

March 3, 1959

I. D. ROHN

2,875,865

COLLAPSIBLE ANTENNA TOWER

Filed March 31, 1953

2 Sheets-Sheet 1

Fig. 1

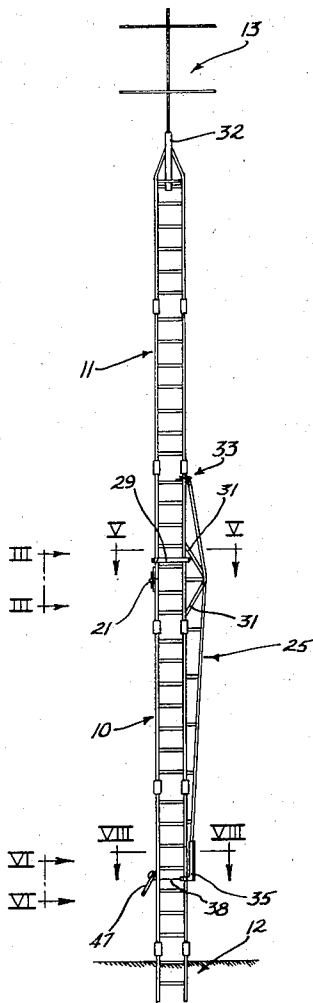


Fig. 2

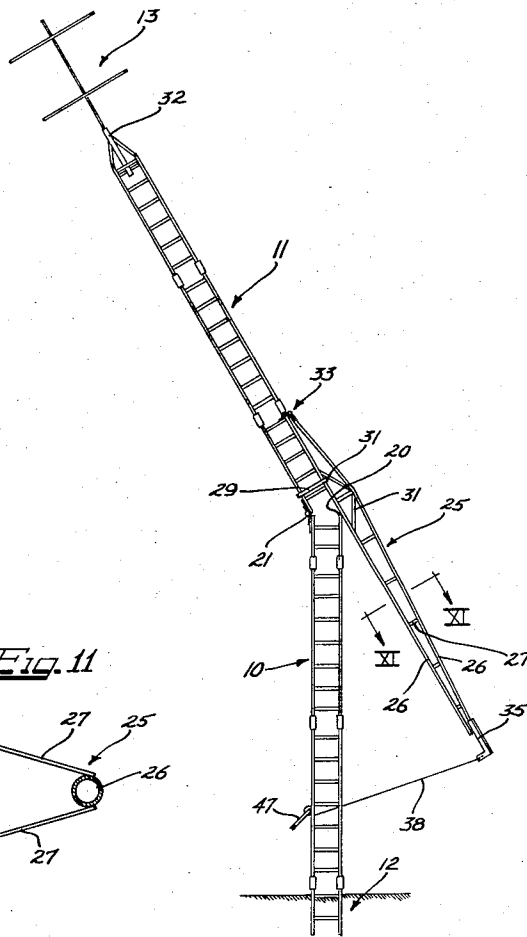


Fig. 11

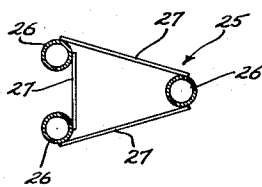


Fig. 9

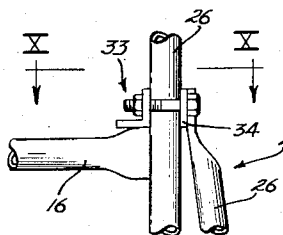
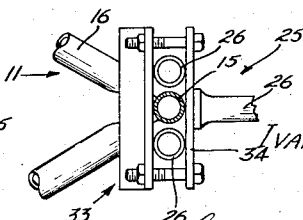


Fig. 10



Inventor
IVAN DWIGHT ROHN

By *Niel, Sherman, Meroni, Gass & Simpson* Attys.

