby guy clips. One of these 3/8-inch clips should be placed next to the bent end of this rod. This forms an attachment for the block and fall used to pull up the 3/8-inch back guy.

6. MAINTENANCE.

Failure or unsatisfactory performance of equipment will be reported on WD, AGO Form No. 468. If form is not available see TM 38–250. A maintenance parts list has not been authorized for this equipment.

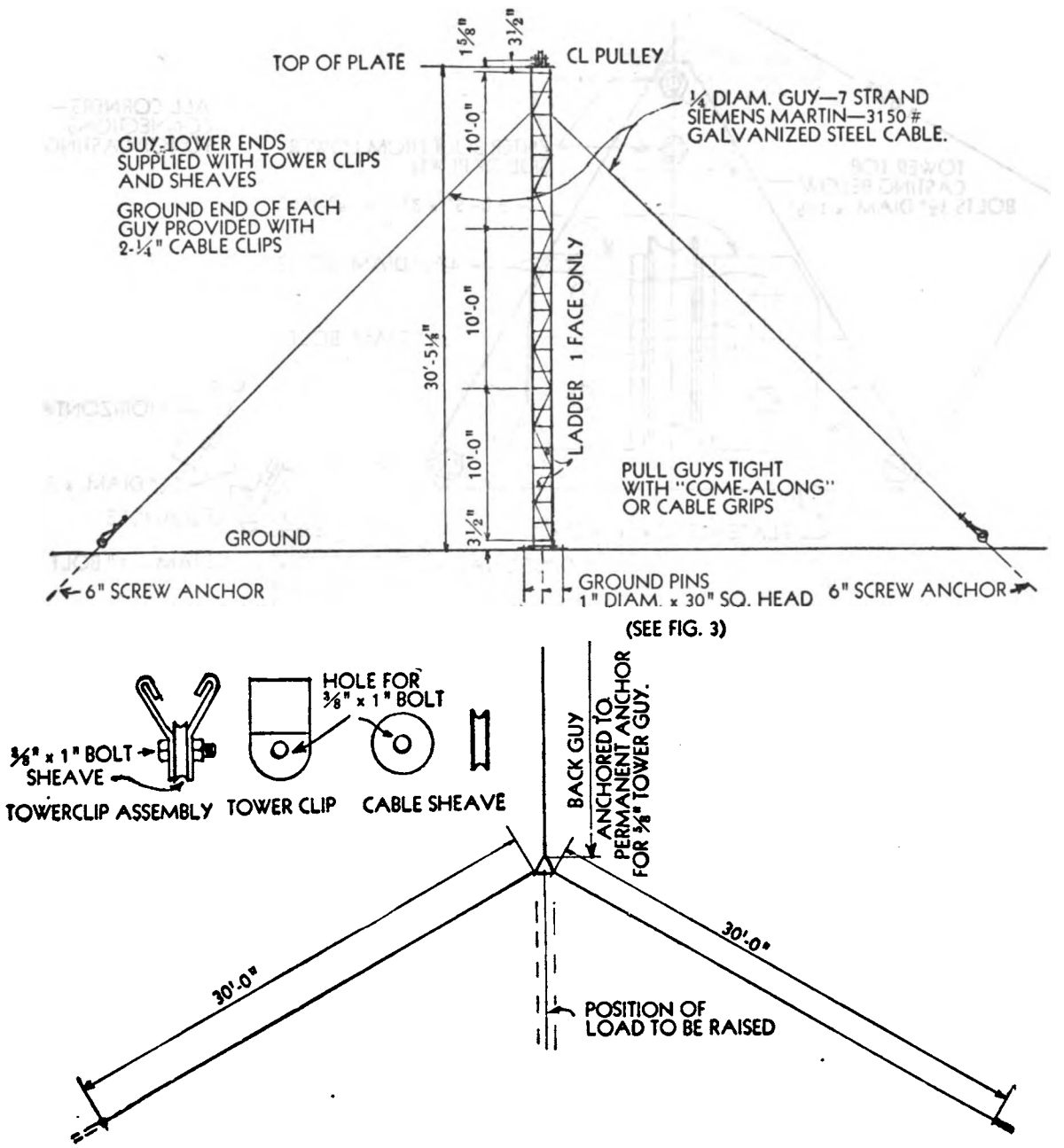


Figure 1. Plan and elevation, showing guy arrangement.

