June 11, 1957 B. H. MUEHLHAUSE ET AL 2,795,303

MASTS OR TOWERS

Filed Dec. 26, 1952 2 Sheets-Sheet 1

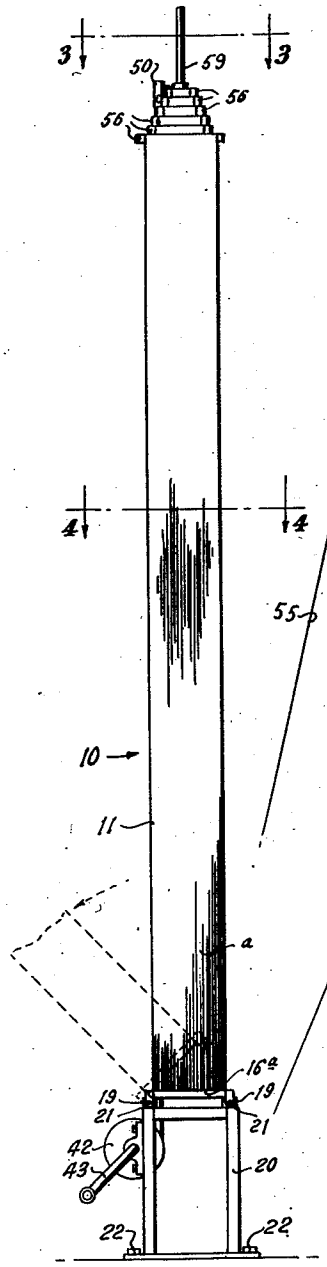


Fig. 1

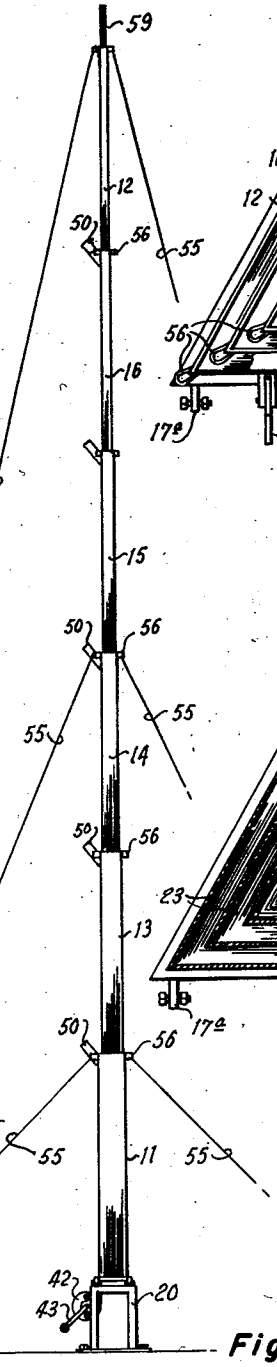


Fig. 2

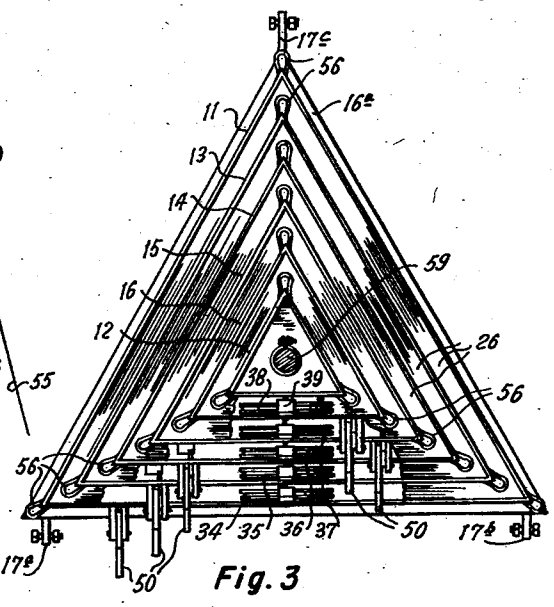


Fig. 3

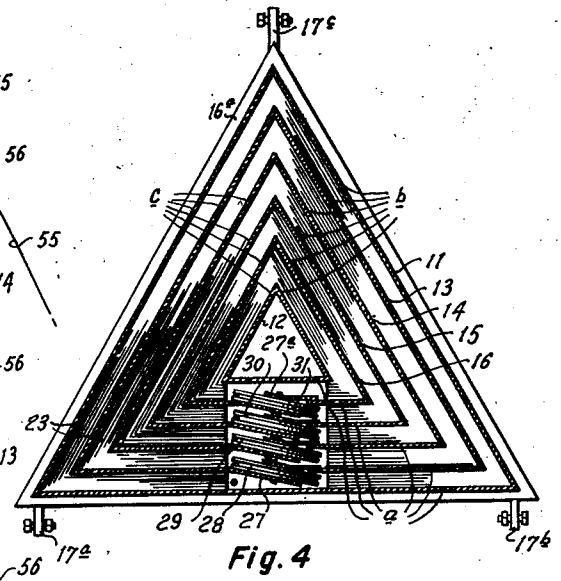


Fig. 4

Benjamin H. Muehlhause
John H. Sumbera
INVENTORS

BY

ATTORNEY

June 11, 1957 B. H. MUEHLHAUSE ET AL 2,795,303

MASTS OR TOWERS

