April 13, 1954 G. REGOORD 2,675,211

EXTENSIBLE COLUMN

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Fig. 2.

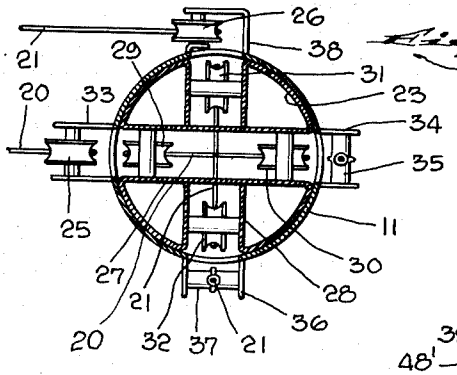
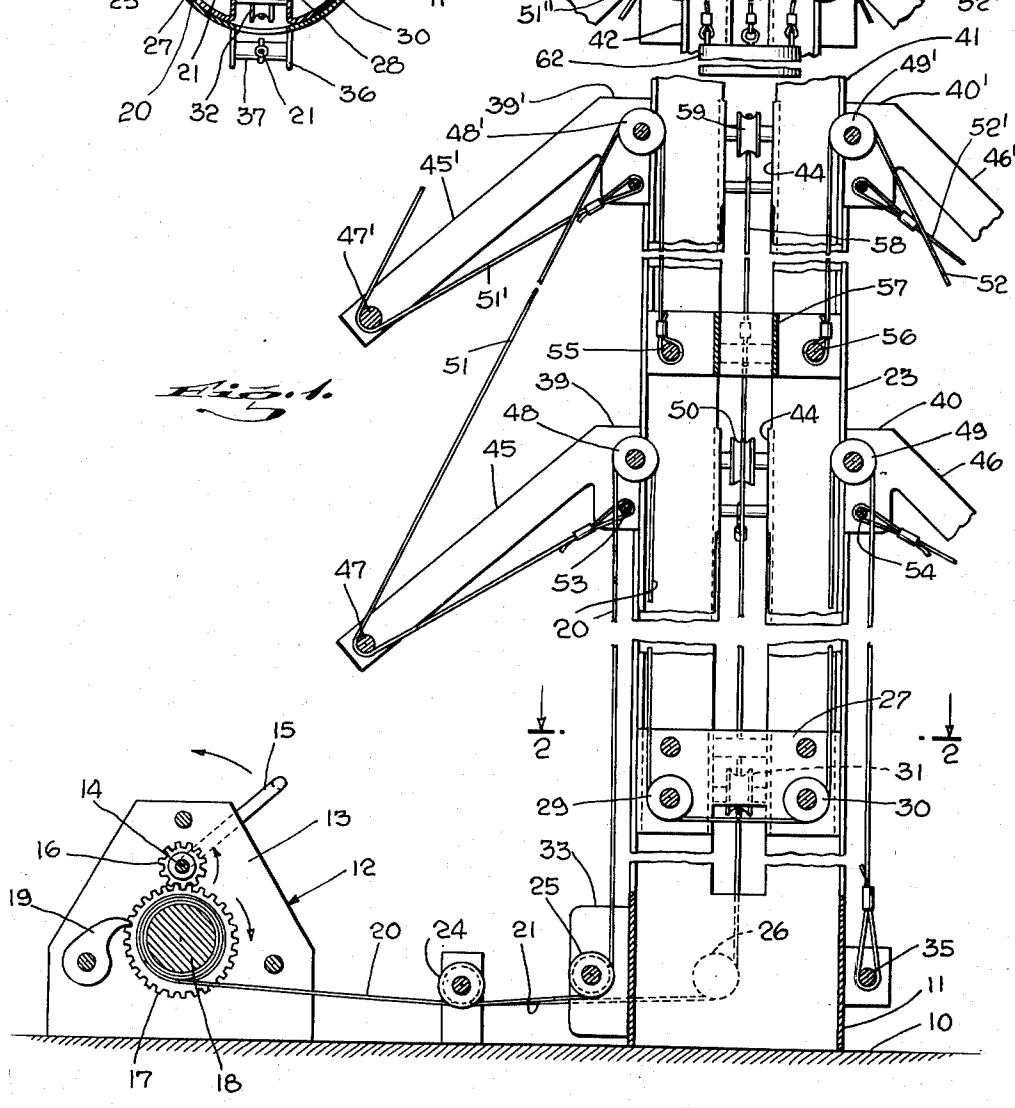


Fig. 1.



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EXTENSIBLE COLUMN

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6 Claims. (Cl. 254—148)

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This invention relates to what I term an extensible column employing a plurality of tubular sections which telescope one with respect to the other to normally provide a relatively low column which can be extended to various heights and utilized as a column, shafting or mast, or as means for raising and lowering one or more platforms, depending upon the number of columns employed.

