ROLLER TUBE

Filed April 22, 1964 2 Sheets-Sheet 1

FIG. 1

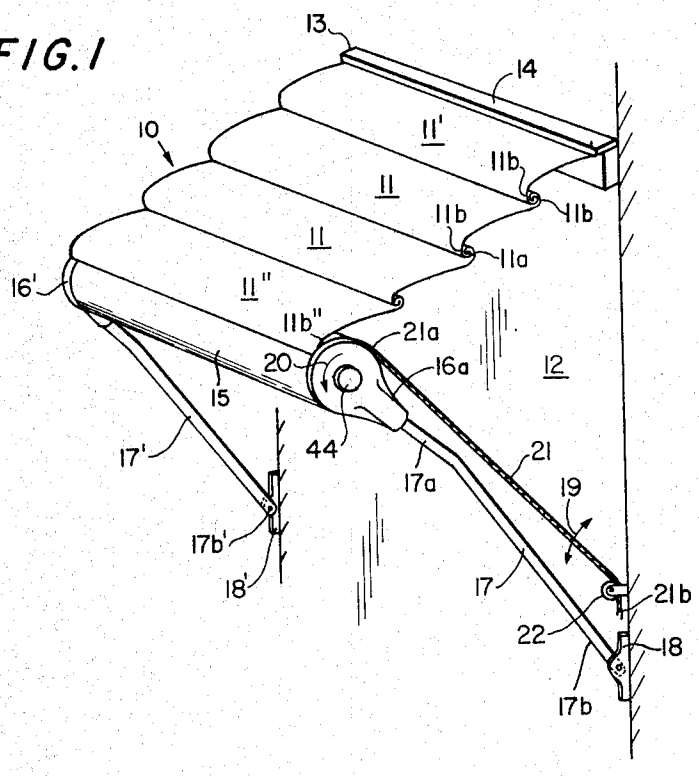
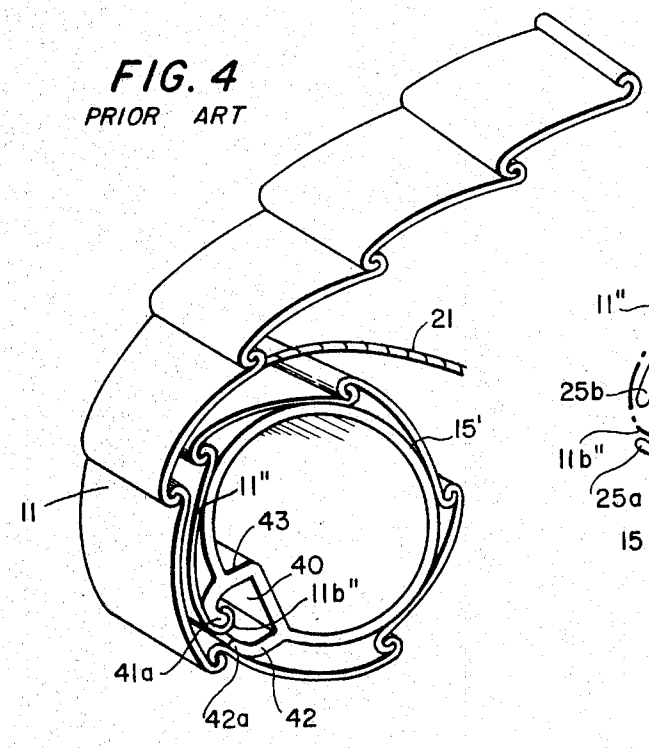


