

HG-70HD

70-Foot Self-Supporting Tower

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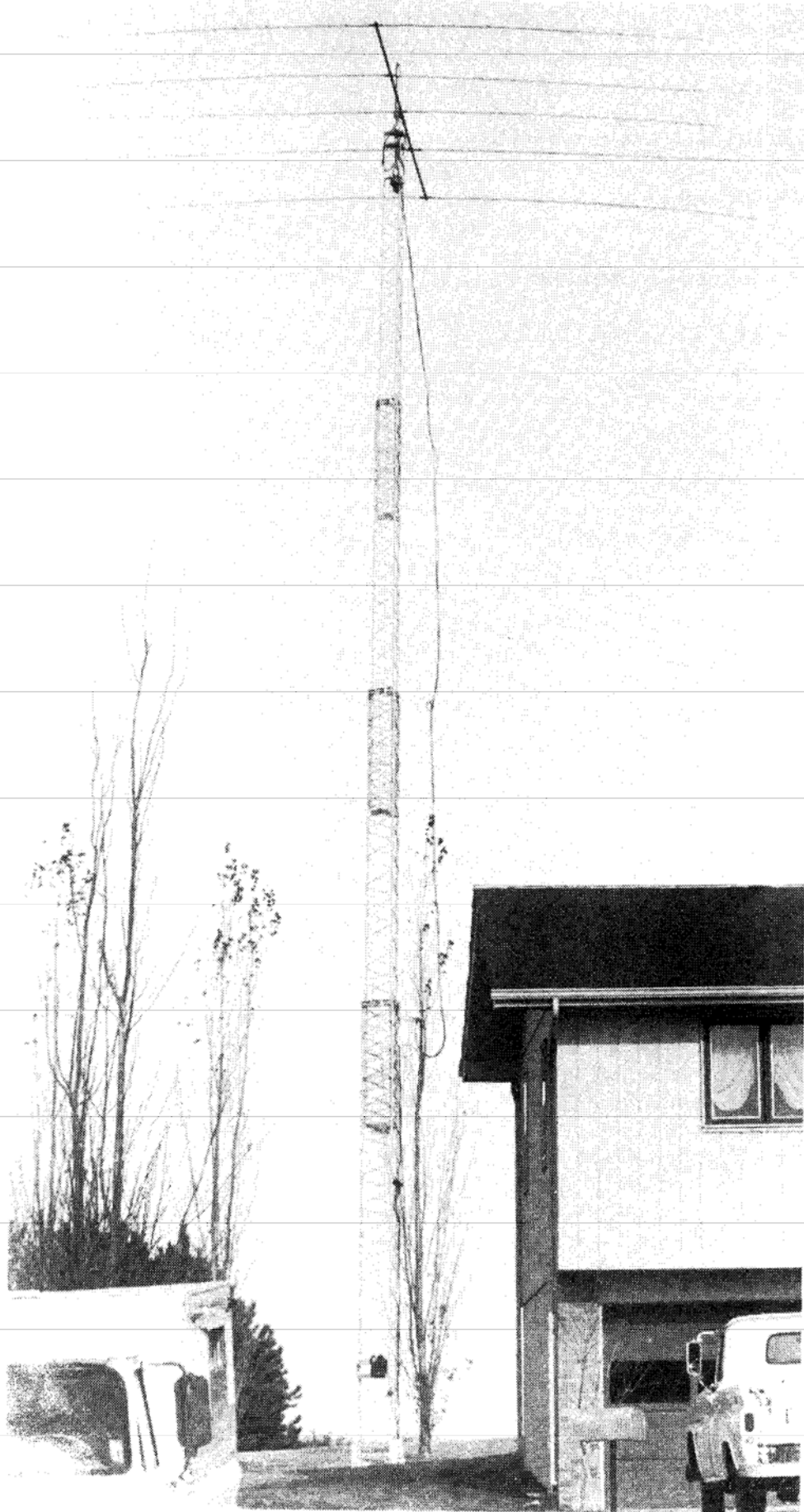


Figure 1
Overall View of HG-70HD Tower

CHAPTER 1

GENERAL INFORMATION

WARNING

Installation of this product near power lines is dangerous. For your safety, follow the instructions.

GENERAL DESCRIPTION

This model is a 70-foot, self-supporting tower designed to support 16.0 square feet of antenna area with winds up to 60 mph. This all steel tower has a guide system that allows the tubing to be open at each end insuring complete galvanizing and total moisture drainage.

The tower can be extended from its nested position by manual crank or the use of an electric motor. A thrust bearing can be bolted to the top section allowing a 2" diameter mast.

The top tower section is designed for a predrilled rotator plate (supplied with the tower) and will accept mounting of a CDE, HAM-M, Tailtwister, or Hy-Gain Antenna Rotators.

UNPACKING AND UNCRATING

Be sure to check your tower for any freight damage or missing parts. If you find damage, notify the trucking line that delivered the equipment immediately, and advise Hy-Gain of the damage. Send a copy of the freight damage claim to:

Hy-Gain
Telex Communications, Inc.
8601 N.E. Highway 6
P.O. Box 5579
Lincoln, Nebraska 68505
Attention: Traffic Department

SPECIFICATIONS

Height,
Extended 70 feet (21.33 m)
Nested 22 feet (6.70 m)
Guying self-supporting
Construction all welded construction
with leg guides and "W"
configuration torsion resistant bracing
Material all steel
Plating hot dipped galvanized
Wind Survival 60 mph (96.55 kmph)
(fully extended with max. load)
Antenna Load Limits ... 16.0 sq. ft. (1.488 sq. m)

EQUIPMENT SUPPLIED

The HG-70HD tower is supplied complete, including reinforcing steel and base mount. The tower corresponds to the drawings contained in this manual. Refer to the Parts List section for a complete breakdown of parts.

The Parts List shows the standard commercial packaging. Any changes or modifications, if any, which may be incorporated as the result of special contractual agreements are covered under Contract Requirements.

EQUIPMENT REQUIRED BUT NOT SUPPLIED

DESCRIPTION	USE
1 tool box with common hand tools	Tower Assembly & Base Foundation
1 measuring tape, 12' level	Base Foundation
3 bolts, 3/4" x 2 1/2"	Base Foundation

WARNING

DO NOT CLIMB

Do not attempt to climb this tower under any circumstances. **Serious injury or fatality** may result. Keep hands and feet outside of tower. Do not attempt to reach inside the structure unless the tower has been fully retracted against the lower stops.

NOTE: The Hy-Gain Crank-Up Tower comes equipped with a rotator support plate for mounting a rotator inside the upper tower section. This plate will support approximately 150 lbs. of vertical load when properly installed.

CHAPTER 2

SAFETY PRECAUTIONS

WARNING

Before you start installation of your tower, let us warn you of the danger of letting any part of your metal tower system touch electrical power lines — YOU MAY BE KILLED!

GENERAL SAFETY RULES

Hundreds of people are killed each year because they don't use common sense when they install their towers or antennas. It happens more often than you realize. Someone falls off of a roof or gets electrocuted by touching a power line with an antenna tower or metal ladder.

There is no such thing as a good tower site if it is near electrical power lines. Unfortunately, most tower systems, and in many cases, the ladders used during an installation, are metal. If any metal tower part or ladder touches a power line, it completes an electrical path from the power line through the metal tower and the installer (YOU!).

DON'TS

1. Don't install any tower near power lines.
2. Don't install a tower on a windy day.
3. Don't try to do the job by yourself.
4. Don't try to catch the tower if it starts to fall.
5. Don't try to remove any metal objects from the power lines.
6. Don't be afraid to call the power company for advice when picking a tower site or removing a fallen tower from the power lines.
7. Don't remove winch handle; use safety chain with lock to secure.
8. Don't climb tower, use separate ladder or lower tower with gin pole for antenna rotator servicing.
9. Don't overload. The design load limit is 16 square feet of antenna on a 2 foot mast for winds up to 60 mph.

