A Fold-Over Wooden Tower

BY FREDERICK E. WARTH JR.*, K4TZN

This 35 foot fold-over tower is built using a 20 foot 6 × 6 as the main support and a fold-over section made of two by fours. The total cost is less than $20.

THE old forty-foot wooden tower I had built some four and a half years ago was literally on its last leg. The other three legs, being held together with make-shift splints and the grace of God, were making only a token gesture at holding the tower up. The scars of several hurricanes that had passed through or near here during its lifetime were signalling that the end was in sight. Each year we found it necessary to add more and stronger guys until finally, along with the tri-band cubical quad topping the tower and the eighty and forty meter dipoles crossing the house, it looked as though a gargantuan spider was weaving its evil webb about the house in order to snare some unsuspecting jet passing on its way from the near-by Air Force Base.

The cubical quad was also as old as the tower, sagging badly, and the bamboo spreaders were split unmercifully, with gaping wounds running the entire length of some of them. Something had to give—and it did. Upon returning home from work one day recently, we discovered, when we took our daily apprehensive glance at this sacrilegious monument to Marconi, that one of the spreaders on the reflector had finally broken in two and the wires were drooping like the proverbial wet noodles. That did it! We couldn't back away any longer from the fact that our antenna system would have to be rebuilt from top to bottom as soon as possible. We had procrastinated long enough.

Fortunately, we had anticipated the coming of this point in the ever-flowing stream of time and had formulated some ideas on the subject. The next installation had to be a completely self-supporting fold-over tower, at least one quarter wave-length tall at 20 meters, and easy on the pocketbook. Of course, the ideal thing to do would be to order one of those fancy, self-supporting, telescoping, fold-over, steel towers, seventy-five or more feet tall, and have it installed by professionals. Since, however, we had very little excess funds that we could earmark for ham radio activities, the buying of even a thirty-foot tower was out of the question.

*1702 E. 50th St., Savannah, Georgia.

View of the cubical quad atop the partially tilted tower.

