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ELEVATING MECHANISMS

Filed Dec. 11, 1961

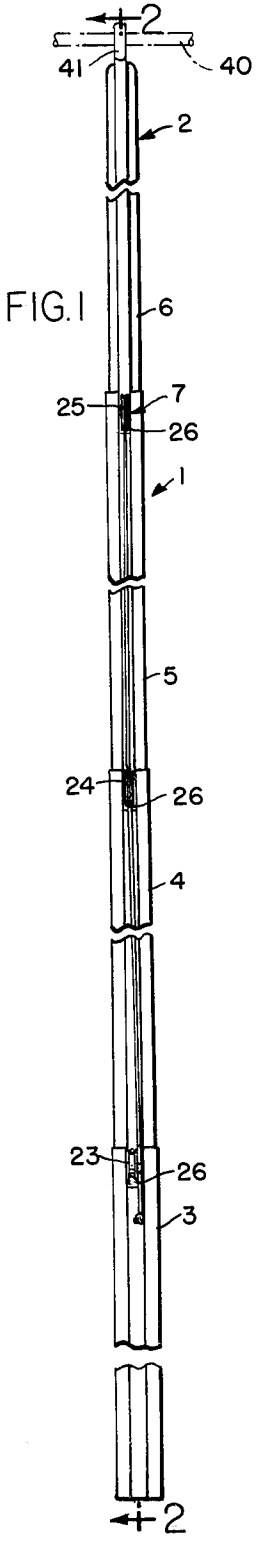

FIG. 1

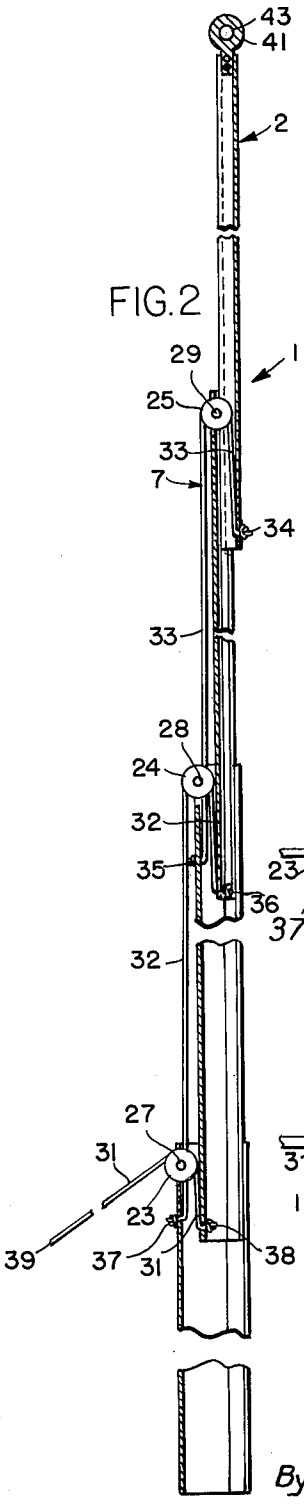

FIG. 2

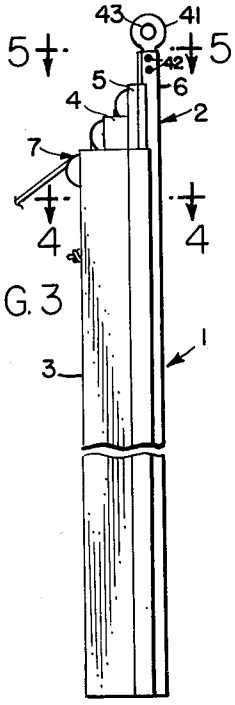

FIG. 3

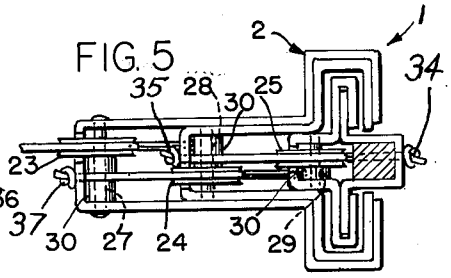

FIG. 5

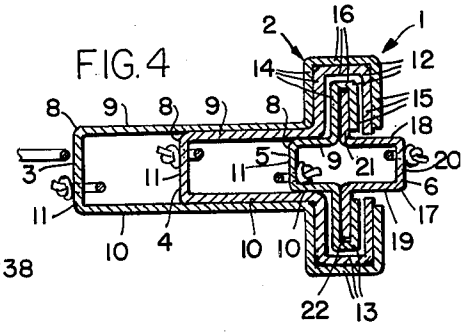

FIG. 4

INVENTORS:

DAVID H. MELBYE

ROBERT K. TURNEY

By Morgall, Johnston, Cook & Root

ATT'YS

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ELEVATING MECHANISMS

David H. Melbye, 4513 W. 101st St., Oak Lawn, Ill., and Robert K. Turney, Rockford, Ill.; said Turney assignor to said Melbye

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This invention relates to elevating mechanisms, and more particularly to elevating mechanisms which are particularly well adapted for raising articles such as, ridge poles, and the like, in operations, such as, for example, in the erection of a tent, or the like.

