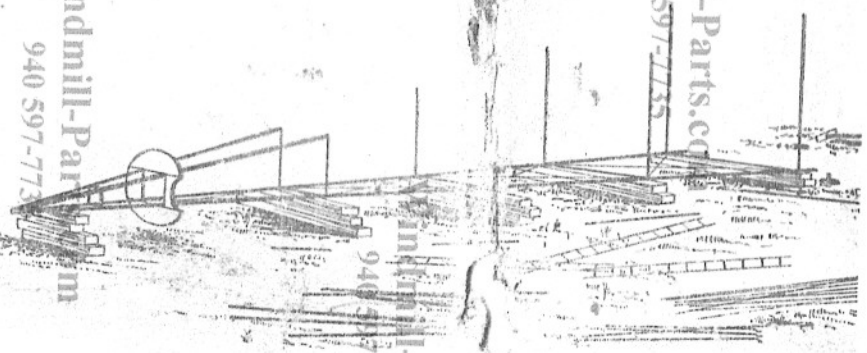


THE BUTLER CO., BUTLER, INDIANA, U. S. DIRECTIONS FOR ERECTING THE BUTLER GALVANIZED STEEL TOWER

Check contents of hardware box.

Dig anchor post holes, centers of holes for 4-post tower—12 inches more than length of bottom band. Holes should be 3 1/2" square for a No. 2 and lighter towers and 2 1/2" ft. for No. 3 and 4 towers, and about the depth of anchor posts, with all bottoms of a level and all holes equal distance from center of pump. If anything extra is to be used for filling holes, the material should be prepared but none of it in until tower has been raised, plumbed and centered.

If convenient it is best to set the anchor posts in concrete. If the soil is loam or cement should be used by all means.

