

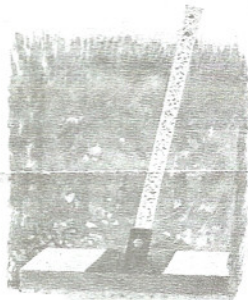
Directions for Assembling and Erecting

STEEL STAR TOWERS AND WIND MILLS

FLINT & WALLING MFG. CO.

KENDALLVILLE, INDIANA, U. S. A.

CHECK over the goods with the printed list to ascertain if shipment is complete. Locate the site of tower and lay out holes for anchor posts by measuring the longest band of tower and adding 13 inches to it, which will give the distance between center of anchor holes. Dig holes 2 feet square by 4 feet 6 inches deep, so bottom of holes will be on same level. Bolt a 2x12 plank 2 feet long to each anchor plate as shown in Cut No. 1, or cover the bottom of holes with small stone and grout with cement after anchor posts are in place, refill holes partly with stone and thin cement, making an excellent anchorage.



Cut No. 1

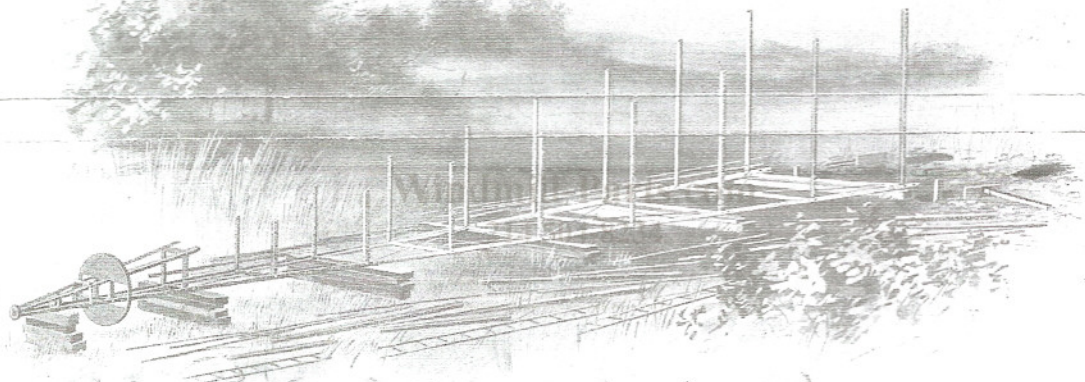
Before putting tower together, observe surroundings which may be to advantage in raising tower, fastening ropes, crabs, etc. Decide from which direction to raise tower and on which side ladder will be most convenient, then space off height of tower from and in line with the anchor holes. Select timbers or blocks enough to raise tower off ground, so as to clear platform when in place. Timbers should be placed at right angles to tower just above each splice. String corner posts, bands and brace rods of tower along the ground, the shortest bands and braces farthest from anchors, the longer ones in succession toward anchors, for convenience in assembling. Take two of the top posts, or those with holes in corner of angles near the top end and lay on set of timbers farthest from anchors. Place bed plate over top end of posts and fasten with bolts through corner holes, nuts on outside. Place truing spider on inside of angles, and bolt in like manner in next set of corner holes below. Bolt shortest band, 7½ inches long, on outside of posts in first set of holes on side of posts, the flange of band upward; bolt the next length of band, 10¾ inches long, in the first set of holes below and on the inside of angles, and

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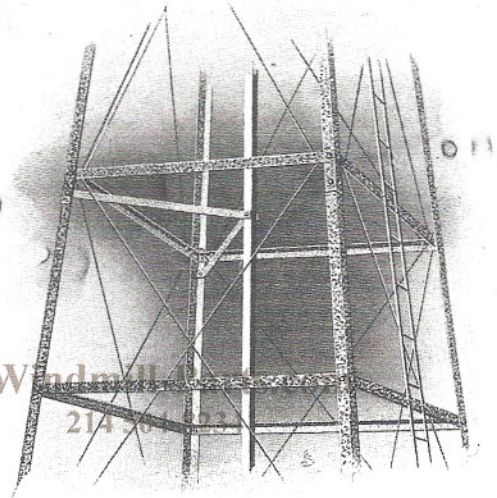


the next length band, 22 inches long, in the third set of holes from lower end of posts. All bands are bolted on inside of corner posts. All bolts should be inserted from the inside, nuts outside for convenience. One band of each set has two holes near center for attaching ladder; see that these are all on the same side of tower, as you proceed. Select the shortest set of brace rods, pass threaded end through inside hole in flange near end of 22-inch band from below, diagonally through the slotted hole in 10 $\frac{3}{8}$ -inch band above, place bevel washer on rod, fit lip on washer in slot and tighten nut on rod.

