COMET

16 to 22' **MILL**
INSTALLATION
INSTRUCTIONS.

Before proceeding with any erecting work, make sure that everything for the plant has arrived on the site, and is correct per the order and Advice Note. Please read carefully through these instructions and study the list of parts and the Packers List to make yourself quite familiar with all the parts and their names.

GUARANTEE: OUR GUARANTEE HOLDS GOOD ONLY IF THE MILLS ANO TOWER HAVE BEEN ERECTED IN ACCORDANCE WITH OUR PRINTED INSTRUCTIONS ANO THE TOWER IS PLUMB, ANO ALSO ONLY IF THE MILL IS LOADED PER OUR PUMPING TABLE AND THE EQUIPMENT IS APPROVED BY US AND PROPERLY INSTALLED. WE CANNOT GUARANTEE A COMET MILL, WHICH HAS BEEN ERECTED ON ANOTHER MAKE OF TOWER.

Use the names specified in these instructions when referring to any of the mill parts in correspondence or in the ordering of duplicate parts and always state the size of the mill and its serial number, both of which are on the side of the main casting oil well. It is also helpful to state date or year of dispatch.

Carefully clean off the protective covering of grease that has been coated over the machined faces of the parts particularly the bore of the mast pipe, the crosshead, the mating faces of the mast pipe, and the main casting flange.

1. TOWER CAP AND TURNTABLE.

After erecting the tower and fitting the tower cap in accordance with our Tower Erecting Instructions, check for the levelness of the tower cap. To do this, assemble the bottom part of the turntable on to the tower cap, then check the ball race by placing a spirit level across two steel balls mounted in opposite sides of the ball race, moving them around to different positions to check for levels at several different diameters. If the ball race is out of level file, the top of the highest tower leg or chip a little off the corresponding support lug inside the tower cap casting. This operation should be done carefully as the mill will not govern correctly if the ball race is not level on final assembly.

When the levelling of this turntable has been completed match mark this turntable and tower cap before unbolting the bottom turntable for returning to ground level for assembling to the mast pipe. Leave the bolts in this bottom part of the ball bearing turntable so that they will be readily available when the assembly is being returned into the tower cap for final bolting up.

2. PULLOUT COLLARS

Put some grease into the groove where the outer collar fits but do not grease outside of mast pipe. See that the nuts and lock washers are tight. The guide bars fit into slotted lugs on the outer collar to prevent it revolving. Bolt the vertical guide bars for the outer collar to the inside of the lugs on bottom guide and top ends to tower rails with tapered washer between each guide bar and tower rail.

3.· BOTTOM GUIDE

Hoist the pullout collars up and temporarily tie them in position inside the tower having the slot for pullout chain on top. The bottom guide for mast pipe is in the tower and the double pullout chain leads down to the most suitable leg for the pullout winch.
See that the lugs of vertical guide bars for pullout collar are below the special tower rails for same and screw up bolts loosely. Then loosen the bolts connecting the bottom guide tower rails to legs. Wind a cord from one leg to the diagonally opposite leg, crossing cord at centre of tower. Repeat this for two other legs. Where all cords cross use as tower centre. Set bottom guide and tighten the bolts through the tower rails and the tower legs again checking position of bottom guide to make sure that it is central. Place a level on the top machined edges of the casting to level up packing if necessary with thin galvanised iron strips. It is important that this bottom guide be central and level. Smear oil well over the inside machined faces of the bottom guide and thoroughly clean oil wells before filling with oil.

4. DERRICK

A length of 3" to 4" pipe or 4" to 5" casing per the size of mill would make a suitable derrick. If pipe or casing is used fix a short sapling in the top end to take the sling for carrying the rope block. Fix block and tackle on top of derrick and three or four guy ropes (it is advisable to have three or four sixty foot lengths of about Yz" dia. manilla rope to use as guys.) before putting the derrick into position. The Derrick could rest upon the platform above the steel rail and tied so that the block is immediately above the centre of the tower cap. Lash securely to the tower and fix the guy ropes before attempting to hoist up anything.
Later when hoisting up the top part of the main casting the top of the derrick should be moved over a little to suit the centre of gravity of the casting and the same thing applies when hoisting the vane.

