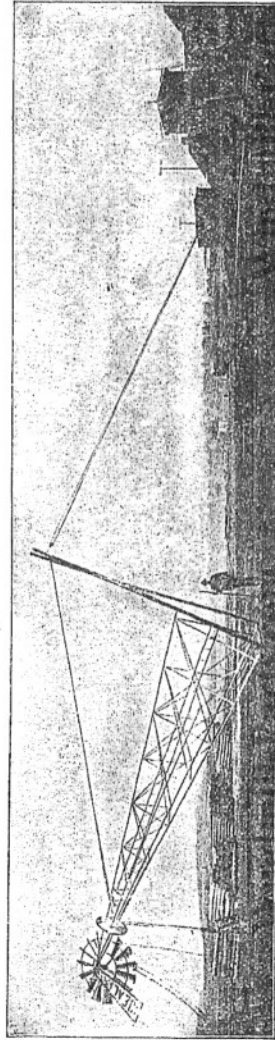


This cut shows mill and tower ready to raise and men in position.

Windmill-Parts.com
940 597-7735



Mill and tower partly raised ~~507-7735~~ men should be employed at guy ropes from ~~940 597-7735~~ until tower is up.

DIRECTIONS FOR ERECTING THE SAMSON GALVANIZED STEEL WINDMILL ON WOOD OR STEEL TOWERS.

THE SAMSON Mills are fitted with combination base plates and will go on the Ideal No. 1 or No. 2 Steel Towers, either three or four post, also on four post wood towers, without requiring extra parts.

TO PROCEED:

1st. Where the tower is already in position and properly anchored, proceed as follows:

For Wood Tower.

Dress off the top of the tower perfectly level (use spirit level), then bolt the lugs (four castings No. 1868) to base plate (casting No. 1862 for 4, 6, 8 and 9 foot mills, or to No. 1962 for 10 foot mill, or to No. 2030 for 12 foot mill, or to No. 2281

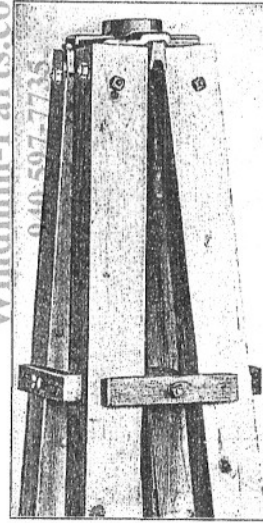


Fig. 1. Wood Tower.

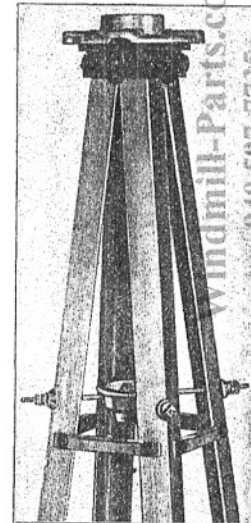


Fig. 2. Steel Tower.

for 14 foot mill, or to No. 2069 for 16 foot mill). The bolts for fastening the lugs to base plate are to be found in box of fixtures. They are $\frac{3}{4}$ x $1\frac{1}{4}$ inches for 6, 8, 9 and 10 foot mills and $\frac{3}{4}$ x $1\frac{1}{2}$ inches for 12, 14 and 16 foot mills.

Place base plate in position on top of the tower, with the lugs between the corner posts. Bore four holes horizontally through the top of the corner posts just below the lugs, two each way, and insert the bolts and draw nuts up tight. See illustration Fig. 1.

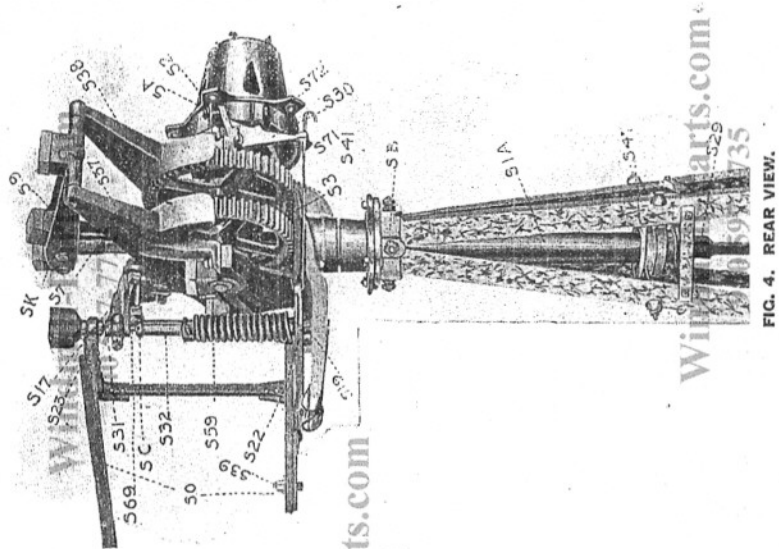


FIG. 4. REAR VIEW.

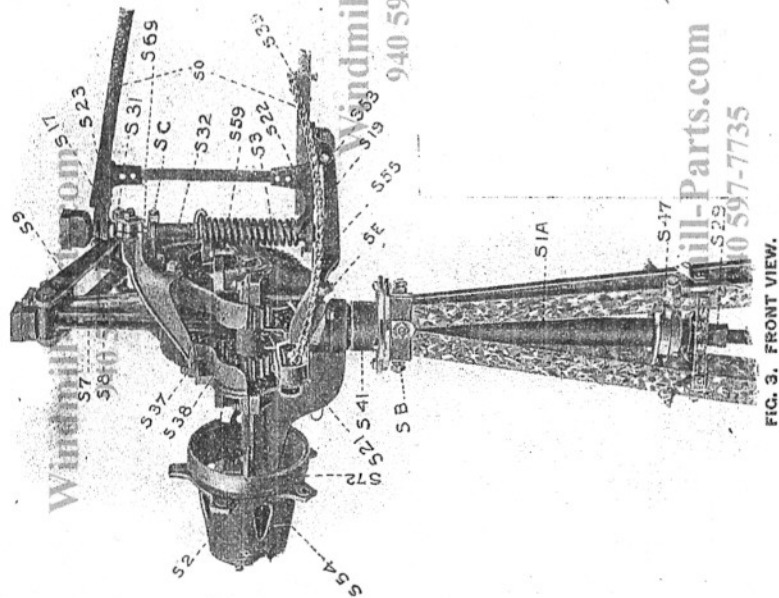


FIG. 3. FRONT VIEW.