There are two kinds of corner posts, light and heavy, of the same width, but of thicker section. The heavy sections are used on the lower 10 feet of a 40-foot tower, lower 20 feet of a 50-foot tower and so on higher. Select two light bottom posts and bolt the end with two set of holes to lower end of top section on the inside so lap of section above will be outside. Nuts of bolts outside.

Bolt next length of band in third set of holes from lower end of post and insert next length of brace rod as in section above, first through round hole, diagonally to slotted hole in band above. Proceed in like manner with all sections.

All towers except No. 1 have bands 5 feet apart. No. 1 bands are every 10 feet apart. The middle or intermediate band of Nos. 2, 3, 4 and 5 towers is bolted midway between the bands of each 10-foot section, and are slotted near center on upper flange for brace rods to be passed through, so tower will not rattle. Having one side of tower together as described, proceed as shown in Cut No. 2. Place platform over top end, angles of platform down, bolting to tower where holes match. See that two holes in platform angle are on the same side as the bands with holes in for attaching ladder. Select the shortest guide bars and bolt the end with large hole in upper splice hole of top section of tower on inside of angle with shoulder bolt, passing bolt through bar from inside. Proceed in like manner every 10 feet as shown in Cut No. 3. Bolt short ladder to platform angle, twisting the top end of ladder one-half turn and pass bolt through; pass end of hook bolt over side of ladder

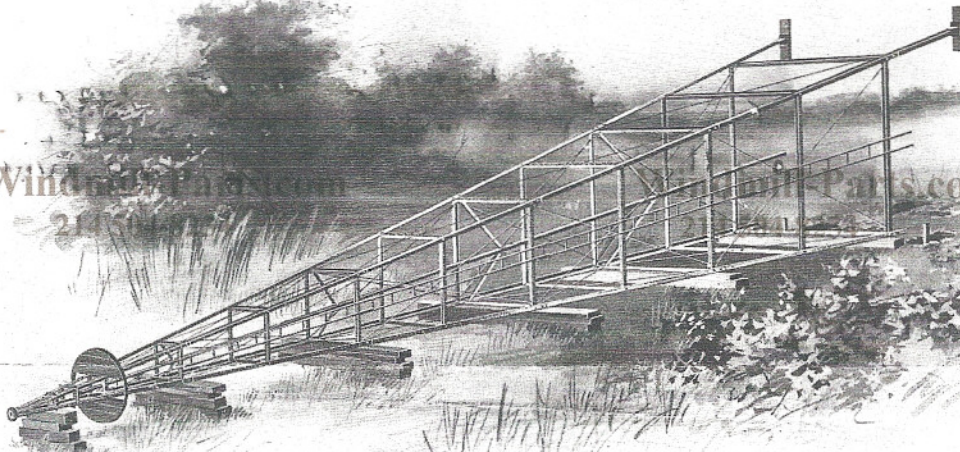


Cut No. 3

and band below and through same with nut on inside of band; splice next length of ladder and attach to bands every 10 feet in same manner. Continue with each side, keeping tower square, and tighten all nuts. Tower should be now as shown in Cut No. 4.

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Cut No. 4

and band below and through same with nut on inside of band; splice next length of ladder and attach to bands every 10 feet in same manner. Continue with each side, keeping tower square, and tighten all nuts. Tower should be now as shown in Cut No. 4.

MILLS

UNPACK mill shipment and check off with list in packing box. Place engine or mechanism of mill near top of tower, remove lower cap on mill pipe and insert end of pipe through bed plate and truing spider, placing the balls in retainer between washers, then replace lower cap and tighten set screw so cap will have a little clearance under truing spider. Bolt swivel to lower end of mill bar, attach long pullout bar to chain, passing bar through top of mill and slot in swivel below. Pass chain over sheave and bolt end into eye of shifting lever. Bolt rudder or vane to stem with smooth side away from stem, then bolt stem to rudder casting on mill with double nutted bolts. Insert governor pipe with weight attached into governor lever and tighten set screw; weight may be adjusted on pipe to suit any desired speed of wind. Bolt arms or spokes of wheel on inside of hubs or spider, the right angle bend on end pointing towards tower, then bolt wheel sections



Cut No. 5.