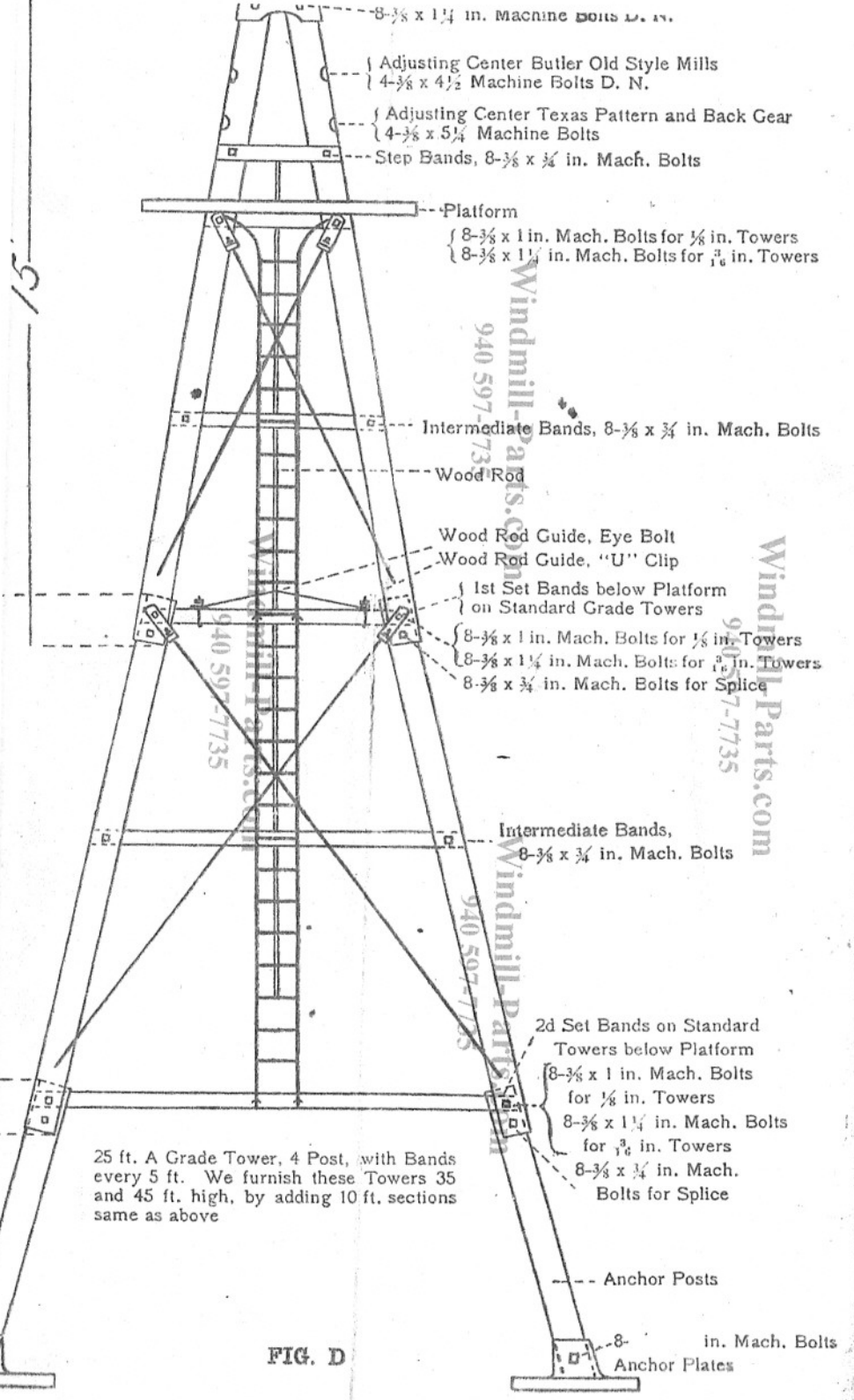


Secure timbers to put tower together (see Fig. 1). Measure from anchor holes to find where top of tower will stand and lay two top corner posts and bolt tower cap to first holes in side of angle with double nuts outside. Upper of top corner posts have holes in corners as well as the sides (except for 14 16 ft. mill.)

They are twenty feet long if tower is 20, 25 feet, etc., and fifteen feet if tower is 25, 30, 35 feet, etc. All corner posts are in ten-foot lengths. Continuing, bolt the two corners together from top side of tower the entire length of same, putting bolts in at BOTTOM splice holes ONLY. Omit bolts from the splice holes until bands are put on. In splicing the corner posts together, note they lap but six inches, the top end of each post being INSIDE and the bottom OUTSIDE of each connecting post. The top ends of all corner posts have four holes in. The bottom ends (except first 15 and 20 foot sections) have four holes in.

The four holes in top of ten-foot corner posts are splice holes and four of the holes in lower ends of all corner posts are likewise splice holes, the other holes being for lower ends of brace rods. The ends of the tower are fastened same bolts on outside of corner posts. For 10 foot mills, the holes occur as follows:

- 1st—1 in. from top of tower, for tower cap.
 - 2nd—27 1/2 in. from top of tower, main pivot pipe.
 - 3rd—40 in. from top of tower, step band.
 - 4th—60 1/2 in. from top of tower, platform.
- The holes in corner posts of the tower for 10 foot mills are at the same place except for platform, which are 68 1/2 inches below



For 14 ft. mill holes in top of tower are as follows:

1st—1 in. from top of tower for tower cap.

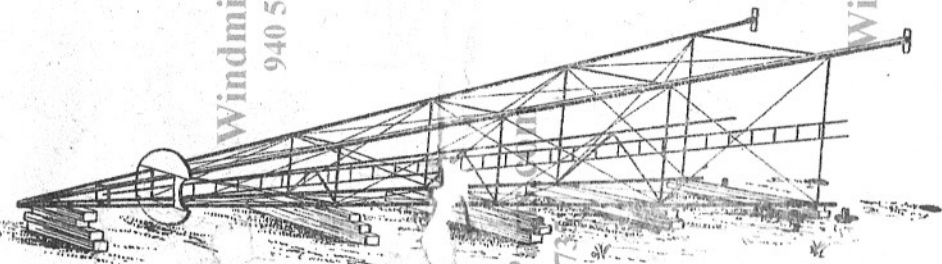
2nd—20¼ inches from top of tower for first set of bands.

3rd—38¾ inches from top of tower bands for truing spider.

4th—64½ inches from top of tower for third set of bands.

5th—78 inches from top of tower for platform bands. "L" lugs for first set of brace rods and top of ladder.

Now bolt the bands on for three sides of tower the entire length of these corner posts (See Fig. 1). One band out of each set of four has two holes near center. These are for the ladder and should all be put on same side of tower. All bands except the short ones above platform and bands at platform, go on inside of corner posts (see Fig. 3). The lengths of the bands suggest their location on tower. All brace rod "L" lugs go on outside of corner posts and are fastened on with band bolts. All bands on towers banded every ten feet come at the splices in corner posts and are fastened on with top splice bolts except the first set below the platform on the 20-foot section, which are attached near middle of 20 foot section as explained below. (See Cut "A"). On all towers banded every five feet the intermediate bands are



fastened at single holes provided for them in corner posts about half way between ten foot bands. (See Fig. "B"). No "L" lugs for brace rods at intermediate bands on regular towers with single bracing. If towers are very high or special they are sometimes braced double, in which case "L" lugs are also put on at intermediate bands. 70 ft. and higher towers are double braced below 55 feet.