DO'S

1. Do install the tower away from power lines. Check the distance to the power lines before you start installing—we recommend you stay a minimum of twice the maximum length of the tower assembly away from all power lines.
2. Do install the tower on a calm day and assure yourself of having plenty of daylight to complete installation.
3. Do stay clear if the tower starts to fall or come in contact with power lines.
4. Do call the power company to remove fallen towers from power lines or to help pick out a safe antenna site.
5. Do crank tower down to retracted position when winds are anticipated to exceed 60 mph.

If someone is accidentally electrocuted, don't touch him or the tower if he is still in contact with the tower or downed power lines. Use a dry stick, like a broom handle or wooden ladder, etc. and in one sweep, push the person free from the tower or knock the wire away and off the victim. Don't allow the wire to touch the victim again. Have someone call the power company and an ambulance.

SITE SELECTION

The tower requires a concrete base approximately 4' x 4' x 7'6" deep. Among the factors to be evaluated in selecting a tower site are the types of earth at the installation site and the nearness of power lines or overhanging tree limbs. Soil conditions around the tower foundation should allow access to the tower during all weather conditions.

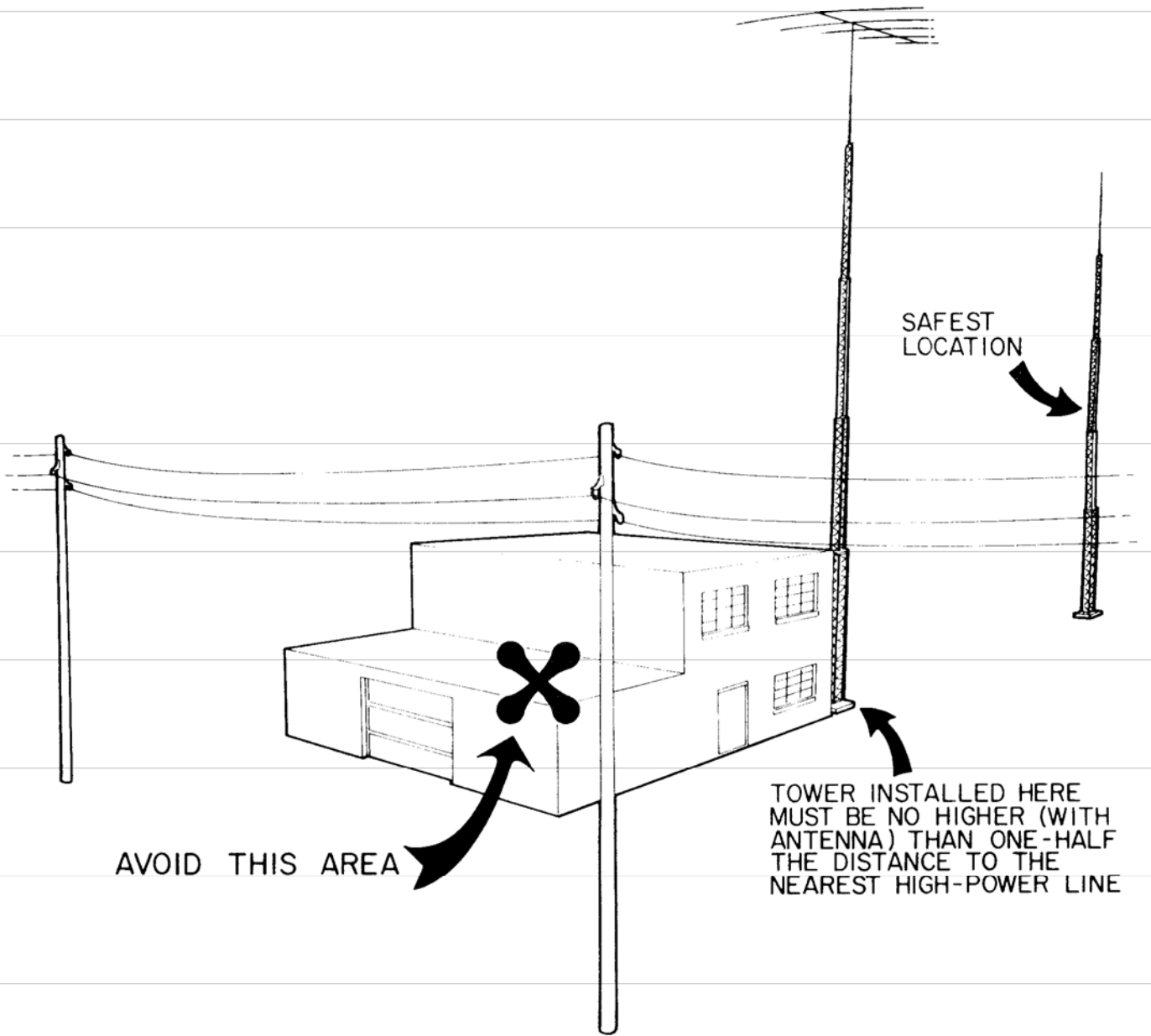


Figure 2
Safe Location of Tower

CHAPTER 3

INSTALLATION PROCEDURES

PLANNING YOUR PROCEDURE

Good planning is a key to a successful and safe tower installation. If you're not sure about a careful, safe installation, don't try to do it yourself. Call for professional help (Yellow Pages under Towers or your local power company).

The tower should be as close as possible to its related equipment. Determine the best possible site while thinking about power lines, but also think about overhanging tree limbs that may be blown into the tower during high winds.

FOUNDATION

Dig a hole 48" square by 7'6" deep as shown in Figure 3.

WOOD FORMS CONSTRUCTION

Construct a wooden frame around the hole to support the base assembly as shown in Figure 4.