March 3, 1959

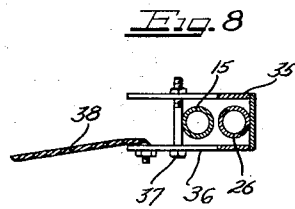
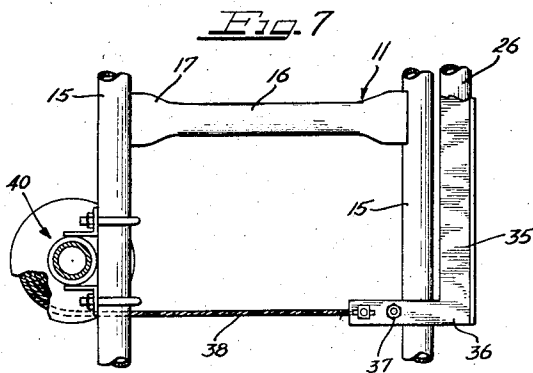
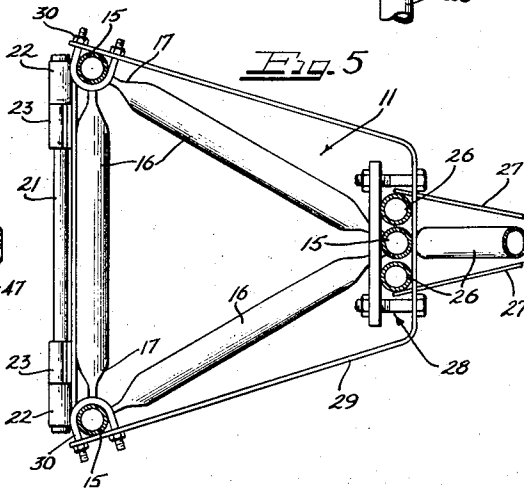
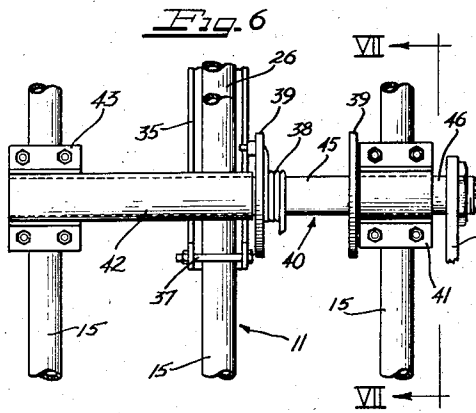
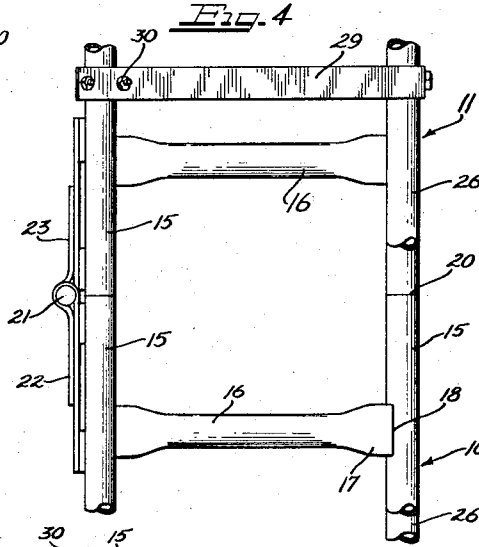
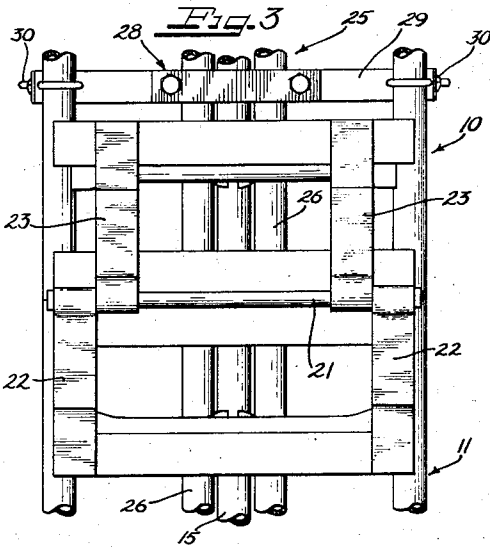
I. D. ROHN

2,875,865

COLLAPSIBLE ANTENNA TOWER

Filed March 31, 1953

2 Sheets-Sheet 2



Inventor
IVAN DWIGHT ROHN

W. H. Hill, Sherman, Morris, Chad & Smith Attys.

1

2,875,865

COLLAPSIBLE ANTENNA TOWER

Ivan Dwight Rohn, Peoria, Ill.

Application March 31, 1953, Serial No. 345,850

1 Claim. (Cl. 189—15)

This invention relates to an antenna tower and more particularly to a multi-unit tower in which an upper unit carrying an antenna support may be raised and lowered as desired or "folded over."

With the great recent growth of television installations and particularly with the use of television in "fringe" areas, a tremendous demand has arisen for easily installable television antenna towers. Many of these towers are of considerable height in order to effect reception and as a consequence it is not easy to get to the antenna in the event of need for repair or adjustment.

It is an object of this invention to provide a multi-unit tower that may be easily and quickly installed and yet which is so constructed that access may be readily had to the uppermost antenna without resorting to the dangerous, expensive and time-consuming act of climbing the tower.