More particularly, the invention deals with an apparatus of the character described having means for simultaneously actuating the column sections to raise the same into extended position and to control lowering of the sections in movement thereof into collapsed position.

Still more particularly, the invention deals with apparatus of the character described, wherein the lift is distributed to opposed sides of the apparatus through utilizing a dual cable, or other operating strand.

The novel features of the invention will be best understood from the following description, when taken together with the accompanying drawing, in which certain embodiments of the invention are disclosed and, in which, the separate parts are designated by suitable reference characters in each of the views and, in which:

Fig. 1 is a broken sectional view, showing a few of the column sections, illustrating the same in a partially extended position, as well as showing the means for operating said sections; and

Fig. 2 is a cross-section through the column on the line 2—2 of Fig. 1.

In the drawing, the line 10 will represent a suitable base or support, this base or support being suitably constructed to adapt it for different uses, particularly in facilitating movement of the apparatus from place to place. Suitably mounted and fixed to the support is the main base section 11 of the telescoping column. At 12 is indicated suitable driving means which may be manually or power-actuated, depending upon the size and use of the device.

The drive 12 comprises a suitable casing, or frame 13, in which is arranged a drive shaft 14, which, in the construction shown, is indicated as operated by a crank 15. On the shaft 14 is a pinion 16 which meshes with a gear 17 on a winding drum or pulley 18; at 19 is indicated a pawl engaging the gear 17 to check and hold the various sections of the column in any desired extended position.

At 20 and 21 are shown a pair of cables which control operation of the first telescoping tube or section 23 which is slidably on the fixed section 11.

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The cables 20, 21 first pass over idler pulleys or sheaves on the base 10, one of which is indicated at 24 in Fig. 1 and then around sheaves 25 and 26, respectively, supported on the fixed section 11 of the column.

The lower end portion of the section 23 has cross-frames 27 and 28, defined by spaced parallel plates, as clearly seen in Fig. 2, the frame 27 supporting two sheaves 29 and 30; whereas, the frame 28 supports two other sheaves 31 and 32.

The supports for the sheave 25 comprise spaced outwardly projecting supporting plates 33 and directly opposed to the plates 33 the section 11 has another pair of supporting plates 34, in which an anchor rod 35 is mounted. At 90° to the plates 34 are another pair of plates 36 supporting another anchor rod 37 and, opposed to the plates 36, the section 11 has a special frame 38 for support of the sheave 26.

Bearing this structure in mind, the upper portion of each of the sections employed has opposed pairs of supporting plates, as for example, two plates similar to the plates 33, 34 are shown at 39 and 40 in Fig. 1 at the upper end of the fixed section 11. Two other similar pairs of supporting plates 39', 40' are shown at the upper end of the section 23. The section 41, which is shown telescoping in section 23, at least the lower portion thereof being shown, also has similar pair of plates, not shown, and this construction continues throughout the several sections which are employed in the column and at 39'' and 40'' are indicated similar supports at what can be termed the uppermost section 42. This section 42, in the present illustration, is indicated as having a supporting platform 43. It will be understood that, at right angles to the various supports 39 and 40, the respective sections of the column will have similar supports, one of these supports being indicated at 44 at the top of the section 11 and another indicated at 44' at the top of section 23.

To simplify the description, reference will be given solely to the structure of the supports 39, 40; 39', 40', but it will be understood that the other sections will be of identical construction and will operate in the same manner. Each of the supports 39 and 40 have long outwardly and downwardly extending arms 45, 46; 45', 46', carrying, at their free ends, cross-rods, one of which is seen at 47 and the corresponding rod at 47' on 45'. The rods of the arms 46, 46' are not shown, as these would simply be repetitious of the rods

defined. Mounted between the plates 39, 40; 39', 40' are sheaves 48, 49; 48', 49'.

It will appear from a consideration of Fig. 1 of the drawing that the cable 20 extends upwardly from the sheave 25 and passes around the sheave 48, downwardly in the tubular section 23, around the sheave 29, then around the sheave 30, upwardly through section 23, around the sheave 49 and then downwardly and is anchored to the anchor rod 35. The cable 21 passes around the sheave 26, then upwardly along the section 11 and over a sheave 50, similar to the sheaves 48 and 49, then downwardly through the section 23 around the sheave 31, then around the sheave 32 and up through the section 23 and around another sheave similar to the sheave 50 and then downwardly and anchored to the anchor rod 37.