Next put the adjustable mast support (S 47 casting, No. 2460 for 4½ foot mills; No. 986 for 6, 8 and 9 ft. mills, No. 1963 for 10 ft. mills, No. 1144 for 12 ft. mills, No. 1028 for 14 ft. mills, No. 1271 for 16 ft. mills), which supports the lower end of mast pipe (S 1-A) in place. It is held in place by four bolts. These bolts are threaded well back to allow for adjustment in plumbing the mill on the tower. The bolts do not go through the corner posts in wood towers, but pass out between the corner posts and are held in place by passing through wood bars, one of which goes on every side of the tower just above the lower end of mast pipe. Do not fasten the wood bars to tower posts until the lower plunger guide, which is composed of two parts (S 28 and S 29), is clamped into position on the lower end of mast pipe (S 1-A) because the adjustable mast support (S 47) must rest on the plunger guide. Then adjust wood bars so as to place the bolts in a horizontal position and nail to the corner posts. The cast iron washers found on these bolts are not to be used on wood towers.

Before beginning to put the mill together, one should examine the illustrations given herewith. The illustrations show all the parts of the mill head in proper position. (The wheel arms and sections only have been left off.) Each of the parts is marked with letter S and a number or letter. This letter and number is only for reference. On the following page is given a table in which the true number as well as the name of the part is placed opposite the reference letter S with its number or letter. The true number of the casting is to be found in the column under the particular size of the mill. (Some parts have no true number, such as the brake band, Dunke bolt, etc.)

Instructions for Assembling Samson Knocked Down Heads.

All bolts in cap boxes and gear shields are furnished with two nuts, the extra nut being used as a nut lock.

In tightening up nuts on bolts in cap box on wheel shaft inside the spider, screw the nuts down so as to just touch the casting and then give nut one-fourth turn more, which will make it tight enough, put on extra nut and draw down tight on the first one. Do the same way on double cap boxes, and when the nut is drawn down just enough to touch the casting give it one-half turn more and then put on the extra nut.

Gear Shields.

The bolts in these castings must have the nuts drawn up tight and extra nut put on and drawn up tight against the first nut.

The brake band is wired securely to spider in position, ready to bolt to top side of lug on head.



	6 ft. Standard	8 ft. Standard	8 ft. Irrigator	9 ft. Standard	9 ft. Irrigator	10 ft. Irrigator	12 ft. Irrigator	16 ft. Irrigator
	No.	No.	No.	No.	No.	No.	No.	No.
S A—Brake Bolt (no number).....								
S B—Tower Cap {	No. 1 Tower { 3 post.....	987	987	987	987	987	1072	1248
	4 post.....	983	983	983	983	983	1073	1243
	No. 2 Tower { 3 post.....	1560	1560	1560	1560	1560		
4 post.....	1584	1584	1584	1584	1584			
S C—Governor Bolt (no number).....								
S D—Brake Stud (no number).....								
S E—Stop (no number).....								
S K—Rocker Arm Hinge Bolt (no number).....								
S O—S O—Vane Rails (no number).....								
S 1—A—Mast Pipe (no number).....								
S 2—Spider.....	1746	1052	1303	1692	1893	1741	2004	2044
S 3—Crank Gear.....	1747	1053	1373	1963	1873	1898	2005	2045
S 7—Plunger (no number).....								
S 8—Pitman.....	1755	1851	1851	1851	1851	1904	2013	2053
S 9—Rocker Arm.....	1754	1850	1850	1850	1850	1903	2012	2052
S 17—Upper Support for Vane.....	1750	1876	1876	1876	1876	1901	2008	2048
S 19—Lower Support for Vane.....	1751	1877	1877	1877	1877	1902	2009	2049
S 21—Pulley for Chain.....	1763	1887	1887	1887	1887	1887	2020	2060
S 22—Lower Hinge Vane Bearing.....	1758	1884	1884	1884	1884	1907	2016	2056
S 23—Upper Hinge Vane Bearing.....	A 22	A 22	A 22	A 22	A 22	C 24	2017	2057
S 28—Plunger Guide (wire side).....	1767	1767	1767	1767	1767	1767	2023	2063
S 29—Plunger Guide (angle side).....	1768	1768	1768	1768	1768	1768	2024	2064
S 30—Brake Lever.....	1757	1883	1883	1883	1883	1906	2015	2055
S 31—Vane Rod Clamp on Upper Vane Support.....	1764	R 34	R 34	R 34	R 34	C 26		
S 32—Spring Adjuster.....	1765	R 35	R 35	R 35	R 35	C 27	2021	2061
S 36—Collar for Plunger Swivel.....	1769	1769	1769	1769	1769	1778	1769	1849
S 37—Bracket for Rocker Arm (right hand).....	1771	1949	1888	1949	1888	1911	2027	2066
S 38—Bracket for Rocker Arm (left hand).....	1772	1950	1889	1950	1889	1912	2028	2067
S 39—Swivel Block on Vane Rail.....	1773	1773	1773	1773	1773	1913	1913	2068
S 41—Base Plate.....	1862	1862	1862	1862	1862	1962	2030	2069
S 47—Adjustable Support for Mast.....	986	986	986	986	986	1063	1144	1271
S 53—Buffer Stud.....	A 30	A 30	A 30	A 30	A 30	A 30	2037	2075
S 54—Brake Guard.....	1934	1936	1936	1936	1936	1937	2036	2074
S 55—Chain (no number).....								
S 59—Governor Spring (no number).....								
S 69—Hinge Rod for Vane (no number).....								
S 71—Brake Rod (no number).....								
S 72—Brake Band (no number).....								

For Steel Towers—Three and Four Post.

1st. Bolt base plate (S 41) to tower cap (bolts $\frac{3}{4} \times 1\frac{1}{2}$ inches for 4, 6, 8, 9 and 10 foot mills and $\frac{3}{4} \times 1\frac{1}{2}$ inches for 12, 14 and 16 foot mills, will be found in box of fixtures). The lugs No. 1863 are not to be used with steel towers.

2d. Fix the adjustable mast support (S 47) in the tower, with the long bolts, as follows: For 4, 6, 8, 9 and 10 foot mills, in the upper holes found in the corner of the posts 21 $\frac{1}{2}$ inches from the top; for 12 foot mill, 33 inches, 14 foot mill 30 $\frac{1}{2}$ inches, and 16 foot mill 39 $\frac{3}{8}$ inches from the top of the tower. The cast washers in every case go on outside of corner posts, under the nut.