FIG. 4
PRIOR ART



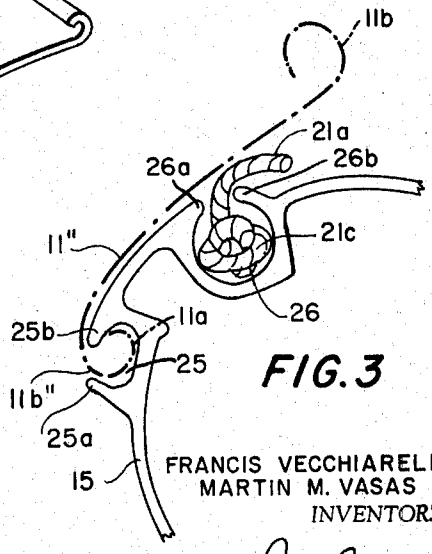


FIG. 3

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ROLLER TUBE

Filed April 22, 1964 2 Sheets-Sheet 2

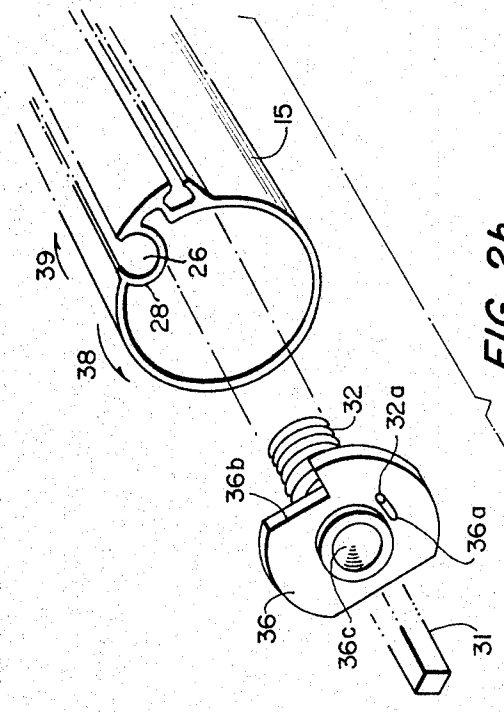


FIG. 2b

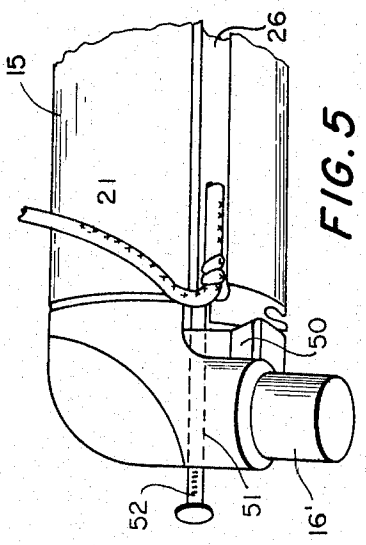


FIG. 5

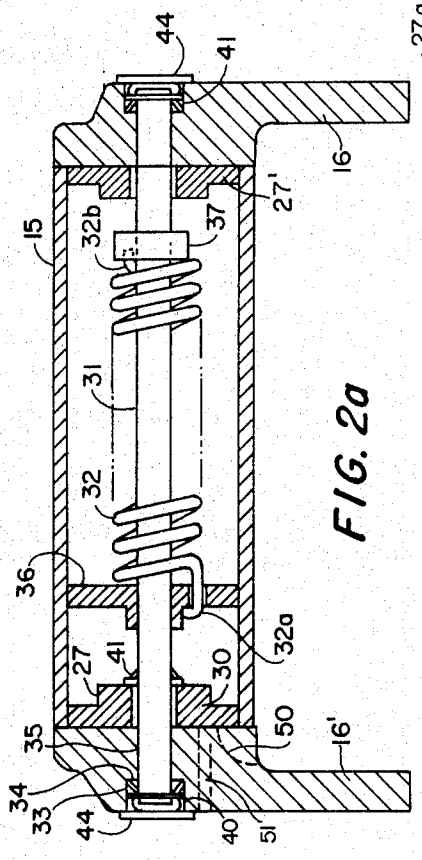
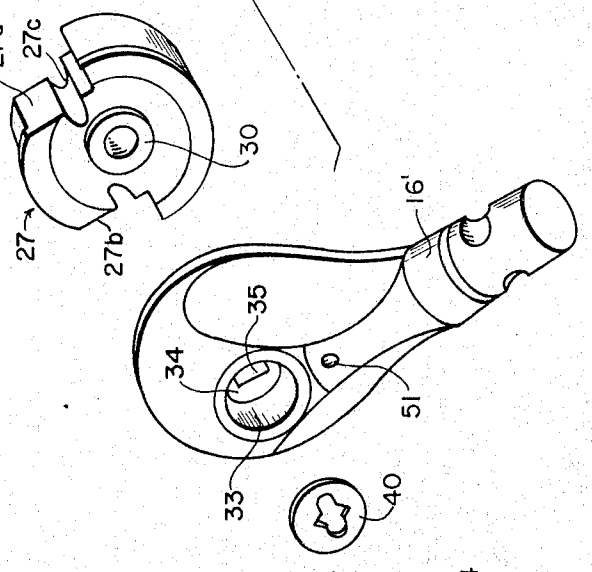