After bolting truing spider and short bands in place above the platform slip platform in place with opening on ladder side of tower, and bolt platform bands on outside of corner posts, and eight "L" brace rod lugs and top of ladder with same bolts. Short bands above platform and two of the bands at platform on our four post towers will be found in hardware box. Top of ladder side pieces are sprung apart to correspond with width of tower at that point. If tower is 20, 30, 40, 50, 60, 70 or 80 feet etc., first set of holes below platform are five feet, and are for hooking the lower end of first set of brace rods into; below the holes about two inches is another set of holes for attaching first set of bands below platform and another set of brace rod "L" lugs and if tower is banded every ten feet, next holes are three set near bottom of 20 foot corners; but if tower is 25, 35, 45, 55, 65 and 75 feet, etc., the first holes below platform are three set near bottom of 15 foot corner posts; that is, on towers banded every ten feet. (See Fig. C.) But if towers are banded every five feet a single set of holes for intermediate bands will always be found about half way between holes for ten foot bands. Below first splice the corner posts are ten feet long and are punched alike for all the different heights of tower.

Next put the remaining corner posts on. (See Fig. 2).

Now put brace rods in tower, observing the following:—On single braced tower they go in every ten feet (except the short set just below platform on 20, 30, 40, 50, 60, 70 and 80 ft., etc., towers, which commence at platform and run five feet below

same.) (See Fig. A). The end with the thread on is the top. (See Fig. 3 and 4). Insert the hooked or bent end in corner posts, on inside about one inch, or until offset in rod is within hole, then with a circular motion swing rod upward cross the tower diagonally to "L" lug on leg on opposite side, now spring middle of slightly until threaded end can be inserted in "L" lug. Now put nut on and draw until slack is nicely taken out and rod has been drawn straight. Now continue until rods are in place, after which tighten them, drawing them each a few turns time, so all will tighten about the same time and not draw tower out of square.

Next put ladder in place splicing the side pieces together where they lap a one inch, and fasten through holes near the middle of the bands occurring every feet with the small hook bolts. The hook goes on outside of band and over side ladder and the nut on inside of bands where it should be drawn up just moderate tight as the bolts at top hold ladder up and these hooks are simply put through to hold ladder from pulling away from tower when being climbed and to prevent rattling.

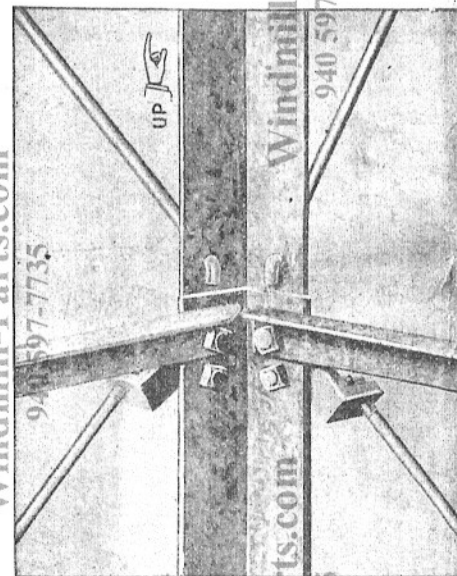


FIG. 3

View of inside corner posts where braces and bands are attached.

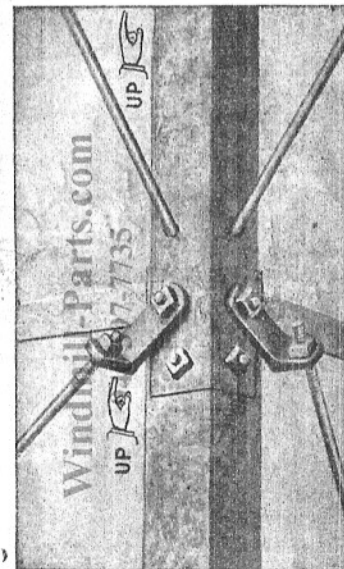


FIG. 4

View of outside corner posts where braces and bands are bolted to.