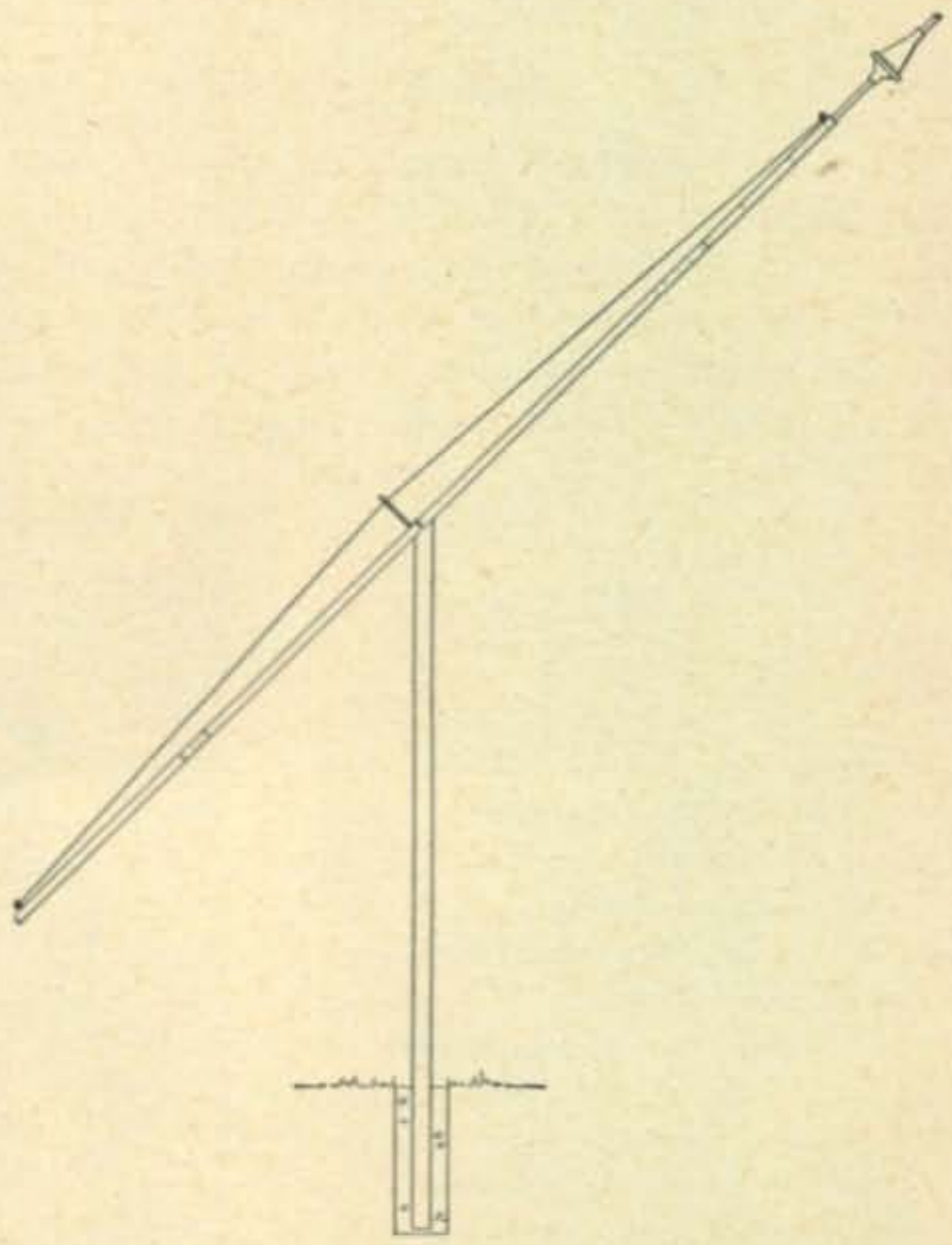

Fig. 1—Side view of the 35 foot fold-over tower built for less than $20. Stay wires run the full length of the fold-over portion to prevent bend.