3d. If Tower has been erected separately. Gin Pole, Tackle and Rope. It is better and more convenient to use a gin pole and tackle with rope to raise mill head and vane to place on tower. (See illustration Fig. 5). The gin pole should be 4x4 inches and 14 feet long for 6, 8, 9 and 10 foot mills, and the same dimensions but 15 feet long for 12 foot mills, 6x6 inches and 18 $\frac{1}{2}$ feet long for 14 and 16 foot mills. Always select good, sound wood for the gin pole.

4th. Gin Pole and Tackle for raising Mill Head and Vane. Tackle Block and Rope. Fasten tackle with rope to top end of gin pole three or four inches from end, raise into place. The gin pole must stand on platform of the tower with foot against tower. Gin pole must stand perpendicular in order to have room between pole and top of tower to place mill head and vane in position. Nail cleats on platform against foot of gin pole to hold it in place. In small mills, 6 to 12 foot, a

block of wood large enough to fit between the pole and top of tower should be placed between pole and tower about one foot below top of tower to keep pole in perpendicular position. For larger mills a substantial support must be arranged. (See Fig. 5). The gin pole should now be lashed most substantially to the windmill tower.

5th. Raise Mill Head up to place. Now raise the mill head and place it in position (see illustration Fig. 6). A steel washer belongs on base plate (S 41). Be careful to have it in place before the mast pipe is inserted in base plate. Plumb the mill head on the tower by means of the bolts and nuts that fasten the adjustable mast support to the tower and tighten the lock nuts.

6th. Put plunger (S 7) in place by inserting bottom end into mast pipe (S 1-A) from the top and pass it down to position, and then connect the top end to rocker arm (S 9). The V point of the steel angle of plunger must be toward the pitman (S 8). Next put mast pipe clamp, which constitutes the lower plunger guide, composed of two parts (S 28 and S 29), in place on lower end of mast pipe (S 1-A).

7th. Bolt lower support for vane (S 19) to the under side of mill head.

8th. Vane. Put the vane together. The vane rails (S O—S O) and the vane bar should first be fixed. The 4, 6, 8, 9 and 10 foot mills have the vane rails (S O—S O) and the bar already fixed for putting on the blade, but the 12, 14 and 16 foot mills have not). Next bolt the blade to the vane arms, keeping the flat sides together. The small $\frac{1}{2}$ -inch bolts for fastening the blade in the 4, 6, 8, 9 and 10 foot mills are to be found in the box of fixtures. For the 12, 14 and 16 foot mills the bolts are to be found in the vane rails where they belong, ready for use. The vane rails for 4, 6, 8, 9 and 10 foot mills are single and the vane blade goes on the flat side, but for the 12, 14 and 16 foot mills the vane rails are double and the vane blade goes between them.

9th. Raise Vane to place. Raise the vane into place (see illustration Fig. 7). In attaching rope to vane fasten it to the bottom rail near the middle, at a point that allows the vane to balance. Before tying rope to lower rail pass it once around the upper rail; this will cause the vane to hang in position for fastening to mill head.

10th. To attach the Vane to Mill Head and put Governor Spring in place. Insert vane hinge rod (S 69) through hole in lower bearing of vane hinge (S 22) from

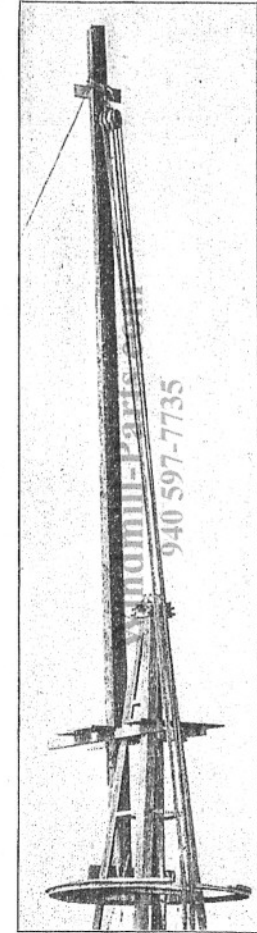


FIG. 5.

the under side, and pass it part way through; then put governor spring in place over hinge rod; then the spring adjuster; then insert the lower end of hinge rod into its place in the hole in lower support (S 19). Observe that the hinge rod passes through the governor spring, the spring adjuster (S 32). Before doing more arrange spring adjuster (S 32), which rests on top and engages the arm of the spring. (See illustration Fig. 4 (S 32). Now raise the outer end of vane so that vane will occupy a horizontal position, bring the upper end of vane hinge rod just below (S 32) into recess of upper vane support (S 17), and clamp tight with clamp and bolts (S 31).

11th. Mast Pipe Clamp, Pull-out Chain, Swivel and Pull-out Wire. The Pull-out Chain.—Fold the chain alongside the wire and insert the loose ends of both in pipe mast (S 1-A) at top and in front of the plunger (S 7). Pull the end of chain out at top, under wheel shaft and over the pulley, then carry it around pulley (S 21) in outer end of the bracket and fasten it to the lower vane rail (S 10) with swivel block (S 39). Before proceeding further, put mast pipe clamp, which forms the plunger guide, in position on lower end of mast pipe. Now pass the lower end of the pull-out wire through hole in plunger guide (S 28) at the lower end of mast pipe, then through hole in plunger swivel at lower end of plunger. Put guide for double pump rod in place on platform (do not nail) and pass the pull-out wire through the center hole. Swivel.—Next attach the swivel to low end of pull-out wire.

12th. Adjust the Governor Spring. A bolt threaded well back, called governor bolt (S C), connects the spring adjuster (S 32) with the spring adjuster lock (S 31). Enter the bolt and pass through S 32 (the bolt being held in upper support for vane, see illustration Fig. 3, S C and S 32). By turning the nut to the right the tension is increased and holds the wheel stronger into the wind. If the nut be turned up too much the wheel working in high winds will operate the pump too fast. To lessen the tension, turn nut to the left. We recommend as light tension as possible according to the work the mill has to do.

13th. Hook one end of brake rod (S 71) in the hole in end of lower vane hinge (S 22) with the hooked end up and the other end in brake lever (S 30) and attach the brake lever to the stud (S D) on mill head. Connect brake band (S 72) to brake lever (S 30) with the brake bolt (S A) and turn nut up just enough to hold bolt in place, until the pull-out wire and reel are put in place, when the brake must be



FIG. 6.

adjusted. Now loosen nut on bolt that fastens the brake guard (S 54) in place, and turn the arm of the brake guard around against brake band (S 72) and turn nut up tight.

