Sept. 29, 1964 E. E. FREY 3,150,671

TILTABLE UMBRELLA

Filed Jan. 14, 1963 3 Sheets-Sheet 1

Fig. 1

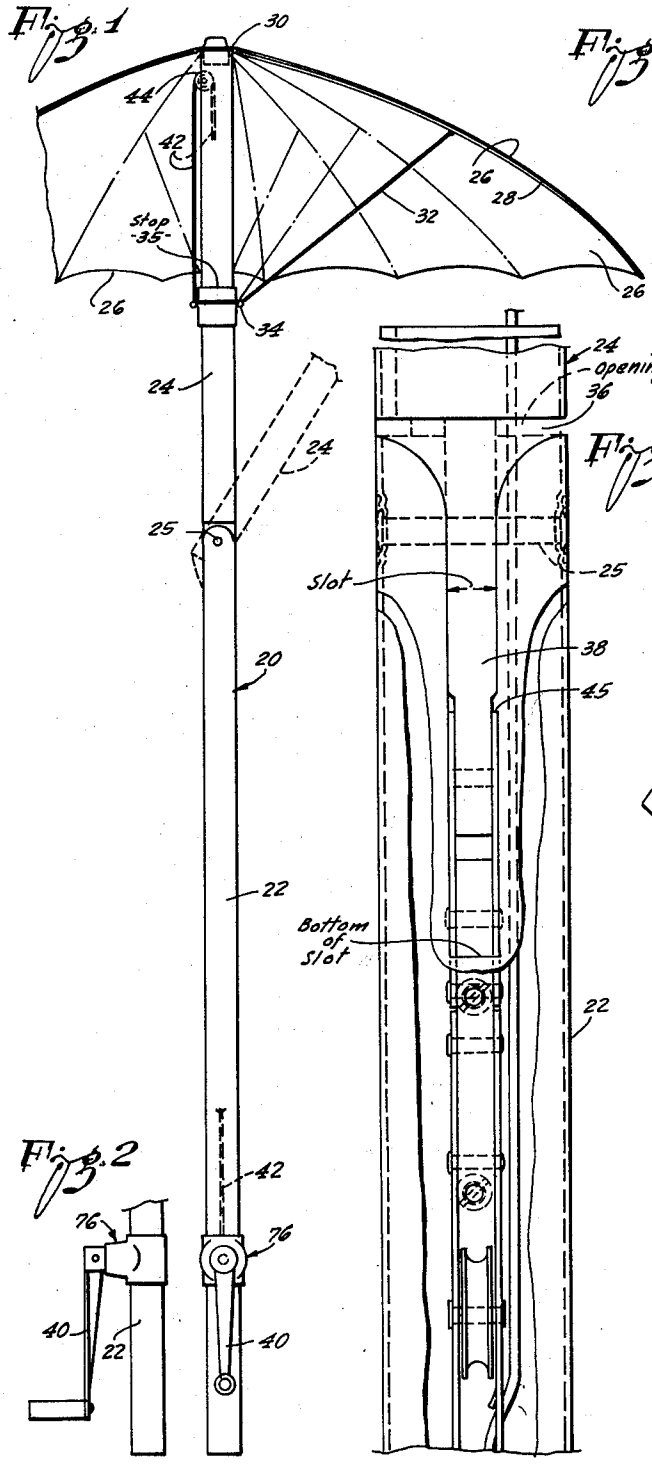

Fig. 10

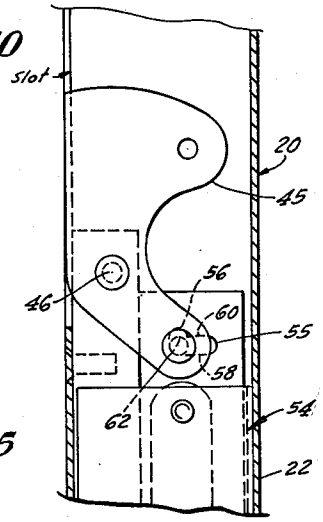

Fig. 5

Fig. 11

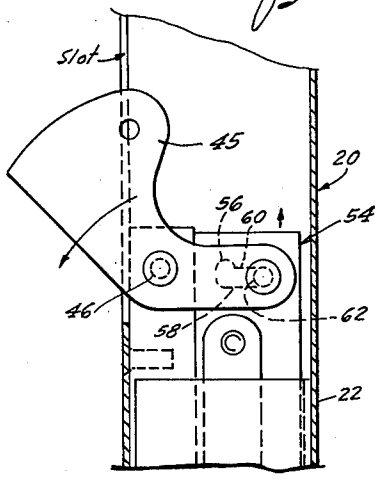

Fig. 2

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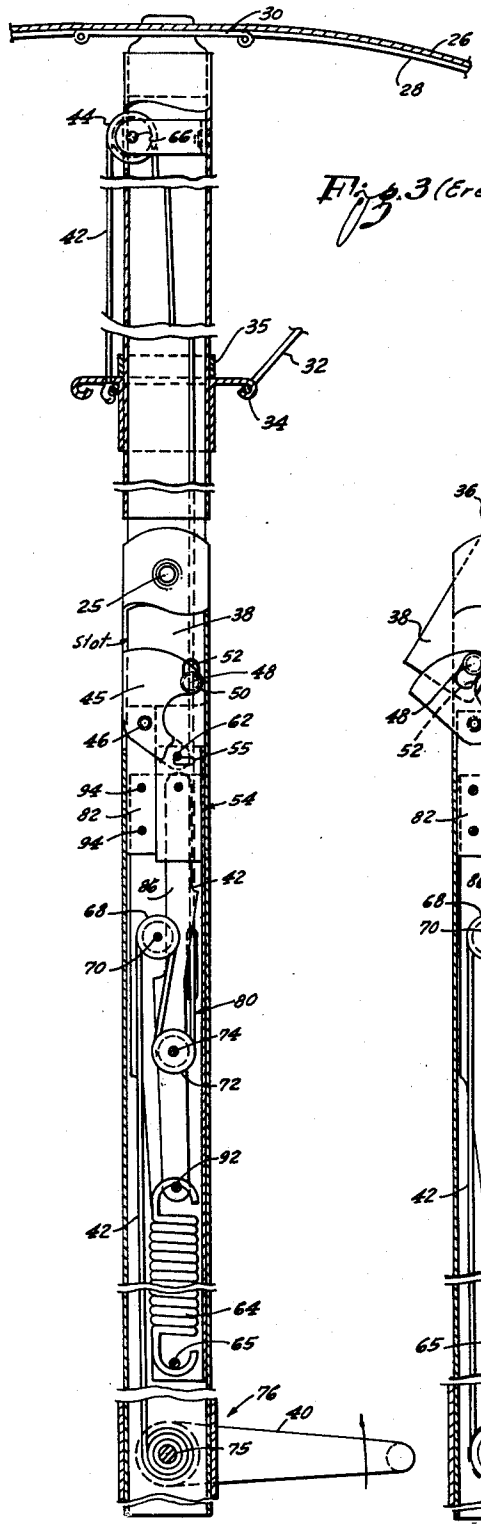

Fig. 3 (Erect)