5. LIFTING TACKLE

If a 20-cwt. winch and wire rope are to be used a single 6" or larger block on the derrick and a single leading block (same size) at the bottom of tower should be suitable and about 130 feet of 3/8" or Yz" dia. flexible wire rope for a 45ft tower with 20ft extra length for each 1Oft extra of tower. If manilla rope is used it must be at least 2-3/4" circumference and a pair of double 6" blocks will be required for the derrick and a single leading block at the base of the tower. For a 45ft tower about 330 feet of rope will be required. Test the heavier loads after lifting about 1 foot from the ground.

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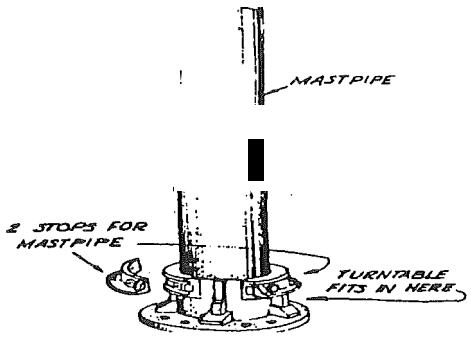
6. STOP FOR MASTPIPE

Clean the oil well in top part of b a l l bearing turntable and both ball races. Stand the mast pipe upside down on its top flange and slip the top turntable over the pipe and into position. Pour some oil in the race and place steel balls in position. They should number one short of quantity necessary to fill the race. Place bottom part of turntable on top of balls and fit angle stop brackets to the mast pipe as shown in sketch. Make sure the set-screws holding the two brackets are fitted with lock washers.

7. HOIST UP MASTPIPE

Bolt a hardwood protector (supplied with the mast pipe) across the flange using 2-1/2" dia bolts and attach the pulley block to the centre of the hardwood with a strong rope ling – SEE ILLUSTRATION NO 9). Clean and oil the bore of the mast pipe. Tie a single strand of fencing wire or rope to the top of the mast pipe to control the latter while it is being hoisted. Lower the mast pipe through tower cap until about a foot above the bottom guide slip the pull-out collars up the mast pipe making sure they are on the right way. The lug for pullout chain is at top end and the outer collar is at bottom end. Now lightly tighten the locking screw to prevent the collars from slipping down. Lower mast pipe into bottom guide until it is almost in position with flat sides of top flange over oil boxes in turntable. Lower into position and remove the sling and hardwood. Bolt part of turntable to the tower cap making sure it is in the same position as when the ball race was levelled up.



Fitting of Stops to Mast pipe.

8. MILL HEAD ON MAIN CASTING

It is important to see that the jointing surfaces and edges of mill_ head and mast pipe flanges are perfectly clean. Fit the pullout bracket with two bolts leaving out the bottom one, which is also a mast pipe bolt. The bottom bar should be placed on the thickened part of the main casting bottom flanged near the slotted hole for chain roller. Bolt the special bolt down through the bar and screw on the castellated nut underneath. Attach the stay bar to the buffer casting and then bolt the other end to the main casting then pass the bolt through from inside and tighten the nut on the outside. Lockwashers must be placed under the nuts of all bolts. Fit the hinged lid to the main oil well and secure it with the pins. Attach a sling to the main casting so that the latter will hang squarely {see Illustration No1O.} and a guy wire or rope to the pullout bracket. Hoist up to its position on top of mast pipe. Turn the mast pipe around until the mill number stamped on the side of the flange comes directly under the number stamped on the main casting flange.
The clamping bolts castellated nuts and castings are numbered and the bolts must be inserted so that the numbers come opposite the corresponding numbers on the casting. Put the two machined bolts in first all nuts underneath. No lock washers but use wire {see Illustration No13}

9. *FOOTPLATE*

Bolt the angle steel rail for dust cover and footplate to the top of the flange of main casting. Attach the footplate frame to rail and struts to main casting. Then bolt the footplate and tool tray to frame.

10. GUIDE ROLLERS

See the guide rollers for draw bar which are underneath the bottom guide revolve freely.

11. WORKING PARTS

Remove the bolts cap and bearing bush from the connecting rod head. Place the two halves of the main swivel over the collar on the bottom end of the crosshead first seeing that there is plenty of grease in the swivel. Insert the steel draw bar between the halves of the swivel and bolt up tightly using a lock washer under each bolt head and nut. It is important that the bar be in line with the crosshead. After the outside of the swivel is cleaned smear it well with oil. See that the crosshead pin is oiled.