14th. Windlass with chain to attach to Pull-out Wire. Put the windlass in place by bolting to corner post of tower about three feet above the ground. The

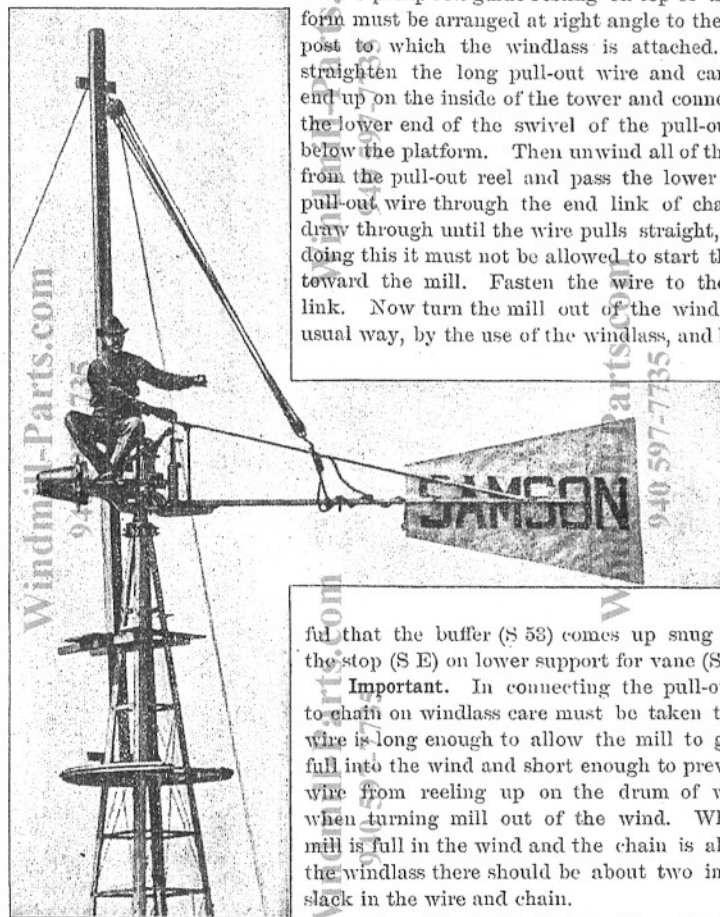


FIG. 7.

double pump rod guide resting on top of the platform must be arranged at right angle to the corner post to which the windlass is attached. Next straighten the long pull-out wire and carry one end up on the inside of the tower and connect it to the lower end of the swivel of the pull-out wire below the platform. Then unwind all of the chain from the pull-out reel and pass the lower end of the pull-out wire through the end link of chain and draw through until the wire pulls straight, but in doing this it must not be allowed to start the vane toward the mill. Fasten the wire to the chain link. Now turn the mill out of the wind in the usual way, by the use of the windlass, and be care-

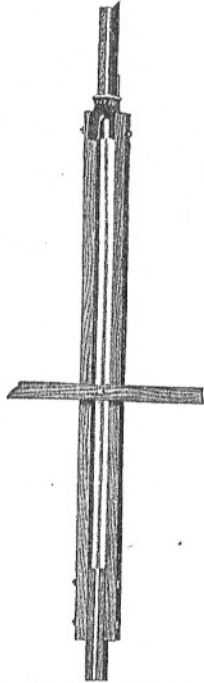
ful that the buffer (S 53) comes up snug against the stop (S E) on lower support for vane (S 19).

Important. In connecting the pull-out wire to chain on windlass care must be taken that the wire is long enough to allow the mill to go back full into the wind and short enough to prevent the wire from reeling up on the drum of windlass when turning mill out of the wind. When the mill is full in the wind and the chain is all off of the windlass there should be about two inches of slack in the wire and chain.

15th. Adjust the Brake. Now, having the mill turned full out of the wind, go on up to the mill and turn up the nut on brake bolt (S A) until it requires considerable effort to turn spider wheel (S 2), then put lock nut on the bolt.

16th. Connect up the Pump Rod. The upper section of the pump rod is composed of two wood bars (see Fig. 8), the upper end of which is to be bolted to the two arms of the collar (S 36) on the plunger swivel. The lower ends, after passing

through the guide resting on the platform, are to be bolted to the top end of the first section of the single pump rod below the platform. The guide—cross bar—which the two wood bars pass through, is to be nailed to the platform after the pump has been put in place and the pump rod has been lined up. Now fix the collar (S 36) in place on the plunger swivel and draw nuts on the bolts tight. Examine the lower plunger guide (S 28 and S 29) at lower end of pipe mast (S 1-A) and see that the plunger works freely and does not bind.



Double Pump Rod and Guide.

17th. Put on Wheel Arms and Sections. Put wheel up last. Bolt wheel arms in place and be sure to draw nuts tight. Observe that two nuts are to be used on all bolts in fastening wheel arms. Place wheel in position one section at a time. The convex side of fans goes toward the tower. Fasten each section temporarily with the regular bolts until all are in place, observing the rule to lap rims all one way. Bolts used for inside rim must point toward hub or center of wheel, and those for outer rim point in the opposite direction.

The outer rim has three holes at each end, one of which is for the wheel arm bolt and the other two are for splice bolt. In attaching the first section observe that the hole in outer rim in center must match the hole in wheel arm. The second section should now be placed at the left of the one already in position, observing the rule for connecting the rim to the arms. Proceed in like manner to attach all remaining sections. After all the

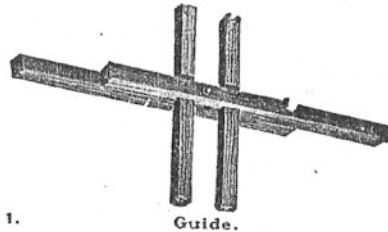


FIG. 11.

Guide.

sections have been put in place then tighten nuts on the bolts. In tightening the nuts turn up slightly each nut one after the other, continuing in this manner round and round the wheel until all bolts are drawn up tight and then put the second nut (called lock nut) on every bolt and draw tight.