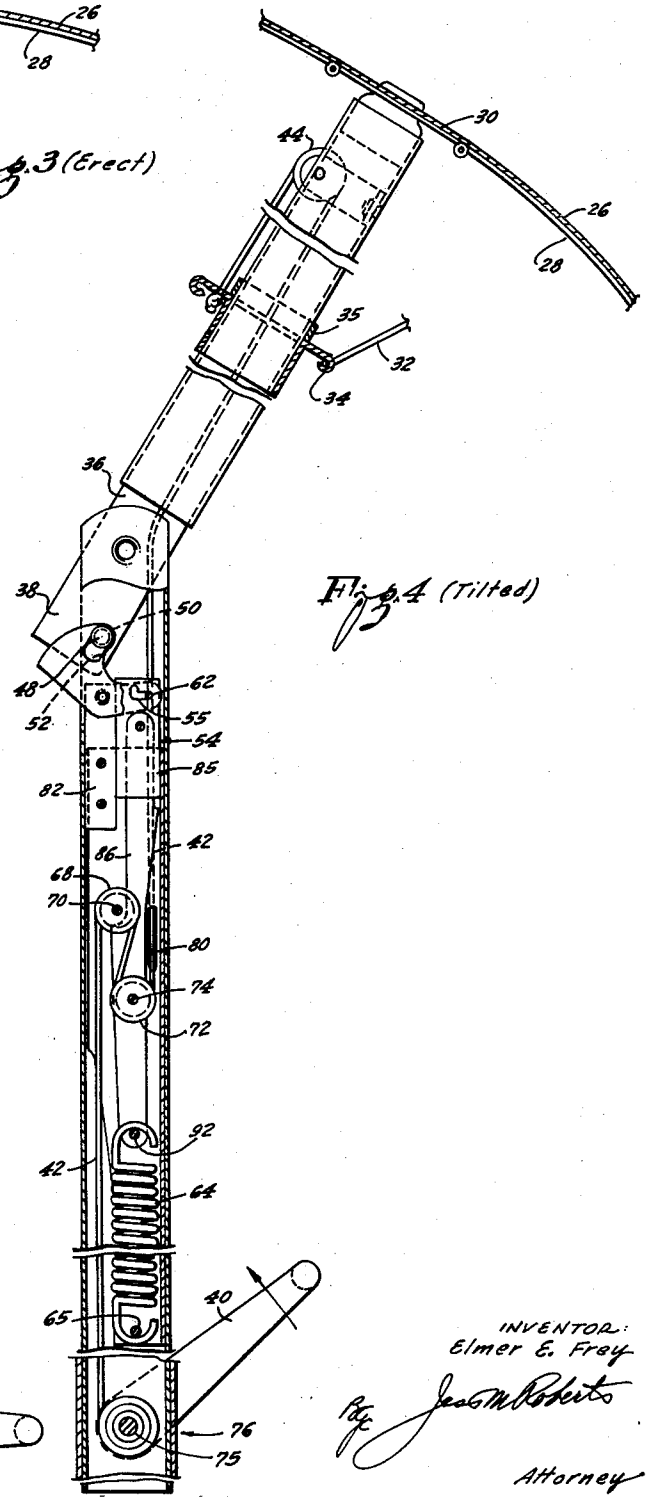

Fig. 4 (Tilted)