12. HOIST UP PARTS

Make sure that the crosshead is perfectly cleaned and oiled before it enters the mast pipe. Pass the sling around the shank of connecting rod and hoist up the parts {see Illustration no11}. Lower them gently down the mast pipe as far as they will go. Clean and oil crankpin and slip on the cleaned hardwood bush so that the oil hole is 'on top and the radiuses edge is against the crank face. Bolt bearing cap and · connecting rod together again on the bush with the side of cap marked OUTSIDE facing vane. Make sure that the oil tube fits in the hole in the bush. Screw up bolts tightly and lock with the second nuts. Bolt crankpin washer to crank using lockwasher under nut.

13. VANE FRAME

Bolt the vane parts together on the ground. If the vane sheet straps were bent in transit straighten them before bolting them together. Bolt the 'C' shaped vane hinge casting also buffer plate to the pipe carefully locking the nuts. Bolt the vane sheet between the vane straps and take out any twists or buckles so that it is true with the whole vane frame and will look right when erected on the mill. Bolt on vane stays and tie the check rods to vane hinge casting to prevent them swinging during hoisting. When the mill is pulled out of the wind the horizontal centre line of the pipe where it meets the buffer stud should be about " above centre of buffer stud to allow for sagging of vane pipe due to wear. This allows the buffer to act centrally even should the vane drop slightly.

14. HOIST UP VANE

Hoist ups the vane hinge rod. Grease both bearing faces where vane casting sits on main casting. Allow the derrick to lean outwards in the direction to which the wind may be blowing. When assembling the vane tie two or three half hitches of rope around the pipe so that when suspended it will be horizontal and the vane sheet will remain vertical. Tie a guy rope to the inner end to steady the vane and hoist it up. {see Illustration No12}. The erected vane sheet should be vertical when in the wind. Place the greased self-aligning washer on the saucer shaped lug at the back of the main casting. Let the bottom of the vane hinge casting rest on the washer then thread the vane hinge rod through the hinge casting and washer and then into the supporting lug.

14. HOIST UP VANE CONT.

NOW ADJUST THE TOP END OF VANE ROD IN ORDER THAT THE MILL WILL GOVERN SATISFACTORILY. IF THE LOCKRING SCREW IN INNER PULLOUT COLLAR JS TO BE USED TO HOLD THE PULLOUT COLLARS AT TOP END OF MASTPIPE THE VANE ROD SHOULD BE ADJUSTED TO APPROX/MA TELY THE CENTRE OF THE SLOTTED HOLE. IF LOCKR/NG SCREW IS NOT TO BE USED AND THE PULLOUT COLLAR ALLOWED TO MOVE UP AND DOWN WITH THE MOVEMENT OF THE VANE PIPE THE VANE ROD SHOULD BE ADJUSTED TO THE LEFT-HAND SIDE [LOOKING FROM THE FRONT OR WHEEL END OF THE MILL}

15. CHECK RODS ON VANE.

Remove nuts from buffer eye bolt which is welded to one end of check rod and with the three plain steel washers close to the head thread it through the buffer box. Place the cast iron washer on the end and then tighten the nut and locknut so that a cast iron washer is firmly clamped against the shoulder. The steel washers are for adjustment if the rod wear in the eyes.

16. DUST COVER

Bolt in position over crank making sure that the front face is weather proof.

17. PULLOUT CHAIN AND WINCH

The single upper pullout chain has a steel split link on one end to connect to buffer plate on vane pipe. Thread the other end of chain over the roller and down to the slot in the inner pullout collar where it is attached. Pull up the collars and temporarily support them by tightening the setscrews against mast pipe. Pass the split link and chain around the roller and pullout bracket and attach the split link to eye of buffer plate and close the split link. Release setscrew in inner collar. Pass the top ends of the two lower chains up through the holes in bottom guide and connect to outer pullout collar. The bottom ends of these chains relate to a ring to which is attached the pullout wire.
Bolt the pullout winch to the inside of the tower leg previously decided upon just above the bottom rail. This leg is at right angles to the two holes in bottom guide through which the double pullout chain passes. Adjust the pullout wire rope so that there is one turn left on winch barrel when vane is in its normal position. Connect the pullout wire to the thimble on the wire rope. The winch works with handle above the barrel.