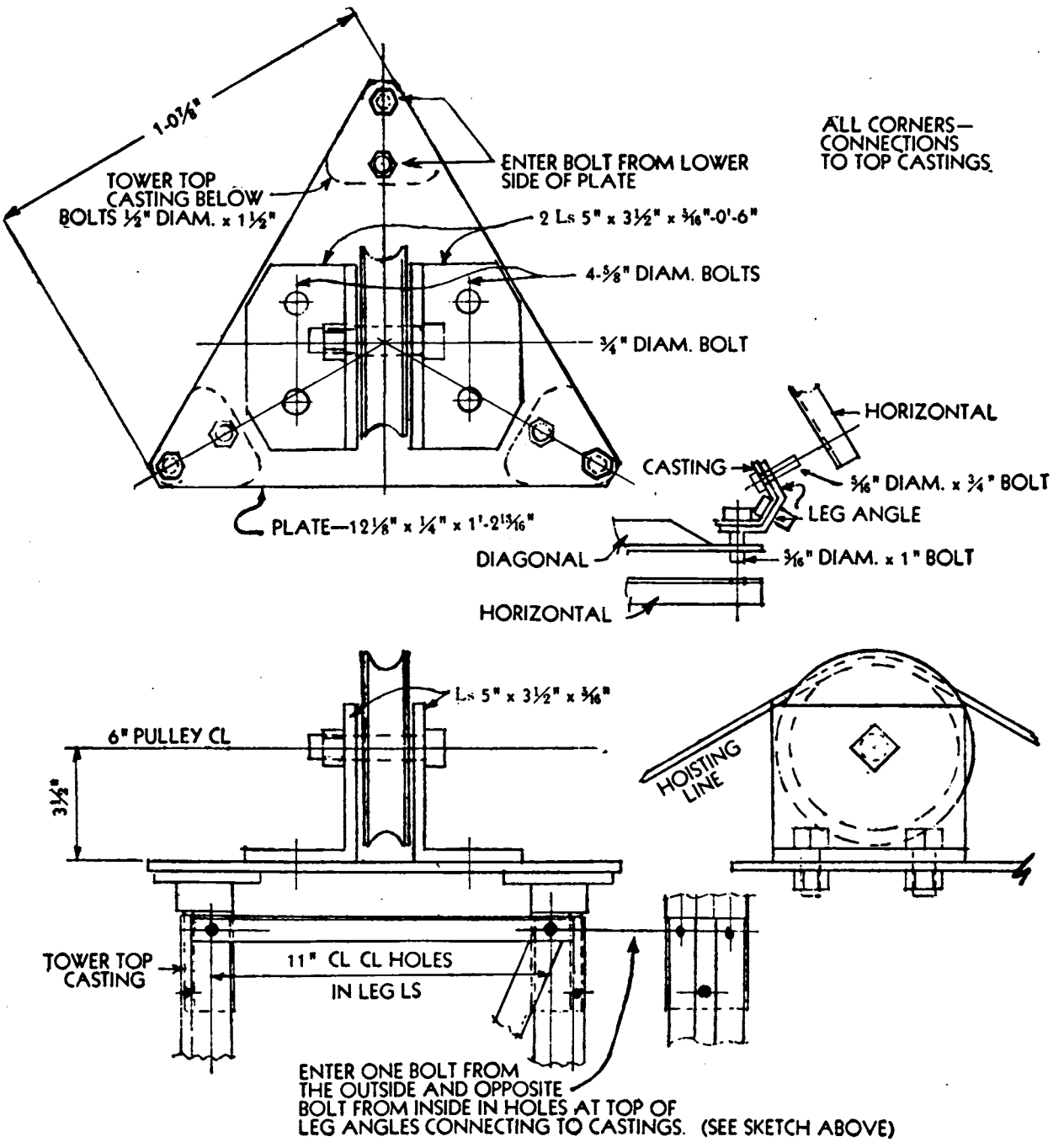
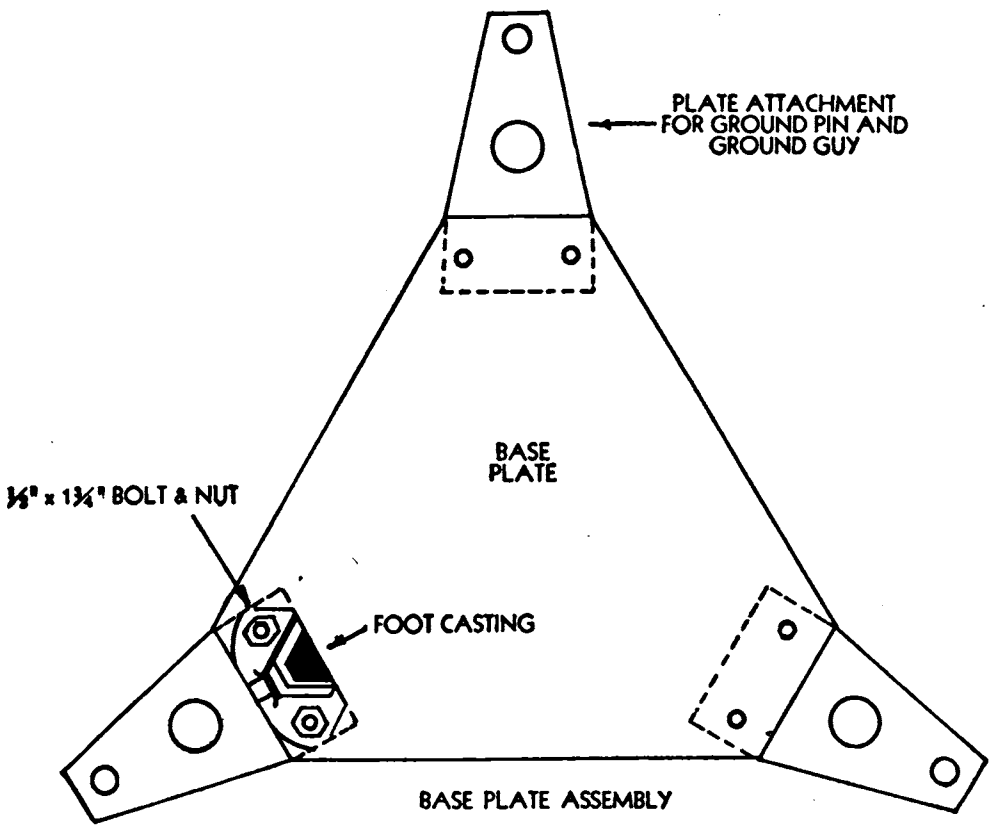