It is a primary object of the present invention to afford a novel elevating mechanism.

Another object is to provide a novel elevating mechanism which is particularly well adapted for raising and lowering tents, and the like.

Another object of the present invention is to afford a novel elevating mechanism, which is pole-like or post-like in construction.

Yet another object is to afford a novel elevating mechanism of the aforementioned type, wherein the parts thereof are so constituted and arranged that they are movable relative to each other in a novel and expeditious manner.

A further object is to afford a novel elevating mechanism, which is pole-like or post-like in form, and which embodies a plurality of sections which are constituted and arranged in a novel and expeditious manner.

Another object is to afford a novel elevating mechanism of the aforementioned type wherein the sections thereof are telescopically disposed relative to each other.

Another object of the present invention is to afford a novel telescoping elevating mechanism embodying a plurality of elongated sections, which are longitudinally movable relative to each other, and wherein the parts thereof are so constituted and arranged relative to each other that such movement may be relatively easily accomplished.

An object ancillary to the foregoing is to afford a novel telescoping elevating mechanism of the aforementioned type, wherein the elongated sections thereof are firmly supported in all positions of adjustment.

Another object of the present invention is to afford a novel elevating mechanism of the aforementioned type which may be elongated and shortened in a novel and expeditious manner by pulling on and releasing a single tension member such as, for example a flexible cable or rope.

Yet another object is to enable such a novel elevating mechanism to embody three or more of the aforementioned relatively movable sections.

A further object of the present invention is to afford a novel elevating mechanism of the aforementioned type which is practical and efficient in operation and may be readily and economically produced commercially.

Other and further objects of the present invention will be apparent from the following description and claims and are illustrated in the accompanying drawings which, by way of illustration, show a preferred embodiment of the present invention and the principles thereof and what we now consider to be the best mode in which we have contemplated applying these principles. Other embodiments of the invention embodying the same or equivalent principles may be used and structural changes may be made as desired by those skilled in the art without departing from the present invention and the purview of the appended claims.

In the drawings:

FIG. 1 is a front elevational view of an elevating mechanism embodying the principles of the present invention,

and showing the mechanism in an extended or raised position;

FIG. 2 is a longitudinal sectional view taken substantially along the line 2—2 in FIG. 1;

FIG. 3 is a side elevational view of the elevating mechanism shown in FIG. 1 but showing the parts thereof in collapsed or lowered position;

FIG. 4 is an enlarged detail sectional view taken substantially along the line 4—4 in FIG. 3; and

FIG. 5 is an enlarged detail sectional view taken substantially along the line 5—5 in FIG. 3.

An elevating mechanism 1, embodying the principles of the present invention, is shown in the drawings to illustrate the preferred embodiment of the present invention.

The elevating mechanism 1 comprises, in general, a telescoping, elongated post or pole 2, embodying a plurality of sections in the form of elongated, substantially straight members 3, 4, 5, and 6, disposed in nested relation to each other, and an actuating mechanism 7 for raising and lowering the inner sections 4–6 relative to the outermost section 3, and relative to each other.

Each of the members 3–5 includes a longitudinally extending, substantially channel-shaped, elongated central portion 8 having two oppositely disposed substantially parallel side walls 9 and 10 connected to and extending from respective side edge portions of an intermediate wall 11, FIG. 4. Each of the members 3–5 also has two flanges 12 and 13 projecting outwardly from the side edge portions of the side walls 9 and 10, respectively, opposite to the side edges which are attached to the intermediate wall 11 of the respective members 3–5. The flanges 12 and 13, like the longitudinal central portions 8, extend the full length of the respective members 3–5, and each is substantially channel-shaped in transverse cross-section, including two substantially parallel side walls 14 and 15 projecting from respective opposite edge portions of an intermediate wall 16, FIG. 4.