18 WHEEL

Bolt the wheel arms to hub {a lockwasher must be placed under every nut on the whole wheel}.
Put on arm on one side of the shaft and then on the opposite side and so on to keep the whole wheel balanced. The outer rim of wheel for 20ft and 22ft mills is on angle steel and goes on to the outside of
of the end of arm with the heel or vertical flange of the steel further most from the tower. {see Illustration No 15}.
All other rims are curved flat steel bars and bolt to the inside faces (nearest the hub) on top of flat steel cross pieces which cross the arms (see illustration No16) for flat steel rims. Make sure that all ends of sections of rims of angle or flat steel lap (or lay) the same way on all arms. To do this the rim is rotated from right to left when bolting on the inner rims and from left to right for the outer rims when looking at the back of the wheel as in Illustration No16 that is the right-hand end of every rim section is nearest the hub.

19. MILL ROD AND GUIDES IN TOWER

Bolt the long Oregon pine (or hardwood) mill rod between connecting straps fixed to the steel draw bar. After the mill rod and pump rods have been connected cut each pair of guide rails, four lengths of 1" thick pine (not hardwood) about 12" long if using 4" wide board. Nail them on the guide rails around the mill rod forming a square with 1/8" clearance all around the rod. It is essential that the mill rod is dead centre. Grease the guides well.

20. BALANCE WEIGHTS

At this stage connect the mill and pump rods so that their weight (note water load) can be balanced before the sails go on the wheel. Turn the wheel around until the crank pin is at top of the stroke then bolt the balance weights to the back (tower side) of the two bottom wheel arms between the inner and middle rims (see Illustration No17.) When the mill is working and the pump rods are rising on the pumping stroke the balance weights must be going downwards.

Turn the wheel until the crank pin is about half way on the down stroke. Then move the balance weights in or out until the wheel arm can be raised slightly with a push of a finger. If the arm continues to move up when the finger pressure is released the balance weights should be moved a little further out from the hub, making each adjustment with a crank pin half way down the stroke and moving downwards (as stated above). If the weighted arms move downwards and the crank pin moves up when finger pressure is released shift the balance weights inwards.

Correct balancing of weight of mill parts and rods is most important, an incorrectly balanced mill will not start in the frequent light breezes and so its pumping capacity may be reduced by up to 50%. It is best to connect rods and pump and adjust balance weights before putting sails on wheels. If you have a screwed stuffing box in a pump or discharge tee, unscrew the gland nut and loosen the packing before balancing. For installations in which there is no long rod to balance weights on wheel arms could be set close to wheel tube it may even be necessary

weights but also to clamp an extra weight to mill rod to do the work of forcing water out of the packing tube on the down stroke.

The setting for the balance weights can be quickly calculated if weights of mill parts mill rod and pump rod are known. Additional data required for a. packing tube installation are diameters of pump and packing tube and vertical delivery elevation above the latter. As we shall be pleased to help you do NOT hesitate to write for any further information you may desire.
If the plant has been completely installed correct balancing can only be done when there is a calm day
a very light breeze.

21. SAIL AND SAIL BRACKETS

Loosely bolt the sail brackets to the sails while on the ground. Push the bolts through the sail from the inside of the curvature so that the bolt heads will be on the front of the wheel. Hoist the sails up and bolt the brackets firmly to the rims of the wheel so that the sail brackets are on the inside of the rims nearest the hub (see Illustration No18.) All the small galvanised bolts must have a lockwasher under the nuts. All Comet Mills turn in a right handed or clockwise direction when looking at the wheel.

22. OILING

Make sure that all oil wells oil tubes and all oil holes are clean. Pour sufficient windmill oil into the centre oil well of main casting to reach the oil level hole-replace the plug.
Place the syphon wicks in their correct oil wells and fill the oil wells with Comet windmill oil. The wide ends of the wicks, which go down the oil tubes, MUST be below the bottom of the oil wells. The wicks are supplied correctly bent and tag marked for their respective oil wells. Don't forget to remove the tags. Lift out dust cover oil well and fill connecting rod oil well with oil then check again that syphon wicks have been placed in oil wells – this is IMPORTANT. Replace dust cover well and fill with oil to within %" of top of oil tube and screw down cover.
Please note that the pullout collar does not require lubrication where it works on the mast pipe. In fact, lubrication on the mast pipe is detrimental to the correct working of the pullout collar so that the mast pipe may be wiped clean of any oil or grease.