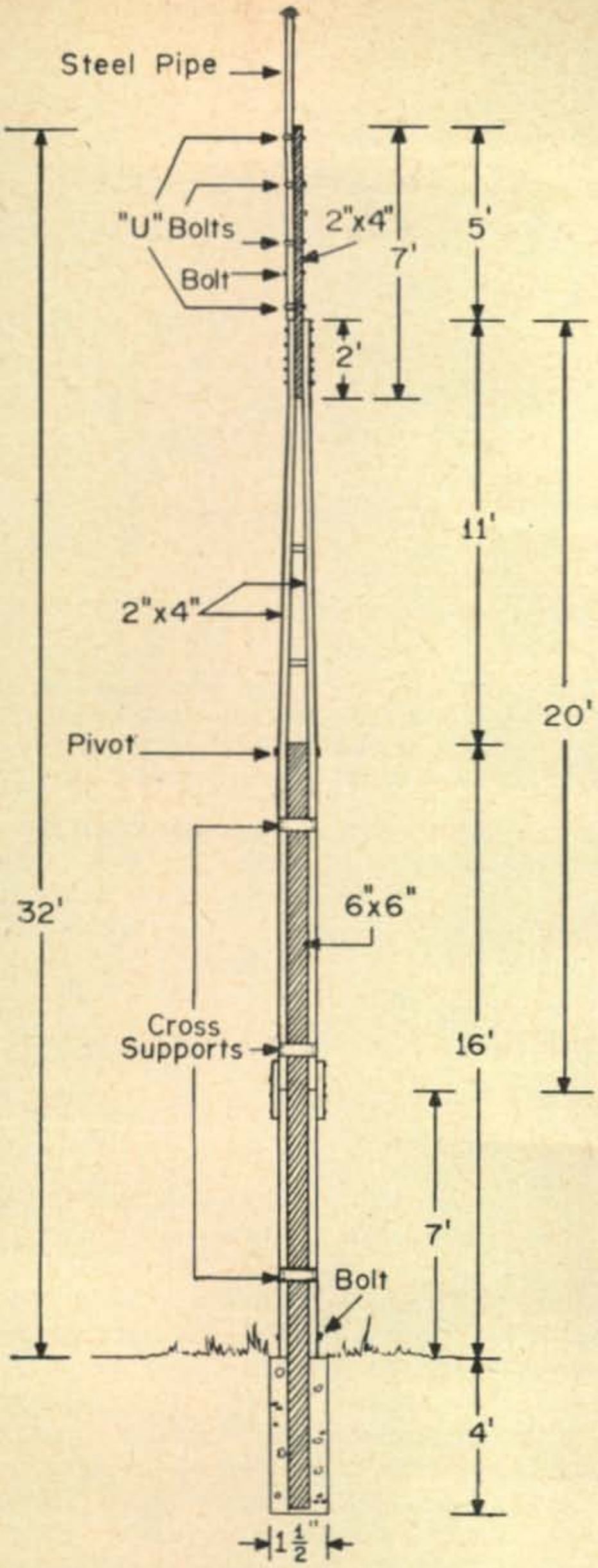

Fig. 2—Back view of the fold-over tower shows the dimensions. The 6×6 is firmly anchored in 4 feet of concrete. The cross supports between the two by fours are secured with galvanized nails.

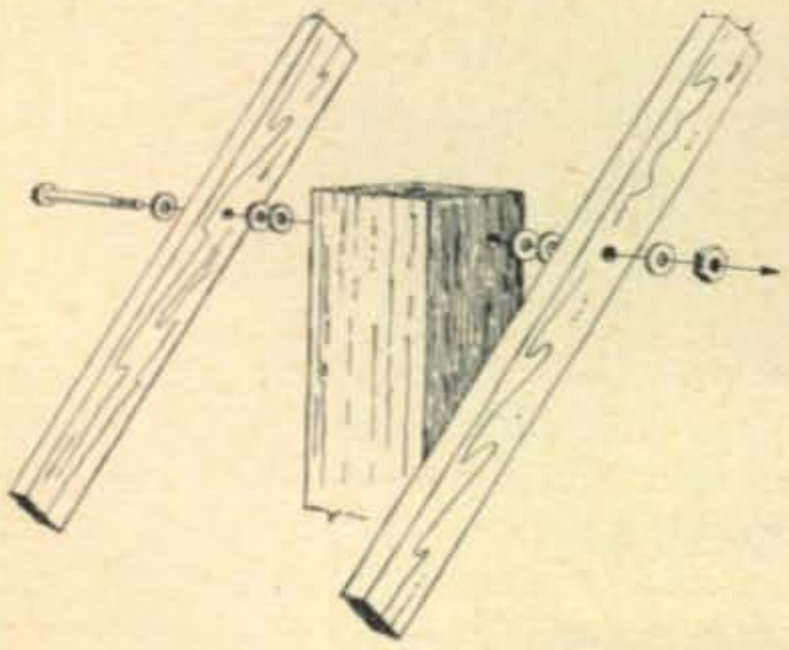