Figure 2. Base plate and pulley details.



ASSEMBLY METHOD

ASSEMBLE LOOSELY—PLATE, PLATE ATTACHMENTS, FOOT CASTINGS, RIGHT, LEFT & CENTER LEGS. ATTACH DIAGONALS & HORIZONTALS PER TOWER SECTION ASSEMBLY SHEET. AS SECTION ASSEMBLES TIGHTEN NUTS, CAREFUL NOT TO STRIP THREADS.

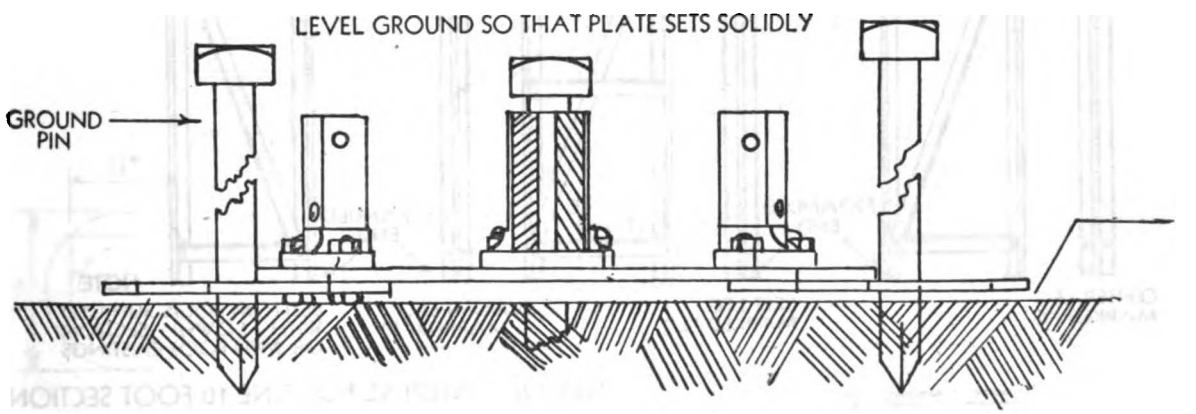
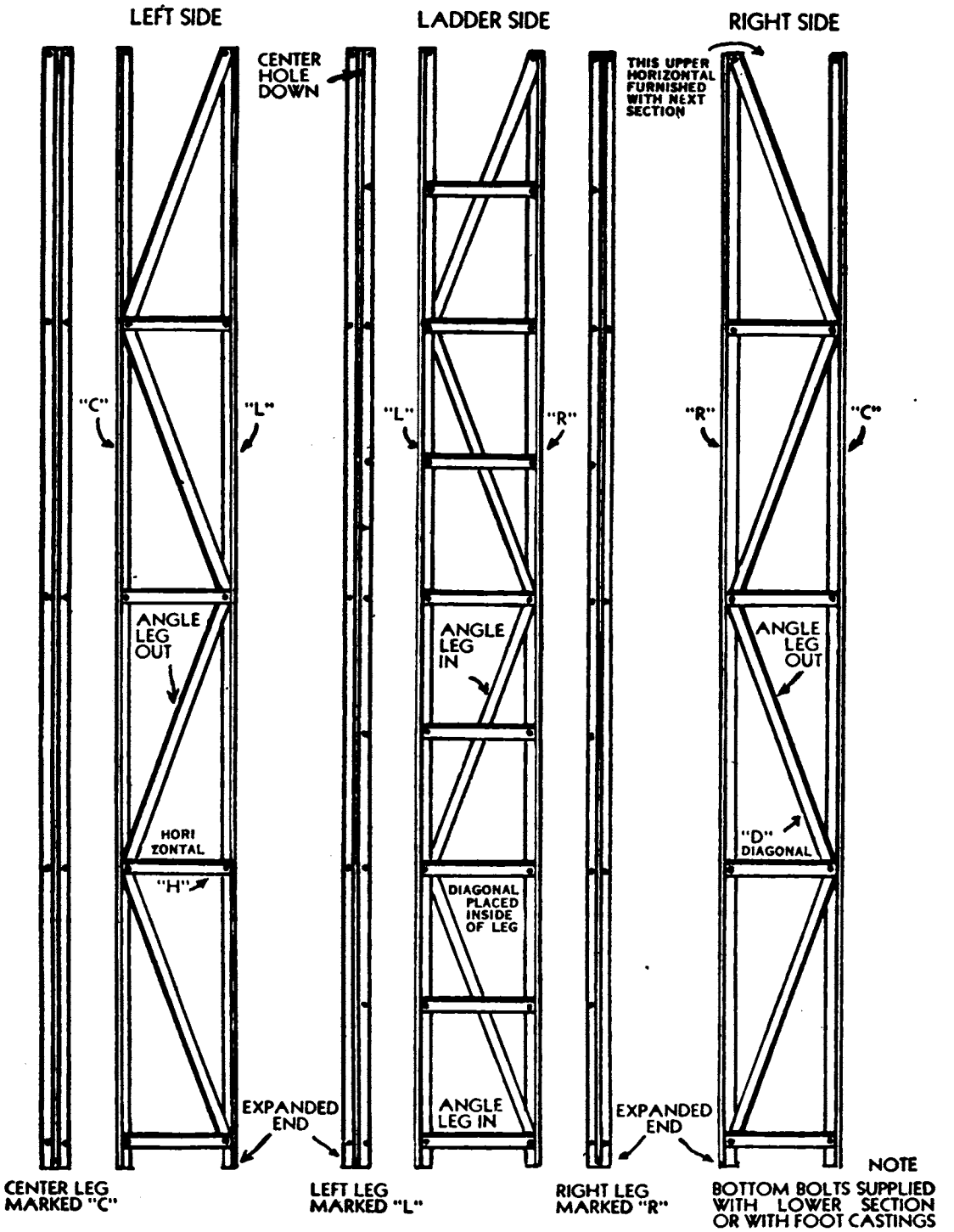
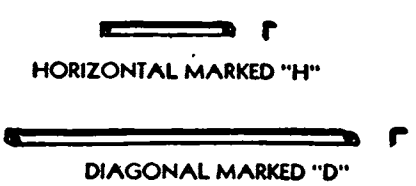


Figure 3. Base plate assembly and installation.





BILL OF MATERIAL FOR ONE 10 FOOT SECTION

CENTER LEG ANGLE MARKED	"C"	1
RIGHT " " "	"R"	1
LEFT " " "	"L"	1
HORIZONTALS (STANDARD)"	"H"	16
DIAGONALS (STANDARD) "	"D"	12
BOLTS AND NUTS 5/16" x 3/4"		35
"PALNUTS" (LOCKING NUTS)		35

Figure 4. Ladder details.