Filed Dec. 26, 1952 2 Sheets-Sheet 2

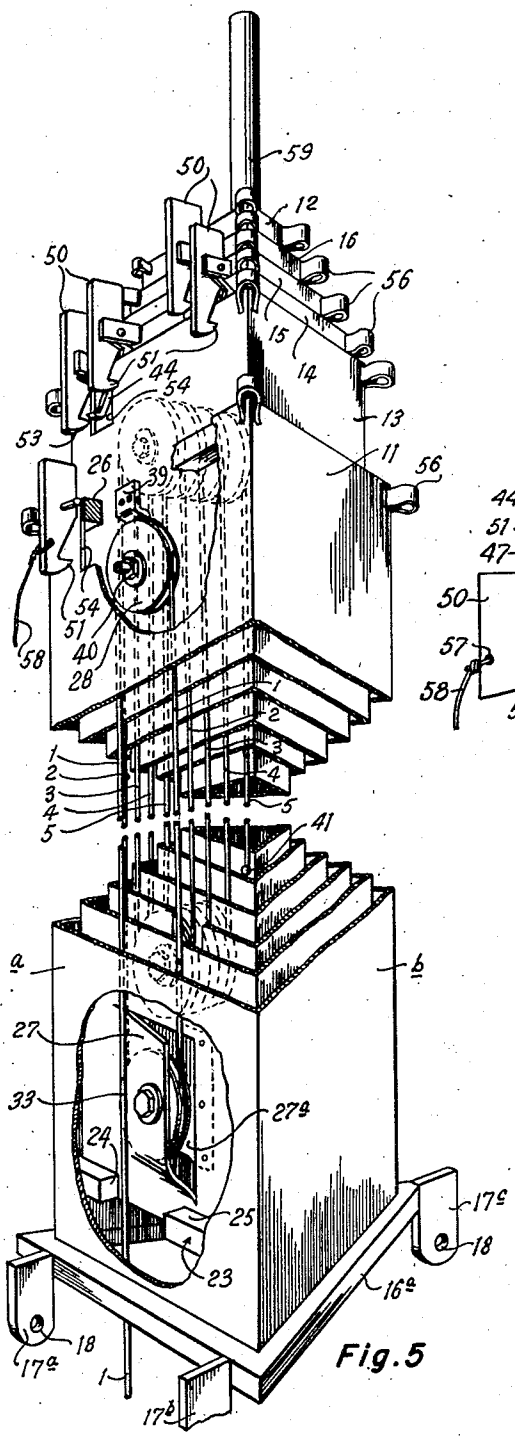


Fig. 5

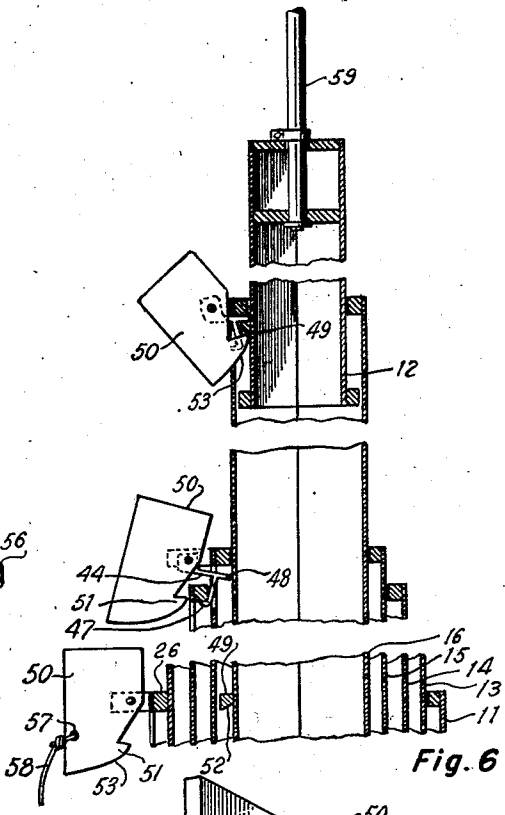


Fig. 6

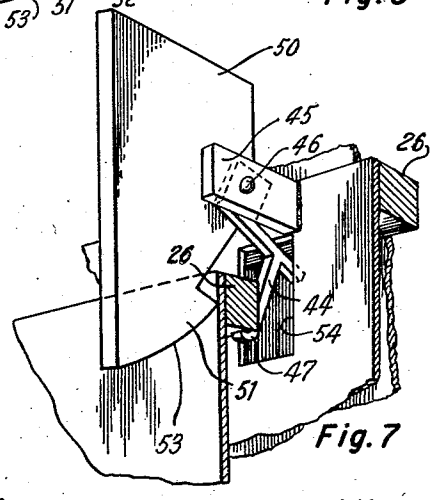


Fig. 7

Benjamin H. Muehlhause
John H. Sumbera
INVENTORS

BY Hastings Ashley

ATTORNEY

United States Patent Office 2,795,303 Patented June 11, 1957

2,795,303

MASTS OR TOWERS

Benjamin H. Muehlhause and John H. Sumbera, Holland, Tex.