Oil Cups. Large oil cups are provided with wire wick feed. These wire wicks used in oil cups are to feed the oil slowly to bearings through brass tube in oil cups. Put these in place by inserting the longer end of wick in brass tube. Fill the cup full of oil so it will run over into the brass tube and cover the whole wick with oil; this gives the bearing a good oiling in the start. Oil other parts and the mill is ready for work. In 12-foot mills and larger more than one wick in each tube may be used; this should only be done when one wick does not feed enough oil to lubricate the bearings properly. A good oil should be used, oil that will work equally well in summer and in winter. We recommend a heavier oil for summer use and

a non-freezing oil for winter. The Ideal oil we furnish is suitable for summer and winter use, and can be had from the dealers.

The wire wick will feed the oil regularly and as long as there is any oil in the cup. As soon as the owner of the mill finds out how long one filling of oil will last, he will know how often he has to oil his mill.

When oiling mill examine wick and tube and if any gum has accumulated remove same.

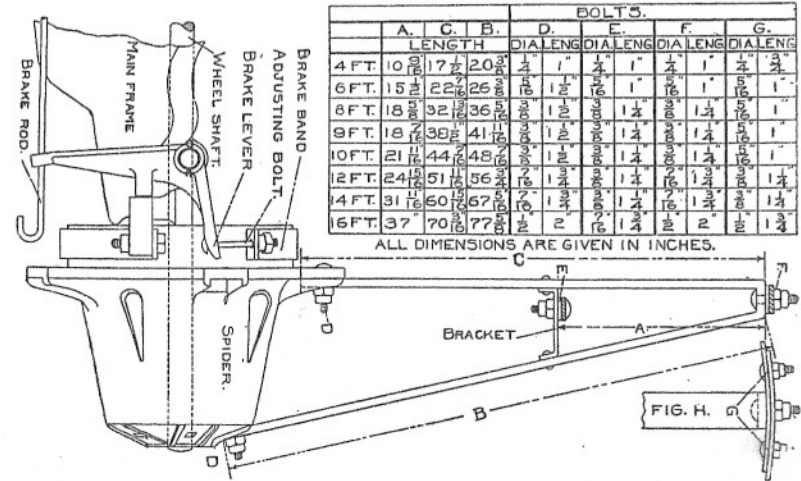
Covers for the Oil Cups. Be careful to keep the covers on the oil cups, and thus prevent dust from getting into the oil and then into the bearings to injure them.

Nuts and Bolts. When you oil the mill, each time take a wrench along and see that all nuts and bolts are in place and tight. Neglect in this direction sometimes causes expensive repair bills.

To put Mill and Tower together on the ground before raising. To put mill and tower together for raising both at once, proceed as follows: Put tower together according to directions for erecting tower, and then put mill on tower while lying on the ground, always proceeding with the work in detail by following the directions for erecting the Samson Mill. Place tower in position for raising. It is better and more convenient to place tower in proper position for raising and then block up top end enough so that the platform does not touch the ground, then begin and put mill together on tower.

Important. In all cases where mill and tower are raised together be careful to loosen the nuts on bolt that connects brake lever (S 30) with flexible brake band (S 72) to avoid breaking the brake lever. This must be done before beginning to raise the mill and tower.

If large mills, put on Wheel Head and Vane Only. Large Mills on High Towers.—It is recommended for 12, 14 and 16 foot mills that it is better to put only the mill head and vane on the tower before raising, especially for towers more than



50 feet high for 12 foot mills, 40 feet high for 14 foot mills and 30 feet for 16 foot mills, and then to put up the wheel after the tower is raised. This recommendation is for beginners; experienced operators will be free to use their own judgment.

The foregoing detail shows spider, wheel arms, brake band and brake lever connection. Also part of main frame and wheel shaft for Samson Windmill. Wheel arms for 6, 8, 9 and 10 foot mills have one bolt at D, as shown by cut; 12, 14 and 16 foot mills have two bolts fastening arms to spider and all are double nutted. The rims of wheel sections are bolted to arm and bracket at E with one bolt, and at F with three bolts. The table given herewith gives measurements of wheel arms and the size of bolts used for different sizes of windmills. Fig. H shows how outer rims are bolted together and to wheel arms.

DIRECTIONS FOR RAISING MILL AND TOWER TOGETHER OR FOR RAISING TOWER ONLY.

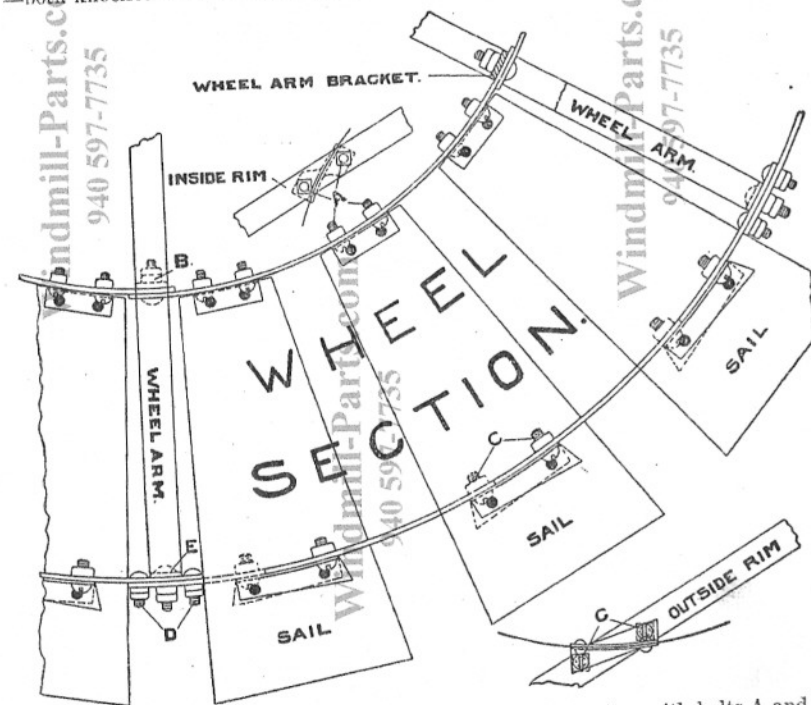
To raise the Tower. The following appliances are required: Tackle block, ropes, a gin pole or shears and a good, steady team or windlass, and if a windlass is to be used, a snatch block will be required. **Ropes.**—One main rope one inch or more in diameter, 100 feet long, to connect shears to tower; two short ropes, same size as above, 25 feet long, one to connect tackle block to pull post and the other to connect windlass to its anchor post; one tackle rope, $\frac{1}{4}$ -inch in diameter and 350 feet long; two $\frac{1}{2}$ -inch guy ropes, each 125 feet long. **Tackle Block.**—One with two and the other with three, or one with three and the other four pulleys. **Shears.**—Made of two pieces of 4x4 or 4x6 inch timber, two feet longer than half the height of tower and fastened together by a bolt one foot from end. **Windlass.**—Use the Ideal or any other good make.