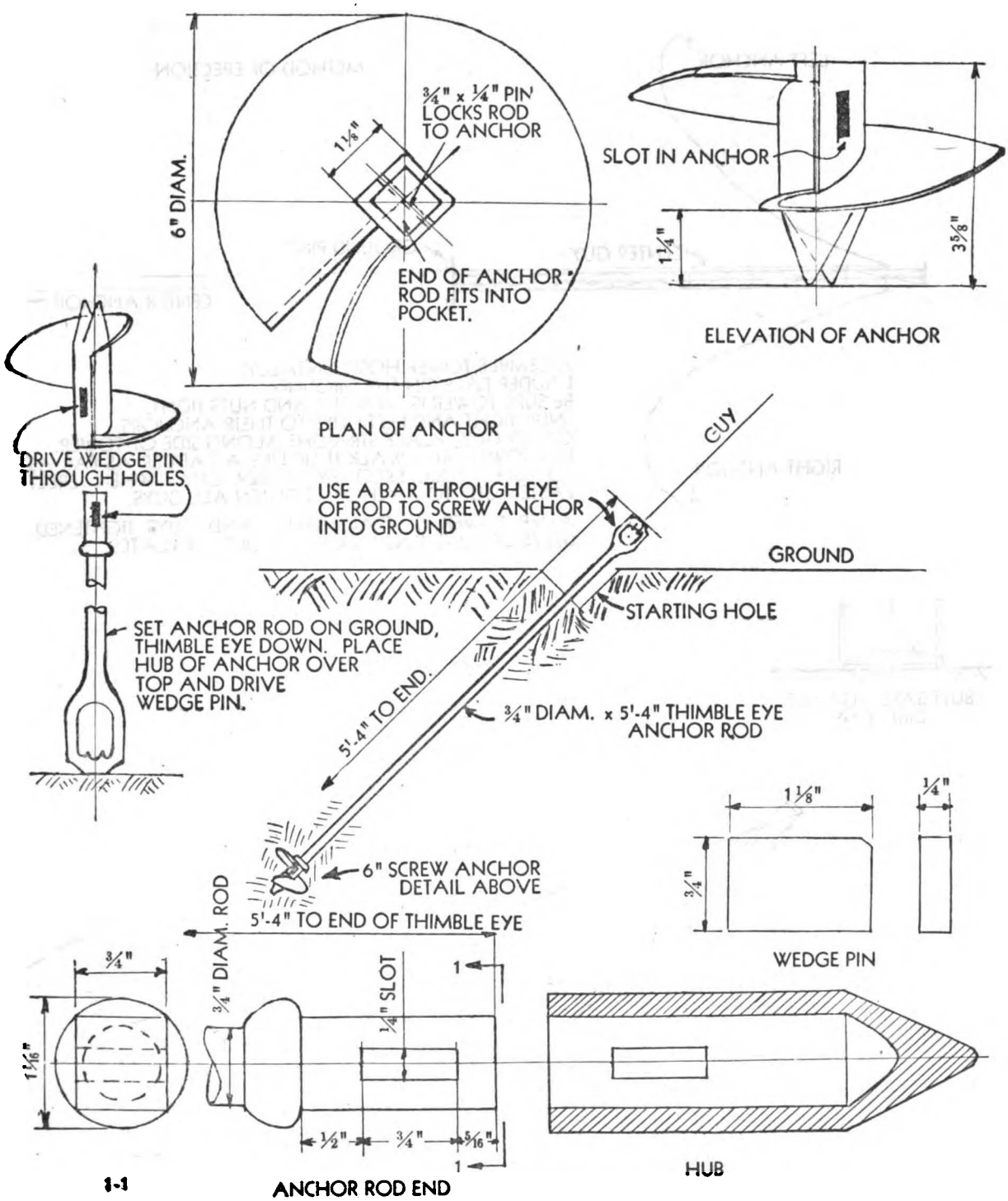


Figure 5. Anchor installation.