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Fig. 6

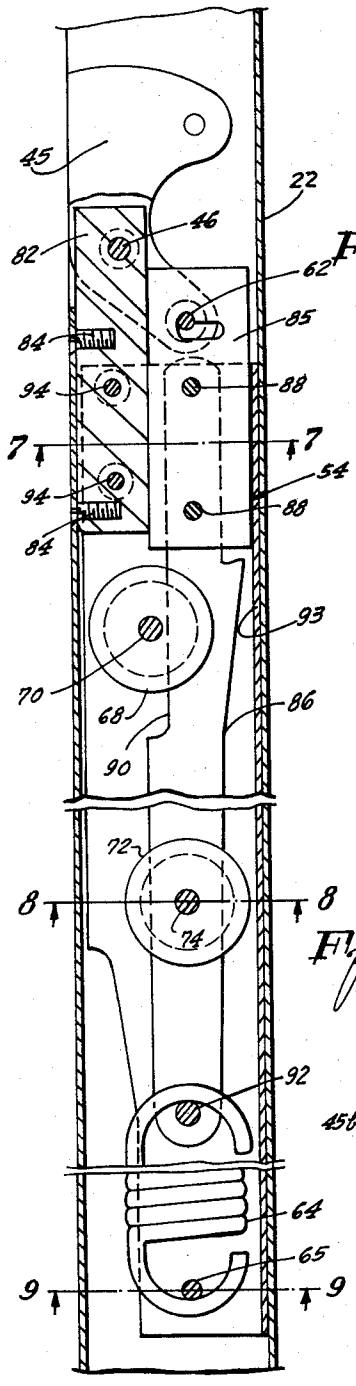


Fig. 7

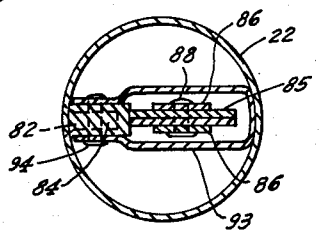


Fig. 8

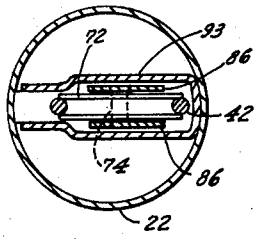


Fig. 9

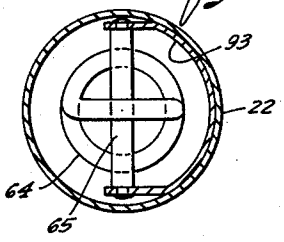


Fig. 12

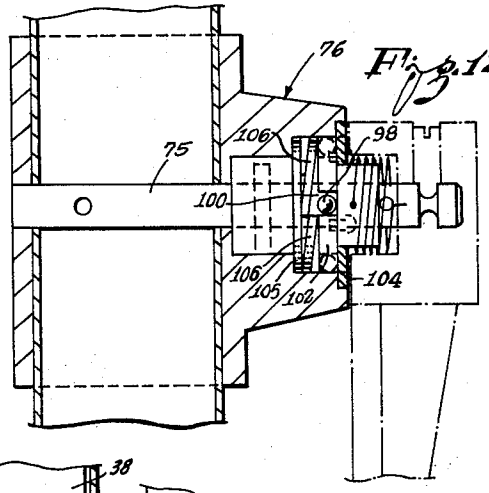


Fig. 14

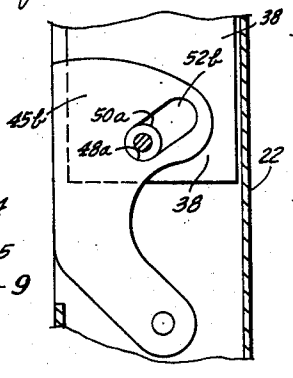
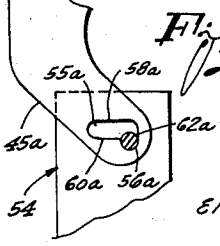


Fig. 13



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3,150,671

TILTABLE UMBRELLA

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Filed Jan. 14, 1963, Ser. No. 251,234
12 Claims. (Cl. 135—20)

This invention relates to a tiltable garden umbrella of the general type disclosed in the Militano Patent 2,271,569 and is directed to the need for certain improvements in such a device.

In a tiltable umbrella of this type the tubular pole is made in two sections comprising a first tubular pole member to serve as a base member and a second upper tubular pole which carries the collapsible canopy and which is tiltable relative to the first pole member to provide shade when the sun is at a relatively low angle. In the operation of the umbrella a crank-operated winch on the base pole member controls a cable which extends to a pulley on the upper pole member and extends back from the pulley to the runner that controls the opening and closing action of the canopy. When the winch is operated to raise or open the umbrella the cable pulls the runner upward to a limit position and then further winding action on the cable by the winch causes the pulley to shift bodily towards the winch in opposition to spring pressure and the tilting of the second or upper pole member is actuated by this bodily shift of the pulley.

One disadvantage of this arrangement is that the tiltable upper pole member is held in its normal upright position solely by the force of the spring that acts on the pulley. Thus the upper pole member will tilt in response to any force sufficient to overcome the spring and if the spring fails the upper pole member slumps to an angle.

A further disadvantage is that an extensive longitudinal slot must be provided in the tubular wall of the pole piece to accommodate the bodily movement of the pulley. Such a slot unduly exposes the interior mechanism to the admittance of foreign particles and moisture.

It is to be further noted that in the described prior art construction the actuation of the tilting mechanism requires substantial length of pulley travel and spring movement. The working parts must be designed for this range of pulley travel and spring movement and, of course, the greater the pulley travel the longer the slot necessary to accommodate the pulley movement.