Application December 26, 1952, Serial No. 327,992

9 Claims. (Cl. 189—14)

This invention relates to masts or towers and more particularly to a telescoping mast or tower.

It is often times desirable to erect an antenna, for example a television antenna, to demonstrate or determine the type of reception which will be received at a particular location. Since the antenna will necessarily have to be moved quite often from one location to another, it is necessary that the mast or tower atop which the antenna is to be mounted be readily transportable, and for the reason the mast or tower should preferably consist of a plurality of telescoping sections which may be readily extended to form a mast or tower of great height at each desired location and be capable of being telescoped to a short length for transport from one location to another. It is also desirable that the telescoping sections be extended with a minimum of effort and energy, especially where the extending mechanism is operated by hand, and for this reason all the sections should not be moved simultaneously out of telescoping positions, since this necessarily requires that the full weight of all the telescoping sections be supported by the extending mechanism throughout the extending operation. Moreover, it is desirable that the tower be capable of use as a permanent installation, and to this end locking means should be provided for holding the telescoping sections in their extended positions, so that their weight need be supported by the extending mechanism only during their movement to their extended positions. Furthermore, the locking means of the telescoping sections should be capable of being unlocked from a position adjacent the foot of the mast or tower.

Accordingly, one object of the invention is to provide an extendable mast or tower which may be readily transported from one location to another, and which is also capable of use in a permanent installation.

Another object is to provide a mast or tower having telescoping sections which may extend to increase the height of the mast or tower.

Still another object is to provide the telescoping sections with an extending mechanism which progressively extends the telescoping sections so that the full weight of all the telescoping sections is borne by the extending mechanism only during the extension of the last telescoping section.

A further object of the invention is to provide locking means for holding the telescoping sections of the mast or tower in extended position.

A still further object of the invention is to provide the locking means of the upper telescoping sections with means which will automatically free each section for downward movement when the next lower section moves back into telescoped position and the lowest telescoping section with a manually operable locking means whereby an operator adjacent the foot of the mast or tower can unlock the locking means of the lowest telescoping section and thus cause all the telescoping sections to move into retracted or telescoped positions.

Further objects and advantages of the invention will readily be apparent from the reading of the following description of a device constructed in accordance with the invention, and reference to the accompanying drawings thereof, wherein:

Figure 1 is a side elevation of the tower showing the telescoping sections in retracted or telescoped positions,

Figure 2 is a side elevation of the tower showing the telescoping sections in extended positions,

Figure 3 is a top plan view of the tower,

Figure 4 is a horizontal sectional view taken on the line 4—4 of Figure 1,

Figure 5 is a perspective view of the tower with some portions of the tower broken away and with the lowermost telescoping section shown partly extended,

Figure 6 is a fragmentary vertical sectional view showing the innermost telescoping section fully extended and a second section partly extended, and

Figure 7 is an enlarged fragmentary view of a telescoping section showing the locking means for holding the next inner section in extended position and the catch for preventing upward movement of the illustrated section until the next innermost section has been moved to fully extended position.

In the drawings, the reference numeral **10** designates an extendable mast or tower having an outer section or tube **11**, an innermost telescoping section or tube **12**, and a plurality of intermediate telescoping sections or tubes **13**, **14**, **15** and **16** disposed between the outer and inner sections. The sections or tubes **11** to **16** are preferably equilateral trinagular in cross-section, each having vertical sides *a*, *b* and *c*.

The outer section **11** is provided at its lower end with a triangular foot ring **16***a* having dependent lugs **17***a*, **17***b* and **17***c* at each corner thereof. The lugs **17** are provided with apertures **18** so that the tower may be secured to similar upstanding lugs **19** on a base **20** by bolts **21** which extend through the apertures **18** and through similar registering apertures in the upstanding lugs on the base.

When the bolts **21** securing the lug **17***c* to the base is removed, the tower may be pivoted downwardly about the bolts **21** securing the lugs **17***a* and **17***b* to the base **20** to a horizontal position. It will thus be seen that the base **20** may be secured to the bed of a truck by the bolts **22** and transported from one location to another in a horizontal position, and be pivoted to a vertical position on the base when the truck arrives at a desired location. The tower of course is readily transportable from one location to another when it is in the lowered horizontal position. Also, this pivotal mounting of the tower provides for ready servicing of antennas or the like mounted on the tower in permanent installations, wherein the base **20** is mounted on the ground or the like.