Fig. 3—Detail of the top pivot shows the use of a ½" carriage bolt 10" long.

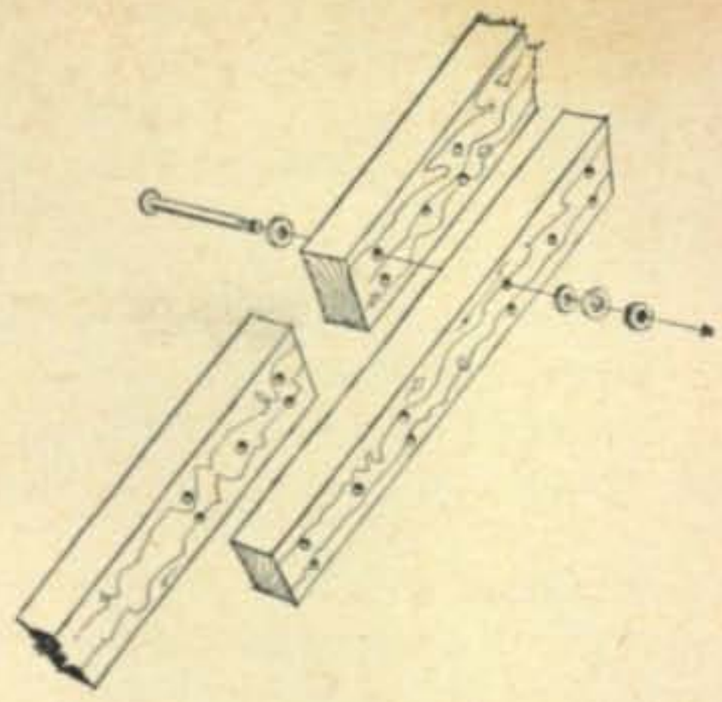

Fig. 4—Method of splicing the two by fours to get the complete length. For maximum strength the ends of the two lengths should butt square.