With the above construction, it will be apparent that, as the spool or drum 18 is rotated, the two strands or cables 20, 21 will be wound on the drum and this operation will result in lifting the section 23 upwardly in the fixed section 11. It will appear from a consideration of Fig. 1 of the drawing that the sheaves 48, 49 and similar sheaves operate in elongated slots in the sides of the sections 23, the sheaves extending into the slots which serves to key the sections one with respect to the other.

At 51 and 52 are shown cables which control relative telescoping movement of section 41 with respect to section 23. One end of these cables is fixed to anchor rods 53, 54 of supports 39, 40 and then pass around rods, such as the rod 47, of arms 45, 46, then around sheaves 48', 49' and then down and anchored to rods 55, 56 on the bottom cross-frame 57 of the section 41. The frame 57 is substantially of the same structure as the cross-frame made up of the frame parts 27, 28 of Fig. 2. These frames, as well as the supports as at 39, 39'; 40, 40' maintain the longitudinally split structure of the sections 23 in relationship to each other.

It will be understood that the arms, at right angles to the arms 45, 46, will have similar cables to the cables 51, 52 and one of these cables is indicated at 58 and passes over a sheave 59, similar to the sheaves 48', 49'.

In Fig. 1 of the drawing, I have shown at 51' and 52' a portion of other cables, similar to the cables 51 and 52. Here again, these cables pass around rods as at 47' of the arms 45', 46' and over other sheaves, not shown, and down to a bottom cross-frame of another section which is not shown.

The frame portions 39'', 40'' which form the top cross-frame of the uppermost section 42 has sheaves 60, 61, over which cables 51'', 52'' pass.

It will be understood that any desired number of column sections can be employed, each section telescoping with its next adjacent section and being slightly less in diameter to fit snugly, but freely, in the adjacent section and, as one section is raised, its corresponding adjacent section is proportionately raised and this relative movement will be readily understood from a consideration of the left-hand side of Fig. 1 of the drawing and the following statement.

Let us assume that the sections are all in fully collapsed position one with respect to the other. Then, the arms as at 45' will be disposed in close proximity to the arms 45 and the part of the cable 51 between 53 and 47 will be nearing and close to a parallel relationship with that part of the cable extending between 47 and 48', 48' being then a short distance above 48 and 55 will then

be disposed adjacent 29, with 29 in its lowered position in the section 11. In Fig. 1 of the drawing, the sections are shown in only a partially raised position and, in the more fully raised position, 55 will come to a point closely adjacent 48', thus producing a long extension of the cable 51 between 48' and 47.

It will, of course, be understood that the upper section 42 has no other section to tie-in with, thus cables 51'', 52'', after passing over the sheaves 60, 61 will couple with a weight 62, it being understood that the other cables, similar to 60, 61 will also be coupled with this weight and one of these cables is indicated at 63. When it is desired to collapse the sections, the pawl 19, or other suitable control is moved into inoperative position and the various sections are lowered by virtue of their own weight or this operation can be positively controlled by hand or by suitable mechanism.

My improved extensible column may be utilized for the purpose of erecting columns or masts for different uses and, further, can be utilized as a supporting column in erecting scaffolds or in simply moving platforms into different vertical positions.

In connection with the latter use, it will be apparent that an apparatus of the character described can be used as a life saving apparatus in conjunction with fire-fighting equipment,

From a standpoint of description, the primary lift, that is to say, the lift of the first section slidably engaging the lower, or base section, is raised by reducing the dimensions of a cable loop, or loops, when two cables are employed. In other words, when the apparatus is fully collapsed, there is a long loop of the cable extending from the upper sheaves of the lower section around the pair of sheaves at the base of the first telescoping section and then up to another sheave at the upper end of said base section. As the first telescoping section is raised, this loop becomes smaller and smaller. In the same sense, the cable connection between adjacent sections may be said to be inverted loops, each loop extending from the outer extremity of the arms, around the sheave of the arm of the next adjacent section and then down to the lower end of said adjacent section. These last named loops become extended or elongated, as the various sections are telescoped upwardly.

Having fully described my invention, what I claim as new and desire to secure by Letters Patent is:

1. An extensible column of the character described, comprising a plurality of tubular sections, one section comprising a fixed base section, a second section being arranged in and telescoping with the base section, a plurality of other sections telescoping in the second section and with each other, each of the sections having, at the upper ends thereof, circumferentially spaced outwardly and downwardly extending arms, sheaves on said sections at the inner ends of the arms, said sheaves operating in elongated apertures in adjacent sections in keying the sections against rotary movement one with respect to the other, the lower end of the second section having two pairs of sheaves, a pair of cables looped around said pairs of sheaves of the second section and passing around the sheaves at the upper ends of the base section, one end of said cables being fixed to the lower portion of the base section, a winding mechanism, and the other end of said cables being fixed to a member of said mecha-

nism whereby, in the operation of said mechanism, the looped portions of said cables are reduced and said second section is raised in the base section.