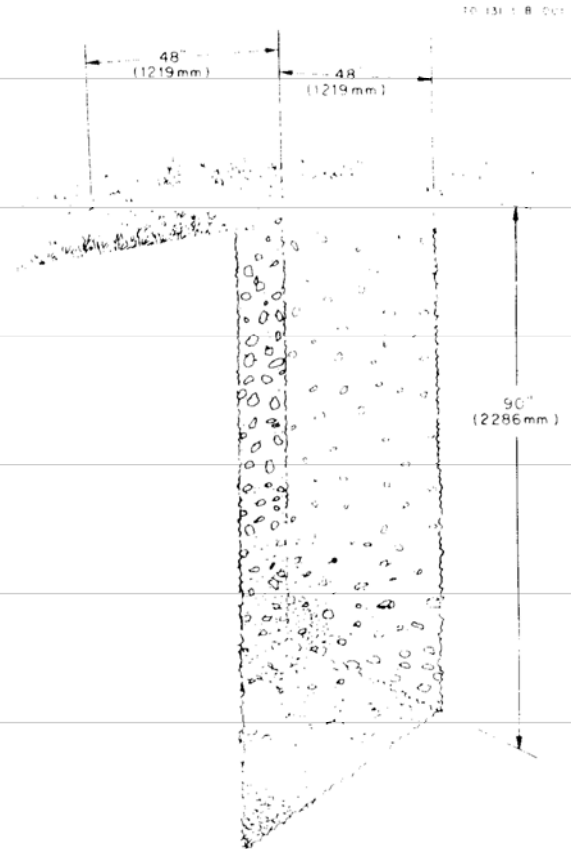


Figure 3
Digging Hole for Foundation

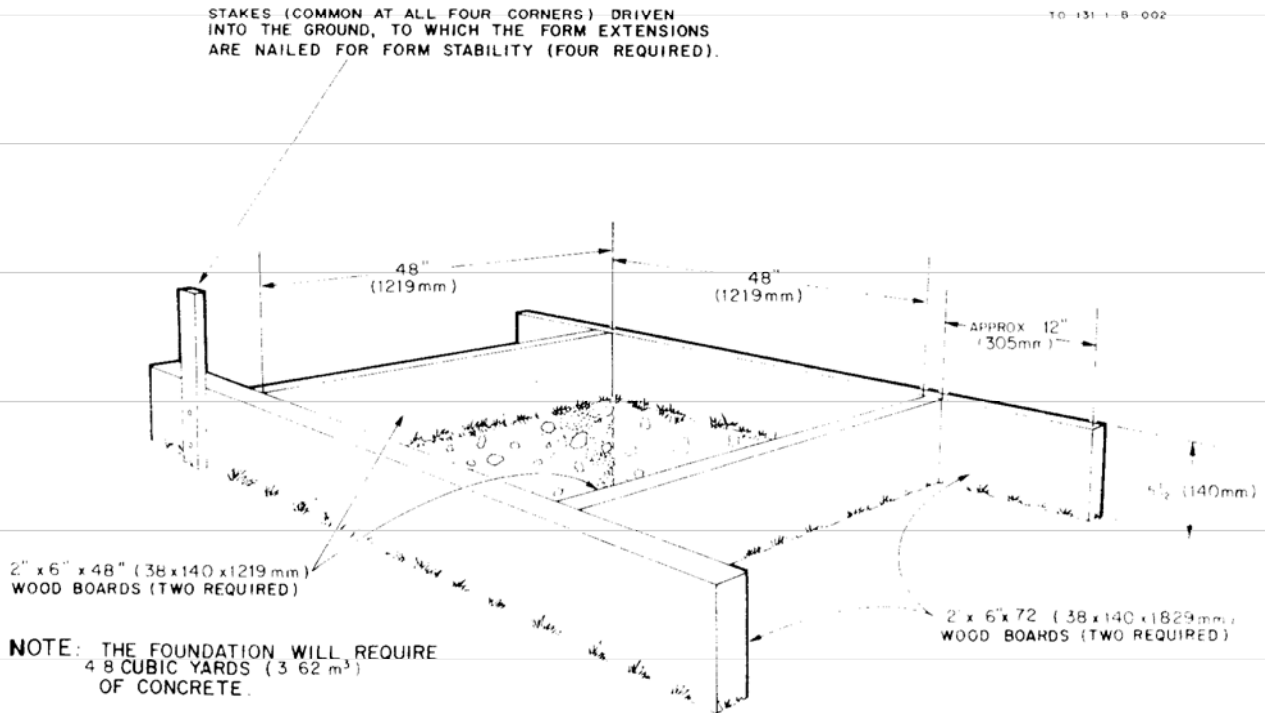
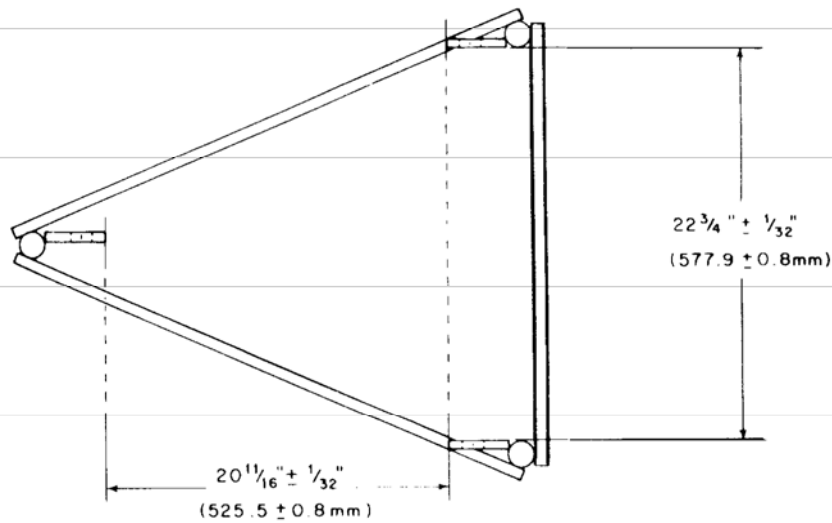


Figure 4
Constructing Frame for Concrete Base



NOTE: The 20 ¹¹/₁₆ inch dimension may be measured by laying a straight board or level across the two ears and measuring from the back edge in the center of the board.

Figure 5
Top View of Foundation Structure Assembly

In the U.S.A. the dimensions of lumber are listed, and referred to, as the size after it is rough-cut at the sawmill, prior to being dried, planed and sold on the market.

A sample would be the two by four (2" x 4"), which after being dried and planed will measure 1 1/2" x 3 1/2" (39 x 89 mm), or a two by six (2" x 6") which will measure 1 1/2" x 5 1/2" (39 x 140 mm).

Orient your tower base in the direction your tower will be raised. The two parallel ears of the base assembly will be in the hinged side.

IMPORTANT

THE TABS ON THE BASE ASSEMBLY MUST MATCH THE SPACING DIMENSIONS CALLED OUT IN FIGURE 5.

The tabs on the tower base assembly may have been knocked out of alignment during shipment or while in storage.

Check and realign the tabs using a large hammer, so they will agree with the dimensions given in Figure 5.

Drill a 3/4" hole in each cross member in line with the lower holes in the base assembly as shown in Figure 6.

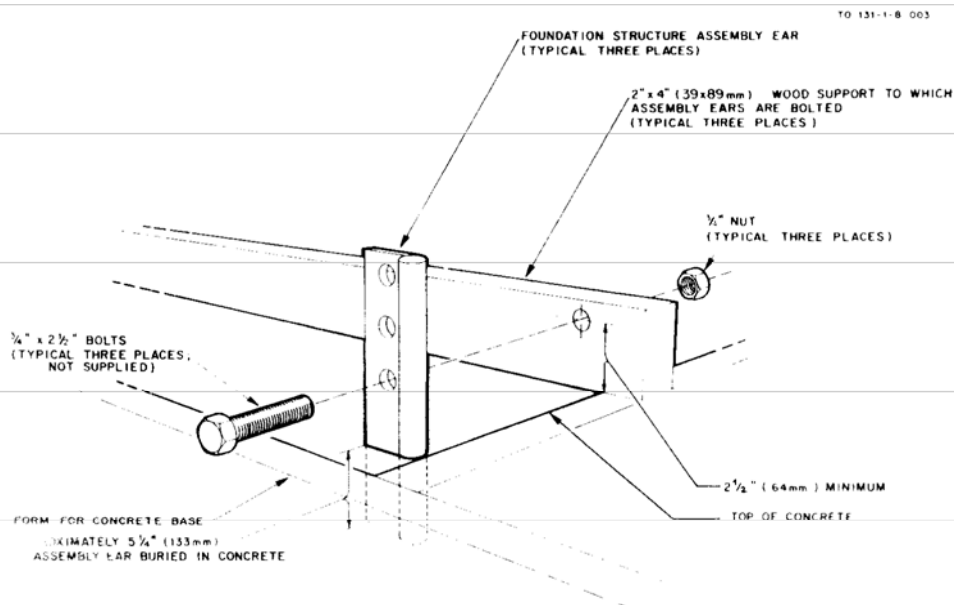


Figure 6
Hanging Base Foundation from Forms

Attach the base assembly to the wood frame using $\frac{3}{4}$ " bolts (not supplied).

Using a carpenter's level, check all points to make sure base frame is level.

IMPORTANT

Base frame must be level for tower to raise and lower properly.