FIG. 2a



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3,263,735

ROLLER TUBE

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4 Claims. (Cl. 160—242)

This invention relates to awning assemblies and more particularly to a roller tube for use in awning assemblies which is simpler in design and permits the utilization of an awning assembly between the fully rolled-up and fully rolled-down positions while utilizing fewer awning panel members than prior art devices.

One type of present-day awning assembly finding extremely widespread use is that of the substantially all metallic assembly which is comprised of a plurality of metallic panel members, each being elongated panel members having a substantially curved cross-section for winding about a roll-up tube and each being further provided with beaded edges which are so formed as to interleave with beaded edges of adjacent awning panel members so as to permit rotational movement between adjacent panel members while, at the same time, suitably connecting panel members to one another to prevent the entrance of either sun or rain between panel members.

The awning assembly is secured to a vertical support such as a wall, for example, and has its lower end connected to a roller tube about which all of the panel members are wound with the awning assembly in its fully rolled-up position. The roller tube is designed to house a wind-up mechanism provided with bias means which is normally biased to urge the awning assembly towards the fully rolled-up position. The bias means is provided with means for transferring stored energy in the bias means to rotate the roller tube in the direction to cause the awning assembly to move to the fully rolled-up position. In order that the awning assembly may be operated to the rolled-down position, or to any position between the fully rolled-up and fully rolled-down positions, the assembly is further provided with an operating cord which is secured at a first end thereof to the roller tube and which, when pulled down at its free end, acts to operate against the force of the biasing member so as to unwind the metallic panel members from the roller tube in order to move the awning assembly toward the fully rolled-down position. The awning assembly may be secured in any desired position simply by tying the free end of the operating cord to any suitable tie point which may be provided.

In present-day awning devices the roller tubes employed therein have normally been designed to provide a single channel for receiving the lower end of the lowermost awning panel member and for receiving one end of the operating cord for moving the awning assembly to the rolled-down position. It thereby becomes necessary to manufacture the roller tube by providing a channel of sufficient dimensions to accommodate both the lowermost panel member and one end of the operating cord. Also, due to the design of such roller tubes having such a channel, when the awning assembly is in the fully rolled-down position, at least the lowermost panel and possibly the two lowermost panels will be wound about the roller tube in this position due to the resolution of the counteracting forces exerted by the awning assembly bias means and the operating cord. Thus, two such panel members provide substantially no function whatsoever other than to link the roller tube member to the remaining panel members, since the two lowermost panel members do not

unwind from the roller tube so as to increase the effective covering area of the awning assembly.

The roller tube of the instant invention is so designed as to provide the same functions as such prior art roller tubes with first and second channels being provided in the roller tube, and further permitting all of the panel members of the awning assembly to be unwound from the roller tube when in the fully rolled-down position.