Each of the intermediate sections **13**, **14** and **15** and the innermost section **12** is provided with a triangular outer spacer member or ring **23** rigidly secured to the exterior of its sides at the lower ends thereof. Each of said spacer rings is cut away on the side *a* of the tube section to provide a vertical slot having spaced ends **24** and **25**, Figure 5, through which a cable may pass between the sides *a* of each adjacent pair of sections. Each of the intermediate sections and the outer section is provided at its upper end with a triangular inner spacer member or ring **26** rigidly secured to the interior of the sides of such tube section. The spacer rings **23** and **26** serve to hold the sections of the tower in proper axially aligned relationship.

Each of the intermediate sections has at the lower end of its side *a* an L-shape cut defining a flap portion **27** which is displaced outwardly at an angle with the side *a*

of such section. Sheaves 28, 29, 30 and 31 are mounted between the flap portions 27 of the intermediate sections 13, 14, 15 and 16, respectively, and supporting plates 27*a* secured to the side *a* of each section adjacent the vertical portion of the L-shaped cut and disposed substantially parallel to and spaced from the corresponding flap on such side *a* of the tube sections. Shaft bolts 32 extend through suitable apertures in the flap portions 27 and in the corresponding supporting plate, and the sheaves are rotatably mounted on such bolts. As will be evident from an inspection of Figures 1 and 4, the opposite vertical peripheral portions of each sheave are disposed on opposite sides of the side *a* to which it is secured so the cable 33 which passes about each sheave is thus led through the L-shaped cut and from one side of the side *a* on which such sheave is mounted to the other side.

Sheaves 34, 35, 36, 37 and 38 are mounted on the sides *a* of the outer section 11 and each of the intermediate sections 13, 14, 15 and 16, respectively. Each of the sheaves 34 to 38 is rotatably mounted between the side *a* of its particular tubular section and a bracket 39 whose upper end is rigidly secured to the interior of the side *a* by rivets, bolts or other suitable means on a shaft bolt 40 journalled in the side *a* and its corresponding bracket 39.

The cable 33 has its inner end fastened to the exterior of the inner section 12 by means of a clamp 41 and passes upwardly from the clamp and over the sheave 38, down and around the sheave 31, up and around the sheave 37, down and around the sheave 30, up and around the sheave 36, down and around the sheave 29, up and around the sheave 35, down and around the sheave 28, up and around the sheave 35, and down through the foot ring 16*a* to a drum 42 rotatably mounted on the base 20 and provided with a crank handle 43. The outer end of the cable 33 is secured to the drum so that as the drum 42 is rotated the cable will be wound upon said drum and will cause the telescoped sections of the tower to move upwardly to extended positions.

In order to prevent the intermediate sections from moving upwardly before the next innermost section has moved to its fully extended position, each of the intermediate sections is provided with a catch 44 pivotally mounted on a shaft 46 carried by an outwardly extending bracket 45 rigidly secured to the upper end of the side *a* of each intermediate section. Each bracket extends outwardly beyond the side *a* of the next outermost section of the tower. The catch 44 is provided with a hook portion 47 which is adapted to engage the underside of the upper inner ring 26 of the next outermost section and a spur 48 which extends in the opposite direction from the hook 47 and which is adapted to be engaged by a stop 49 rigidly secured to the side *a* of the next innermost section.

When the tower is retracted, each catch 44 has its hook portion 47 extending outwardly beneath the inner ring 26 of the next outermost section so that the section on which the catch is mounted may not be moved upwardly because of such engagement of the hook with the inner ring.

The innermost section 12 is free to move upwardly at all times since it is not provided with a catch 44. When the innermost section is moved upwardly, its stop 49 will engage the spur 48 of the catch 44 of the intermediate section 16, causing the catch to pivot and move the hook portion 47 out of engagement with the inner ring 26 of the next outward intermediate section, which is the section 15. The intermediate section 16 is then free to move upwardly. The intermediate section 15 is next freed for upward movement when the stop 49 on the section 16 engages the spur 48 of the catch of the section 15. The intermediate sections 14 and 13 will be successively freed for upward movement in the same manner as the tubular tower sections are moved to extended positions. The stops 49 are disposed on the sides *a* of the innermost section 12 and on each of the intermediate sections adjacent the lower ends of the sections, just above the lower sheaves 28, 29, 30 and 31 on their respective tubular sections.

In order to retain or lock the tubular sections in their fully extended positions, the outermost section 11 and the intermediate sections are provided with locking plates 50 pivotally mounted on the shafts 46 and having at their lower ends hooks 51 which are adapted to engage under the beveled underside 52 of the stops 49 on the next innermost tubular sections and thus lock the sections in extended positions. The locking plates are so designed that the weight of their upper outer portions tends to rotate the plates counterclockwise (Figure 6) and thus constantly urge the hooks toward engaging or locking position. The lower edges 53 of the locking plates are curved upwardly and inwardly toward the points of the hooks so that the camming action between the edge 53 of the locking plate of one section and the upper edge of the next outermost section will cause the locking plate to pivot clockwise to retracted releasing position as the section on which it is mounted moves downwardly into retracted position. The clockwise pivoting movement of the locking plate will disengage its hook 51 from the stop 49 of the next innermost section which will then be free to move downwardly.