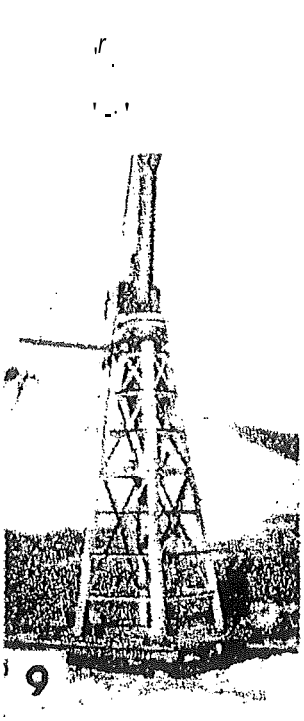
23. TYPE OF OIL

On no account use linseed neatsfoot castor or oil engine sump oil in your Comet mill. Comet Windmill Oil has been developed over many years of careful scientific research to best serve the windmill. Motor engine oils are not satisfactory because they contain additives, which adversely affect the syphoning.
In-service the oil wells should be regularly topped up as experience indicates necessary usually at about 6 monthly intervals.

24. FINALLY

When the mill is erected go over the bolts and see that each one is screwed up tightly particularly those in the wheel and that lock washers have. been put on wherever necessary.
It may be advisable after the mill has been in operation for some three months or so to again go over the bolts to take up any bedding-in that may have occurred.
If any problems should arise do not hesitate to communicate with us. However, attention to the above instructions should ensure that your Comet Mill gives good and lasting service.

HAND THESE INSTRUCTIONS TO THE OWNER OR MANAGER WHEN THE PLANT HAS BEEN ERECTED.



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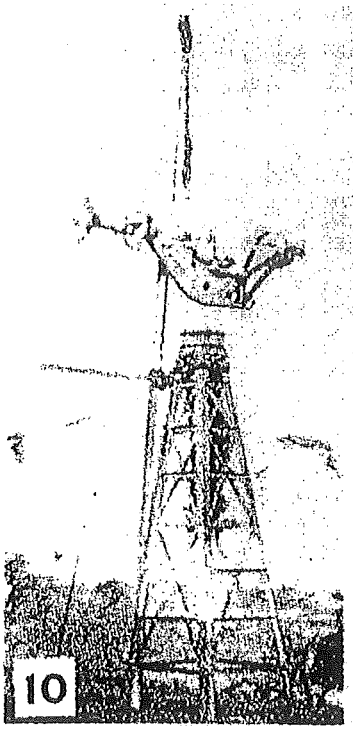

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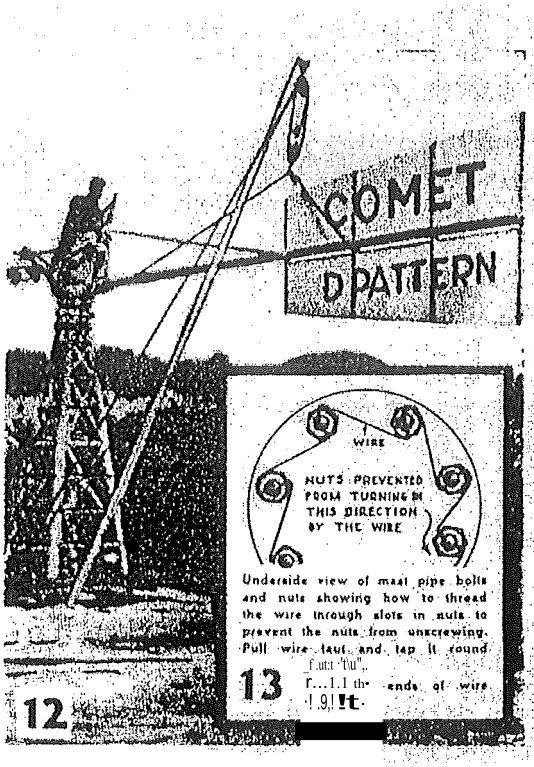

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Underside view of mast pipe bolts and nuts showing how to thread the wire through slots in nuts to prevent the nuts from unscrewing. Pull wire taut and lap it round

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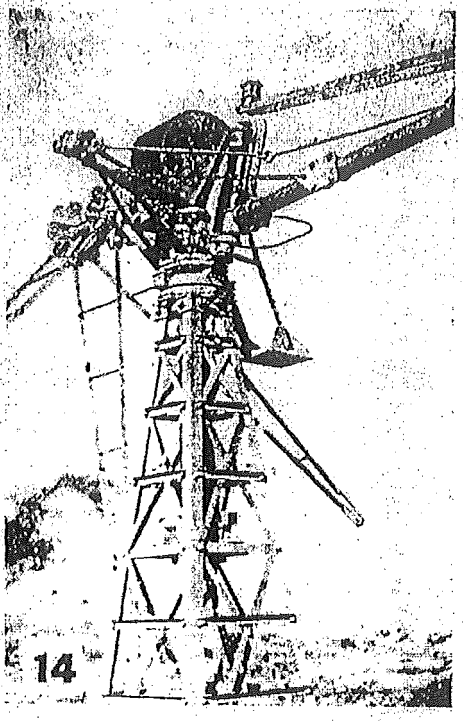