The roller tube of the instant invention is comprised of a substantially cylindrical elongated member having first and second channels extending inwardly from the surface of said tube and at spaced intervals from one another. A first one of said channels is shaped to provide a substantially cylindrically shaped profile for the purpose of receiving the beaded lower end of the lowermost awning panel member. Said first cylindrical channel permits relative rotational movement between the lowermost panel member and the roller tube so as to facilitate both the winding and unwinding of the panel members from the roller tube. The second channel is designed to receive one end of the operating cord, and, due to the fact that the lowermost panel and the one end of the operating cord are secured in a spaced relationship relative to one another, this permits the awning assembly to be moved to its fully rolled-down position, in which position all of the panel members including the lowermost panel members are unwound from the roller tube and are thereby all utilized to cover or shade the region being protected by the awning assembly. Thus, with the roller tube arrangement of the instant invention employed in the awning assembly, the fully rolled-down position of the awning assembly may be achieved with fewer awning panel members than prior art devices, while at the same time, the roller tube of the instant invention is simple in design and compares favorably with present-day roller tubes, as to cost of fabrication of the roller tube as well as the cost of materials and assembly of the total awning assembly. Thus, the design of the roller tube of the instant invention is such as to permit said roller tube to occupy said fully rolled-down position without the necessity for having any panels wound about said roller tube, thereby providing an awning assembly which may achieve the same rolled-down position as prior art assemblies, at the same time requiring at least one less awning panel member having a roller tube of much simpler design than that of the prior art devices.

Since the cord of the roller tube assembly is the one element of the assembly which is most likely to wear well before the others, the assembly is so designed as to enable the cord to be readily removed and/or replaced without any need whatsoever for disassembling any of the elements of the roller tube assembly. In normal operation, however, the roller tube assembly is designed so as to effectively prevent removal of the cord.

It is therefore, one object of the instant invention to provide a novel roller tube for use in awning assemblies and the like, having spaced channels provided along the length of said roller tube for receiving the awning lowermost panel and the awning assembly operating cord.

Still another object of the instant invention is to provide a novel roller tube for awning assemblies and the like which is so designed as to require fewer awning slats than present-day awning assemblies.

Still another object of the instant invention is to provide a novel roller tube for awning assemblies and the like which is provided with a first elongated channel along the length of said roller tube for receiving both the awning assembly lowermost panel and a second elongated channel for receiving the awning assembly operating cord wherein said channels are positioned at spaced intervals along the surface of said tube requiring fewer awning slats in the awning assembly.

These and other objects of the instant invention will become apparent when reading the accompanying description and drawings, in which:

FIGURE 1 is a perspective view of an awning assembly, as shown in the partially rolled-down position.

FIGURE 2*a* is a cross-sectional view of the operating assembly of the awning structure shown in FIGURE 1.

FIGURE 2*b* is an exploded view showing one end of the operating mechanism of FIGURE 2*a*.

FIGURE 3 shows the roller tube of the instant invention.

FIGURE 4 is a perspective view of a prior art roller tube.

FIGURE 5 is a perspective view showing another detail of the roller tube assembly of FIGURES 1–3.

Referring now to the drawings, FIGURE 1 shows an awning assembly **10** comprised of a plurality of metallic panel members **11** which have substantially curved profiles and are bent at their ends to form the beads **11***a* and **11***b* which interengage with one another so as to form a pivotal coupling therebetween thereby facilitating the rolling up of the panel members **11** in a manner to be more fully described. The topmost edge of the uppermost panel is secured to the vertical wall **12** at the end points **13**. A rainguard member **14** may be provided along the entire upper edge of the uppermost panel in order to prevent any rain from entering between the right-hand edge of the uppermost panel and the vertical wall **12**. This arrangement is optional depending upon the requirements of the user.

The beaded edge **11***b*″ (FIG. 3) of the lowermost panel **11**″ is pivotally secured to a roller tube **15**. Roller tube **15** is provided with end caps **16** and **16**′ (only one of which can be seen in FIGURE 1) having a projection **16***a* for receiving the first end **17***a* of a rod **17**. The lower end **17***b* of rod **17** is pivotally secured to a support means **18** which is rigidly secured to the vertical wall **12**. The pivotal support means **18** permits rotation of the rod **17** in the directions shown by arrow **19** to permit the awning assembly to be moved to either the rolled-up and rolled-down positions or any intermediate position therebetween. The left-hand end of the awning assembly **10** is likewise provided with a rod **17**′ affixed to a pivotal support means **18**′ at the end **17***b*′ of the rod **17**′.