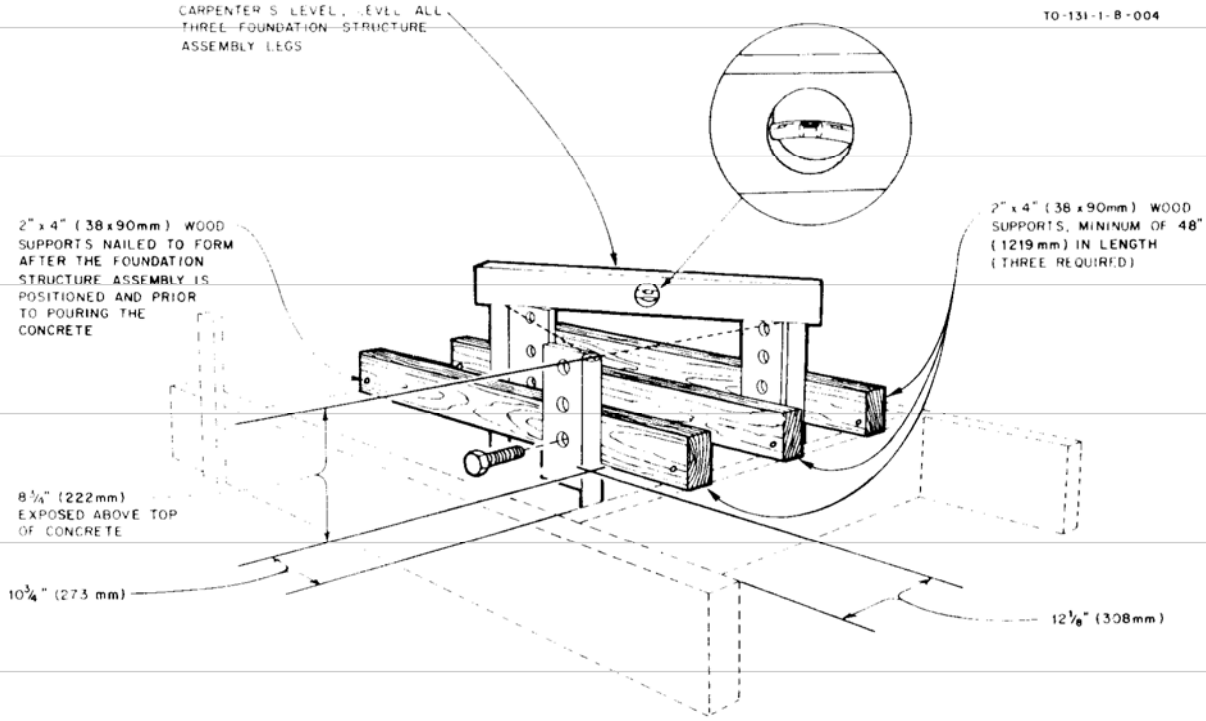
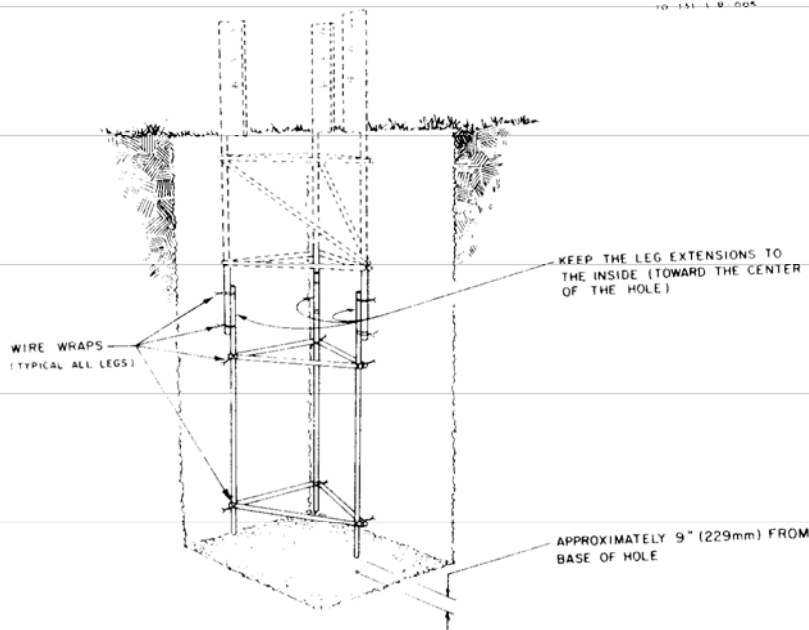


Figure 7
Attaching and Leveling Base Frame to Wood Forms



Attaching Reinforcing Extension

Pour concrete carefully into hole. Make certain base assembly maintains the proper clearance from the outside edges of the hole. Refer to Figure 8.

The concrete shall be designed to provide a minimum 28 day strength of 2000 PSI and shall contain not more than 7½ gallons of water per sack of cement.

After the concrete is poured, check base assembly, making sure it is level and it hasn't shifted during the pour.

If the base is not level, tap the ears of the base with a hammer to level.

Let the base cure for at least one week before setting up tower!

ATTACHING TOWER TO BASE PLATE

Set your tower on the hinged side of the base, align the bottom holes of the tower with the bottom holes in the base assembly. Install a single ¾" bolt in each of the two parallel base ears. See Figure 9.