The present invention incorporates a number of features to avoid these disadvantages of the prior art.

In the first place an automatic latch is provided to releasably lock the upper pole member in its normal erect position in a rigid and positive manner. An important feature of the invention is that the latch is provided merely by recessing a slot in an operating connection in the pole-tilting mechanism and the slot is so located that the necessary bias for the latch is supplied by the same spring that opposes the bodily movement of a cable-guiding pulley. Thus the invention provides a dual function for the operative connection and a dual function for the spring to accomplish an automatic locking operation without the addition of any structure whatsoever.

In the second place, the invention transfers the function of actuating bodily movement from the upper exposed pulley to a lower internal pulley. Thus the invention avoids the necessity of cutting an extensive longitudinal slot in the tubular wall of the pole to accommodate pulley travel. The wall opening for the upper pulley may be a simple window conforming to the dimension of the pulley to provide relatively little clearance for the admission of foreign particles and moisture.

In the third place, a new mechanism is provided for

tilting the upper pole member, which mechanism requires only a short actuating stroke for the full range of tilt. The bodily travel of the internal actuating pulley and the travel of the opposing spring are correspondingly shortened. As a result the internal mechanism may be compactly arranged longitudinally of the pole member and the spring that is employed may advantageously be a relatively short spring of substantial strength.

A further important feature of the invention is a construction that simplifies fabrication and especially assembly of the mechanism. In this regard the invention is characterized by the concept of providing a self-contained spring-loaded mechanical unit that may be completely fabricated separate and apart from the umbrella proper and may then be inserted into the base pole. Prefabrication of the mechanical unit is a simple task because its parts are readily accessible. Installation of the unit is also simple because permanent anchorage of the unit in its predetermined correct location is accomplished by screws in predetermined screw holes.