The awning assembly is provided with biasing means (see FIGURE 2) which acts to rotate the roller tube **15** counterclockwise in the direction shown by arrow **20** about the longitudinal axis of roller **15** so as to tend to urge the awning assembly towards the fully rolled-up position. Operating cord means **21** has a first end **21***a* secured to roller tube **15** and a second free end **21***b* which may be grasped so as to pull the awning assembly **10** to the rolled-down position. After the awning assembly is adjusted to the desired height, the operating cord **21** may then be suitably tied or fastened in any other suitable manner about a post **22** provided along the vertical wall **12** so as to retain the awning assembly in the desired rolled-down position.

FIGURE 3 shows the roller tube **15** of the invention which is provided with a first groove or channel **25** for receiving the bead **11***b*″ of the lowermost panel **11**″. A second channel **26** provided in roller tube **15** and spaced a predetermined distance away from channel **25** is provided for receiving the end **21***a* of operating cord **21** which is secured in channel **26** simply by tying a suitable knot **21***c* in cord **21** near end **21***a* and sliding this knot into the confines of the substantially C-shaped channel **26** so as to suitably secure end **21***a* of the operating cord **21** therein.

Turning now to FIGURES 2*a* and 2*b*, the roller tube **15** is shown as having an end bearing member **27**, shown in both FIGURES 2*a* and 2*b*, which is provided with first and second flat faces **27***a* and **27***b* which are designed to abut against the shoulder **28** formed by the inwardly facing channel **26** of roller tube **15**. The end plug **27** is provided with a substantially circular opening **30** for receiving torque rod **31** which has a substantially square cross-section. A plate member **36** is positioned adjacent the right-hand side of end plug **27** and is secured to one end **32***a* of a helical spring member **32** at opening **36***a*. The plate **36** has a shoulder **36***b* which abuts the shoulder **28** of roller tube **15**. The helical spring **32** is wound about the square rod **31** in the manner shown in FIGURE 2*a* and is secured at its opposite end **32***b* to plug **37** which has a square opening to key it to rod **31**.

First and second end caps **16** and **16**′ are positioned at the left and right-hand ends of roller tube **15** and are each provided with a circular aperture **33** which is ended abruptly to form a shoulder or ledge **34** having a substantially square-shaped opening **35** for receiving the square rod **31** therethrough. Square rod **31** is thereby firmly keyed to end cap **16**′ and thereby prevented from rotating. Both of said end caps **16** and **16**′ are provided with such cylindrical and square shaped openings **33** and **35** so as to support the rod **31** at the ends thereof, as well as keying the rod **31** to prevent rotation thereof. Bearings **27** and **27**′ provided adjacent the end caps **16** and **16**′ respectively, have circular openings **30** which receive rod **31** and permit rotation of roller tube **15** relative to rod **31**.

The end **32***a* of helical spring **32** is secured to plate **36** as provided on rod **31** so as to impart any rotation of spring end **32***a* to the plate **36**. The plate **36** is provided with a circular opening **36***c* which permits it to rotate about the substantially square shaped rod **31**. The opening **33** in the end cap member **16**′ is sealed by means of an end cap button **44** which is pressure fitted into the opening **33**.

The operation of the roll-up mechanism of the awning assembly is as follows:

Let it be assumed that the operating cord **21**, as shown in FIGURE 1, is pulled down in a direction to cause the roller tube to be driven clockwise in the direction shown by arrow **38** (FIG. 2b). Thus, the shoulder **28** of roller tube **15** bears against the shoulder **36***b* in plate **36** causing it to likewise rotate in the direction shown by arrow **38**. The end **32***a* of spring **32**, being secured to plate **36** is rotated with plate **36** placing it under compression since its opposite end **32***b* is held against movement by the plug **37**. As the operating cord is pulled down, the awning is then moved from the fully rolled-up position towards the rolled-down position. It should be noted that roller tube **15** is free to rotate about rod **31** due to bearings **27**—**27**′. In order to maintain the awning in any particular rolled-down position, the operating cord is simply tied about the pin **22** provided on the vertical wall **12** of FIGURE 1.