Another object of this invention is to provide a knock-down type of multi-unit antenna tower in which an upper unit may be readily pivoted from lower to upper position and vice versa and when uppermost can be held in that position.

Another object of this invention is to provide a simple and improved multi-unit antenna tower construction.

In accordance with the general features of this invention there is provided in an antenna tower, aligned vertical units, the uppermost of which has an antenna support at its upper end, a pivot between the units relative to which the uppermost unit may be moved to raise and lower same from a vertical antenna supporting position, and means for retaining the upper unit in the position and against pivotal movement, the upper unit upon release of the means being swingable about the pivot to lower its antenna supporting end to an accessible point below the pivot.

Another feature of the invention relates to forming a lateral and downward extension on the upper tower unit which together with the upper unit comprises a pivotal boom.

Yet, another feature of the invention relates to the provision of control means in the form of a cable and reel, suitably power operated, for raising the upper or boom unit of the tower and also for guiding the lowering of the same.

Still another feature of the invention relates to disengageable means for positively holding the upper or boom unit against movement when it is in its uppermost position.

Yet, another feature of the invention relates to the provision of multiple tower units superimposed one upon the other each of which is in the form of longitudinal rods or tubes held together by cross braces each of which has flat ends with side edges butt welded to the two adjoining longitudinal members.

Other objects and features of the invention may more fully appear from the following detailed description taken in connection with the accompanying drawings which illustrate several embodiments thereof and in which:

2

Figure 1 is a side view of my novel multi-unit tower showing it supported in vertical position and carrying an antenna;

Figure 2 is a view similar to Figure 1 but showing the upper or boom element in the process of being lowered under the guiding or restraining influence of a cable;

Figure 3 is an enlarged fragmentary side view taken on the line III—III of Figure 1 looking in the direction indicated by the arrows and showing the pivot between the upper and lower tower units;

Figure 4 is a side view of the structure shown in Figure 3 at right angles thereto;

Figure 5 is an enlarged fragmentary cross-sectional view taken on the line V—V of Figure 1 looking downwardly and showing the fastening for the extension on the upper unit, the tripod of the extension being shown partly fragmentarily;

Figure 6 is an enlarged fragmentary side view taken on the line VI—VI of Figure 1 looking in the direction indicated by the arrows and showing the reel and cable connection to the lower end of the extension on the upper unit;

Figure 7 is a fragmentary side view taken on the line VII—VII of Figure 6 looking in the direction indicated by the arrows and at right angles to Figure 6 showing more in detail the reel and cable connection to the extension;

Figure 8 is an enlarged section view taken on the line VIII—VIII of Figure 1 looking downwardly and showing how the lower end of the extension is detachably bolted to one of the longitudinal tubes or legs of the lower unit;

Figure 9 is a fragmentary detail view drawn on an enlarged scale and corresponding to a portion of Figure 1 showing how the upper extremity of the extension on the upper tower unit is clamped in place;

Figure 10 is a fragmentary cross-sectional view taken on the line X—X of Figure 9 looking downwardly showing more in detail the clamp; and

Figure 11 is a fragmentary cross-sectional view taken on the line XI—XI of Figure 2 looking downwardly and showing the tripod formation of the extension.

As shown on the drawings:

The reference characters 10 and 11 designate lower and upper boom units superimposed one upon the other with the lower unit suitably fastened in place at 12, as by means of cement and the like, and with the upper unit provided at its upper end with a conventional television antenna 13.

These units 10 and 11 are of the so-called "knock-down" type and each of them may embody any number of sections depending upon the desired height of the antenna tower. Since the basic construction of the sections going to make up these units is, for the most part, substantially alike it is believed that one description will suffice for all of them with the exception of additions which shall be described hereinafter.

Each unit, in general, comprises longitudinal metal tubes 15 (Figure 5) arranged in the form of a triangle or a tripod and rigidly connected together at spaced vertical intervals by transverse tubular braces 16. Each of these braces has its ends flattened as at 17 (Figure 4), the edges 18 of the flattened ends being butt welded to the adjoining longitudinal tube or member 15.

The upper tower unit 11 (Figure 4) has the ends of its longitudinal rods or tubes 15 resting at 20 upon the upper ends of the corresponding tubes of the lower unit 10. At one side of the tripod adjacent this junction 20 is a hinge or pivot pin 21 mounted in straps 22—23 carried by the lower and upper units 10 and 11. This pin and strap construction establishes a hinge or pivotal connection between the upper and lower units.

