

Sept. 24, 1968

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3,402,901

ROLL-UP MEANS FOR FLEXIBLE STRIPS

Filed Aug. 9, 1966

2 Sheets-Sheet 1

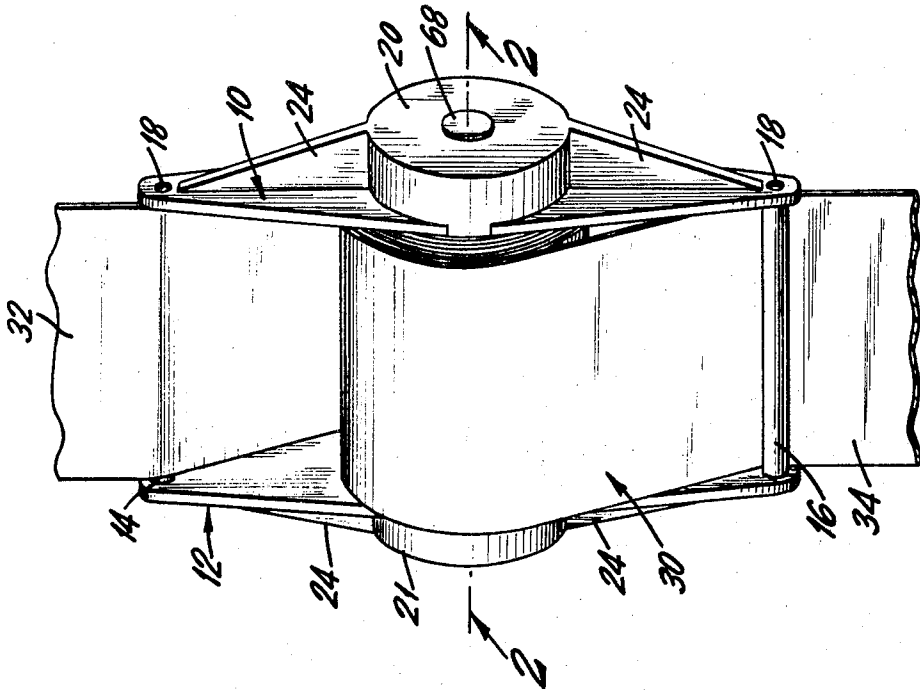


FIG. 1

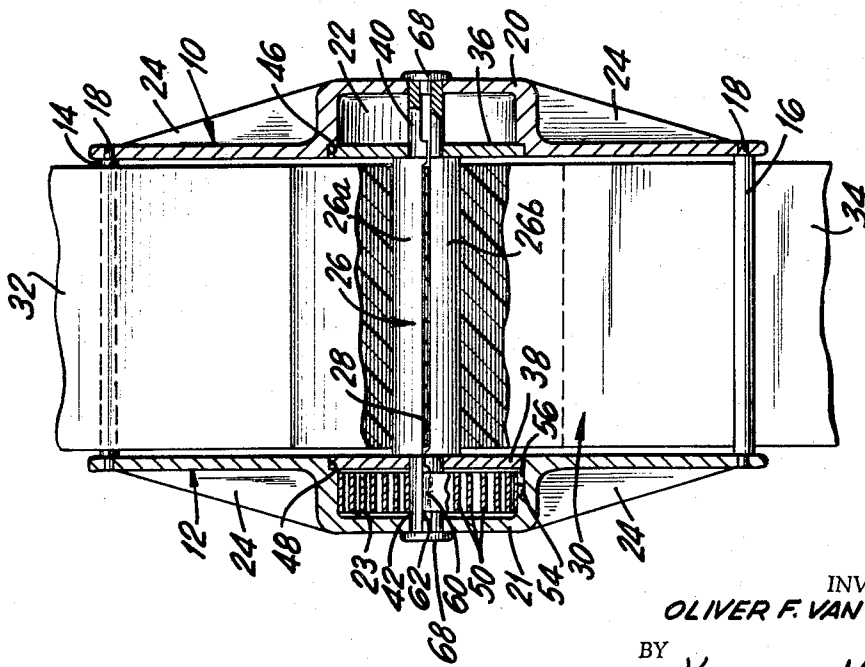


FIG. 2

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Filed Aug. 8, 1966

2 Sheets-Sheet 2

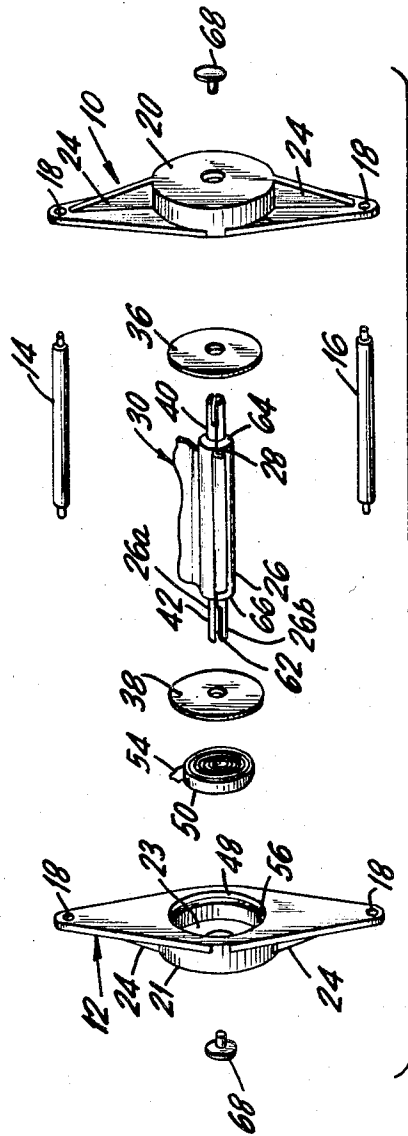


FIG. 3

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**ROLL-UP MEANS FOR FLEXIBLE STRIPS**

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Filed Aug. 9, 1966, Ser. No. 571,212

2 Claims. (Cl. 242—107.11)

**ABSTRACT OF THE DISCLOSURE**

A roll-up means for flexible strips comprising a centrally located shaft journaled between two elongated side members, said shaft being adapted to roll up the flexible strip thereon. A constant force spring is attached to one of the side members and to the shaft, and arms are provided at the ends of the elongated side members and connected between them to prevent twisting of the flexible strip during extension and retraction.

This invention relates to roll-up means for flexible strips and more particularly to a new and improved roll-up means for flexible strips such as ribbon, tape, flexible cable or the like.

In many applications, flexible strips such as ribbon, tape, flexible cable or the like are wound up on reels which are adapted to retract the strip after the strip has been partially unwound from the reel. A well-known type of reel comprises a spring-loaded rotatable drum to which one end of the strip is connected mounted within a housing from which the strip may be withdrawn by the application of a pulling force. Removal of the pulling force causes retraction of the strip into the housing by