When it is desired to return the awning assembly either to the fully rolled-up position or to a position intermediate the fully rolled-down position and the fully rolled-up position, the operating cord is simply untied from the holding pin **22** and either released completely or released slowly. When so released, the energy stored in helical spring means **32** causes the spring to release its stored energy driving the end **32***a* thereof clockwise in the direction shown by arrow **39** of FIGURE 2*a*, likewise driving the plate **36** in the clockwise direction. Shoulder **36***b* of end plate **36** bears against the shoulder **28** of projection **29** provided in roller tube **15** causing the roller tube member **15** to likewise be driven in the clockwise direction **39**. This causes the awning panel members **11** to be wound about the roller tube until the awning assembly reaches either the fully rolled-up position, or some position intermediate the fully rolled-down position, depending only upon the control exerted by the user.

The end caps **16** and **16**′ may be secured to the roller tube **15** by providing speed-nut members **40** at the ends thereof which urge the end caps **16** and **16**′ inwardly towards the roller tube **15** so as to secure the end caps and, hence, the entire operating assembly within the roller tube **15**. Speed nuts **40** rest upon the shoulders **34** in opening **33** of end caps **16** and **16**′. The end plug **27** may likewise

be provided with a speed-nut **41** to secure it in the left-hand end position, as shown in FIGURE 2*a*. The speed-nut is further shown in perspective in FIGURE 2*b*, and is adapted to remain stationary with the square rod **31** while at the same time preventing the removal of end cap **16'** without first removing the speed-nut **40**.

Considering the prior art embodiment of roller tube **15'**, shown in FIGURE 4, it should be noted that the channel **40** receives operating cord **21** at end **21***a* thereof and is provided with a lip **41***a* which receives the bead **11***b''* of lowermost awning panel **11''**. Utilizing the roller tube **15'** of FIGURE 4 in the awning assembly **10** of FIGURE 1, when the awning assembly is in the fully rolled-down position, the lowermost panel **11''** will occupy the position, as shown in FIGURE 4, so that it is substantially wound about the roller tube **15'**. This is due to the use of a single channel **40** which requires at least one panel to be wound about the roller tube in order to maintain the appropriate counter-acting forces between the operating cord **21** and the helical spring **32**.

In the roller tube of the instant invention, which can best be seen in FIGURE 3 of the drawings, the roller tube **15** is provided with a channel **25** formed by first and second projections **25***a* and **25***b* extending inwardly towards one another and along cylindrical surface of the roller tube **15**. The projections **26***a* and **26***b* of channel **26** face inwardly, as shown in FIGURE 3, to enclose the substantially C-shaped channel **26**. The channel **25** is a substantially cylindrical shaped design to pivotally receive bed **11***b''* of lowermost panel **11'** in the manner shown so as to permit relative movement between roller tube **15** and panel **11''**, while at the same time, securing the lower end thereof to the roller tube. The operating cord **21** is retained within the C-shaped channel **26** by tying a knot **21***c* at the end **21***a* of cord **21** and sliding the knotted portion into the channel in the manner shown in FIGURE 3 so as to rigidly secure the end **21***a* of cord **21** within the channel **26**.

In operation of the roller tube **15** of the instant invention, the fully rolled-down position can be seen in FIGURE 1 and, due to the fact that the cord **21** secured in channel **26** is spaced from channel **25** in which the panel **11''** is secured, the panel **11''** is not wound about roller tube **15**, but is unwound in the manner shown in FIGURE 3 so that all panels of the awning assembly are thereby unwound when the awning is in the fully rolled-down position. Thus, with the roller tube of the instant invention, the awning assembly may achieve the identical fully rolled-down position as awning assemblies of the prior art by the use of fewer awning panel members.