The members 3–5 are telescopingly disposed relative to each other, with the member 4 mounted in the member 3, and member 5 mounted in the member 4. The members 3 and 4 are of such size and configuration that when the member 4 is operatively mounted in the member 3, the channel-shaped portion 8 and the flanges 12 and 13 of the member 4 are slidably mounted in the channel-shaped portion 8 and the flanges 12 and 13, respectively, of the member 3, with the side walls 9 and 10 of the member 4 disposed between the members 9 and 10 of the member 3 with a relatively snug, but freely slidable fit, and with the intermediate wall 11 of the member 4 disposed in inwardly spaced relation to the wall 11 of the member 3, FIG. 4. Also, when the member 4 is so operatively mounted in the member 3, the flanges 12 and 13 of the member 4 are disposed in the flanges 12 and 13, respectively, of the member 3, with the walls 14, 15, and 16 of each of the flanges 12 and 13 of the member 4 disposed in relatively snugly engaging, but freely slidable relation to the respective walls 14–16 of the flanges 12 and 13, respectively, of the member 3, FIG. 4.

The member 5, when it is disposed in operative position in the member 4, is mounted therein in the same relation thereto as the member 4 is mounted in the member 3, the flanges 12 and 13 of the member 5 being disposed in the flanges 12 and 13, respectively, of the member 4 with a relatively snug but freely slidable fit, and the channel-shaped portion 8 of the member 5 also being disposed in the channel-shaped portion 8 of the member 4, with a relatively snug but a freely slidable fit between the respective side walls 9 and 10, and with the wall 11 of the member 5 disposed in inwardly spaced relation of the member 4, FIG. 4.

As may be seen in FIG. 4, when the members 3–5 are

disposed in operative relation to each other, the open sides of the channel-shaped portions 8 thereof, which are disposed on the opposite sides thereof from the respective walls 11, all face in the same direction, namely, to the right as viewed in FIG. 4.

The member 6 of the elongated post 2 also embodies an elongated, channel-shaped central portion 17 extending the length thereof. The channel-shaped central portion 17 of the member 16 includes two substantially parallel side walls 18 and 19 projecting from respective opposite edge portions of an intermediate wall 20. Two flanges 21 and 22 project outwardly from the edge portions of the side walls 18 and 19, respectively, opposite to the edge portions of the respective side walls 18 and 19 secured to the intermediate walls 20. The channel-shaped portion 17 of the member 6 is of substantially the same transverse size and configuration as the channel-shaped portion 8 of the member 5, FIG. 4, and the flanges 21 and 22 of the member 6, unlike the flanges 12 and 13 of the members 3–5 are not channel-shaped in transverse cross-section but are substantially uniplanar.

When the member 6 is disposed in operative position in the elevating mechanism 1, the flanges 21 and 22 thereof are disposed in the flanges 12 and 13, respectively, of the member 5, and the channel-shaped portion 17 of the member 6 projects outwardly away from the channel-shaped portions 8 of the members 3–5 in such position that the open side of the channel-shaped portion 17, which is opposite to the intermediate wall 20 thereof, faces in the opposite direction to that in which the open side of the channel-shaped members 8 face, FIG. 4. The flanges 21 and 22 are of such size and configuration, and are so disposed on the member 6, that when the member 6 is disposed in operative position in the erecting mechanism 1, the flanges 21 and 22 are disposed in the flanges 12 and 13 and engage the walls 14–16 thereof with a relatively snug, but freely slidable fit.

With this construction, it will be seen that the members 4–6 may be reciprocated longitudinally relatively to each other, and relative to the member 3, throughout substantially their entire length, while still maintaining the members 3, 4, and 5 in good, positive supporting relationship to the members 4, 5, and 6, respectively.

The actuating mechanism 7 of the elevating mechanism 1 includes three sheaves or pulleys 23, 24, and 25 rotatably mounted on the upper end portions of the members 3–5, respectively, as will be discussed in greater detail presently.

The upper end portion of the intermediate wall 11 of each of the channel-shaped members 8 of the members 3–5 is cut away to afford a notch 26 in the upper edge portion of the channel-shaped member 8 of each of the members 3–5, FIGS. 1 and 2. The sheaves 23–25 are rotatably mounted on suitable pins 27, 28, and 29, which are mounted in and secured to the side walls 9 and 10 of the channel-shaped portions 8 of the members 3–5, respectively, FIGS. 2 and 5. The pins 27 and 29 are so disposed in the members 3–5, respectively, that the sheaves 23–25 project outwardly through the notches 26 in the members 3–5, respectively, FIG. 2.