means of the spring which is mounted internally of the drum. Where it is desirable to unwind a pair of strips in opposite directions, the strips being wound on the drum, difficulties have been encountered in preventing the cable from twisting during the extension and retraction thereof. In such applications, it is also desirable that the strip be subjected to a uniform force during extension and retraction of the strip from the reel. It is also desirable to wind up as long a length of flexible strip on a reel of as small a diameter as possible.

It is thus an object of the present invention to provide new and improved roll-up means for flexible strips which is efficient in operation and economical in manufacture.

It is a further object of the present invention to provide new and improved roll-up means for flexible strips which automatically retracts strips which have been extended therefrom.

It is yet another object of the present invention to provide new and improved roll-up means for flexible strips which applies a uniform force to the strip during extension and retraction thereof.

It is still another object of the present invention to provide new and improved roll-up means for flexible strips which allows extension of two strips in opposite directions therefrom while preventing twisting of the strips during extension and retraction.

These and other objects will be evident to those skilled in the art from the following description and drawings wherein:

FIGURE 1 is a perspective view of a preferred embodiment of the roll-up tracking guide of the present invention;

FIGURE 2 is a partially sectional view taken along line 2—2 of FIGURE 1; and

FIGURE 3 is an exploded view showing the separate elements of the guide of FIGURE 1.