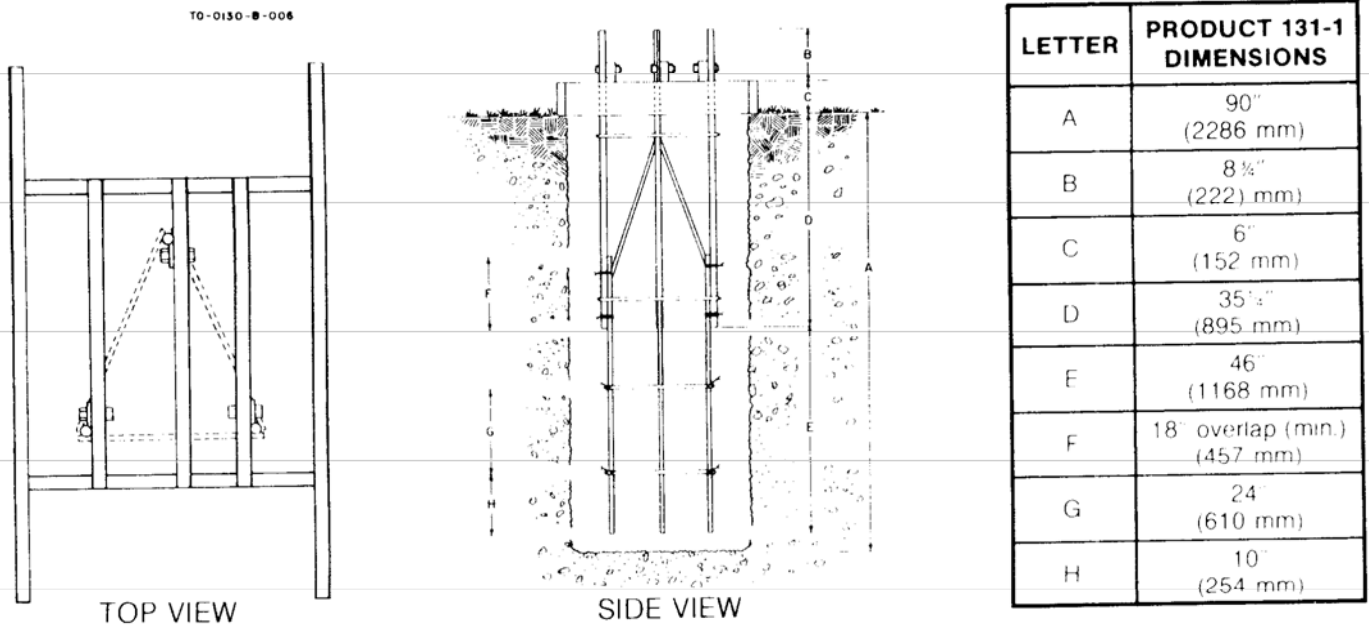


Figure 8
Tower Foundation

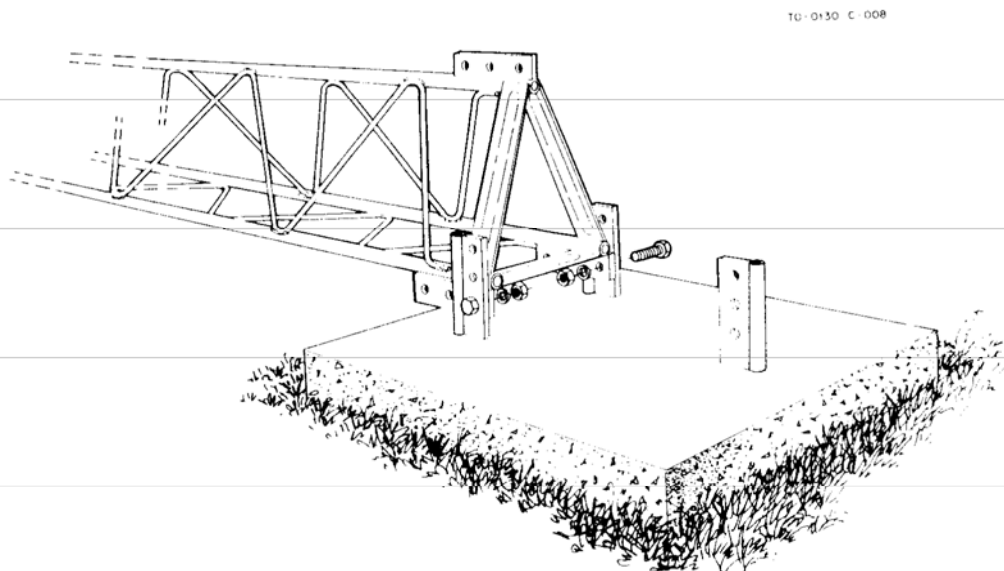


Figure 9
Attaching Tower to Base Tabs

Support the tower on a support, such as a sawhorse, and attach your antenna and/or rotator to the tower before raising the tower as shown in Figure 10. The support should not have any sharp edges that may come into contact with the winch cable.

The use of a thrust bearing, HG-TBT, Order No. 121B, is recommended for use on this tower if the combined weight of the antenna, mast and rotor is greater than 150 pounds. The use of this thrust bearing is also recommended on all systems used in areas where ice loading may be experienced.

CAUTION

The tower must be in the nested position before any work begins.

MOUNTING PLATE AND ROTATOR INSTALLATION

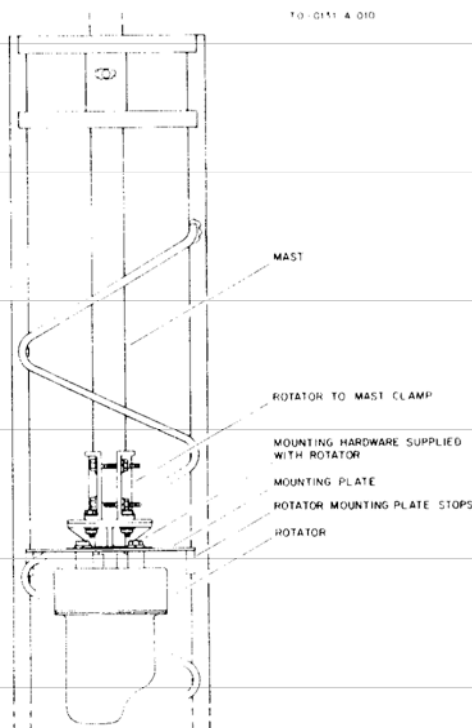
Pull top tower section out only enough to allow the rotator stops to clear the top of the second tower section.

For a rotator that installs below the mounting plate, follow the steps below and refer to Figure 10, Detail A:

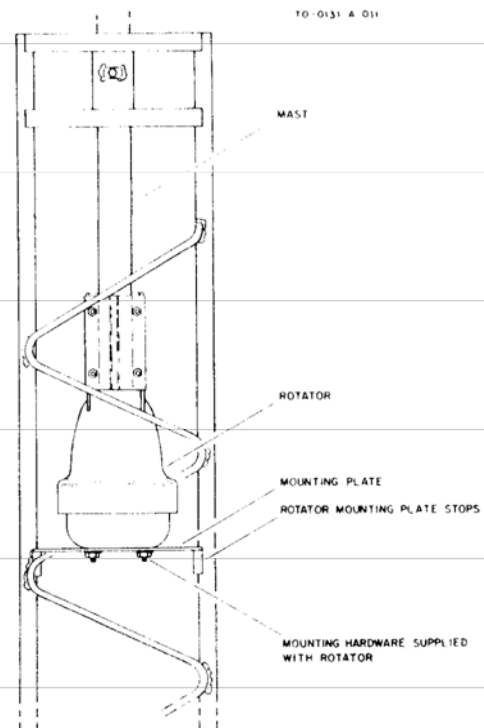
1. Set the rotator in the tower with the shaft bearing pointing up. If the mast brackets or clamps are attached to the shaft, they must be removed.
2. Set the rotator mounting plate in the tower so it will set directly on the three stops welded to the inside of each tower leg.
3. Bolt the rotator to the mounting plate using the mounting bolts supplied with the rotator.
4. Assemble the rotator-to-mast, mast platform and mast as shown in Figure 10, Detail A.

For rotator mounted above the rotator mounting plate, follow these instructions and refer to Figure 10, Detail B:

1. Insert the rotator mounting plate in the tower so it rests on the mounting plate stops.

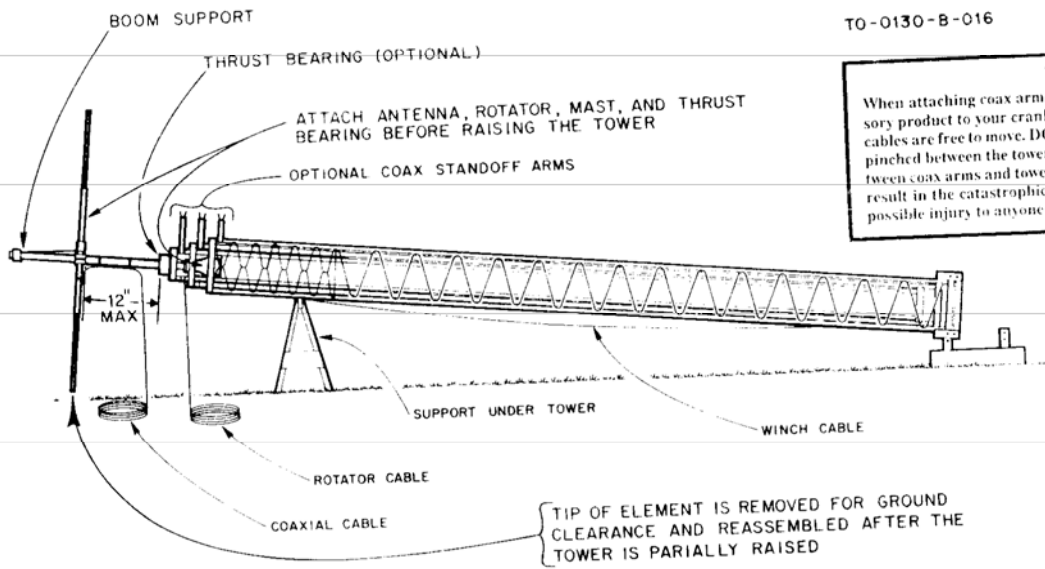


**Figure 10—Detail A
Typical Installation of
Rotator Mounted Below Plate**



**Figure 10—Detail B
Typical Installation of
Rotator Mounted Above Plate**

NOTE: When the Hy-Gain HDR-300 Rotator is installed, do not retract the tower all the way. The tower will not be able to nest completely.



WARNING
 When attaching coax arms (product 122) or any other tower accessory product to your crank-up tower, ensure that the tower raising cables are free to move. DO NOT allow the raising cables to become pinched between the tower legs, sheave brackets and pulleys or between coax arms and tower legs. Failure to inspect these cables may result in the catastrophic failure of your tower-raising system and possible injury to anyone standing nearby!