Spacing members in the form of sleeves 30 are mounted on each of the pins 27–29, FIG. 5. The sleeve 30 on pin 27 is disposed between the sheave 23 and the side wall 10 of the member 3 to thereby position the sheave 23 to the left of the longitudinal center line of the pole 2, as viewed in FIG. 1. The sleeve 30 on the pin 28 is disposed between the sheave 24 and the side wall 9 of the member 4 to thereby position the sheave 24 to the right of the longitudinal center line of the pole 2, as viewed in FIG. 1. The sleeve 30 on the pin 29 is disposed between the sheave 25 and the side wall 10 of the member 5 to thereby dispose the sheave 25 to the left of the longitudinal center line of the pole 2, as viewed in FIG. 1. The notches 26 are of such size and configuration as to permit this offset positioning of the sheaves 23–25.

The actuating mechanism 7 also includes three elongated tension members, preferably in the form of relative flexible cables 31, 32, and 33, trained over the sheaves 23–25, respectively. One end of the cable 33 extends through the lower end portion of the intermediate wall 20 of the member 6 and is secured against inward withdrawal therethrough by suitable means such as a knot 34, FIGS. 2 and 4. The other end of the cable 33 extends through the upper end portion of the intermediate wall 11 of the member 4, and is secured against inward withdrawal therethrough by suitable means such as a knot 35, FIGS. 2 and 4. From the sheave 25 to the knot 35 the cable 33 extends downwardly past the sheave 24 to the left thereof, as viewed in FIG. 1.

One end portion of the cable 32 extends downwardly and inwardly from the sheave 24 and extends through the lower end portion of the intermediate wall 11 of the member 5, and is secured against inward withdrawal therethrough by suitable securing means such as a knot 36, FIGS. 2 and 4. The other end portion of the cable 32 projects downwardly from the sheave 24 and extends through the upper end portion of the wall 11 of the member 3, and is secured against inward withdrawal therethrough by suitable securing means such as a knot 37, FIGS. 2 and 4. This latter end portion of the cable 32 projects downwardly from the sheave 24 to the right of the sheave 23, as viewed in FIG. 1, FIGS. 1 and 4.

The cables 32 and 33 are preferably of such length, and are preferably so disposed on the sheaves 24 and 25, respectively, that they are taut in all operative positions of the members 4, 5, and 6.

One end portion of the cable 31 extends downwardly and inwardly from the sheave 23 and extends through the lower end portion of the wall 11 of the member 4, and is secured against inward withdrawal therethrough by suitable securing means such as a knot 38, FIGS. 2 and 4. The other end portion of the cable 31 projects outwardly from the sheave 23 and the member 3 to afford a portion 39 by which movement of the cable 31 may be controlled to thereby control movement of the members 4–6 relative to the member 3 and relative to each other, as will be discussed in greater detail presently.

The members 3–6 are preferably of such length relative to each other that when the pole 2 is disposed in fully lowered or fully collapsed position, as shown in FIG. 3, wherein the lower ends of the sections 3–6 are preferably disposed in uniplanar relation to each other, the upper end portions of the members 4–6 project above the upper end portions of the members 3–5, respectively, as shown in FIG. 3.

In the operation of the elevating mechanism 1, when the members 4–6 are disposed in fully lowered position as shown in FIG. 3, they may be quickly and easily moved upwardly relative to the member 3 by movement of the cable 31 from right to left, as viewed in FIG. 2, over the sheave 23. Such movement of the cable 31 may be effected in any desired manner such as, for example, manually or by a suitable drive mechanism such as a winch, not shown. Such movement of the cable 31 is effective to move the end portion thereof on which the knot 38 is disposed upwardly toward the sheave 23. This movement of the cable 31 is effective to move the member 4 upwardly in the member 3. It will be remembered that the cable 32 is preferably taut on the sheave 24. Therefore, the upward movement of the member 4 relative to the member 3 is effective to cause the end portion of the cable 32 on which the knot 36 is disposed to move upwardly toward the sheave 24. This movement of the cable 32 is effective to move the member 5 upwardly in the member 4. The movement of the member 5 upwardly in the member 4 is effective to cause the end portion of the cable 32 on which the knot 34 is disposed to move upwardly toward the sheave 25 and thereby move

the member **6** upwardly in the member **5**. In this manner, the pole **2** may be extended from its collapsed or fully lowered position shown in FIG. 3 to an extended or raised position as shown in FIGS. 1 and 2. When it is desired to again lower the raised sections **4–6** of the pole **2**, this may be readily accomplished by releasing the tension on the cable **31** and permitting the sections **4–6** to move downwardly by gravity from the raised positions shown in FIGS. 1 and 2 to the lowered position shown in FIG. 3.