The features and advantages of this invention may be understood from the following detailed description and the accompanying drawings.

In the drawings, which are to be regarded as merely illustrative:

FIG. 1 is a fragmentary elevational view of a tiltable umbrella incorporating the invention;

FIG. 2 is a fragmentary elevation of the lower end of the umbrella as seen from a different direction showing the manner in which the manually operable crank is mounted on the lower pole member;

FIG. 3 is a longitudinal sectional view showing the working parts positioned with the upper pole member in its normal erect position;

FIG. 4 is a similar view showing the upper pole member in its tilted position;

FIG. 5 is a fragmentary elevational view showing the structure of the joint between the two pole members;

FIG. 6 is a longitudinal sectional view on an enlarged scale showing the structure of the self-contained spring-loaded mechanism unit installed in the lower pole member;

FIG.7 is a transverse section along the line 7—7 of FIG. 6 showing the configuration of the upper portion of the inner guide housing and the slide that is mounted therein;

FIG. 8 is a similar section along the line 8—8 of FIG. 6 showing the lower pulley that is carried by the slide;

FIG. 9 is a section along the line 9—9 of FIG. 6 showing how the spring is anchored to the lower end of the guide housing;

FIG. 10 is a fragmentary view partly in section and partly in side elevation showing the latch for the upper pole member in released position;

FIG. 11 is a similar view of the same parts of the mechanism with the upper pole member tilted;

FIG. 12 is a fragmentary view partly in section and partly in elevation showing the means for automatically locking the crank-driven winch against reverse rotation by the tension cable;

FIG. 13 is a fragmentary sectional view showing an alternate form of latch for locking the upper pole member in its normal erect position; and

FIG. 14 is a fragmentary view partly in elevation and partly in section showing a modified operating connection between the tilt-control mechanism and the upper pole member.

As shown in FIG. 1, the umbrella incorporating the selected practice of the invention has a tubular pole 20 which is made in two sections, namely, a first lower tubular pole member 22 and a second upper tubular pole member 24 that is connected to the lower pole

member by a pivot 25 to swing to a tilted position as indicated by broken lines. The second or upper pole member 24 carries the usual fabric canopy 26 which is mounted on the collapsible ribs 28 that are pivotally connected to an upper fixed collar or crown 30. The usual stretchers 32 are pivotally connected to the ribs 28 with the inner ends of the stretchers pivotally connected to a runner 34 in the form of a collar that is slidably mounted on the upper pole member 24. The runner 34 is movable from a relatively low position with the umbrella closed to an upper position against a stop collar 35 as shown in FIG. 1 to open the umbrella.

As shown in FIG. 5 the lower end of the upper pole member 24 is formed by a casting 36 which telescopes into the tubular wall of the upper pole member and which has a flattened end portion 38 that extends into the interior of the lower pole member 22. The previously mentioned pivot 25 about which the upper pole member 24 tilts extends through the flattened end portion 38 and is fixed at its opposite ends to the lower tubular pole member 22.

The lower end of the lower pole member 22 is provided with a manually operable crank 40 which may be rotated clockwise to reel in a cable 42 which passes over an upper pulley 44 to pull the runner 34 upward against the stop collar 35 for the purpose of opening the umbrella. Continued clockwise rotation of the operating crank 40 after the runner 34 reaches its limit position against the stop collar 35 operates internal mechanism to cause the upper pole member 24 to tilt.

The principal working parts of the umbrella include: a lever 45 mounted on the lower tubular pole member 22 by a pivot 46, a pin 48 on the upper arm of the lever 45 carrying a roller 50 that slides in a slot 52 in the flattened end portion 38 of the upper pole member 24; a slide, generally designated 54, that is suitably mounted and guided inside the lower tubular pole member 22, the slide being formed with an L-shaped slot 55 having a locking recess 56, the slot further having a lower cam edge 58 and an upper cam edge 60; a pin 62 carried by the lower arm of the lever 45 and slidingly extending through the L-shaped slot 55; a heavy tension spring 64 attached at its upper end to the slide 54 and fixedly anchored at its lower end to a cross pin 65; the previously mentioned upper pulley 44 in an opening in the tubular wall of the upper pole member 24, the pulley being mounted on a thick axle pin 66; a second lower pulley 68 mounted on a fixed axle pin 70 in the lower pole member 22; a third pulley 72 at an intermediate level mounted by an axle pin 74 on the slide 54; a winch 75 inside the lower tubular pole 22 operated by the crank 40 to wind and unwind the cable 42; and a locking mechanism 76 effective to hold the winch against reverse rotation by the tension of the cable 42.