How to Proceed. The tower (and the mill if both are to be raised together) having been put together according to the printed instructions, place the foot of the tower in position so as to have the ends of the two corner posts lying on the ground at the identical place where the corner posts of tower are to stand when tower is up, then place a strong plank under the ends of these two corner posts and another plank on top of the first one and against the ends of corner posts and drive two or more strong stakes against and in front of this plank to prevent the tower from sliding forward while being raised. Fasten long main rope around top of shears at the bolt, leaving three to five feet of rope for fastening to the upper tackle block (the one with the largest number of pulleys). Next fasten upper tackle block to short end of main rope close to shears, with tackle rope in the blocks; then stand the shears in position (as illustrated on opposite page) with the feet just in front of and close to end of tower posts; lean top of shears toward top of tower and about five feet out of plumb, and tie the other end of main rope around top of the tower at or near platform. Be careful in arranging the rope so that platform will not interfere with it. Then spread the blocks as far apart as the tackle rope will permit, reserving enough rope to hitch team to or fasten it to the windlass. If a windlass is to be used then draw heavily by hand on the lower tackle block to find location for setting the anchor or pull post. There should be a space of three or four feet left between tackle block and pull post. Be careful to set pull post in a straight line from the top of tower and over top of shears, so that the ropes will

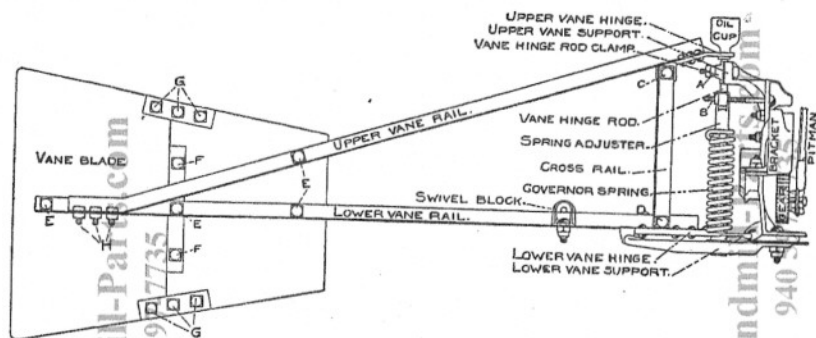
pull straight with the center of tower to prevent the tower from swinging around while being raised. The pull post must be most strongly fixed, so as to stand the strain put against it. Use one of the short main ropes to fasten lower tackle block to pull post; next fasten one end of each of the two guy ropes to tower just below the platform. To use the windlass, place it in position just to one side of the pull post and set another good pull post five or six feet to the rear of it (this post will also answer for snubbing post) and fasten windlass to this post with the remaining short main rope by threading the end of the rope up through one hole and down through the other of the plank upon which the windlass is mounted, thence back to the post. Be sure this post is substantially set. Now fasten tackle rope to the windlass by passing the free end around the drum three or four times and bring it back to the pull or snubbing post and pass it around two or three times, which completes the preparation for raising the outfit.

PLAN SHOWING KNOCKED DOWN WHEEL AND VANE FOR EXPORT SHIPMENT.

Also showing manner of fastening wheel to wheel arms and vane rail to vane—both knocked down and otherwise.



Section of wheel showing manner of fastening sails to rims with bolts A and C. Also section at rims to wheel arms and rims together with bolts B, D and E.



Cut showing manner of assembling the parts of vane blade and rails. Also placed in position showing governor spring connection. To make a secure job, all bolts on nut end should be riveted slightly; this will prevent nut from coming loose and off.

DIRECTIONS FOR ERECTING IDEAL No. 2 GALVANIZED STEEL TOWERS—3 AND 4 POST.

IDEAL No. 2 towers, both three and four post, are composed of sections. When the height of the tower is a multiple of 12 all of the sections are 12 feet long, but when the height of the tower is a multiple of 6, but not of 12, then every section is also 12 feet except the last one at foot—ground section—which is only 6 feet long. Example, a 36-foot tower contains three 12-foot sections, while a 30-foot tower contains two 12-foot and one 6-foot section.

Two sections (12 feet each) make a 24-foot tower, and so on after this manner. The sections are numbered from the top of tower downward. The top section is called section No. 1; the next is called Section No. 2. (Sections Nos. 1 and 2 are always put together in one bundle for shipping and are marked F 1 and 2, 3 P. if for a three post tower, and F 1 and 2, 4 P. if for a four post tower. The letter F is always placed in front of the number in marking the sections for the Ideal No. 2 tower). The third section is called section No. 3 if for a 36-foot tower, but if this section is only 6 feet long then it is called section No. 2½. The remaining sections are numbered in like manner as follows: Sections 1, 2, 3 (or 2½), 4 (or 3½), 5 (or 4½), 6 (or 5½), etc., while an 84-foot tower is composed of seven 12-foot sections, i. e., Nos. 1, 2, 3, 4, 5, 6 and 7.

Each section is composed of corner posts, girts, braces, bolts, eccentric washers, guide rods, clamps, etc.

Splicing Corner Posts Together.

To distinguish the top end of post from the bottom end, first in the first (top) section, the upper end contains no holes for splicing; on the contrary, the edges of top ends of posts in this section are notched to fit square head of bolt for fastening the tower cap, while the lower ends of posts in this (first) section contain four holes for making splice, two in corner of post and one on each side. The upper end of

posts in all sections (except No. 1) contains four holes, two in corner and one on each side for making splice, while the bottom end contains five holes, three in corner and one on each side.

Bolts in Splice.

Four bolts are used in making splice, two in corner and one on each side, but at anchor post splice five bolts are used. The bottom end of corner post laps outside—make no mistake when splicing corner posts.

To Put Tower Together.

Arrange to put tower together at the identical place for raising.

Bolts and Fixtures.

Open box marked F 1 and 2, 3 P. if for a 3 post tower, or box marked F 1 and 2, 4 P. if for a four post tower, and separate the bolts into lots of the same length and size—every size and every length of bolt belongs in a particular place in the tower. It will be observed that sections of tower below No. 2 are packed separately and the bolts for that section are packed in a box separately and has the same letter and number as the section to which it belongs. It will be found that all bolts fit holes exactly when put where they belong—are just long enough to take one nut, except the bolts that fasten tower cap in place, where the bolts take two nuts, one of which is for locking the other.