Assuming now that the tower is in its upright, retracted position, as shown in Figure 1, and it is desired to extend it to the position shown in Figure 2, the drum is rotated by means of its crank handle to wind the cable 33 on the drum 42 and draw the cable over the various sheaves. The intermediate sections 13, 14, 15 and 16 are locked against upward movement by the hook portions 47 of their catches 44 which engage the inner rings 26 of their adjacent sections. For example, the catch 44 of section 16 engages the inner ring 26 of the next outermost intermediate section 15, the catch 44 of section 15 engages the inner ring 26 of section 14, the catch 44 of section 14 engages the inner ring 26 of section 13, and the catch 44 of section 13 engages the inner ring of the outer section 11. The innermost section 12, however, has no catch and is free to move upwardly, and does so as the drum is rotated and the cable is pulled over the various sheaves.

When the innermost section 12 approaches its fully extended position, its stop 49 engages the spur 48 of the catch 44 of the next outermost intermediate section 16 and pivots the catch to releasing position, counterclockwise in Figure 6. This movement of the catch causes the hook 49 of this catch to disengage from the inner ring 26 of the intermediate section 15 and the section 16 is thus freed to move upwardly. The upward movement of the innermost section 12 relative to the intermediate section 16 will now cease since the stop 49 of the innermost section 12 engages the spur 48 of the catch 44 of the intermediate section 16 and the pivotal movement of this spur is limited by the inner ring 26 at the upper end of the intermediate section 16 on which it is mounted.

Continued rotation of the drum will now cause the intermediate section 16 to move upwardly, whereupon the hook 51 of the locking plate 50 of the intermediate section 16 will be raised above the upper edge of the intermediate section 15, whose outer surface it had been contacting, and the lower hook end of the locking plate will pivot inwardly to engage under the undersurface 52 of the stop 49 of the innermost section 12. The hook 51 will now prevent downward movement of the innermost section 12 relative to the intermediate section 16.

As the drum is further rotated, the section 16 will be moved upwardly to its fully extended position, and during this movement its stop 49 will engage the spur on the catch 44 of the next outermost section 15 to free such section 15 for upward movement. The hook 51 of the locking plate 50 of the section 15 will then engage under the stop on the section 16 to lock the section 16 against downward movement relative to the section 15.

Further continued rotation of the drum will result in the successive extension of the intermediate tubular sections **14** and **13** and then locking of the sections **15** and **14** in their extended positions by the hooks of the locking plates of the sections **14** and **13**, respectively.

The hook **51** of the locking plate **50** of the outer section extends inwardly through an aperture **54** in the side *a* of the outer section and is adapted to engage beneath the underside of the stop **49** of the intermediate section **13** and thus lock such intermediate section in extended position. The curved edge **53** of the locking plate causes it to be cammed outwardly by the stop **49** as it moves upwardly past the hook **51**.

The tower will now be in its fully extended position, and the drum may be turned to relieve the cable **33** of of all tension since the locking plates hold the intermediate tubular sections and the innermost tubular section in their extended positions. Guy wires **55** may be fastened to ears **56** provided on the upper ends of the sections of the tower and to the ground or to fixed structures, if it is so desired, to give greater rigidity to the tower.

When it is desired to retract the tower, the locking plate **50** of the outer tubular section **11** is pulled outwardly from locking position, clockwise in Figure 1. This locking plate may be provided with an aperture **57** so that a cord **58** may be fastened to the locking plate for so swinging the same. The locking plate can then be moved to unlocked position by jerking or pulling outwardly on such a cord, or, if desired, other means such as a hook may be employed to engage in the aperture **59** to swing the locking plate. When the locking plate **50** of the outer section is pulled outwardly out of engagement with the stop **49** of the next innermost tubular section **13**, the section **13** moves downwardly in the outer section **11**. When the intermediate section **13** approaches its lowermost position, the curved edge **53** of its locking plate **50** contacts the upper edge of the outer section **11** and cams the locking plate outwardly to disengage its hook **51** from the stop **49** of the intermediate section **14** which section is then in its turn freed to move downwardly with respect to section **13**. The locking plates **50** of the intermediate tubular sections **14**, **15** and **16** are successively cammed outwardly in the same manner to free the sections **15**, **16** and **12** for movement to retracted positions.

During the retracting movement of the tubular tower sections, the drum **42** and cable **33** may be employed to brake or control the speed of retraction.

A tube or pipe **59** may be secured at or within the upper end of the innermost section **12** of the tower by any suitable means to extend upwardly above the sections. An antenna or other desired device can be attached to the upper end of this pipe.

It will thus be seen that a base **20** has been provided which may be secured to the bed of a truck and to which is pivotally secured a telescoping tower so that the telescoping tower may be pivoted to horizontal position over the truck bed when it is desired to transport the tower from one place to another and so that the tower may be pivoted to an upright position when it is at the desired location. Of course, it will be readily apparent that the base **20** may be fixed to the ground or other fixed structure, and that the tower may be pivoted to horizontal position to facilitate attachment, detachment or repair of an antenna or other device on the upper end of the tower.