As best shown in FIG. 3, the cable 42 extends from the winch 75 over the pulley 68, passes under the pulley 72 on the slide 54 and then extends upward to pass over the upper pulley 44. Thus the cable 42 is formed with a loop, generally designated 80, which engages the pulley 72 on the slide 54. It is apparent that the spring 64 in continuously urging the slide 54 downward causes the pulley 72 to pull on the cable loop 80 whenever the cable is pulled taut by the winch 75.

Operation

When the umbrella is closed with the upper pole member 24 in its normal erect position in coaxial relation to the lower pole member 22, the spring 64 holds the slide 54 at its lower limit position with the pin 62 in the locking recess 56 to immobilize the lever 45. Thus the confinement of the pin 62 by the locking recess 56 of the L-shaped slot 55 mechanically locks the upper pole member 24 rigidly in its normal erect position.

To open the umbrella, the crank 40 is manually rotated clockwise to cause the winch 75 to reel in the cable 42 and thereby cause the cable to lift the runner 34 from its lower position to its upper limit position in abutment with the stop collar 35. If it is desired merely to open the umbrella the crank 40 is relinquished as soon as the cable is tightened by the abutment of the runner 34 against the stop collar 35 whereupon the locking mechanism 76 associated with the winch 75 prevents reverse or counterclockwise rotation of the winch.

If it is desired to tilt the upper pole member 24, the clockwise rotation of the crank 40 and the winch 75 is continued with consequent shortening of the cable loop 80 in opposition to the tension of the spring 64. The shortening of the loop 80 lifts the pulley 72 and thereby lifts the slide 54 against the opposition of the spring 64. The initial upward movement of the slide shifts the L-shaped slot 55 upward to free the pin 62 from the locking recess 56 thereby to unlock the upper pole member 24 in preparation for tilting movement. Continued clockwise rotation of the crank 40 with continued shortening of the loop 80 continues the upward movement of the slide 54 with the consequence that the lower cam edge 58 of the L-shaped slot 55 cams the pin 62 to the opposite end of the slot as indicated in FIGS. 4 and 11 to cause the upper pole member 24 to swing to its tilted position. The crank 40 is then relinquished and the locking mechanism 76 keeps the tension of the cable from causing reverse rotation of the winch 75.

To return the upper pole member 24 from its tilted position to its normal coaxial position, the crank 40 is rotated counter-clockwise to release the locking mechanism 76 to permit the winch 75 to unwind in response to the pull of the cable created by the spring 64. The resulting retraction of the slide 54 causes the upper cam edge 60 of the L-shaped slot 55 to cam the pin 62 back to the position shown in FIG. 10 with consequent swinging of the upper pole member back to its normal position. The continued retraction of the slide 54 then brings the locking recess 56 into engagement with the pin 62 to limit the movement of the slide and to lock the upper pole member 24 rigidly and positively in its normal erect position.

It is apparent that the total travel of the slide 54 between its two limit positions is relatively short because of the angle of the lower arm of the lever 45 relative to the longitudinal axis of the slide. It is also to be noted that the L-shaped slot 55 in combination with the pin 62 that is carried by the lever arm serves not only to determine the two limits of movement of the slide but also provide the automatic locking action for positively immobilizing the upper pole member at its normal erect position. Referring to the mode of operation of the invention: the actuating means for carrying out the cycle of operation includes handle 40, winch 75, cable 42, and pulleys 44, 68 and 72, the actuating means having a first stage of operation and a second stage of operation; means to erect the canopy 26 in response to the first stage of operation of the actuating means comprises the runner 34 which is movable from a lower position to an upper position against the stop collar 35; means to tilt the second or upper pole member in response to the second stage of operation of the actuating means includes the slide 54, the pin 62 on the slide, lever 45, roller 50 and slot 52; and means to rigidly lock the upper pole member in its straight position during the first stage of operation and to unlock in response to initiation of the second stage of operation comprises the locking recess 56 of the L-shaped slot 55, which recess normally engages the pin 62 to lock the lever 45 against rotation and thereby lock the upper pole member against tilting movement.