How to Begin.

1st. Lay out a sufficient number of corner posts to form two complete corners, remembering that if the tower contains a 6-foot section the posts in this section belong at base of the tower. Splice by bolting together, and observe that bottom end of post should lap outside and not inside. Fasten tower cap to top end of posts. The posts are notched at top end to fit a square tapering head bolt; this bolt goes between two posts from the inside and through tower cap and is double-nutted. Do not draw these nuts tight until all posts are in place, then draw them good and tight.

Carefully spread the bottom ends of tower posts the proper distance apart. Then select longest set of girts, one of which should now be laid in its place at foot of tower posts, and the remaining girts of this set should be put aside for using when fixing other sides of the tower; next proceed to arrange the remaining girts in place in similar manner until all the girts belonging on one side of the tower are at their place, remembering that the longest set of girts goes at foot of tower and the shortest at the top. Now arrange the wire cable braces by selecting a pair of the very longest set to go at the foot of the tower and put aside the remaining pairs of this set for fixing the remaining sides. Proceed to place one pair of wire cable braces from each of the remaining sets in place; the longest set belongs at foot of tower and the shortest set at top. Commence at top of tower to fasten girts and braces in place.

2d. Girts.—The shortest set of girts found in box with bolts and fixtures goes at first set of holes in the side of posts below tower cap and must be bolted on the outside of posts. The second set of girts belong at third set of holes in the side of corner posts below tower cap. It is to be observed that girts of the second set as well as all girts from the second set down go on the inside of the corner posts with the flat side against the post and with the flange up. The third girt belongs at

fourth hole in side of corner posts. It is at this girt that the lower end of the first set of cable braces attach and where the upper end of the second set of cable braces begin.

3d. Braces.—The shortest set of wire cable braces begins at second girt (the third hole in the side of corner post below cap). Observe that the braces have a loop at each end—one large, the other small. The end having small loop goes up. The upper end of all wire cable braces belongs on the inside of corner posts, but not between the girt and post, but inside of both post and girt. In fastening girt and upper end of wire cable braces in place observe that the bolt must have a steel washer, which prevents bolt head from slipping through the loop of the wire cable braces.

Now pass the bolt through loop of brace and then through hole in the end of girt and through hole in corner post of tower, then put nut on bolt.

The end of each girt and each wire cable brace in this set is to be fixed in like manner.

There should be two sets wire braces to each section of tower after the second—to omit these cancels our guarantee.

4th. Eccentric Washers.—In fixing the third girt (just above first splice in corner post) select the bolt for the place and pass a steel washer over bolt and up against the head; now pass bolt through loop in upper end of the next shortest wire cable brace (small loop of brace is at upper end, large loop always goes down) then through hole in end of girt (flat side of girt against tower post, with flange up and inside of tower post), then pass bolt on through hole in corner post of tower, and then through loop of the lower end of wire cable brace above, which is attached at top to the opposite corner post, and put eccentric washer in place on the bolt and have thin side of the eccentric (a V point on outside of eccentric washer indicates the thin side) down; then put nut on the bolt and draw up moderately tight. Now fix the other end of this girt and the wire braces, connecting in exactly the same manner.

5th. The next girt belongs in the middle of the next lower (second) section. The third set of wire cable braces begins at this girt. Observe that the lower end of the second set of wire cable braces, as does the lower end of all sets of wire cable braces below this set, attaches down at the second girt below the one to which the upper end is attached.

6th. The next girt belongs at the sixth hole in the side of corner post below tower cap (it belongs just above the second splice in corner post). Proceed to fix the girt and braces in this set exactly as directed for 5th, that is, to pass a steel washer over bolt and up against the head, then pass bolt through loop in upper end of the next shortest wire cable brace, then through hole in end of girt, then through hole in corner post of tower and then through loop of the lower end of wire cable brace above, which is attached at top to the opposite corner post, and then put eccentric washer in place on the bolt and then the nut and draw up moderately tight. Now fix the other end of this girt and the wire braces in like manner.

7th. Clamps.—The wire cable braces, beginning with the second set from top of tower, are to be fastened in the middle to the girt with a clamp which is bolted to girt—two holes will be found in each girt at the place where the cable braces cross (see instruction for adjusting clamps). Now put on the clamps, but do not

draw nut up on bolt tight—just tight enough to clamp the cable brace in place until tower is all put together. Proceed in like manner with each remaining set of girts and wire cable braces until one side of the tower is completed.

Having one side of the tower put together, then—

8th. To proceed—three post towers. Begin at top of the tower and fix the first (top) section of the corner post in place by bolting to the tower cap (by temporarily fixing the girts that belong just above the first splice in corner post, the first section of the corner post is easily held in place while bolting to tower cap). Next fix all girts and wire cable braces to both sides of this section of the tower in the same manner as directed for fixing same on the side of tower already finished.

9th. The Ladder.—The tower is arranged so as to allow the ladder to be placed on either side. The upper end of top section of ladder is to be bolted to the girt just below the platform, and lower end is to be bolted to the girt just above first splice in corner post. The lower end of second section of the ladder is to be bolted on over the clamps that bind the wire cable braces to girt. Observe that the clamp goes between the brace and ladder and that both are held in place by the same bolt, and that the nuts on bolts *must not be drawn up tight*, but left loose enough to permit adjustment of cable braces when the tower has been put together, after which the bolts that fasten clamps, as well as the bolts that fasten clamps and ladder to place, must be drawn up tight.

10th. Having the first (top) section put together, then proceed to splice on the next section of corner post and then to fix girts and wire cable braces on both sides of this section (observing to fix clamps and ladder) in the same manner as directed for fixing the opposite side of the tower already finished. Now splice on the next section of corner post and fix girts and wire cable braces (observing to fix clamps and ladder) in the same manner as directed for fixing the side already finished, and proceed in like manner with each remaining section until all is finished.

11th. To proceed—four post towers. Put one side of tower together exactly as directed for putting the three post tower together. Then begin at top of tower and fix the first (top) section of corner posts in place by bolting the two corner posts to tower cap. (By temporarily fixing the girts that belong just above the first splice in corner posts the first section of the posts is easily held in place while bolting to tower cap). Next fix all girts and wire cable braces on all three sides of this section of the tower in the same manner as directed for fixing girts and wire cable braces on the side of tower already finished.