Now, referring to Figures 1 and 2, it will be noted that fastened to a side of the upper unit 11 opposite the hinge pin 21 is an extension 25 which extends laterally and downwardly from the unit 11 past the pivot 21. This extension is made up of longitudinal tubes 26 arranged in the form of a tripod and rigidly connected together by transverse braces or straps 27.

In Figure 5, I have illustrated how two of the longitudinal tubes 26—26 of this extension are fastened by a clamping device 28 to one of the longitudinal tubes 15 of the upper unit at a mid-point in the length of the extension. Included as a part of this clamping device 28 is a U-shaped strap 29, the legs of which extend to the other tubes 15—15 of the unit 11 and each of which has its extremity clamped by a U-bolt 30 to the adjacent rod or tube 15. This arrangement is such that the extension 25 is firmly clamped to and made an integral part of the upper tower unit 11 so that it, together with the upper tower unit, in reality, comprises a pivoted boom as is clearly shown in Figure 2, and adapted to be folded over or down along the lower unit 10. If it is so desired, the extension 25 may be provided with additional reinforcing diagonal braces 31 as shown in Figures 1 and 2.

In order to prevent any possibility of the extension 25 slipping longitudinally relative to the upper unit 11, I provide at the extreme upper end of the extension, additional clamping means which is shown in detail in Figures 9 and 10. This clamping means is designated generally by the reference character 33 and is immediately above one of the transverse braces 16 of the upper unit. It will be noted that at this point one of the longitudinal tubes 26 of the extension 25 converges into and is secured to one of the clamping plates 34 which is a part of the clamping means 33 and that the clamping means extends around two of the other tubes 26 of the extension and one of the tubes 15 of the upper unit. This clamping mechanism 33 is a conventional bolt and plate type clamping means and is readily securable to one of the tubes 15 of the upper unit.

At this point it might be well to note that the tubes or rods 15 at the upper end of the unit 11 converge into a tubular support 32 for the conventional antenna 13.

I shall now proceed to describe the means for controlling the raising and lowering of the boom including the extension 25 and the means for fastening this boom to the lower unit 11 in its uppermost position. This mechanism is best shown in Figures 6, 7 and 8. It will be perceived that one of the tubes 26 of the extension 25 extends downwardly beyond the others and has secured to it a vertical U-shaped or channelled fastening strap 35 including an extension 36 (Figure 7) for engaging around one of the longitudinal tubes 15 of the lower unit. A transverse bolt and nut assembly 37 is insertable through openings in the legs of this extension 37 for positively fastening the strap, on the lower end of the extension, to the tube 15 so that the extension 25 of the upper unit 11 can be firmly held in the uppermost position shown in Figure 1.

One of the legs of the extension 36 has secured to it an end of a cable 38 which is wound around and secured to one of the flanges 39 of a tubular reel 40 having an elongated hub or arbor 45. One end of the tubular reel hub 45 is journalled in a bearing 41 clamped to one of the tubes of the lower unit 10 and the other end is journalled in a tubular extension 42 carried by a flanged bracket 43 clamped to another tube 15 (Figure 6). In other words, the hub 45 of the reel 40 is elongated so that it extends on each side beyond the flanges 39 of the reel for support in clamp brackets carried by the spaced rods 15.

It will also be noted at 46 that the reel hub 45 extends beyond the clamped bearing 41 and has secured to it a suitable crank handle 47 for manually turning the reel.

Now, after the assembly of the units 10 and 11 and

the extension 25 so that the extension and upper unit are hinged or pivoted to the lower unit 10, the antenna 13 can be mounted in position in the support 32 while the upper end of unit 11 is lowermost or "folded-over" the lower unit. Thereafter, by turning the crank 47 the cable will pull the extension toward the lower unit 10 until the strap legs 36 engage around one of the longitudinal tubes 15 of the lower unit as shown in Figures 7 and 8 at which time the bolt and nut assembly 37 can be manually applied to positively fasten the extension to the lower unit.

When it is desired to lower the boom so as to have access on the ground to the antenna 13 the bolt and nut assembly 37 (Figures 7 and 8) is removed and then by turning the crank 47, as best shown in Figures 2, 6, and 7, the lowering of the boom, embracing the extension 25 on the unit 11, can be guided or restrained so that the antenna 13 will not suddenly fall to the ground and be damaged. Actually, the counterbalancing effect of the extension 25 is such that it tends to hold the upper unit in its upper position when the antenna is uppermost.

However, upon a slight movement of the extension 25 away from the lower unit 10, the shifting of the mass of the upper unit relative to the pivot pin 21 will result in the weight of the upper unit 11 being sufficient to crash that unit downwardly if it were not for the restraining effect of the guiding or controlling reel cable 38.