Structural Details

The lever 45 comprises two identical parallel plates which straddle both the upper end of the slide 54 and the lower flattened end portion 38 of the upper pole member 24. As shown in FIG. 6, the pivot 46 that carries the lever 45 is mounted in an elongated metal block 82

which in turn is attached to the inner surface of the lower tubular pole member **22** by a pair of spaced screws **84**.

In the construction shown in FIG. 6 the slide **54** comprises a short metal bar **85** in which the L-shaped slot **55** is formed and further comprises a pair of parallel straps **86** which are attached at their upper ends to the opposite sides of the metal bar by suitable rivets **88**. The pulley **72** is mounted between the two straps **86** in the manner shown in FIG. 8 and the edges of the two straps are cut away as indicated at **90** to clear the axle pin **70** of the pulley **68**. The lower ends of the two straps **86** carry a cross pin **92** which is engaged by the upper end of the spring **64**.

A guide housing, generally designated **93**, for guiding the longitudinal movement of the slide **54** is made of a single piece of sheet metal of generally U-shaped cross-sectional configuration with the upper end of the U-shaped guide housing straddling the elongated block **82** and attached thereto by spaced rivets **94** as shown in FIGS. 6 and 7. The lower end of the guide housing **93** is widened as shown in FIG. 9 and carries the cross pin **65** to which the lower end of the spring **64** is attached.

It is apparent that the structure shown in FIG. 6 is a self-contained spring-loaded assembly or mechanical unit comprising the following parts: the lever **45**; the metal block **82**; the metal block **85** and the two straps **86** that constitute the slide **54**; the pulley **72** carried by the slide; the guide housing **93** that confines the slide; and the spring **64** which is connected at its opposite ends to the slide and the guide housing respectively. This self-contained mechanical unit may be fabricated separately and then simply inserted into the interior of the lower pole member **22** and anchored in place by the two screws **84**.

The locking mechanism **76** that is associated with the crank **40** and the winch **75** may be of any suitable type. FIG. 12, for example, shows such a locking mechanism in which circumferentially spaced balls **98** are mounted in peripheral notches **100** in a ring or washer **102**. The balls are confined between a flat washer **104** on one side and a locking washer **105** on the other side which locking washer has a series of cam elements **106** corresponding to the balls **98**. When the winch tends to reverse under the pull of the cable **42** the balls **98** wedge against the cam elements **106** in the familiar manner of an overrunning clutch. When the crank is operated, however, the crank releases the balls from the wedging engagement with the cam elements for free rotation of the winch.

FIG. 13 illustrates a modification which comprises a reversal of parts in the operating connection of the lever **45** with the slide **54**. In this alternate construction, two identical L-shaped slots **55***a* are formed in the two plates of the lever **45** and a cooperating pin **62***a* is mounted in the slide **54**. Each of the slots **55***a* has a locking recess **56***a* and each of the slots further has two opposite cam surfaces **58***a* and **60***a* for cooperation with the pin **62***a*.

FIG. 14 shows a similar reversal in relationships that may be made at the operating connection between the lever **45** and the upper pole member **24**. In this alternate construction the upper arm of the lever **45***b* is slotted, there being a slot **52***b* in each of the two plates that form the lever **45***b*. The lower flattened end portion **38** of the upper pole member **24** carries a cross pin **48***a* on which are mounted two rollers **50***a* that cooperate with the two slots **52***b* respectively.

My description in specific detail of the presently preferred practice of the invention will suggest various changes, substitutions and other departures from my disclosure within the spirit and scope of the appended claims.

I claim:

1. In a device of the character described having a collapsible canopy; wherein a first tubular pole member and a second tubular pole member normally coaxial therewith are pivotally interconnected and one of said first or second tubular pole members carries a mechanism to erect the canopy, actuating means effective in sequence to operate said mechanism and then to tilt the second tubular pole member relative to the first tubular pole member, said actuating means comprising:

a pulley mounted on a fixed axis in an opening in the wall of said second tubular pole member;

a cable extending from the interior of said first tubular pole member to the interior of said second tubular pole member and over said pulley to the exterior of the second pole member to operate said mechanism;

manually operable means on said first tubular pole member to reel in said cable to operate said mechanism;

a slide mounted inside one of said two tubular pole members for advance relative thereto from a retracted position to an advance position;

said second tubular pole member being operatively connected to said slide for tilt from its normal position in response to advance of the slide to said advanced position;

yielding means normally holding said slide at its retracted position;

guide means for said cable forming the cable into a loop with the loop operatively connected to said slide for opposition to shortening of the loop by said yielding means;

whereby initial reeling in of the cable by said manually operable means actuates said mechanism and further reeling in shortens said loop to shift said slide to tilt said second tubular pole member in opposition to said yielding means; and

means to lock said second pole member in its normal coaxial position;

said locking means being releasable in response to rise in tension of said cable after said mechanism is operated.