It will also be seen that the telescoping tower includes a plurality of sections which are movable to extended positions by a drum **42** and cable **33** and that the sections are extended successively outwardly, the innermost first, when the drum is operated so that the full weight of all extendable sections is borne by the cable only during the extension of the last and outermost extendable section **13**. It will also be seen that this is accomplished by the provision of catches **44** on the intermediate sections **13**, **14**, **15** and **16**, which catches engage the inner

rings **26** of the outer section **11** and the intermediate sections **13**, **14** and **15**. It will also be apparent that locking plates **50** have been provided on the outer section and the intermedaite sections to lock the extendable sections in the extended positions and that the locking plates have been provided with camming edges or surfaces **53** so that the locking plates may be successively cammed to open position as the tower sections are retracted or telescoped so that the tower may be easily retracted.

The foregoing description of the invention is explanatory only, and changes in the details of the construction illustrated may be made by those skilled in the art, within the scope of the appended claims, without departing from the spirit of the invention.

What I claim and desire to secure by Letters Patent is:

1. A tower comprising: a plurality of elongate telescoping sections and a flexible member having an end secured to the innermost of said sections extending over sheaves mounted on the other sections and having an outer end disposed without said tower for progressively moving said sections to extended positions, the innermost section being moved outwardly first upon initial application of force on said outer end of said flexible member, separate catch means pivotally mounted at the upper end of each of said sections except the outermost and innermost sections, each catch means being actuatable by gravity to be engageable with an adjacent section to prevent upward movement of each section until the next inner section has been fully extended, and stop means on each of said sections except the outermost section, the stop means of each section engaging the catch means of the next adjacent section to open said catch means when said each section has been fully extended and permit the next adjacent section to move toward extended position.

2. A tower comprising: an outermost elongate hollow section having a vertical longitudinal axis; an innermost section disposed in said outermost section for upward vertical movement parallel to said longitudinal axis; a plurality of elongate intermediate hollow sections disposed between said innermost and outermost sections for upward vertical movement parallel to said longitudinal axis; means spacing said sections from one another to provide spaces between adjacent sections; an elongate flexible member extending through said spaces and having an inner end secured to said innermost section and an outer end disposed exteriorly of said sections; sheaves at the upper end of said outermost section and at the upper and lower ends of each of said intermediate sections; said flexible member passing over said sheaves to cause said innermost section and said intermediate sections to move progressively to extended positions when tension is applied to said outer end; catch means pivotally mounted on the upper portions of each of said intermediate sections; each catch means extending outwardly and actuatable by gravity to engage an adjacent section disposed outwardly of the section on which the catch means is mounted to prevent upward movement of the section on which the catch is mounted; and a stop means on said innermost section and on each of said intermediate sections; each of said stop means engaging and retracting the catch means of an adjacent section disposed outwardly of the section on which the stop means is mounted when the section on which the stop means is mounted has been moved to extended position whereby the adjacent section is freed for upward movement.

3. A tower comprising: an outermost elongate hollow section having a vertical longitudinal axis; an innermost section disposed in said outermost section for upward vertical movement parallel to said longitudinal axis; a plurality of elongate intermediate hollow sections disposed between said innermost and outermost sections for upward vertical movement parallel to said longitudinal axis; means spacing said sections from one another to

provide spaces between adjacent sections; an elongate flexible member extending through said spaces and having an inner end secured to said innermost section and an outer end disposed exteriorly of said sections; sheaves at the upper end of said outermost section and at the upper and lower ends of each of said intermediate sections; said flexible member passing over said sheaves to cause said innermost section and said intermediate sections to move progressively to extended positions when tension is applied to said outer end; automatic locking means pivotally mounted on the upper portions of said outermost section and of each of said intermediate sections; each locking means extending inwardly and actuatable by gravity to engage an adjacent section disposed inwardly of the section on which the locking means is mounted for holding said adjacent section in extended position when said adjacent section has moved to fully expanded position; and separate catch means pivotally mounted on the upper portions of each of said intermediate sections; each catch means being actuatable by gravity and extending outwardly to engage an adjacent section disposed outwardly of the section on which the catch means is mounted to prevent upward movement of the section on which the catch is mounted; and a stop means on said innermost section and on each of said intermediate sections; each of said stop means engaging and retracting the catch means of an adjacent section disposed outwardly of the section on which the stop means is mounted when the section on which the stop means is mounted has been moved to extended position whereby the adjacent section is freed for upward movement.