Referring more particularly to the drawings, FIGURES 1-3 show a preferred embodiment of the roll-up tracking

means of the present invention. As shown generally in FIGURE 1, the roll-up tracking means of the present invention comprises a pair of side members 10 and 12 having diametrically opposite arms 14 and 16 extending therebetween. Arms 14 and 16 are journaled at their ends in holes 18 of members 10 and 12. Members 10 and 12 are respectively provided with centrally disposed circular housings 20 and 21 having chambers 22 and 23. Strengthening ribs 24 are provided on members 10 and 12 to add rigidity thereto.

As shown more clearly in FIGURES 2 and 3, centrally disposed shaft 26 is journaled at its ends in members 10 and 12. Shaft 26 is fabricated with two identical halves 26a and 26b and is slotted as at 28 to receive a flexible strip 30. The identical halves of shaft 26 are placed around strip 30 at substantially the central portion thereof. Strip 30 is then wound about shaft 26 and has its ends 32 and 34 projecting in opposite directions. Strip 30 may also be prewound with shaft 26 being inserted into the core thereof. Ends 32 and 34 may, for example, be attached to two separate members (not shown) which are normally moved towards or away from each other. Such a situation arises, for example, when strip 30 is multiconductor flat cable acting as a jumper between circuitry which is movably mounted within a fixed frame and circuitry mounted on the frame.

Washers 36 and 38 are slipped over ends 40 and 42 of shaft 26 and are cemented in place. Washers 36 and 38 are adapted to rotate within annular recesses 46 and 48 in members 10 and 12 and thereby to provide additional bearing support for shaft 26.

A spirally wound spring 50 is mounted within chamber 23 of housing 21 of member 12 and keyed to member 12 by projection 54 slipped into slot 56 in housing 21. The other end of spring 50 is affixed to end 42 by end 60 of spring 50 being slipped into slot 62 of shaft 26.

Referring now to FIGURE 3, there are shown more clearly the individual components described hereinabove prior to assembly. Assembly of these components may be accomplished as follows: identical halves of shaft 26 are positioned about the central portion of strip 30 and washers 36 and 38 are respectively cemented over ends 40 and 42 of shaft 26 until they abut against faces 64 and 66 of shaft 26. Strip 30 is then wound up on shaft 26. Spring 50 is positioned within housing 21 in chamber 23 of member 12, spring 50 being keyed to member 12 by sliding projection 54 into slot 56. End 42 is then slipped through spring 50 and member 12, end 60 of spring 50 being inserted into slot 62 of shaft 26. Washer 38 is inserted into recess 48 of member 12. The assembly is completed by journalling end 40 of shaft 26 in member 10 and inserting washer 36 into recess 46 in member 10. Buttons 68 are cemented into recesses at the ends of shaft 26 to prevent members 10 and 12 from slipping off the ends of shaft 26. Arms 14 and 16 are journaled in members 10 and 12 just prior to completion of the assembly and ends 32 and 34 of cable 30 projecting over arms 14 and 16.

In use, one end of strip 30 may be affixed to a stationary member such as a frame, with the other end of strip 30 affixed to a member which is movable with respect to the stationary member, such as a drawer movably mounted within the frame. If, for example, strip 30 is multiconductor flat cable, the individual conductors of the cable might be terminated to a terminal strip mounted on the frame and to circuit elements on a chassis mounted on the movable drawer. When strip 30 is retracted, spring 50 is untensioned so that no torque is exerted on shaft 26 by spring 50. As the ends of strip 30 are extended, shaft 26 is rotated, causing spring 50 to be tensioned. The tensioning of spring 50 creates a torque on shaft 26 which is opposite to the torque ex-

erted on shaft 26 by the extension of the ends of strip 30. Spring 50 is of such a nature that it exerts a substantially uniform torque on shaft 26 for the full length that strip 30 is extended. Extension of the ends of strip 30 would be accomplished in the above example by withdrawing the movable drawer from the frame. When it is desired to replace the drawer in its normal position within the frame, the tension on strip 30 will be relieved and tensioned spring 50 will tend to return to its normally untensioned state and thus cause shaft 26 to retract strip 30 about shaft 26.