2. A combination as set forth in claim 1 in which said locking means is releasable and is operatively connected to said slide to be released in response to initial advance of the slide from its normal retracted position.

3. The combination as set forth in claim 1 in which the operative connection between said slide means and said second tubular pole member includes:

a rocker member mounted on a fixed pivot in said first tubular pole member;

a slot in one of said rocker member and said slide means; and

a pin in the other of said rocker member and said slide means,

said pin slidingly engaging said slot,

said slot forming a locking recess to receive said pin to immobilize said rocker means thereby to releasably lock said second tubular pole member in its coaxial position,

said slot having an edge for cam action on the pin to tilt said second tubular pole member in response to advance of the slide means.

4. A combination as set forth in claim 3 in which said slot is in said rocker member and said pin is on said slide.

5. A combination as set forth in claim 1 which includes three pulleys in engagement with said cable, one of said pulleys being mounted on a fixed axis on said first tubular pole member, another of said pulleys being mounted on a fixed axis on said second tubular pole member, the third of said pulleys being mounted on said slide in engagement with said loop of the cable.

6. A combination as set forth in claim 1 in which said manually operable means includes:

a winch connected to said cable;

a manually operable crank to rotate said winch; and

means to lock said winch against unreeling rotation by tensioning of the cable,

said locking means being releasable in response to unreeling rotation of the crank.

7. In a device of the general character described having a first pole member and a second pole member pivotally connected thereto and normally coaxially therewith, said second pole member carrying a canopy and a mechanism to erect the canopy, and wherein a cable extends from said first pole member to said mechanism and manually operable means on said first pole member is adapted to wind in said cable to operate said mechanism to said limit, a spring-loaded unit adapted to be inserted into the interior of said first pole member to tilt said second pole member in response to continued reeling in of the cable after said mechanism reaches its limit, said unit comprising:

a guide housing dimensioned to fit into the interior of said first pole member longitudinally thereof and adapted for permanent attachment thereto;

a slide movably mounted in said guide housing for guidance thereby, said slide being movable from a retracted position to an advanced position;

yielding means interconnecting said slide and said guide housing to normally hold the slide at its retracted position;

means pivotally mounted on said guide housing and operatively connected to said slide for pivotal movement in response to advance and retraction of the slide;

said pivotally mounted means being adapted for operative connection to said second pole member to tilt the second pole member in response to advance of the slide; and

a pulley carried by said slide to engage a loop in said cable and to advance the slide in response to shortening of said loop by said manually operable means after said mechanism erects the canopy.

8. A unit as set forth in claim 7 in which the operative connection between the slide and the pivotally mounted means comprises a slot in one of said slide and said pivotally mounted means and a pin in the other of said slide and pivotally mounted means in sliding engagement with said slot.

9. A combination as set forth in claim 8 in which said slot is in said pivotally mounted means and said pin is carried by said slide.

10. A combination as set forth in claim 8 in which said slot has a locking recess to releasably confine said pin under the force exerted by said yielding means to immobilize said pivotally mounted means and thereby releasably lock said second pole member in its normal position when said slide is at its retracted position.

11. In an umbrella having a first tubular pole member and a second tiltable tubular pole member, said second pole member carrying a collapsible canopy and a runner movable over a given range for opening and closing the canopy, means to open said canopy and tilt said second pole member in sequence, comprising:

a pulley rotatably mounted at a fixed point on the second pole member beyond said range of movement of the runner;

a cable extending from said first pole member to said pulley and back from the pulley to the runner;

manually operable means on said first pole member to reel in said cable to move the runner over said range;

means inside one of said two pole members to form said cable into a loop;

yielding means in said one of the two pole members to urge extension of said loop and to yield for retraction of the loop in response to increased tension of the cable when the cable is reeled in while the runner is at the outer end of its range of movement; and

means to tilt said second pole member in response to the retraction of said loop.

12. A combination as set forth in claim 11 in which said loop forming means comprises two pulleys, one of the two pulleys being movable bodily by retraction of the loop, said titlting means being responsive to the bodily movement of said one pulley.

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