# antenna carriage
## and track pole mount

Mounting a rotatable antenna on a utility pole can be easy, inexpensive

**Some ingenious ways have been devised** to raise antennas. These have included mounting a stationary mast on a rotatable base; digging a hole, setting a pole, and then cranking the mast up and down; raising and lowering a mast through the roof; making a tiltable mast, using gin poles; and using a mast with telescoping sections.

The technique I've devised consists of stringing two cables vertically on a utility pole, 10 inches apart. A pulley at the top of the pole serves as a sheave for the steel cable that raises and lowers the antenna-bearing carriage. The carriage rides up and down the vertical cables.

### access to the top

Mounting the pulley requires the use of an extension ladder tall enough to reach the top of the pole. Start by mounting a curved block of wood on the top rung of the ladder as shown in **fig. 1**. This prevents the ladder from sliding sideways while positioned at the top of the pole. The base of the ladder should be secured by lashing it to stakes driven into the ground. Use guy ropes to keep the ladder from swaying.

### pulley and cables

Because the top of the pole is 8-1/2 inches (21.6 cm) in diameter, a 9 inch (22.8 cm) die-cast aluminum pulley is required. The pulley is attached to a pair of aluminum brackets and mounted with lag screws see (**fig. 2**). It may be necessary to use shims to keep the pulley in a vertical position if the top of the pole is not straight.

Both a support and winch cable are needed. The support cable is a single 70 foot (21.3 m) length of 1/4 inch (6 mm) flexible steel cable. The winch cable is about 75 feet (22.8 m) of 1/8 inch (3 mm) cable. A heavier carriage and antenna would require using a heavier winch cable.

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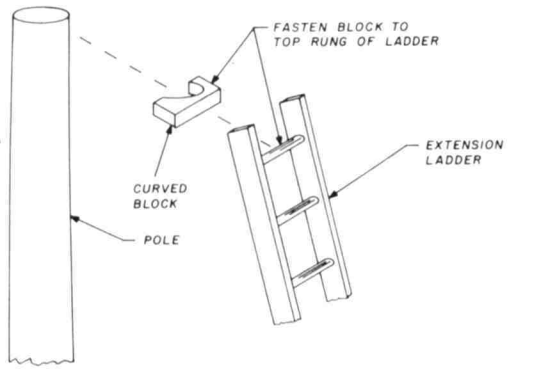


fig. 1. Wooden chock for stabilizing top of ladder.

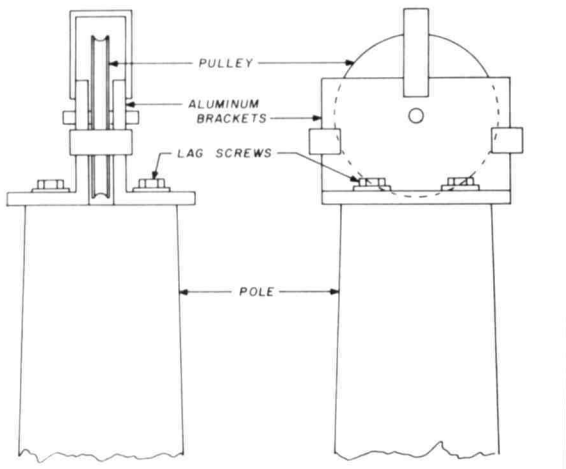


fig. 2. Details of assembly at top of pole.

## carriage

The carriage (**fig. 3**) is fabricated from ordinary slotted steel shelving upright strips available at hardware stores. Each strip is 4 feet (1.2 m) long. The steel support cables fit easily in the channels of these strips.

Lay the steel strips on a work bench 10 inches (25.4 cm) apart, the required spacing for the support cables. Bolt two metal supports at right angles to the strips at points one quarter and three quarters of the way up the carriage. Weld the two shelving brackets into the bottom slots of the uprights. Then bolt the bottom shelf to these brackets. Make six clips which will slide onto the upright carriage strips to hold the support cable securely in the groove when the carriage rides up and down the support cables. When mounting the carriage onto the support cables, hold these clips in place with cotter pins.