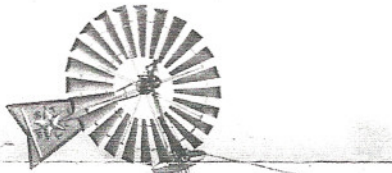
to arms, the outer rim to bent end and inner rim to cross piece of arm. All bolts should be left loose until wheel is together, then true it and tighten all bolts; each bolt should have two nuts.

In packing box an envelope will be found containing twisted wires for the oil cups; insert end of wire in tube of oil cup until it touches shaft, then bend upper end of wire over tube and let it point down into bowl of cup, fill with oil, and replace cover. Tighten all nuts and set screws.

When tower is erected and mill is to be placed thereon separately, tie a gin pole, 4 x 4 12 or 14 feet long, to top of tower with a small tackle block fastened to upper end and hoisting rope passing through it. Raise engine of mill and lower pipe end into place through bed plate and truing spider, replace lower cap after inserting balls in retainer between washers, raise the other parts, and assemble as described above.

ERECTING

HAVING assembled the Mill and Tower as directed, proceed to erect as follows: Bolt a 2-inch plank to lower end of posts on ground through the holes which bolt anchor posts to tower, about four feet longer than the bottom of tower, allowing the plank to project two feet on each side to prevent the tower from swaying. The lower end of tower should be even with edge of anchor holes nearest tower. A complete outfit includes one main hoisting rope, one inch in diameter, one and one-half times the height of tower; two double sheave tackle blocks with becket; one $\frac{5}{8}$ -inch hoisting rope four times the height of tower; two $\frac{5}{8}$ -inch guy ropes twice the height of tower; one Hoosier hand crab; one gin pole or shear, half the height of tower, made of 4x4 timbers bolted together two feet from ends with $\frac{5}{8}$ -inch bolts and spread at bottom the width of bottom of tower.



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The lower end of shear to rest on plank bolted to bottom of tower. Incline shear towards tower about 25 degrees from perpendicular. Attach main rope to upper end of tower at platform bands securely, avoiding sharp corners, stretch main rope and place it in crotch of shear, not fastening it, and attach main hoisting rope a few feet from shear. Locate a strong post securely in ground a distance equal the height of tower away from anchor holes and directly in line with same. Place crab 10 feet back of this pulling post, bolted to timbers which are securely fastened. Take three wraps of hoisting rope around the drum of crab, and one man to keep rope taut as it is reeled from drum. Attach two guy ropes to upper band, one man to handle each rope to the rear and side of tower, to play out rope as tower is raised, keeping rope tight. On large outfits it is necessary to have posts to secure guy ropes. (Cut No. 5).

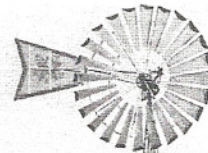
Cut No. 6.

of greatest strain, it proves all tackle sufficiently strong. Proceed to raise carefully. When tower is raised so hoisting rope will be in direct line with crab, the shear will drop free to the ground without jar. (Cut No. 6). When tower has reached vertical position keep guy and hoisting ropes perfectly tight. Remove plank from bottom of tower and bolt the remaining anchor posts to tower. Then plumb and center tower with well. Fill anchor holes with rubble stone and earth, stamping it solid as it is thrown in. It is very important to have secure anchorage. (Cut No. 7). Remove all ropes and oil the mill. Connect pump rod to swivel above, and turn mill so it will be in center of its stroke and place swinging guide bars square or at right angles with pump rod and bore the hole for pump rod bolts. Put bolts through rod so washers will be between rods and guide bars to prevent wood rod from wearing. Cut pump rod at lower end of proper length to connect to hollow iron of pump, and set to work. Large mills on high towers, or any size for that matter, can be conveniently erected with little assistance in 10-foot sections from ground up. Placing anchors in ground, leveling and securing same, then bolt on the 10-foot posts with succeeding bands and brace rods, the threaded end of rods always uppermost and in slotted holes with bevel washers, and headed end through inside hole. Bands in holes above splices and swinging guide bars in upper splice hole. Placing planks across corners on bands makes a strong and convenient platform on which to work. Many prefer this method of erecting. The towers have been thoroughly tested and when instructions are followed there is no danger of buckling or collapse.

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When all is in readiness, raise tower a few inches, giving it a slight jar. This being the point

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Cut No. 7