4. A tower comprising: an outermost elongate hollow section having a vertical longitudinal axis; an innermost section disposed in said outermost section for upward vertical movement parallel to said longitudinal axis; a plurality of elongate intermediate hollow sections disposed between said innermost and outermost sections for upward vertical movement parallel to said longitudinal axis; means spacing said sections from one another to provide spaces between adjacent sections; an elongate flexible member extending through said spaces and having an inner end secured to said innermost section and an outer end disposed exteriorly of said sections; sheaves at the upper end of said outermost section and at the upper and lower ends of each of said intermediate sections; said flexible member passing over said sheaves to cause said innermost section and said intermediate sections to move progressively to extended positions when tension is applied to said outer end; automatic locking means pivotally mounted on the upper portions of said outermost section and of each of said intermediate sections; each locking means extending inwardly and being actuatable by gravity to engage an adjacent section disposed inwardly of the section on which the locking means is mounted for holding said adjacent section in extended position when said adjacent section has moved to fully extended position; each of said locking means on said intermediate sections having a cam surface engageable with the upper end of the adjacent section disposed outwardly of the section on which the locking means is mounted whereby the locking means of each of said intermediate sections is cammed out of engagement with the adjacent section disposed inwardly of the section on which the locking means is mounted when the section on which the locking means is mounted is moved inwardly to retracted position; and separate catch means pivotally mounted on the upper portions of each of said intermediate sections; each catch means extending outwardly and being actuatable by gravity to engage an adjacent section disposed outwardly of the section on which the catch means is mounted to prevent upward movement of the section on which the catch is mounted; and a stop means on said innermost section and on each of said intermediate sections; each of said stop means engaging and actuating the catch means of an adjacent section disposed outwardly of the section on which the stop means is mounted when the section on which the stop means is mounted has been moved to extended position whereby the adjacent section is freed for upward movement.

5. A tower comprising: an outermost elongate hollow section having vertical walls disposed about a central sectional longitudinal axis; and elongate innermost sections disposed in said outermost section and having vertical walls disposed about said central axis; a plurality of elongate intermediate sections between said innermost and outermost sections and having vertical walls disposed about said central axis; each of said sections being triangular in cross-sectional configuration and having imperforate walls; means spacing said sections to provide a space between the walls of adjacent sections; a sheave mounted at the upper end of said outermost section; a pair of vertically spaced sheaves mounted on a wall of each of said intermediate sections; a flexible member extending about said sheaves and having an inner end secured to said innermost section and an outer end disposed exteriorly of said outermost section whereby a pulling force applied to said outer end causes said innermost and intermediate sections to be moved progressively outwardly to extended positions; each of said intermediate sections having a wall provided with an L-shaped aperture and having the portion defined by said aperture displaced laterally of said wall; one of said sheaves of said pair of sheaves being mounted on said portion whereby said flexible member may extend about said one of said sheaves through said aperture from one side of said wall to the other without passing exteriorly of said tower.

6. A tower comprising: an outermost elongate hollow section having vertical walls disposed about a central sectional longitudinal axis; and elongate innermost sections disposed in said outermost section and having vertical walls disposed about said central axis; a plurality of elongate intermediate sections between said innermost and outermost sections and having vertical walls disposed about said central axis; each of said sections being triangular in cross-sectional configuration and having imperforate walls; means spacing said sections to provide a space between the wall of adjacent sections; a sheave mounted at the upper end of said outermost section; a pair of vertically spaced sheaves mounted on a wall of each of said intermediate sections; the uppermost of said sheaves being mounted parallel to the wall of said section and inwardly of said wall, and the lowermost sheave being mounted adjacent the lower end of the same wall of said section; a flexible member extending about said sheaves and having an inner end secured to said innermost section and an outer end disposed exteriorly of said outermost section whereby a pulling force applied to said outer end causes said innermost and intermediate sections to be moved progressively outwardly to extended positions; each of said intermediate sections having the wall on which the sheaves are mounted provided adjacent its lower end with an L-shaped aperture and having the portion defined by said aperture displaced laterally of said wall; the lower one of said sheaves of said pair of sheaves being mounted on said portion whereby said flexible member may extend about said one of said sheaves through said aperture from one side of said wall to the other without passing exteriorly of said tower; and automatic locking means pivotally mounted on the upper portions of said outermost section and of each of said intermediate sections; each locking means extending inwardly and actuatable by gravity to engage an adjacent section disposed inwardly of the section on which the locking means is mounted for holding said adjacent section in extended position when said adjacent section has moved to fully extended position.

7. A tower comprising: an outermost elongate hollow section having vertical walls disposed about a central sectional longitudinal axis; and elongate innermost sections disposed in said outermost section and having ver-