Figure 10
Attaching Related Products

2. Install the rotator on the mounting plate. Use the mounting bolts supplied with the rotator.
3. Loosen the rotator mast clamp so the mast can be inserted in the clamp.
4. Tighten the mast clamp around the mast.
5. Install the thrust bearing (if used) and secure it to the mast and tower according to instructions supplied with the bearing. Check for proper centering of mast.
6. Mount your antenna(s) on the top of the mast. If you are using coax arms, tie your rotator cable and coax to the coax arms. Allow enough length of each cable for full tower extension.
7. Connect your coax to the radio equipment, and rotator cable to controller to check for proper length.

Lift tower into place with gin pole and block and tackle as shown in Figure 11.

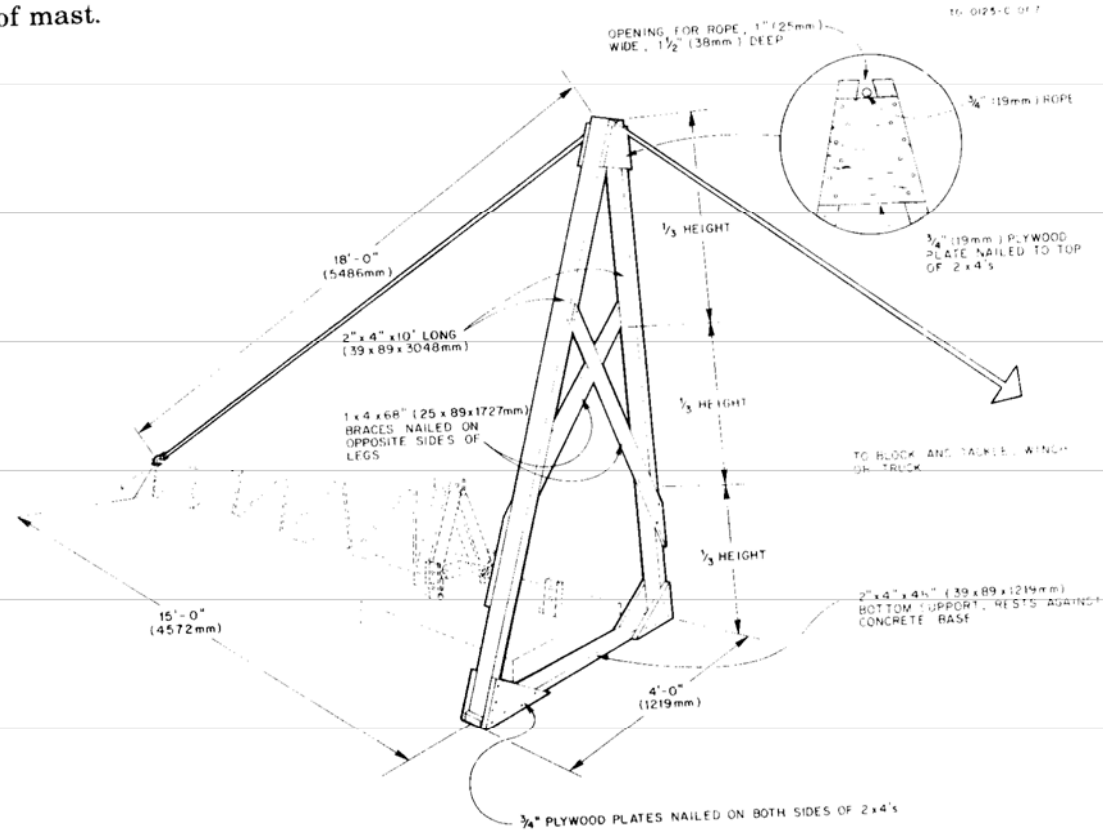
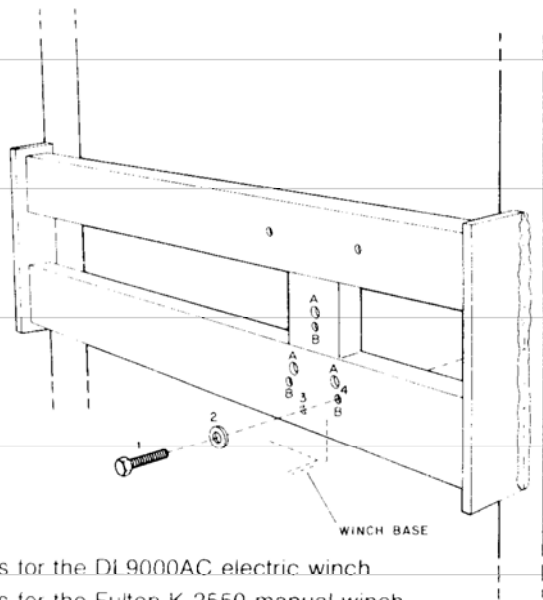


Figure 11
Constructing Gin Pole



NOTE: Numbers do not correspond with Item Nos. in Parts List.

**WINCH MOUNTING
HARDWARE SEQUENCE (TYPICAL)**

1. Bolt
2. Flatwasher, $\frac{3}{8}$ "
3. Winch base mounting hole
4. Winch frame mounting hole (on tower)
5. Split lockwasher, $\frac{3}{8}$ "
6. Nuts, $\frac{3}{8}$ ", hex jam

A — Mounting holes for the DL9000AC electric winch
B — Mounting holes for the Fulton K 2550 manual winch

Figure 12
Typical Attachment of Winch Assembly to Tower

After tower is up, put all base bolts in place and secure tower in vertical position.

Attach winch assembly to tower winch plate as shown in Figure 12 and in the instructions enclosed with the winch.

Connect the cable to the winch as shown.

RAISING AND LOWERING TOWER

Before cranking the winch to raise the tower, examine the raising cables to be certain that they are securely terminated and properly positioned in the cable sheave grooves.

The tower should raise with only moderate effort with the hand crank winch. If excessive force is required, check again for possible shipment damage. **DO NOT** force the tower up. It may become jammed in an extended position and won't retract under its own weight.

When lowering the tower, simply crank the winch in the opposite direction. Constantly check the upper section cables to make sure they remain taut as the tower is lowered.

CAUTION

When cranking the tower down, make sure all sections lower simultaneously.

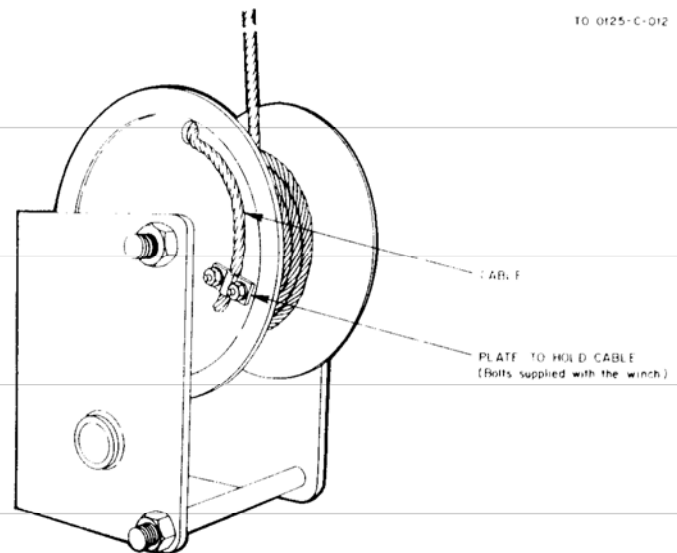


Figure 13
Connecting Cable to Winch

A second person should watch the lowering sequence carefully to make sure all sections of the tower lower together.

A good way to tell is by watching the raising cable. If any of the cables become slack at any location, **STOP**. The tower section is binding up and must be cleared before lowering continues.