Now splice the wood plunger pole together, lapping same as directed by bevel ends and putting flat splice irons on two sides and using three bolts at each splice and place same within tower and proceed to fasten same as follows:

Bolt wind mill swivel to top of wood rod, enter pivot pipe of mill into tower and bolt swivel to iron plunger rod which projects from bottom of pivot pipe.

Next proceed to put on the guides that guide the wood rod down through tower. The 20, 30, 40, 50, 60, 70 and 80 ft. etc., towers are to have pump rod guides attached to the first set of bands that come below the platform and every set of bands coming thereafter, at intervals of ten feet. On the 25, 35 and 45 foot towers commence with these guides at bands ten feet below platform and put them every ten feet thereafter. To attach pump rod guides first put two "U" shaped clips and angle on each band at which guides are to be placed. The clips go on and around the band, and the angles on top. These clips go on near the corner posts and both on the same side of the tower. (Fig. 51).

Next, raise the inner end of guides next to the plunger pole until they are level; now turn the mill until the plunger pole is just half way between the highest and lowest point and mark same and bore hole to receive the bolt.

There are two washers on each bolt, one of which comes on each side of the

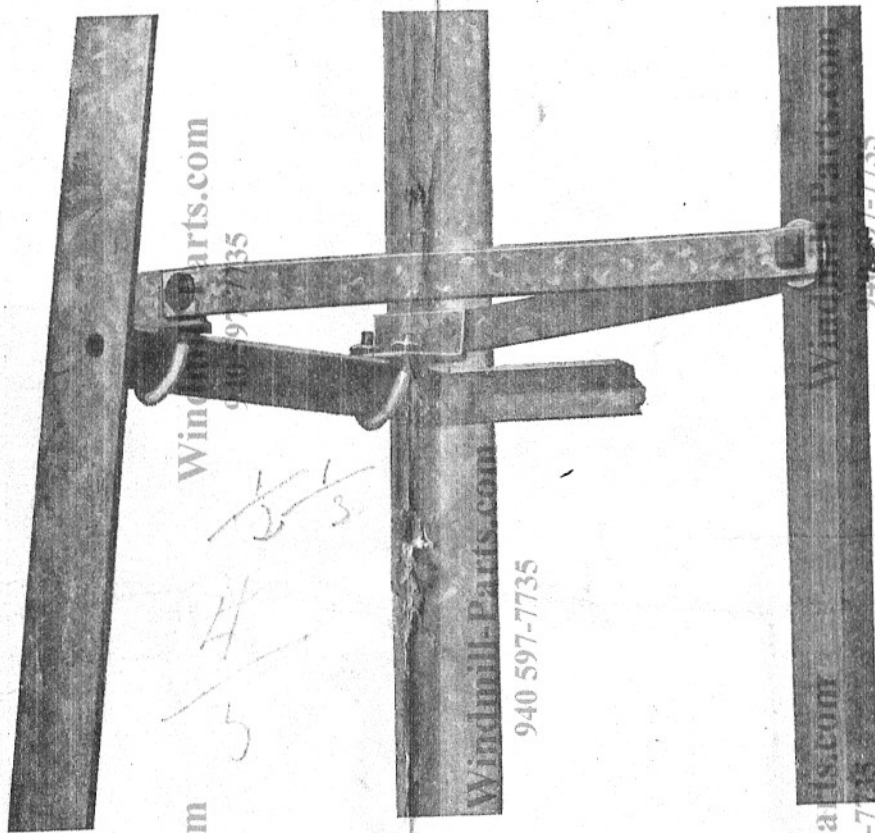


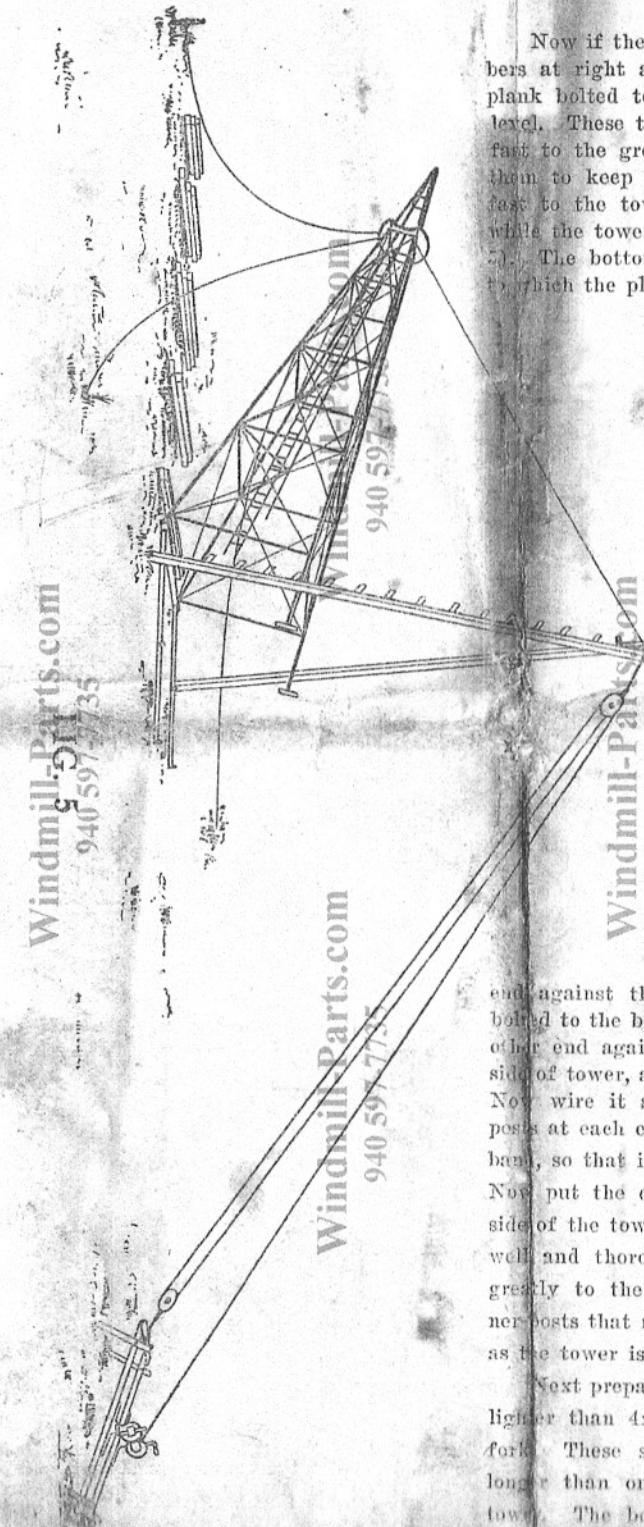
FIG. 51

plunger pole. After putting these guides on, if the plunger pole is sprung out of place by any particular set of guides, or does not come down directly over the pump, which should be exactly in the middle of the tower, it can be drawn over by loosening the "U" clip on the bands. Shoving these clips toward the center of the bands will throw the plunger pole in further, or shoving them out on the bands toward corner posts will draw the plunger pole toward the side to which these guides are attached. All these guides should be on the same side of the tower.