2. An extensible column of the character described, comprising a plurality of tubular sections, one section comprising a fixed base section, a second section being arranged in and telescoping with the base section, a plurality of other sections telescoping in the second section and with each other, each of the sections having, at the upper ends thereof, circumferentially spaced outwardly and downwardly extending arms, sheaves on said sections at the inner ends of the arms, said sheaves operating in elongated apertures in adjacent sections in keying the sections against rotary movement one with respect to the other, the lower end of the second section having two pairs of sheaves, a pair of cables looped around said pairs of sheaves of the second section and passing around the sheaves at the upper ends of the base section, one end of said cables being fixed to the lower portion of the base section, a winding mechanism, the other end of said cables being fixed to a member of said mechanism whereby, in the operation of said mechanism, the looped portions of said cables are reduced and said second section is raised in the base section, and other cables being invertedly looped around the outer ends of the arms of the base section, around sheaves at the upper ends of arms of the second section and having ends fixed to the lower ends of a third section, whereby telescoping movement of the second section is transmitted to said third section.

3. An extensible column of the character described, comprising a plurality of tubular sections, one section comprising a fixed base section, a second section being arranged in and telescoping with the base section, a plurality of other sections telescoping in the second section and with each other, each of the sections having, at the upper ends thereof, circumferentially spaced outwardly and downwardly extending arms, sheaves on said sections at the inner ends of the arms, said sheaves operating in elongated apertures in adjacent sections in keying the sections against rotary movement one with respect to the other, the lower end of the second section having two pairs of sheaves, a pair of cables looped around said pairs of sheaves of the second section and passing around the sheaves at the upper ends of the base section, one end of said cables being fixed to the lower portion of the base section, a winding mechanism, the other end of said cables being fixed to a member of said mechanism whereby, in the operation of said mechanism, the looped portions of said cables are reduced and said second section is raised in the base section, other cables being invertedly looped around the outer ends of the arms of the base section, around sheaves at the upper ends of arms of the second section and having ends fixed to the lower ends of a third section, whereby telescoping movement of the second section is transmitted to said third section, and at least one of said sections having a supporting member.

4. An extensible column of the class described, comprising a plurality of telescoping tubular sections, one section comprising a fixed base section, a second section telescoping in the base section and having sheaves at its lower end, a plurality of other sections telescoping in the second section and in each other, means comprising a cable looped around sheaves of the second section for controlling telescoping movement of the second section in said base section, said cable having one end fixed to the lower end of the base section, winding means, the other end of the cable being fixed to said winding means, other inverted looped cables having ends fixed to adjacent sections, whereby movement of the second section in the base section will correspondingly move said plurality of sections in the second section and with respect to each other, and one end of the cables of the inverted loops of the uppermost section being attached to a weighted member movable longitudinally of said sections.

5. An extensible column of the class described, comprising a plurality of telescoping tubular sections, one section comprising a fixed base section, a second section telescoping in the base section and having sheaves at its lower end, a plurality of other sections telescoping in the second section and in each other, means comprising a cable looped around sheaves of the second section for controlling telescoping movement of the second section in said base section, said cable having one end fixed to the lower end of the base section, winding means, the other end of the cable being fixed to said winding means, other inverted looped cables having ends fixed to adjacent sections, whereby movement of the second section in the base section will correspondingly move said plurality of sections in the second section and with respect to each other, one end of the cables of the inverted loops of the uppermost section being attached to a weighted member movable longitudinally of said sections, said uppermost section having a platform, and means keying said sections one to the other to prevent relative rotary movement.

6. An extensible column of the class described, comprising a plurality of telescoping tubular sections, one section comprising a fixed base section, a second section telescoping in the base section, a plurality of other sections telescoping in the second section and in each other, means comprising two cables looped around two pairs of sheaves at the lower end of the second section for controlling telescoping movement of the second section in said base section, one pair of sheaves being at right angles to the other pair, said cables having one end fixed to the lower end of the base section, a single winding means for both cables, the other end of the cables being fixed to said winding means, and other inverted looped cables having ends fixed to adjacent sections, whereby movement of one section in the base section, by said winding means, will correspondingly move said plurality of sections in the second section and with respect to each other.

References Cited in the file of this patent

UNITED STATES PATENTS

Number	Name	Date
91,103	Dungan	June 8, 1869
160,290	Trenchard	Mar. 2, 1875
1,418,775	Brown	June 6, 1922
1,932,768	Coffing	Oct. 31, 1933
2,508,835	Moon et al.	May 23, 1950

FOREIGN PATENTS

Number	Country	Date
272,491	Germany	Apr. 2, 1914