A spring-loaded plunger (**fig. 4**) is attached on the underside of the bottom plate. When the carriage is in position at the top of the pole, the plunger slides into a mating hole in the pole, to act as a safety catch in case the winch cable breaks. A nylon string is attached to the eye on the plunger assembly so it can be released from the ground.

## antenna mast guides

To stabilize the mast, a right angle bracket is installed at the top of the carriage. A hole slightly larger than the diameter of the mast is made in the bracket. A bearing plate is mounted over the hole while the mast is fitted into the rotor. The size of the bearing plate depends on the size of the mast; some measuring and alignment is necessary to assure that the rotor is correctly aligned with the hole in the top bracket and that the mast is straight.

## winch

The winch is mounted on the pole at shoulder level. Purchased from Montgomery Ward, mine was strong enough to pull about 1200 pounds (545 kg). It

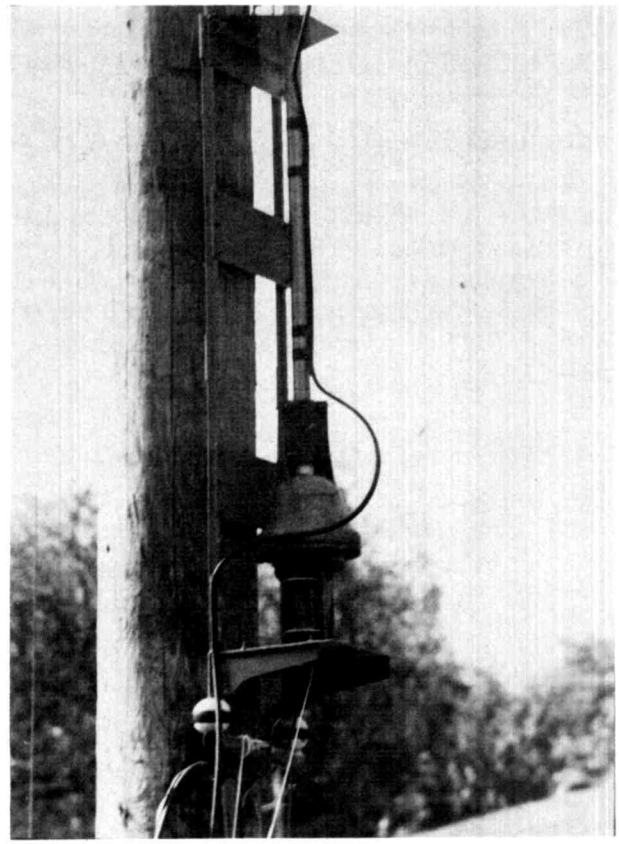

fig. 3. The carriage. Clip can be seen on the left upright. Notice the pipe at the top of the carriage. This was used to wrap the steel cable to the carriage. The two rubber balls mounted at the bottom are shock absorbers.

was spaced far enough away from the pole for the handle to clear and bolted to the pole with two 3/8 inch (9.6 mm) threaded rods. (Each of the two threaded rods should be ground to a point at one end and squared off to accommodate a wrench at the other end. Finished this way, each rod can be screwed into the pole by first drilling a hole slightly smaller in diameter and then using a wrench to turn the rod into the hole. A little grease may make the job easier.) When the rod is in place, cut away the excess length and mount the winch.

## vertical guide cable and cable spreader

To install the vertical guide cable on the pole, mount a top support bracket at the top of the pole using two 1/2 inch (13 mm) bolts made from threaded rod (**fig. 5**). The cable spreader (**fig. 5**) is lag bolted to the pole about 6 feet (1.8 m) from the ground. To fasten the turnbuckles install a triangular plate about 3 feet (0.9 m) from the ground using a 1/2 inch (13 mm) rod through the pole (**fig. 5**). Lay the 1/4 inch (6 mm) flexible steel carriage support cable in the top cable bracket and attach the turnbuckles to the ground end of the cables with the cable clamps. After the cable is installed and tightened, the carriage can be mounted and run up and down the pole a few times to assure proper operation.