The elevating mechanism **1** shown in the drawings is of a form particularly well adapted for raising and lowering a rod-like member **40** such as, for example, the ridge pole of a tent, or the like, and embodies a supporting bracket **41** secured to the upper end portion of the member **6** by suitable means such as rivets **42**, and having an opening **43** extending therethrough, through which opening **43**, the ridge pole **40**, or the like, may be extended. With this construction, and with the ridge pole **40** of a tent, or the like, disposed in the opening **43** of the bracket **41**, it will be seen that such a ridge pole may be quickly and easily raised and lowered with our novel elevating mechanism **1** by merely pulling on and releasing, respectively, the end portion **39** of the cable **31**.

From the foregoing, it will be seen that we have afforded a novel and practical elevating mechanism which is particularly well adapted for use in the raising and lowering of tents, and the like.

Also, it will be seen that we have afforded a novel elevating mechanism, which is post-like or pole-like in form, and which may be readily and economically produced commercially.

Thus, while we have illustrated and described the preferred embodiment of our invention, it is to be understood that this is capable of variation and modification, and we therefore do not wish to be limited to the precise details set forth, but desire to avail ourselves of such changes and alterations as fall within the purview of the following claims.

We claim:

1. In an elevating mechanism, an upstanding, elongated member having a channel-shaped, longitudinally extending central portion and two longitudinally extending flanges, said channel-shaped portion having an intermediate portion and two longitudinally extending side wall portions, said flanges projecting outwardly from the edge portions of respective ones of said side wall portions remote from said intermediate portion in generally opposite directions and having free edge portions terminating in spaced relation to each other, said flanges being channel-shaped and opening generally inwardly toward the central portion of said member, another upstanding, elongated member having a channel-shaped, longitudinally extending central portion and two longitudinally extending flanges, said last-mentioned channel-shaped portion having an intermediate portion and two longitudinally extending side wall portions, said last-mentioned flanges projecting outwardly from the edge portions of respective ones of said last-mentioned side wall portions remote from said last-mentioned intermediate portion in generally opposite directions and being slidably mounted in a respective one of said first-mentioned flanges in position to support said last-mentioned intermediate portion in spaced relation to said first-mentioned intermediate portion, said last-mentioned flanges being longitudinally reciprocable relative to said first-mentioned flanges, a sheave rotatably mounted on the upper end portion of said first-mentioned central portion, and a cable for longitudinally reciprocating said other member relative to said first-mentioned member, said cable being trained over said sheave and having one end portion operatively connected to said other member, and another end portion disposed outwardly of said first-mentioned member in position to be longitudinally reciprocated through a path of movement effective to longitudinally reciprocate said cable over said sheave.

2. The combination in an elevating mechanism as defined in claim **1**, and in which said sheave is journaled between said first-mentioned side wall portions.

3. The combination in an elevating mechanism as defined in claim **1**, and in which said second-mentioned intermediate portion is disposed on the side of said second-mentioned flanges remote from said first-mentioned intermediate portion.

4. An elevating mechanism comprising a plurality of upright, elongated members having at least portions thereof nested one within the other, each of said members having a longitudinally extending, channel-shaped central portion having two free edge portions, and two flanges, each of said flanges projecting outwardly from a respective one of said free edge portions, each of said central portions having a longitudinally extending open side, all of said open sides except said open side of the innermost one of said members facing in the same direction, said open side of said innermost member facing in the opposite direction to the other of said sides, the flanges on each of said elongated member except said innermost member being channel-shaped, the flanges on each of the inner ones of said members being slidably mounted in the flanges on the next outwardly disposed one of said elongated members, a plurality of sheaves, said sheaves being rotatably mounted on the upper end portions of respective ones of said channel-shaped portions which have open sides facing in the same direction, and means for longitudinally reciprocating said inner members relative to the outermost one of said elongated members and relative to each other, said means comprising a plurality of elongated cables, each of said cables being trained over a respective one of said sheaves, each of said cables, except the cable trained over the sheave on the outermost member, having opposite end portions operatively connected to the two said members disposed immediately inwardly and outwardly, respectively, of said member on which is mounted the sheave over which said respective cable is trained, said cable which is trained over said sheave on said outermost member having one end portion operatively secured to the immediately inwardly disposed one of said members, and another end portion projecting outwardly from said outermost member into position to be longitudinally reciprocated outwardly of said members.

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RICHARD W. COOKE, JR., *Primary Examiner.*

JOEL REZNEK, JACOB SHAPIRO, *Examiners.*