PROCEDURES FOR FREEING BINDING TOWER SECTIONS

Some causes for the sections to bind can be:

1. Bent tower braces during shipment or installation.
2. A heavy object has been accidentally knocked into the tower bracing after installation is complete.
3. Excessive wind force can cause a tower section to bind up and not retract straight in line with the next larger tower section.

4. Unbalanced antenna or other equipment.
5. Foreign objects such as tree limbs, dirt or ice can reduce clearance between sections.

To correct these problems, crank the tower back up until the cable is tight. A soft, rubber faced hammer can be used on the tower legs while lowering the tower to jar the obstruction free. If you use a rubber mallet, tap only on the tower leg where the bracing meets the leg and tap as far up on the bottom section as you can reach. **NEVER TAP ON ANY TOWER BRACING!!!** See Figure 14.

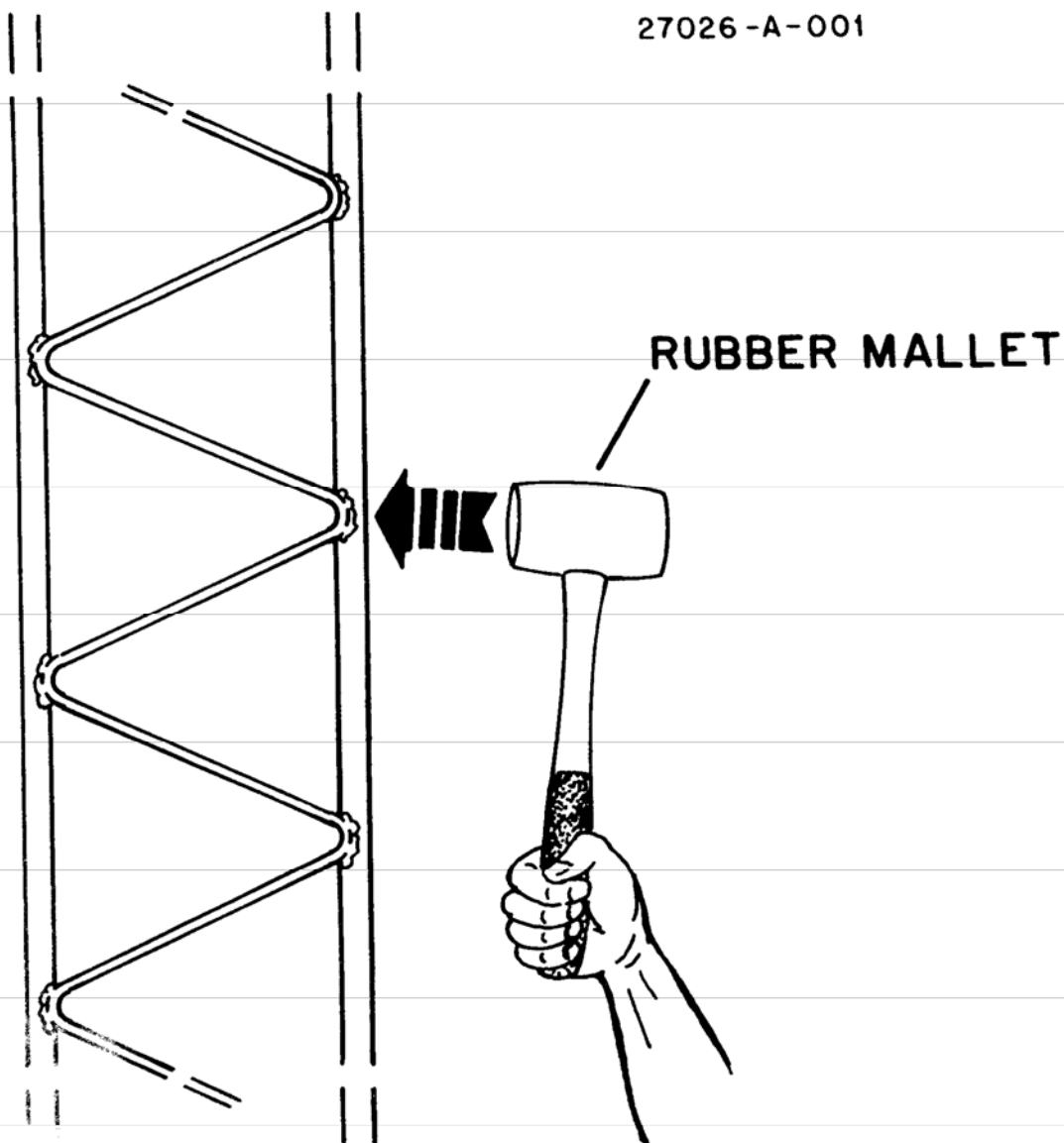


Figure 14
Freeing Binding Tower Sections

If cable becomes slack again, raise the tower to tighten the cable and repeat the procedure.

Another procedure to free binding sections is to rotate the antenna to a different heading one or more times. Doing so can help solve the binding caused by 3 and 4 above.

If foreign objects must be removed to free the tower, **DO NOT CLIMB THE TOWER!** Be sure all cables are tight before doing so.

If none of the previous methods work to free the tower, seek professional help. A snorkel or boom truck can be utilized to inspect, and correct the cause of the binding. Never leave the cable slack hoping the tower will free itself. If it does come free, it could collapse completely, damaging both the tower and the antenna. All Hy-Gain towers are factory tested (fully extended and retracted) and inspected before being shipped, to insure proper operation.

LIGHTNING PROTECTION

To protect your installation and your radio equipment, the tower system must be properly grounded. Drive a 4'-8' ground rod as close as possible to the tower structure.

Then connect a #8 (or larger) copper or aluminum wire between the base of the tower and the ground rod. Also, a static discharge unit (Hy-Gain Model LA-1, Order No. 229, Lightning Arrestor) should be connected to the antenna lead-in at the place where it enters the home. (Follow the instructions provided with the static discharge unit.)

TOWER MAINTENANCE

To maintain proper and safe operation, inspect and lubricate your tower at least once a year; more often if subject to heavy or frequent use. Always be sure your tower is in the retracted position before attempting any maintenance procedures.

Inspect all bolts for tightness including cable termination, winch and base bolts.

Inspect raising cables and replace if excessively kinked or frayed.

Inspect pulleys and pins for excessive wear and replace as required.

Place a few drops of light machine oil on all pulley bearings.

Refer to winch manual for proper lubrication of winch.

PARTS LIST

NOTE: Item numbers may not necessarily be in numerical sequence and may appear more than one time, depending on how often a part is used, or identical parts being placed in different parts packs.

Item No.	Part No.	Description	Qty
		Tower Assembly, Sections 4, 5, 6 & 7	1
1	880122	Cable Sheave with Oil Bushing	5
2	871154	Foundation Structure, 131-1	1
3	871147	Cable, 1/4" x 59 1/2'	1
4	690346	Cable, 1/4" x 20 1/2'	1
5	690198	Cable, 3/16" x 20 1/2'	1
6	690197	Retainer Pin, 5/32" x 7/8", roll s.s.	5
7	590023	(Not Used)	—
8		Lockwasher, 1/2", split	5
9	567055	Nut, 1/2"-13, hex	5
10	556920	Bolt, 1/2"-13 x 1 1/2", hex head	5
11	506865	Pulley Pin, 1/2" x 1 9/16", stainless steel	1
12	380664	Plate, Rotator	2
13	380418	Thimble, 3/16", wire rope	3
14	356788	Thimble, 1/4", wire rope	6
15	356421	Sleeve, 1/4", Nicopress®	4
16	350695	Sleeve, 3/16" Nicopress®	1
17	350685	Parts Pack, Product 131-1	1
	878309	Winch	9
18	871149	Bolt, 3/4"-10 x 2", hex head	9
19	500116	Nut, 3/4"-10, hex	9
20	557628	Lockwasher, 3/4", split	5
21	567626	Bolt, 3/8"-16 x 1 1/2", hex head	9
22	506880	Nut, 3/8"-16, hex jam	4
23	558137	Lockwasher, 3/8", split	4
24	561047	Washer, 3/8", flat	4
25	567105		