tical walls disposed about said central axis; a plurality of elongate intermediate sections between said innermost and outermost sections and having vertical walls disposed about said central axis; each of said sections being triangular in cross-sectional configuration and having imperforate walls; means spacing said sections to provide a space between the walls of adjacent sections; a sheave mounted at the upper end of said outermost section; a pair of vertically spaced sheaves mounted on a wall of each of said intermediate sections; the uppermost of said pair of sheaves being mounted adjacent the upper end of said section interiorly of the wall and parallel to said wall; a flexible member extending about said sheaves and having an inner end secured to said innermost section and an outer end disposed exteriorly of said outermost section whereby a pulling force applied to said outer end causes said innermost and intermediate sections to be moved progressively outwardly to extended positions; each of said intermediate sections having at the lower end of the wall on which the upper sheave is mounted an L-shaped aperture and having the portion defined by said aperture displaced laterally of said wall; the lower one of said sheaves of said pair of sheaves being mounted on said portion whereby said flexible member may extend about said one of said sheaves through said aperture from one side of said wall to the other without passing exteriorly of said tower; and catch means pivotally mounted on the upper portions of each of said intermediate sections; each catch means extending outwardly to engage an adjacent section disposed outwardly of the section on which the catch means is mounted to prevent upward movement of the section on which the catch is mounted; and a stop means on said innermost section and on each of said intermediate sections; each of said stop means engaging and actuating the catch means of an adjacent section disposed outwardly of the section on which the stop means is mounted when the section on which the stop means is mounted has been moved to extended position whereby the adjacent section is freed for upward movement.

8. A tower comprising: an outermost elongate hollow section having vertical walls disposed about a central sectional longitudinal axis; and elongate innermost sections disposed in said outermost section and having vertical walls disposed about said central axis; a plurality of elongate intermediate sections between said innermost and outermost sections and having vertical walls disposed about said central axis; each of said sections being triangular in cross-sectional configuration and having imperforate walls; means spacing said sections to provide a space between the walls of adjacent sections; a sheave mounted at the upper end of said outermost section; a pair of vertically spaced sheaves mounted on a wall of each of said intermediate sections corresponding to the wall of the outermost section on which the sheave is mounted; a flexible member extending about said sheaves and having an inner end secured to said innermost section and an outer end disposed exteriorly of said outermost section whereby a pulling force applied to said outer end causes said innermost and intermediate sections to be moved progressively outwardly to extended positions; each of said intermediate sections having its sheave carrying wall provided with an L-shaped aperture adjacent the lower end thereof and having the portion defined by said aperture displaced laterally of said wall; the upper one of said sheaves of said pair of sheaves being mounted adjacent the upper end of the sheave carrying wall of said section interiorly thereof and parallel thereto, and the lower one of said sheaves being mounted on said laterally displaced portion of said L-shaped aperture whereby said flexible member may extend about said one of said sheaves through said aperture from one side of said wall to the other without passing exteriorly of said tower; and catch means pivotally mounted on the upper portions of each of said intermediate sections; each catch means extending outwardly to engage an adjacent section disposed outwardly of the section on which the catch means is mounted to prevent upward movement of the section on which the catch is mounted; and a stop means on said innermost section and on each of said intermediate sections; each of said stop means engaging and actuating the catch means of an adjacent section disposed outwardly of the section on which the stop means is mounted when the section on which the stop means is mounted has been moved to extended position whereby the adjacent section is freed for upward movement.

9. A tower comprising: an outermost elongate hollow section having vertical walls disposed about a central sectional longitudinal axis; and elongate innermost sections disposed in said outermost section and having vertical walls disposed about said central axis; a plurality of elongate intermediate sections between said innermost and outermost sections and having vertical walls disposed about said central axis; each of said sections being triangular in cross-sectional configuration and having imperforate walls; means spacing said sections to provide a space between the wall of adjacent sections; a sheave mounted at the upper end of said outermost section; a pair of vertically spaced sheaves mounted on a wall of each of said intermediate sections corresponding to the wall of the outermost section on which the sheave is mounted; a flexible member extending about said sheaves and having an inner end secured to said innermost section and an outer end disposed exteriorly of said outermost section whereby a pulling force applied to said outer end causes said innermost and intermediate sections to be moved progressively outwardly to extended positions; each of said intermediate sections having its sheave carrying wall provided with an L-shaped aperture adjacent the lower end thereof and having the portion defined by said aperture displaced laterally of said wall; the upper one of said sheaves of said pair of sheaves being mounted adjacent the upper end of the sheave carrying wall of said section interiorly thereof and parallel thereto, and the lower one of said sheaves being mounted on said laterally displaced portion of said L-shaped aperture whereby said flexible member may extend about said one of said sheaves through said aperture from one side of said wall to the other without passing exteriorly of said tower; and automatic locking means pivotally mounted on the upper portions of said outermost section and of each of said intermediate sections; each locking means extending inwardly and actuatable by gravity to engage an adjacent section disposed inwardly of the section on which the locking means is mounted for holding said adjacent section in extended position when said adjacent section has moved to fully extended position; each of said locking means on said intermediate sections having a cam surface engageable with the upper end of the adjacent section disposed outwardly of the section on which the locking means is mounted whereby the locking means of each of said intermediate sections is cammed out of engagement with the adjacent section disposed inwardly of the section on which the locking means is mounted when the section on which the locking means is mounted is moved inwardly to retracted position.

References Cited in the file of this patent

UNITED STATES PATENTS

2,339,327	Fox	Jan. 18, 1944
2,632,530	Wagner	Mar. 24, 1953

FOREIGN PATENTS

16,343	Great Britain	of 1902
255,261	Germany	Jan. 6, 1913
104,131	Great Britain	Feb. 22, 1917