Construction

After some deliberation and several sketches, we finally came up with the following design: Figure 1 shows a side-view of the tower partially folded over. The main body of the tower is a 6" × 6" section of wood twenty feet long with four feet of it buried in a block of concrete 1½' × 1½' × 4'1". The one inch of concrete was poured before the 6" × 6" was dropped into the hole in an attempt to completely seal off the butt end of the tower with concrete. The fold over portion of the tower is made up of two by fours having a total length of thirty-two feet, as shown in fig. 1 and fig. 2. With the addition of steel pipe and a TV rotor, we were able to fasten the boom of the quad at the thirty-five foot mark. You will also notice in fig. 1 that stay wires

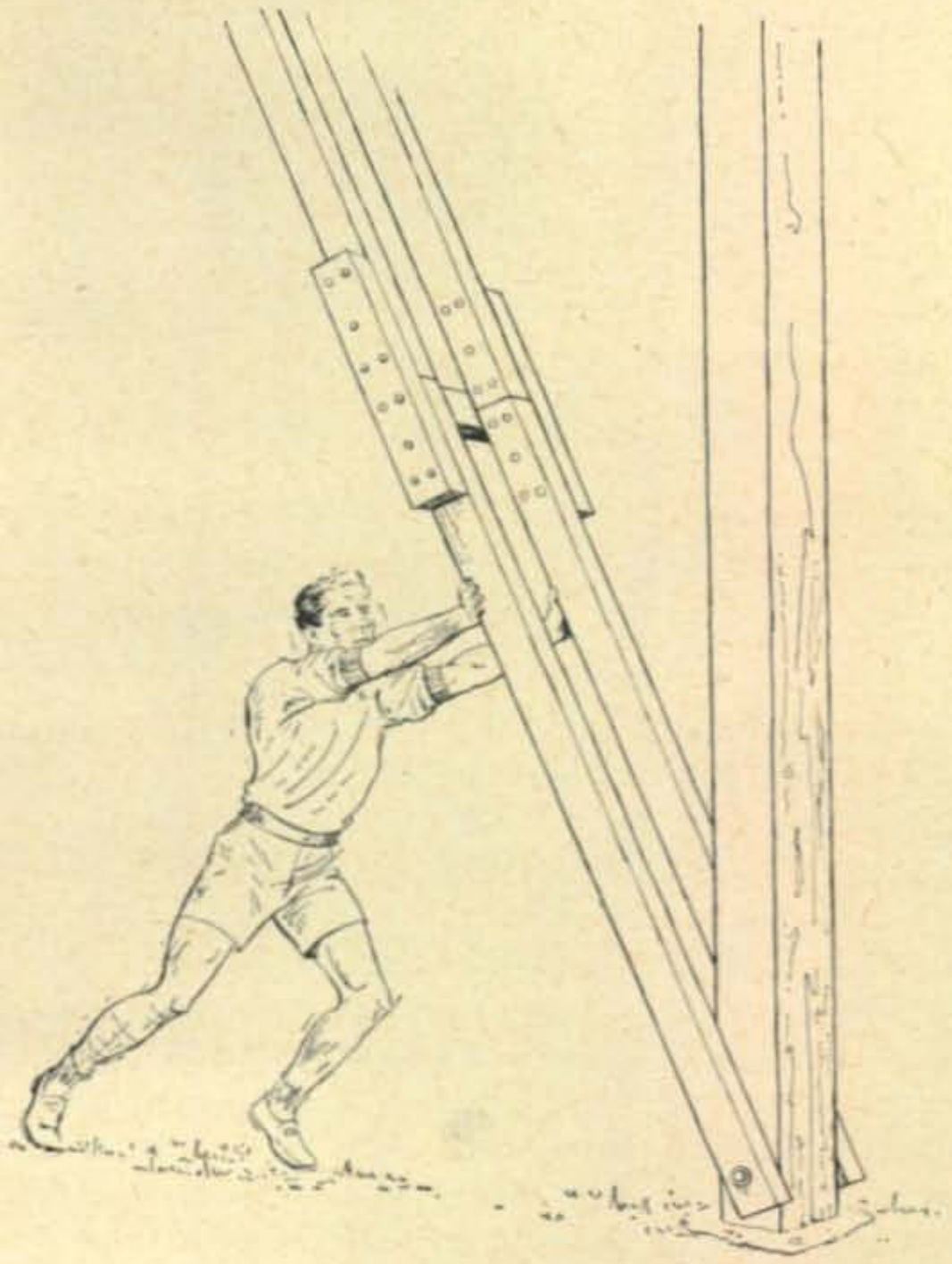

Fig. 5—Method of walking the mast up after inserting the base pin. Perhaps a few cans of liquid refreshment might get a few helpers.

run the entire length of the fold-over portion. The eye bolts at the center of the wires should be as long as possible, without causing the stays to come in contact with the quad (or whatever antenna you use). These wires were added as an afterthought when we discovered, upon rocking the fully loaded tower over, that the two by fours had more bend to them than we had anticipated. However, we folded the tower over several times before we decided that these stays would be necessary.

The whole tower is bolted together with the exception of the 2 × 4 cross supports (as can be seen in fig. 2) which are nailed on with galvanized nails. In fig. 3 you can see how the tower was fastened together at the pivot point. A ½" carriage bolt 10" long was used as the pivot and another carriage bolt the same size was used at the bottom of the tower to pin it in place. Figure 4 shows how the two by fours were spliced together to get the necessary length. When making this splice, be sure that the ends are squared off cleanly and butt tightly together. Quarter inch round head bolts were used for this joint and five-sixteenth inch bolts were used to secure the top section of the two by fours.

Needless to say, the best grade of wood should be used. We found, also, that lumber was not uniformly priced at the various lumber companies here in town and with a little shopping we were able to get wood at a reasonable price. For example, to our surprise, we were able to get the twenty foot six by six for only seven dollars.

We could not resist the temptation to get a little fancy with this tower, so we stained it with oak wipe-on stain and covered it with several coats of Spar varnish. The lower four feet of the 6" × 6" imbedded in concrete was first painted with about four coats of aluminum paint. The cost of this tower could be held down by painting it entirely with aluminum paint, but we felt that it would be much more attractive and less conspicuous to the neighbors if we used the stain and varnish.