## conclusion

This simplified method of assembly, using inexpensive and readily available materials, can be used to raise antennas to effective working heights.

My antenna stands 20 feet (6 m) high in its lowered position; in the raised position, it stands 40 feet (12 m) high. The pole to which it is attached measures 35 feet (10.6 m).

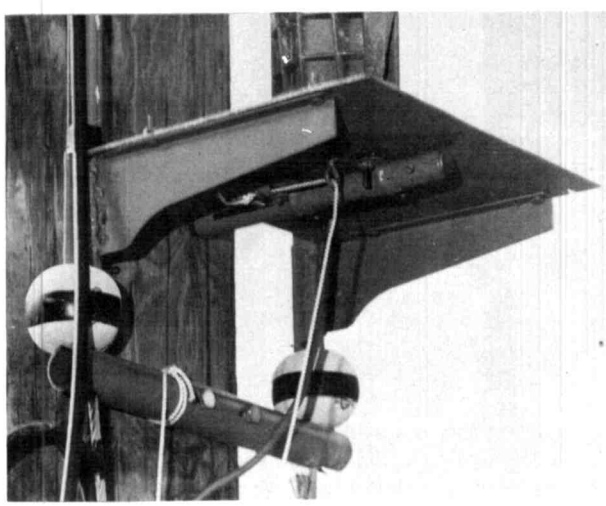

fig. 4. View of plunger assembly.

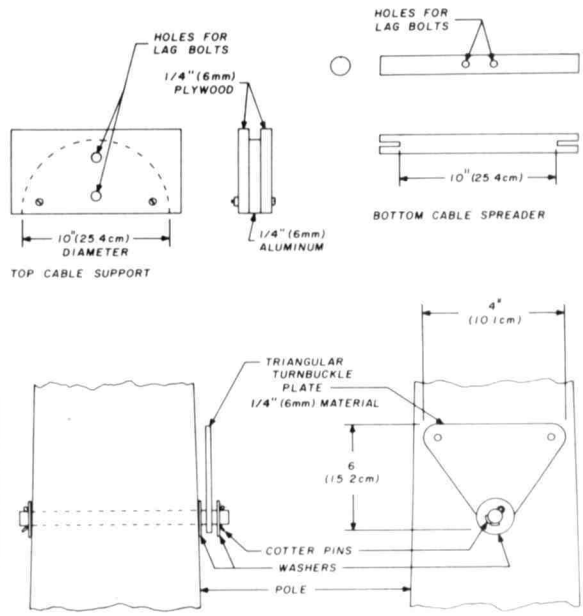


fig. 5. Construction details.

*materials list*

| *quantity* | *description* |
|---|---|
| *2* | *turnbuckles* |
| *4* | *cable clamps — 1/4 inch (6 mm) cable* |
| *3* | *cable clamps — 1/8 inch (3 mm) cable* |
| *1* | *9 inch (22.8 cm) pulley* |
| *1* | *hand operated utility winch* |
| *70 feet (21.3 m)* | *1/8 inch (3 mm) steel cable* |
| *75 feet (22.8 m)* | *1/4 inch (6 mm) flexible steel cable* |
| *30 feet (9.2 m)* | *nylon string* |
| *2* | *upright steel shelving strips* |
| *2* | *shelf brackets to fit strips* |

*aluminum plate*
*aluminum mast material*
*steel plate*
*lag bolts*
*threaded rod with nuts (also known as All-thread)*
*steel metal for brackets, braces, and clamps.*

A few details should be noted: be sure to prime and paint any metal parts subject to rust. Lubricate as necessary. Run a ground wire from the support cable and the winch, and install a ground rod at the base of the pole. The transmission line and rotor cable can be run underground to the shack, if you wish. Remember to rotate the antenna only in the raised position.

**ham radio**