12th. Having the first (top) section put together, then proceed to splice on the first section of corner posts and then to fix girts and wire cable braces on all three sides of this section (observing to fix clamps and ladder) in the same manner as directed for fixing the side of tower already finished.

Now splice on the next section of corner posts and fix girts and braces (observing to fix clamps and ladder) on all three sides of this section in the same manner as directed for fixing the side already finished, and proceed in like manner with each remaining section until all is finished.

13th. Adjustment of Wire Cable Braces by Means of Eccentric Washers.—One cast eccentric washer is furnished for the lower end of each wire brace, to go on outside of corner post, and is used for tightening braces by turning to the left. The washer is held in place by tightening nut on bolt.

When all the braces and girts are in place, begin at the top of tower and tighten the wire braces by turning the cast eccentric washers in each section *equally* to the left until braces are just tight and no more, and one equally as tight as the other, then draw the nut up firm to prevent slipping and draw nuts tight on clamps.

CAUTION.—In adjusting the braces it should be borne in mind that too much tension will cause the girts or corner posts to spring out of line and thus weaken the tower.

14th. Adjustment of Clamps.—Clamps are provided to fasten braces to the girts (commencing at the middle of section 2, or 18 feet from top) for the purpose of strengthening the girts and preventing them from springing up or down, in or out. In fastening the clamps be sure the girts are straight. Two clamps are used on each girt near the center and bolt holes are arranged accordingly. On the ladder side the clamps go between the girt and ladder and are held by the same bolts that fasten the ladder to the tower and should be drawn tight after braces are adjusted.

15th. Mast Support.—The mast support holds the lower end of mast of the mill in place. It is capable of adjustment by means of the long thread on bolts used for fastening it in place. It is important that the mill itself is plumb on the tower, hence the need of means for plumbing the mast. Observe that for 6 and 8 foot Ideal Mills and for 6 and 8 foot Samson Mills the mast support is to be fixed at the first set of holes in corner post of tower below the cap at top.

16th. Raising.—A steel tower is different from one made of wood, and care should be exercised that the two lower posts do not buckle while raising. In 48 foot towers and higher it will be well to lash a 4x4 16 feet long to the outside of each of the two lower posts, which will greatly stiffen them. In all heights lash a piece of 4x4 to the two side bottom girts to keep same from buckling while raising.

The use of a shear is recommended for raising towers. It not only facilitates the work, but lessens the risk. A shear should be at least two feet longer than one-half the height of tower in every case and placed at the foot of tower, resting on the ground, the upper end of shear leaning well toward the top of tower.

17th. The Pull-out Wire must pass from guide at platform (see instructions for erecting mill) down between the arms of swinging guide rods that guide pump rod and the corner post of the tower.

In attaching pull-out wire to pull-out reel, unwind all of the chain from reel and draw pull-out wire down taut and then pass the end of pull-out wire through link at end of reel chain and draw both chain and wire taut, but not taut enough to begin turning mill out of the wind, and then firmly secure the wire to last link of chain. Care should be taken in adjusting the length of pull-out wire that there will be about two inches of slack when mill is turned into the wind, and that in turning mill full out the wire does not wind up on the reel.

18th. To Connect Pump-Rod Guides. Two fixed pump-rod guides are used, one on top of platform, nailed fast, so as to center rod properly close to the swivel; the pull-out wire passes through the swivel and the guide between the rods, so as to keep it in proper place. The other fixed pump-rod guide is bolted on top of girt 12 feet from the top of tower (just above splice in corner post) and should be properly adjusted. These two fixed guides are made of wood. Swinging pump-rod guides are furnished for each additional girt (or every six feet). The last guide comes within 12 feet of ground.

Turn the wheel so the pump-rod is half way up (in making stroke of pump) and bore $\frac{1}{8}$ hole through the rod on a level with top girts, to which the rods con-

nect, for the guide-rod clamp. The swinging pump-rod guides are secured at each end with clamps, one fastened to the girts near corner post and the other on the side of pump-rod opposite the fastening at girt. See that the adjustment leaves the rod straight.

Anchor Posts. Steel anchor posts only are used for this tower and are furnished with steel anchor plates. Fasten anchor plate to foot of anchor post with one-half inch bolts, and draw nuts good and tight. A steel washer goes under nut. Put anchor post in position in the hole that has been dug for the same. The splice at top bolting to bottom end of corner post with five bolts each. In setting anchor posts, see that they line up with corner post of tower. It is of the **UTMOST IMPORTANCE** that the anchor posts be sunk in the ground to a depth that will bring the lower girt flush with the surface of the ground. If lower girt is omitted or is allowed to become bent, the tower is weakened and is liable to go down in a heavy wind, for it is absolutely necessary that this girt be maintained without a bend in it, and that neither this girt nor the lower braces be removed in any case.

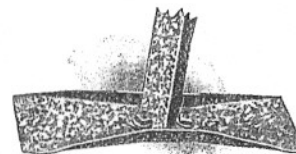
Strict attention to the foregoing directions will prevent trouble and damage to the tower.

How to Secure Anchor Posts. Good anchorage is most essential, for upon it depends the security of mill and tower. To properly secure steel anchors in the ground it is necessary to adopt one of the following directions:

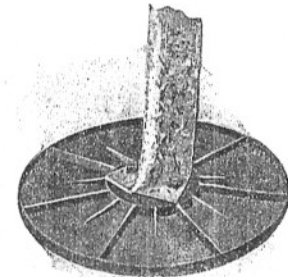
The holes having been dug deep enough and large enough to admit of anchor posts and plates, and the tower being erected, bolted to the anchors and accurately plumbed, proceed to fill up the holes, tamping the earth solid as it is thrown in. If the earth at bottom of hole is loose, either put in plank or broken rock and cement to give a solid foundation. Rock, plank or boards on top of anchor plates will be found most excellent to prevent anchors from pulling.

Near the top of ground something besides dirt must be used about the anchor post. A large rock—not less than 12 inches diameter—should be placed against the inside of post below the surface to keep the post from moving toward the center of tower; or the upper part of holes for two feet deep can be filled with cobble stone or small broken rock, well tamped about the inside of anchor post, which will also answer the purpose. There is so little surface to a steel anchor post that it is necessary to supply extra surface with other material of a suitable character.

Always carry a taper punch or drift to drift out holes at splices where they do not exactly meet. By so doing it will be an easy matter to enter the bolts.



Steel Anchor Plate.
Anchor Post Attached.



Cast Iron Anchor Plate.
Anchor Post Attached.