Installation

Erecting the 6 × 6 was a simple matter with

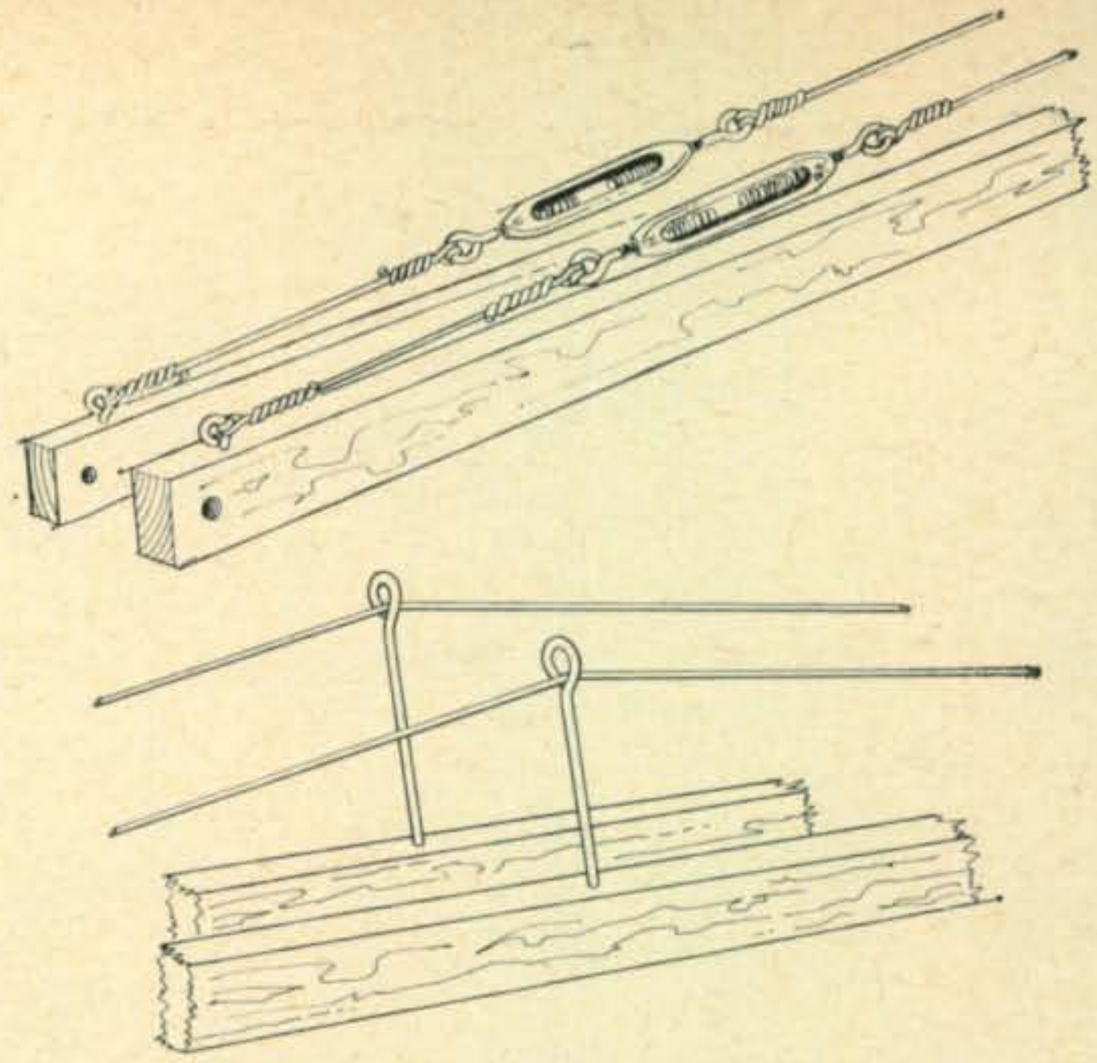

Fig. 6—(A) Details of how the turnbuckles are secured at the base end and (B) how they pass through the eyes at the center. The top eye bolts are located where the two by fours come together.

the aid of three friends. After the concrete was poured and allowed to harden for a couple of days, we were able to add the fold-over section using our own muscle power. The method used was to pin the bottom of the fold-over section to the bottom of the 6 × 6 and simply walk it up (see fig. 5). The cross supports kept it from falling past the 6" × 6". Once in position, a ladder was used to climb to the pivot point and insert the carriage bolt.

We must confess that with the addition of the rotor and the repaired quad, it is not easy to rock this configuration up and down by ourself although we do it all the time. The addition of something like lead bricks as counter weights and a crank would be a nice refinement and we highly recommend such. All in all, we are quite pleased with the tower and find a certain asthetic enjoyment in its simple clean cut, uncluttered lines, as you can see in the various views of the actual constructed tower. And best of all, it cost us less than twenty dollars to construct.

That's not bad for a thirty-five foot fold-over tower. ■

K3IOP Defense Fund

As reported in the May *CQ*, the K3IOP Defense Fund stood at $95.00. As of April 6th it was up to $206.00, with contributions from: W3AGT, W3RWQ, W3TDF, W3VZA, K3HRE (second time), K3IVE, K3NBD, K3PYJ, K3RLQ, K3SBE, ZL2GX, I1DFD, the Latrobe A.R.C., Greater Pittsburgh VHF Society, and the Allegheny-Kiski A.R.C. Individual contributions are still needed. If this case goes against Seaman, an appeal will be an absolute necessity. Just a few weeks ago the Council of Elizabeth Borough, Pennsylvania, appropriated $1200 more to fight their cause.

A pre-hearing conference was held February 26 in Washington, D.C., where attorneys representing K3IOP, FCC, Elizabeth and ARRL met to decide the course of the hearing. The Hearing Examiner ruled that the FCC order limited the hearing to technical matters. This has been appealed by the FCC itself and as of this date (mid-April) action by a Review Board is awaited.

Incidentally, on February 28 amateur station K3IOP got a going over by the FCC the likes of which no other amateur station ever got. And again everything checked out okay.

Contributions should be mailed to:

Edward C. Lipps, W3BWU
3302 Hazelhurst Avenue
Pittsburgh, Pennsylvania 15227