Due to the nature of spring 50, spring 50 has the characteristic such that it resists uncoiling with a force that is constant with linear displacement. Thus a substantially uniform force will be exerted on strip 30, both during extension and retraction thereof. By mounting spring 50 at the end of shaft 26, it is possible to roll up a greater length of strip about shaft 26 than would be possible if a helical spring were used which was disposed within the central portion of shaft 26. Thus the diameter of spring 50 does not limit the minimum diameter of the central portion of shaft 26, thus allowing a greater length of cable to be wound about shaft 26.

In order to prevent twisting of the strip during extension or retraction, the ends 32 and 34 of cable 30 are passed over arms 14 and 16. The distance between arms 14 and 16 is such that when strip 30 is extended, the tendency of the strip to twist will be counteracted by arms 14 and 16.

Instead of the elongated side members described above, it will be understood that members 10 and 12 could also be circular or have any other suitable configuration. It may also be desirable to enclose the periphery of the roll-up means to prevent dirt, etc., from fouling the wound-up strip. In such a case, it is only necessary that the ends of the strip protrude beyond the enclosure. The roll-up means may be of any suitable material such as metal, plastic or the like. Where plastic is used, solvent cementing may be used to assemble the elements of the roll-up means.

Although a specific embodiment of the present invention has been described hereinabove, it will be understood that other embodiments and modifications evident to those skilled in the art are considered to be within the scope thereof.

The present invention is therefore not to be limited by the foregoing description and drawings, but rather by the following claims.

I claim:

1. A roll-up tracking means comprising a pair of elongated side members, a centrally disposed shaft journaled at its ends in said side members, said shaft being split in half to form two semicylindrical half members, said half members being provided with oppositely disposed recesses to form a slot when said half members are joined together, a flexible strip having its central portion disposed within said slot of said shaft, sandwiched between said half members of said shaft, said flexible strip being spirally wound about said shaft and having its ends projecting in opposite directions, one of said side members being provided with a centrally disposed circular housing having a chamber opening out towards said shaft, a constant force spring positioned within said housing of said side member, said spring being spirally wound, having one end secured to said housing of said side member and the other end secured to said shaft, a pair of oppositely disposed arms journaled at their respective ends at the ends of said side members, said oppositely

projecting ends of said flexible strip projecting over said arm members, the distance between said arms being such that when said strip is extended, the tendency of said strip to twist will be prevented by said arms, said other of said side members being provided with a centrally disposed circular housing having a chamber opening out towards said shaft wherein said ends of said shaft are respectively provided with recesses, a pair of washers respectively mounted on the ends of said shaft and adapted to be journaled within said chambers of said housings of said side members for rotation therein, a pair of buttons having pin portions, said circular housings of said side members respectively having centrally disposed apertures, the ends of said shafts being journaled in said apertures and said pin portions of said buttons are inserted into the recesses in the ends of said shaft and cemented therein to prevent said side members from slipping off the ends of said shaft.

2. A roll-up tracking means comprising a pair of elongated side members, a centrally disposed shaft journaled at its ends in said side members, said shaft being split in half to form two semicylindrical half members, said half members being provided with oppositely disposed recesses to form a slot when said half members are joined together, said slot being adapted to receive a flexible strip to be rolled about said shaft, one of said side members being provided with a centrally disposed circular housing having a chamber opening out towards said shaft, a constant force spring positioned within said housing of said side member, said spring being spirally wound, having one end secured to said housing of said side member and the other end secured to said shaft, a pair of oppositely disposed arms journaled at their respective ends at the ends of said side members, the distance between said arms being such that when a strip wound about said shaft is extended, the tendency of said strip to twist will be prevented by said arms, said other of said side members being provided with a centrally disposed circular housing having a chamber opening out towards said shaft wherein said ends of said shaft are respectively provided with recesses, a pair of washers respectively mounted on the ends of said shaft and adapted to be journaled within said chambers of said housings of said side members for rotation therein, a pair of buttons having pin portions, said circular housings of said side members respectively having centrally disposed apertures, the ends of said shafts being journaled in said apertures and said pin portions of said buttons are inserted into the recesses in the ends of said shaft and cemented therein to prevent said side members from slipping off the ends of said shaft.

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