Now detach swivel from iron plunger in mill and remove mill from tower before raising the latter. The tower having been put together, bolt the two anchor posts on top side ONLY.

The anchor posts lap on tower posts same as corner posts lap on each other, and bottom bands are secured as per Fig. 8. Next bolt the anchor plates on these posts, allowing flange on plate to go outside of post. This is done to relieve the bolts from outward strain on anchor posts caused by spread of tower.

The tower now being ready to raise, proceed as follows: Take a piece of plank 1½ inches to 2 inches thick and four feet longer than the spread of the tower at the bottom and bolt it fast to the lower end of the corner posts on lower side of tower, through the holes where the anchor posts go on.



Now if the ground is uneven, lay timbers at right angles with and under plank bolted to the tower until plank level. These timbers must now be set fast to the ground and a cleat nailed them to keep the plank which is bolted to the tower from slipping forward while the tower is being raised. (See Fig. 52). The bottom of the two corner posts which the plank has been bolted to

just go to the edge of the two anchor holes next to tower.

Some erectors follow the custom of putting the mill in the tower while it lies on the ground and raise all together. We do not prove of this plan: will not guarantee

mill and tower against injury caused by accidents in raising; but the erector insists following this plan should brace the tower extra at the bottom, that the corner posts will not buckle. To this take two pieces of timber of suitable

length and put end against the plank which has been bolted to the bottom of the tower, and other end against corner post on the side of tower, and just below second band. Now wire it substantially to the corner posts at each end and to the brace rod band, so that it cannot drop out of place. Now put the other timber on the other side of the tower in the same manner. well and thoroughly done, this will greatly to the strength of the tower corner posts that receive nearly all the strain as the tower is being raised.