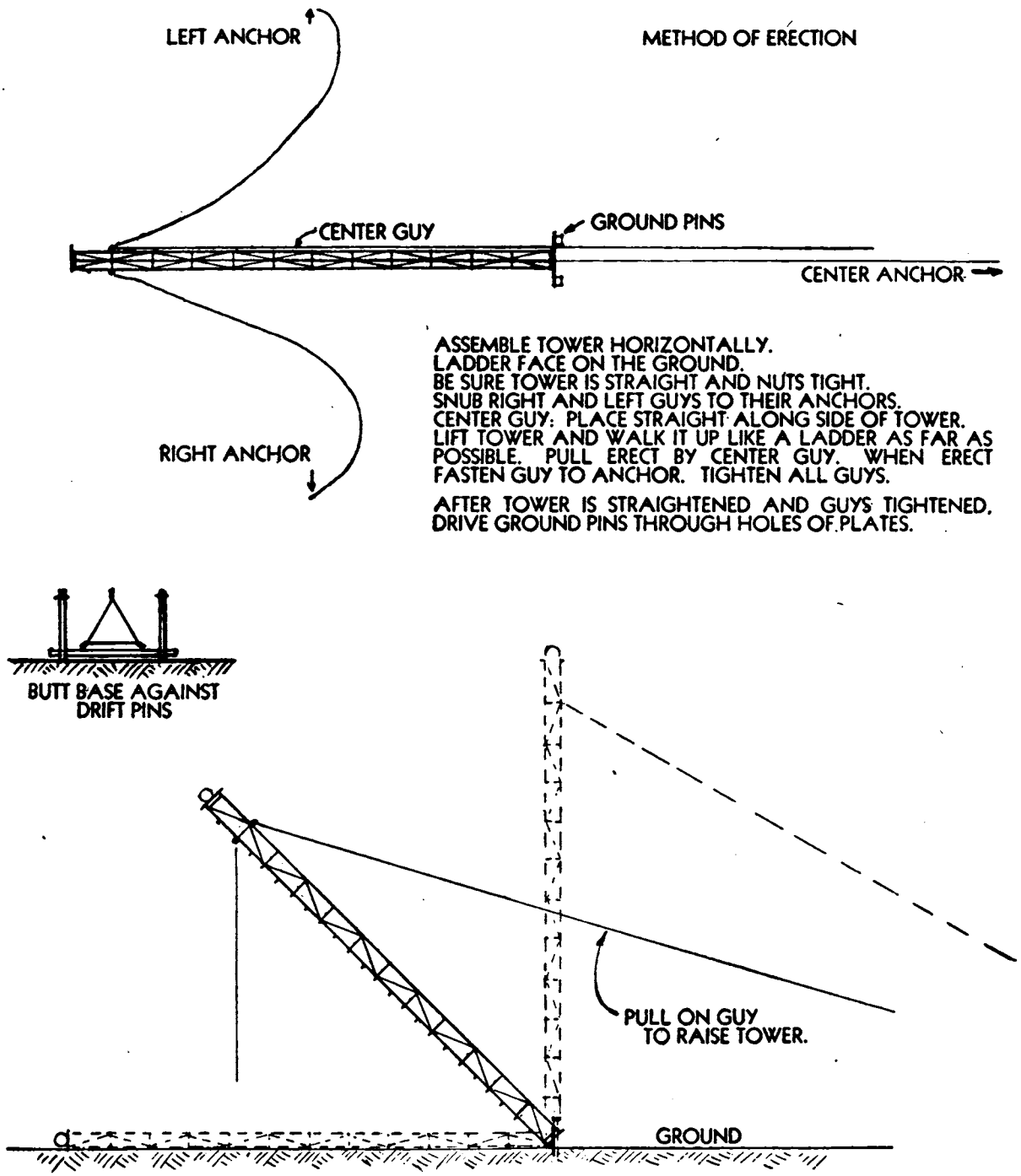


Figure 6. Method of erection.

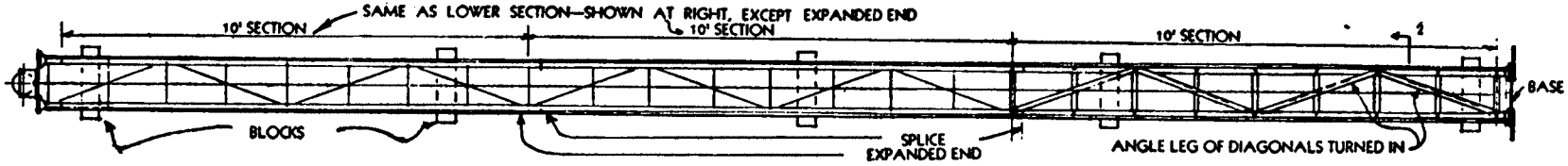


Figure 7. Horizontal Assembly, ladder face toward ground.