It is now apparent that the boom or truss attachment is bridged across the tower units opposite the pivot and cooperates with the third of the three legs 15 of the upper unit 11 at the area of juncture between the superimposed units. Fastening means is provided for connecting the truss attachment or boom to the upper unit 11 and suitable means may be provided for connecting the boom or the attachment to hold the boom or attachment against the lower unit 10. The boom actuating means is operable to release the attachment to swing the upper unit 11 and the boom about its pivot to lower its upper end to an accessible point below the pivot for adjustment of the antenna. The new and improved boom or attachment construction is comprised of the three attachment legs 26 with the braces 27 operating to sustain the legs in tripod form and with the attachment having a truss area opposite the pivot structure and outwardly of the third legs of the tower sections. Two of the three attachment legs 26 are disposed at all times in generally parallel relation with the third tower leg 15 of the upper unit and with the parallel attachment legs being spaced apart a distance exceeding the outside dimension of the third tower legs and with the third leg of the upper unit at all times sandwiched between the parallel attachment legs 26. The parallel attachment legs 26 of the attachment unit or boom are movable into and out of parallel relation and sandwiched relation with respect to the third leg 15 of the lower tower unit 10 upon operation of the boom actuating means. It should be further noted that the third attachment leg 26 lies in a vertical plane disposed between the other two of the parallel attachment legs which third leg is bent with the greatest distance between it and the other parallel attachment legs being disposed generally opposite the pivot area for rigidification of the boom.

In the foregoing it is clear that I have provided a foolproof mechanism for controlling the raising and lowering of the upper unit of the tower and whereby when access is desired to the antenna, for purposes of repair or replacement, it is not necessary to climb the tower or a ladder in order to get to the antenna.

I have also provided a very strong and simple structure by reason of the manner in which the cross braces are welded to the longitudinal tubes or struts of the tower. In addition, the double fastening means provided at both a midpoint and at an upper end of the extension 25, with respect to the upper tower unit, insures against any displacement or slippage of the extension relative to the

upper unit and so that it will, hence, always move as a part of the upper unit. This, in reality, causes the extension together with the upper unit to be in effect a boom pivoted on the lower unit.

I claim as my invention:

In a collapsible knockdown multiple unit tower, a tri-leg tower unit, a tri-leg upper unit superimposed on the lower unit with the legs transversely spaced for vertical alignment with those of the lower unit, a hinge detachably connected two legs of the lower unit with the corresponding two legs of the upper unit at a two legged side of the tower defined by said legs, an extension boom-like tri-leg truss unit having detachable clamping structure detachably engaging the third leg of said upper unit so as to be carried thereby and projecting freely downwardly with two of the legs of said boom-like truss unit positioned to straddle the third leg of said upper unit in a position for raising and lowering said upper unit on the hinge pivot, the third leg of said boom-like truss unit having a maximum transverse spacing from its other two legs generally opposite said hinge when upright and converging in truss-like manner toward the said other two legs of said boom-like truss unit, respectively, the other two legs of said extension boom-like tri-leg truss unit being substantially straight and generally parallel to said hinged legs of the upper unit when in erect position with said hinge being disposed on one side of the tower and with the truss unit being disposed on an opposite side of the tower, said detachable clamping structure comprising transverse clamp means securing said two extension unit legs and said third leg of the upper unit together at the

upper extremity of said boom-like truss unit and at a point generally opposite said hinge and so that said third leg of said upper unit is reinforced by said two extension unit legs at the junction of the upper and extension units, said extension unit being readily detachable from said upper unit upon detachment of its detachable clamping structure and said upper unit being detachable at said hinge from the lower unit for the disassembly and knock-down of said unit, and means at the lower end of said boom-like truss unit detachably connecting the lower end of said unit to the third leg of said lower section to maintain the upper and lower tower units in aligned position.

References Cited in the file of this patent

UNITED STATES PATENTS

431,991	Perry	July 8, 1890
446,744	Robinson	Feb. 17, 1891
774,371	Altmyer	Nov. 8, 1904
1,609,781	Slater	Dec. 7, 1926
1,631,831	Palmer-Jones	June 7, 1927
1,742,481	Miller	Jan. 7, 1930
1,846,567	Murray	Feb. 23, 1932
2,213,870	Scholl	Sept. 3, 1940
2,401,229	Cohen	May 28, 1946
2,611,456	Bader	Sept. 23, 1952
2,653,685	Buck	Sept. 29, 1953

FOREIGN PATENTS

65,418	Switzerland	of 1913
--------	-------------	---------