FIGURE 5 is a perspective view showing a portion of the roller tube means assembly which is so designed as to permit removal of the cord **21** and replacement thereof in a very simple manner. The end cap **16'** shown in FIGURE 5 is provided with a cavity **50** (note also dotted line **50** of FIGURE 2*a*) which cavity is immediately adjacent the left-hand end of roller tube **15**. The end cap is further provided with an opening **51**, which can best be seen in FIGURES 2*a* and 2*b*, which opening **51** extends through the end cap and communicates with the interior of roller tube **15**. If it is desired to remove the cord **21** for any purpose, this may be very simply performed by rotating the roller tube **15** (either clockwise or counterclockwise) so that the channel **26** is in alignment with the cavity **50** in the manner shown in FIGURE 5. In order to retain the roller tube **15** in this position relative to the end cap **16'**, any long, narrow and substantially rigid member such as, for example, a nail **52** may be inserted into the opening **51** so that it extends into the interior of roller tube means **15**. Due to the relationship of the cavity **50**, the channel **26** and the bearing member **27**, when the nail **52** is inserted into the opening **51**, the nail will enter either one of the two notches **27***b* or **27***c*, shown in FIGURE 2*b*. In this position the end bearing **27** will be locked against rotation relative to the end cap **16'**, thereby preventing the roller tube means from rotating relative to end cap **16'**. This will retain the roller tube means in a stationary position relative to the end cap until the cord is removed. If the cord is removed due to the fact that it has frayed or torn, another cord may be prepared and inserted simply and readily. After insertion of either the original or a new cord with a suitable knot such as the knot **21***c* of FIGURE 3 near its extreme end, the nail **52** may then be removed to enable the roller tube means to return to its normal functioning position. It should be understood that either of the two end caps, or both end caps **16** and **16'** may be provided with a cavity **50** for the purpose of keying the roller tube means **15** to the end cap in order to remove and/or replace the cord **21**. Since the cord is the only element of the assembly which is more likely to wear out or fray prior to any of the other components therein, the arrangement of FIGURE 5 enables the replacement of the cord without any necessity for disassembling the roller tube assembly.

It can, therefore, be seen that the instant invention provides a roller tube for awning assemblies which is simple in design and which permits positioning of awning assemblies in the fully rolled-down position, while using fewer panel members than prior art structures, thereby providing a substantial saving in both cost and fabrication of the entire awning assembly.

Although this invention has been described with respect to preferred embodiments thereof, it should be understood that many variations and modifications will now be obvious to those skilled in the art, and it is preferred, therefore, that the scope of this invention be limited not by the specific disclosure herein, but only by the appended claims.

The embodiments of the invention in which an exclusive privilege or property is claimed are defined as follows:

1. A roll-up awning assembly, comprising, in combination, roller tube means, a plurality of elongated panel members forming said awning, an operating mechanism including an operating cord for rolling down said awning asesembly, wherein said tube means comprises an elongated substantially annular-shaped tube having the lowermost of said panel members operatively connected thereto; a first substantially C-shaped groove in the face of said tube parallel to the longitudinal axis thereof containing therein a knotted end of said operating cord, the lips of said C-shaped groove being adapted to engage said knot and retain the same within said C-shaped groove to control the rotation of said roller tube means; a second substantially C-shaped groove in the face of said tube parallel to the longitudinal axis thereof and circumferentially spaced from said first groove and receiving one end of the lowermost panel member adjacent said roller tube, means to pivotally secure said panel members to said roller tube; means for controlling the roll-up and roll-down operation; and an abutment within said tube adapted for driving engagement with roller rotating means within said tube.

2. The device of claim **1**, in which said aboutment extends throughout the length of the tube and is formed by the inwardly deformed wall of said first substantially C-shaped groove.

3. For use in a roll-up awning assembly having a plurality of elongated panel members forming said awning and an operating mechanism including an operating cord for rolling down said awning assembly and means for rolling said assembly into extended or rolled up positions; a roller tube, said tube being substantially annular shaped, a first operating cord receiving, substantially C-shaped groove in the face of said tube and extending parallel to the longitudinal axis thereof, a second panel member receiving, substantially C-shaped groove in the face of said tube, said second groove extending parallel to said first groove and to the longitudinal axis of said tube and circumferentially spaced from said first groove, and a driving abutment extending inwardly from said tube and extending longitudinally parallel to said first and second grooves.

4. The structure of claim 3 wherein said abutment extends throughout the length of the tube and is formed by an inwardly deformed wall of said first groove.

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