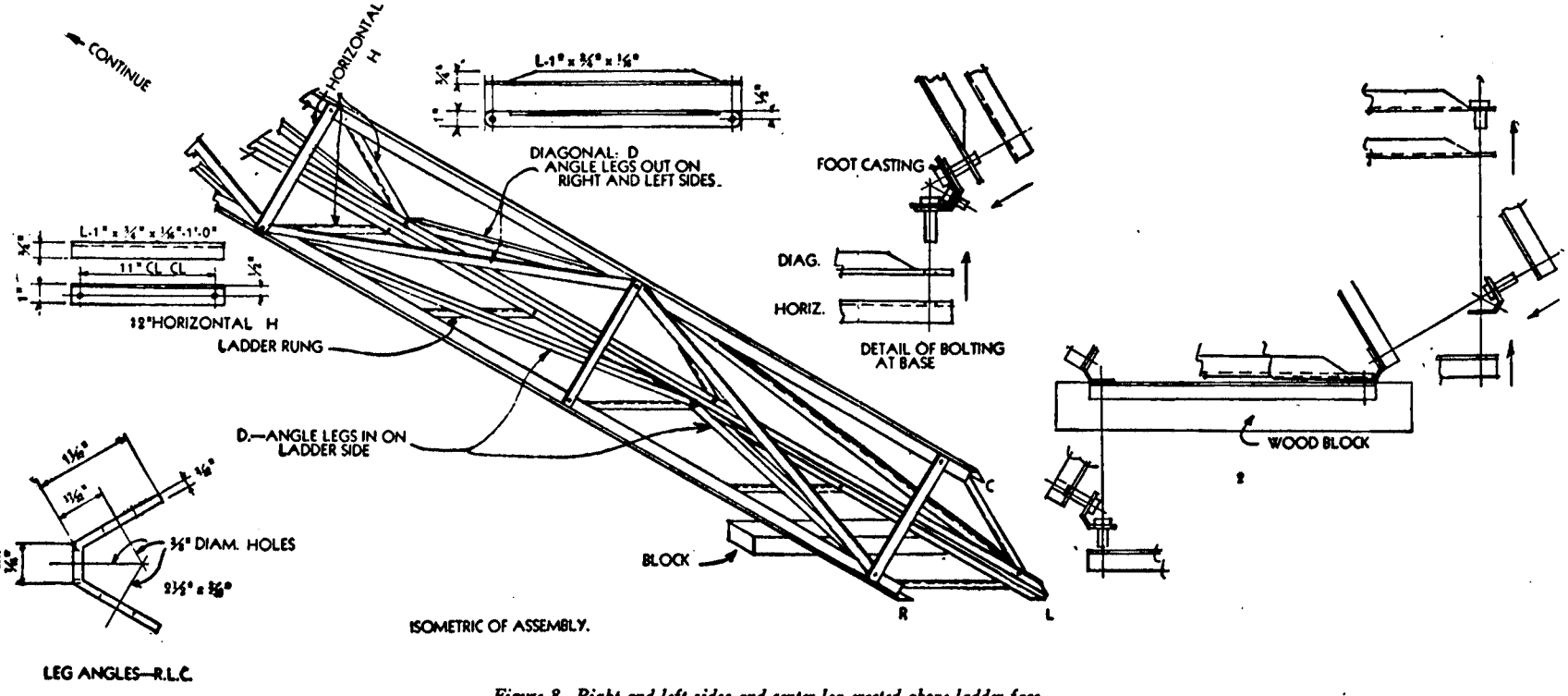


Figure 8. Right and left sides and center leg erected above ladder face.