Next prepare two pieces of timber lighter than 4x4 for a pair of shears for the tower. These should be about two feet longer than one-half the height of the tower. The bottom ends should be

about the width of the bottom of the tower, and a bolt put through them about eighteen inches from the top ends, and all sharp corners, which might cut the rope rounded off.

Then attach a one inch rope to the tower, just below the platform, so as not to cut the rope. This rope should be fifteen feet longer than the height of the tower. To the other end of the rope attach a good steel pulley.

Next locate one of our hand crabs about ten feet more than the height of the tower away from the anchor post holes, opposite the tower, and exactly in line with the tower. (See Fig. 5.) To make a frame for the crab, take two pieces of timber 2x4 inches and 8 feet long, set them on edge and bolt crab permanently to same. Across the top of these 2x4, near each end, nail a piece of board 1 inch by 6 or 8 inches wide, and long enough to project three inches over the side pieces, and you have all the frame necessary, being careful of course to see that nothing can slip when tower is being raised.

Then take a 3/4-inch rope, four times the height of the tower and tie one end to the eye in the pulley that is on the one-inch hoisting rope, pass it back through a single pulley to be fastened to a stake near the hand crab; thence back through the pulley on 1-inch rope, and from there to the crab, being sure to tie the end firmly to the crab shaft.

Now take the shears and place the ends which are spread the most about two feet outside the anchor post holes toward the crab. Take the single one-inch rope and put it through the fork in the top of the shears, so that the shears lean about 20 or 30 degrees toward the tower. Drive a couple of short stakes on each side of the bottom of the shear posts, to prevent any possibility of slipping.

Now wind the rope on the shaft of the hand crab, raising the tower slowly and carefully. When it is up about two or three feet, give it a couple of light jerks downward to see if everything is going to stand the test.

Next, attach to the tower cap or other convenient place, two 5/8 inch or larger guy ropes, which should be twice the height of the tower. Two persons should take these guy ropes and extend them outward each way from the tower, as same is being raised, to prevent any possibility of the tower lurching sideways. A third rope the same size and length as the two others should be attached to the tower near the platform, and the other end attached to a stake driven firmly into the ground about one foot out from the top of the tower. This end should be wrapped several times around the stake, to prevent the tower being pulled over too far after it has been raised.

When the tower has been raised about 45 degrees, the shears will fall to the ground, and if they have been properly placed, the top will fall away from the tower, as they should fall.

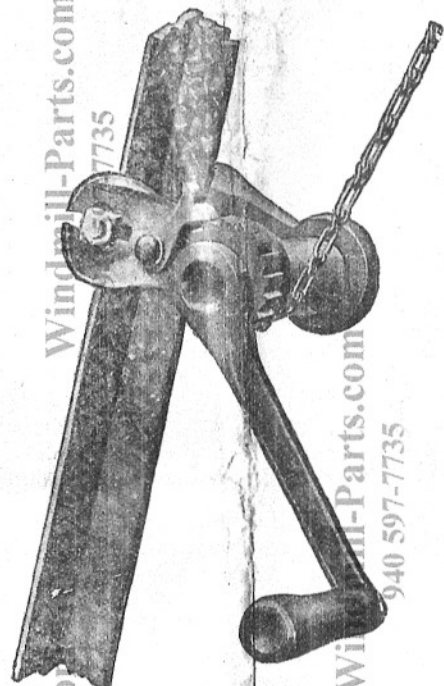
After the tower is up, pull the weight over to the two anchor posts which have been attached, having first firmly tied the rope to the stake extending in the opposite direction to prevent any possibility of the tower being pulled over, and fasten the other two anchor posts. To do this, it will be necessary to remove the plank. Do not remove both ends of the plank at one time, but take one end off at a time, and put one anchor on at a time, leaving the plank off, of course.

The anchor posts now being in place, proceed to center the tower over the pump and plumb it. After it is in place fill the anchor post holes as heretofore directed,

after which all the guy ropes, etc., can be loosened and you are now ready to put the mill.

If preferred the tower can be built from the ground up, one section at a time and the same instructions for bolting on bands and braces will apply, but the anchor posts must first be leveled and centered and firmly and permanently anchored in place. For erecting in this way, the towers banded every five feet are the most

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SECTIONAL VIEW OF BOTTOM OF CORNER POST OF TOWER SHOWING METHOD OF ATTACHING BOTTOM BANDS AND BRACES

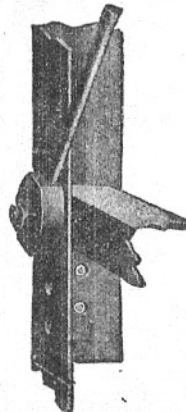


FIG. 8

This cut shows the improved method of fastening by set of bands and braces on any high tower. Eight of castings are used on a four-post tower and six on a 1 post.