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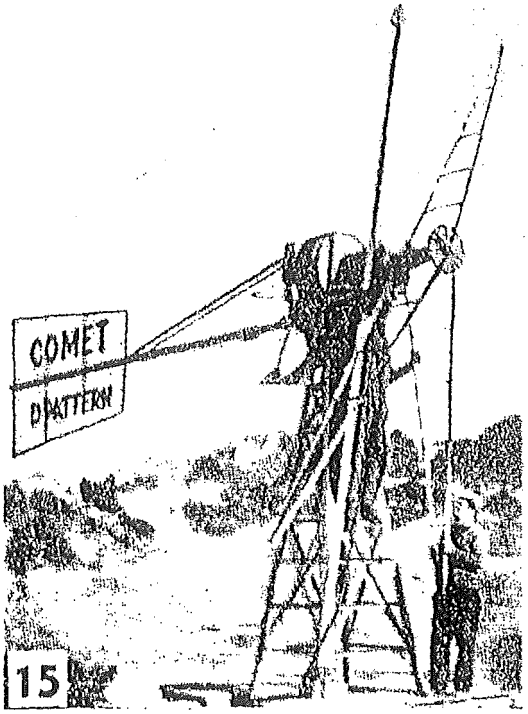

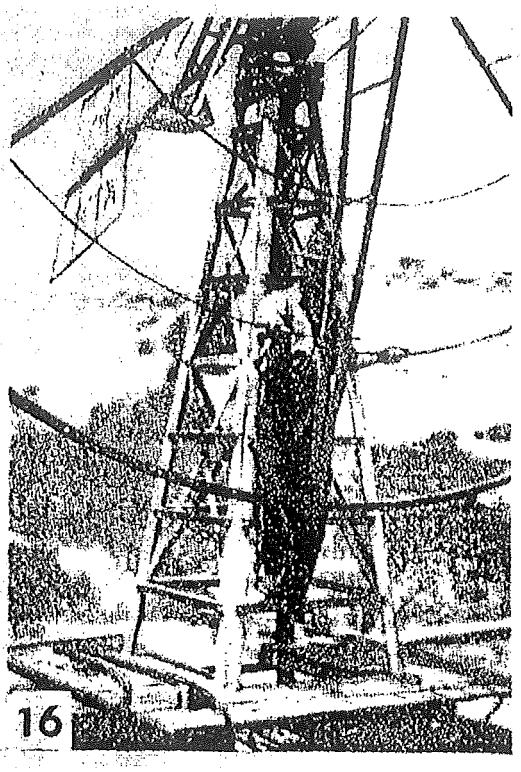

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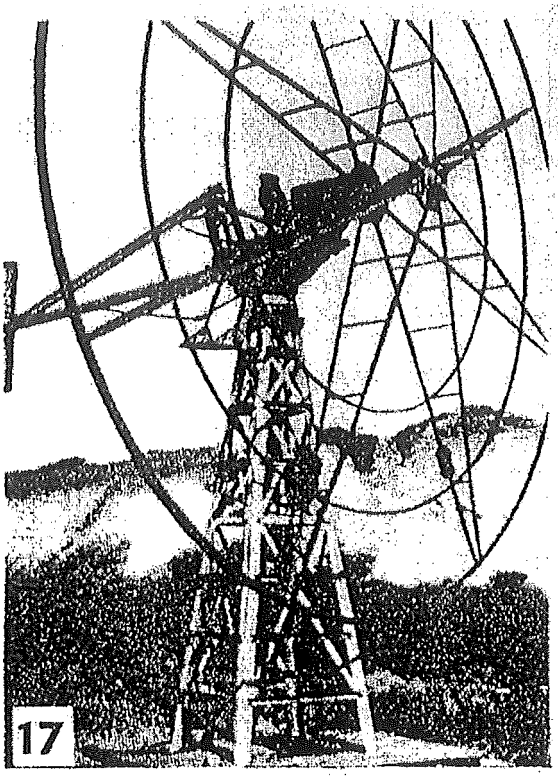
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