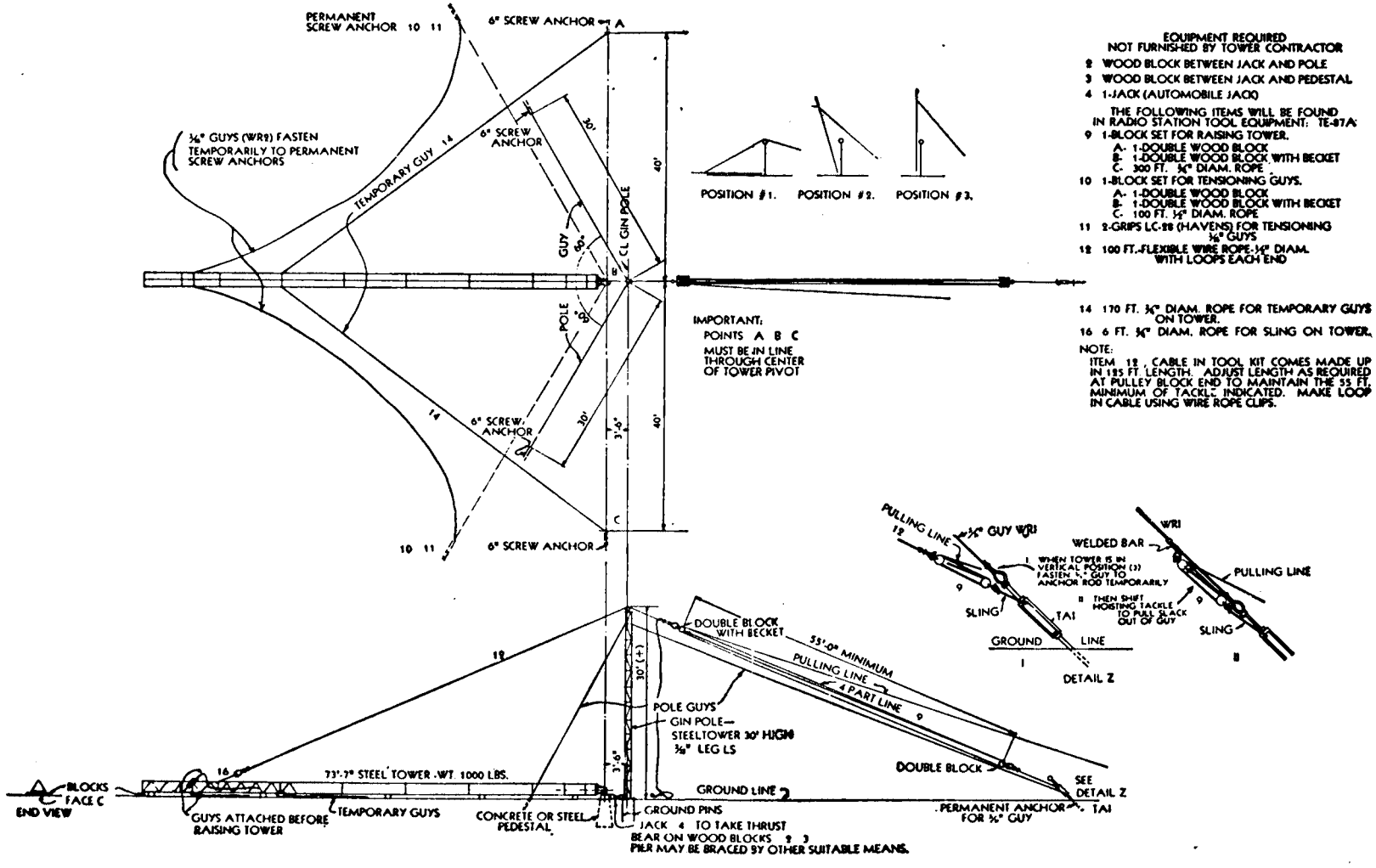
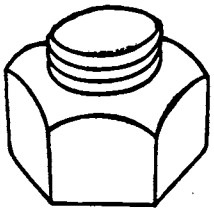
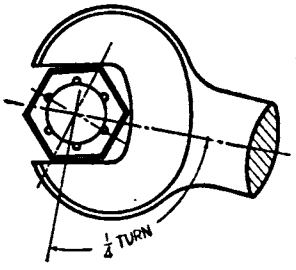


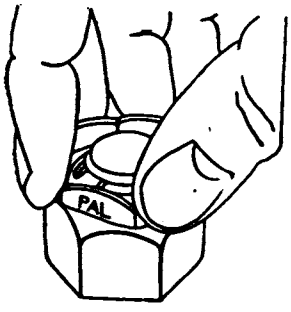
Figure 9. Elevation position No. 1.



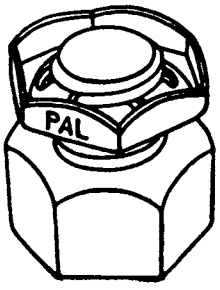
Turn nut to desired tightness with wrench. Be sure that not less than two FULL threads are provided for the Palnut.



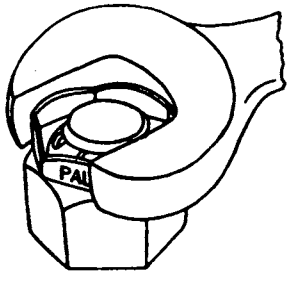
Tighten Palnut about ¼ turn with wrench, making sure wrench does not engage regular nut. Maximum holding power of Palnut is obtained at ¼ turn beyond finger-tight position.



Twirl Palnut onto bolt with fingers, until Palnut is snug against regular nut. Always apply Palnut locknuts with OPEN side out.



To remove Palnuts, first, loosen with a wrench, engaging only Palnut. After Palnut is loosened, Palnu tand regular nut may be removed separately or together, as preferred. Palnuts may be used again, providing most of the spring jaws in the center have retained their arch.



INSPECTION is made by taking a short grip on wrench handle. If it resists tightening with shortened wrench grip, Palnut is locked properly.

Figure 10. Locknut details.

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