In this way it is not necessary to remove or loosen bottom braces or bands to get anchor posts bolted fast to tower after raising same. These are only used at the bottom of each tower and the braces and bands remain the same length, thus not interfering in any way with the combination feature in our towers. No matter what the height of tower is this casting goes at bottom set only, the object being to provide a fastening for the bottom bands above the anchor posts without punching additional holes or changing kind of bands and braces from what they regularly are.

Fig. 7 represents our brace rod adjusting washer raising cross in bottom set of brace rods convenient height

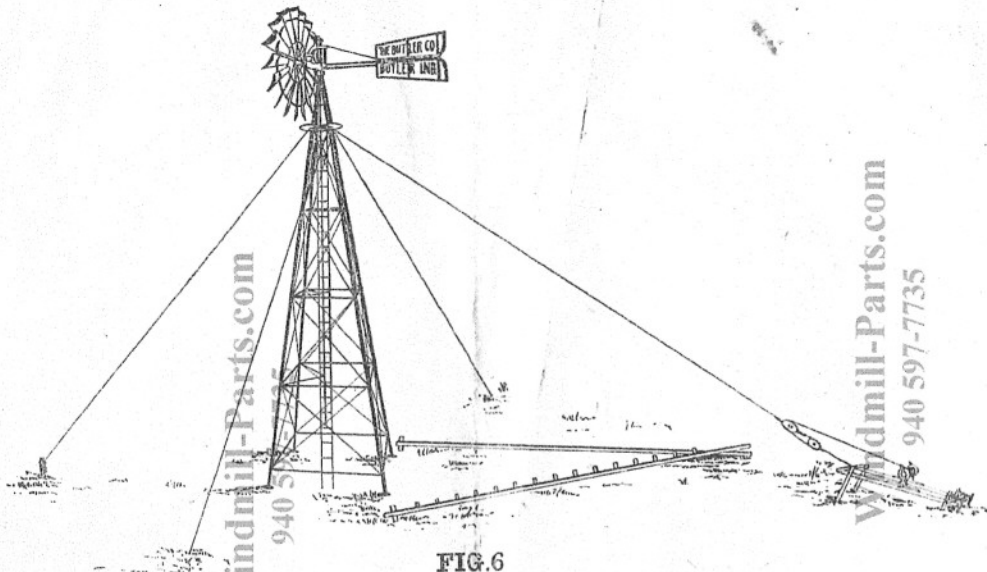


FIG. 6

pass in and out to pump without inconvenience of stooping.

In the box for hardware for tower will be found four round washers with square hole in middle and grooves in one side of same. Choose one or two sides of tower through which it is desired to pass in and out to pump, and place 2 of these washers on brace rods where they cross and put $\frac{3}{8} \times 1\frac{3}{4}$ carriage bolt through same just below cross, and draw up nut until the washers begin to grip brace rods and by hammering up against lower side of washers force cross in brace rods up to the desired height, after which tighten the bolt firmly.

If the nuts on the brace rods were previously drawn too tightly they should be loosened before forcing cross up too far as by adjusting cross the brace rods are drawn much tighter.

FORGED CLIP FOR TYING BRACE ROD TO BAND WITHOUT PUNCHING HOLE IN BAND

The accompanying cut, Fig. 9, shows our method of tying brace rods to bands on towers banded every five feet.

They are used regularly on 65 foot or higher towers without extra charge. If sent with lower towers they must be especially so ordered, in which case an extra charge will be made to cover cost of extra material and labor.

It will be noted that we accomplish this without punching holes through the bands which would greatly reduce their strength. In our method we do not reduce the strength of any part of the material; on the other hand, every part is made stronger and more rigid. On high towers the lower sets of braces and bands are very long, making them more liable to break or buckle, unless tied together in this manner.