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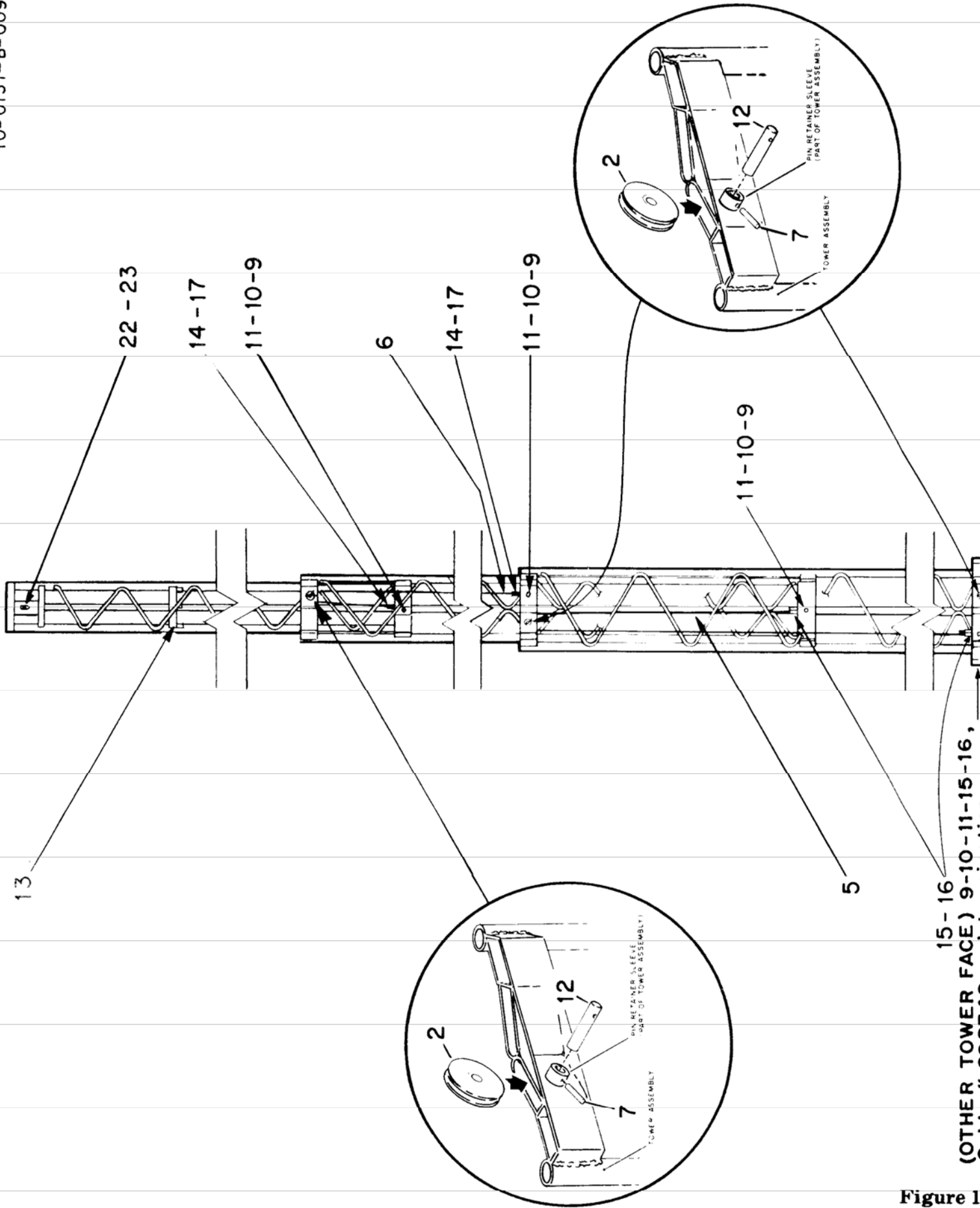


Figure 1
Tower with Call-Out

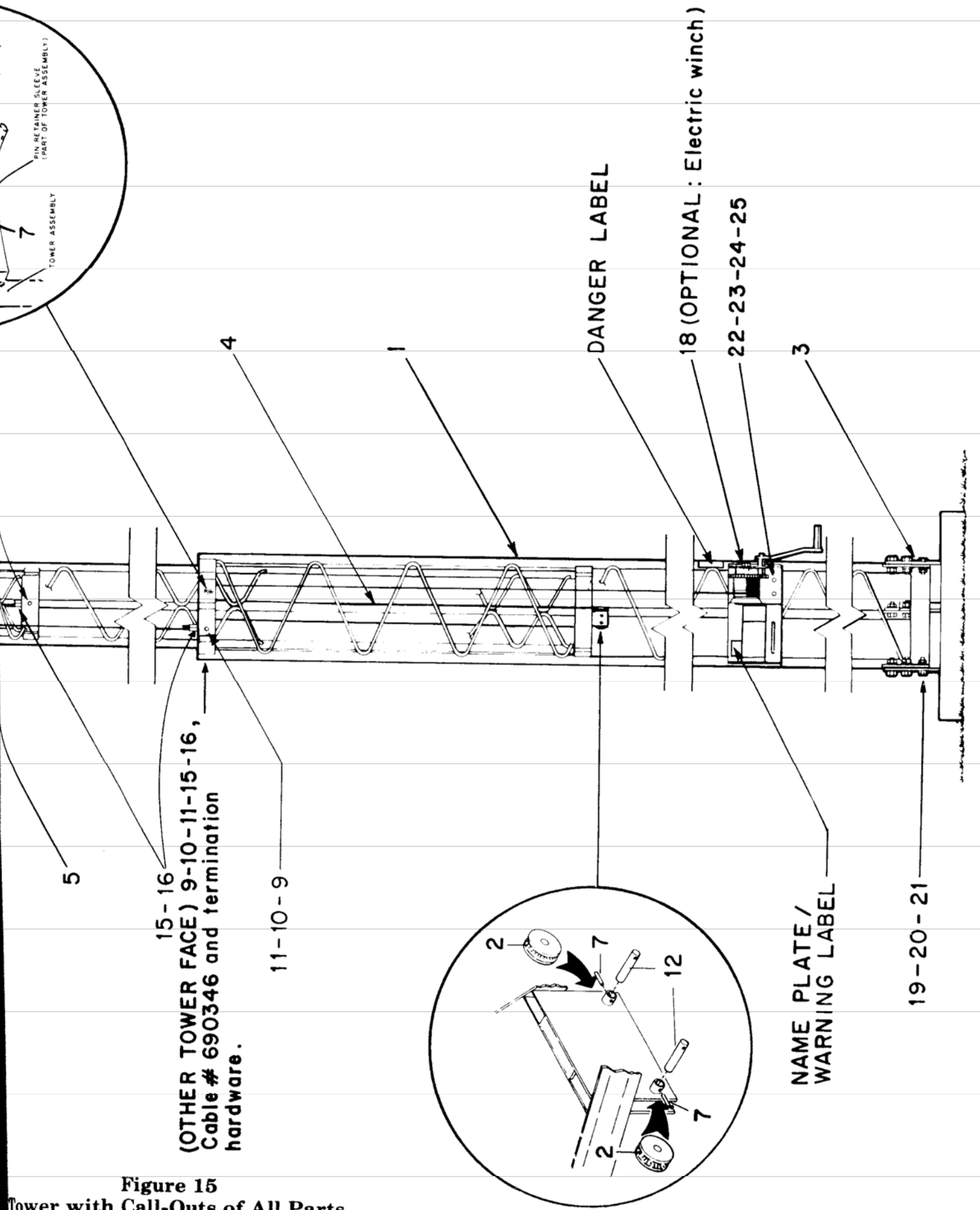


Figure 15

Tower with Call-Outs of All Parts