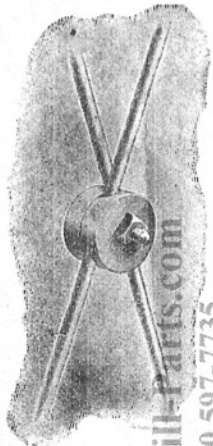


FIG. 7

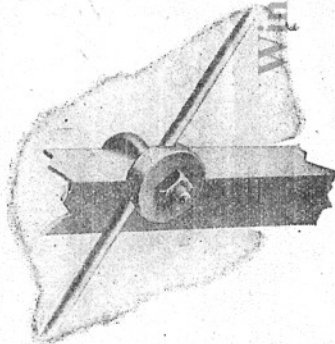


FIG. 9

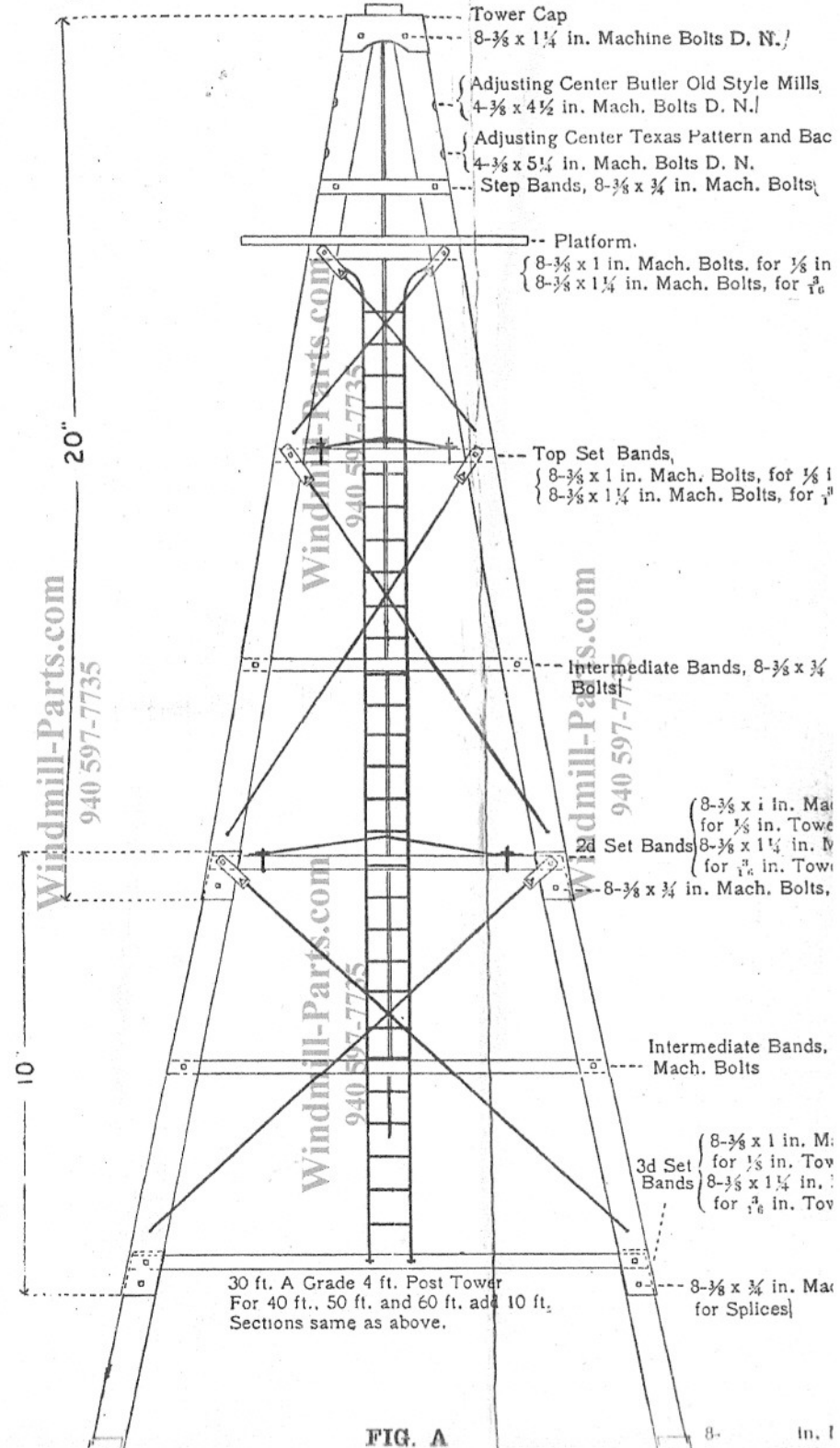


FIG. A

