

March 10, 1925.

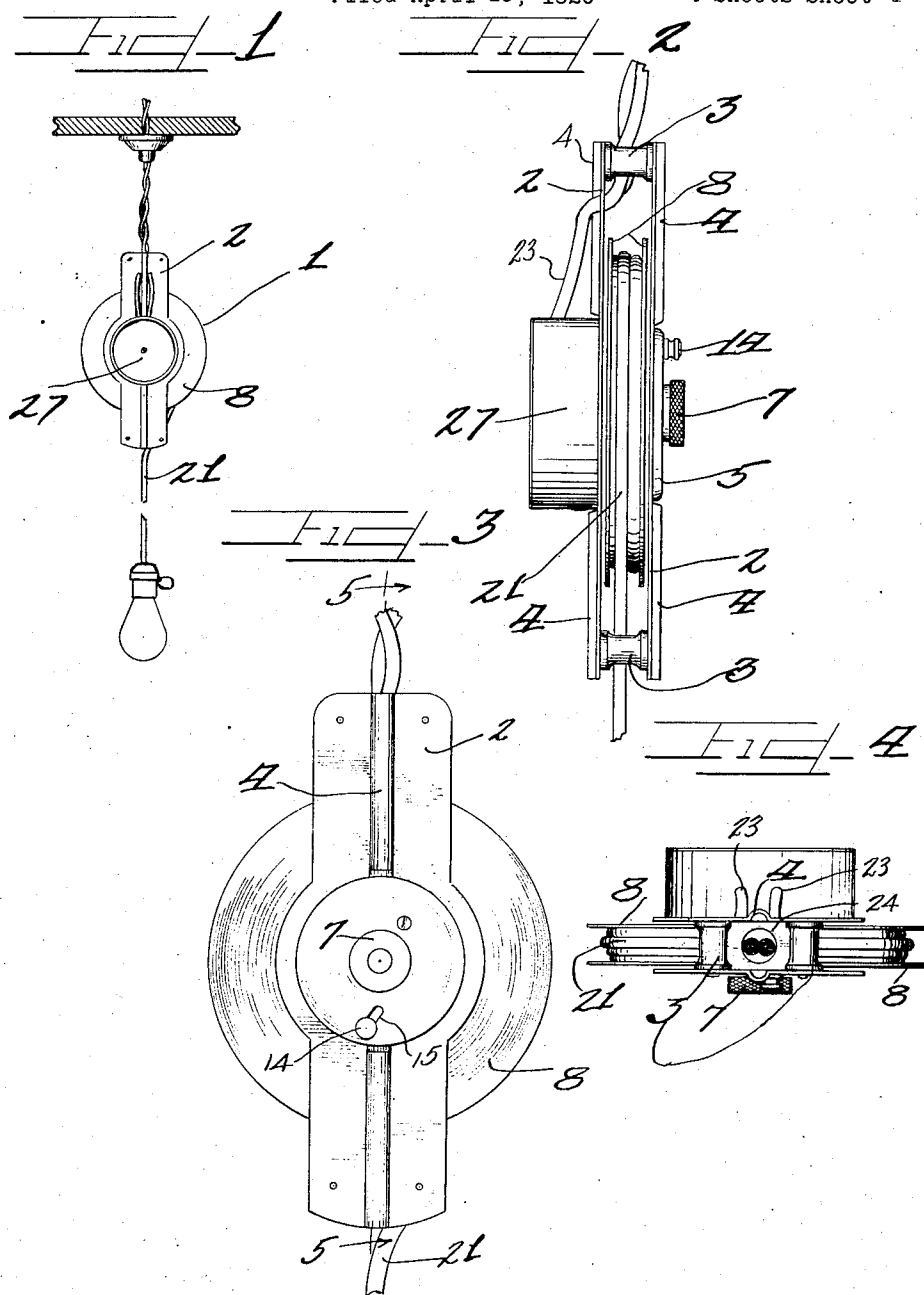
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H. L. HAYDEN ET AL

ADJUSTABLE REEL FOR ELECTRICAL CONDUCTORS

Filed April 19, 1920

4 Sheets-Sheet 1



WITNESSES

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March 10, 1925.

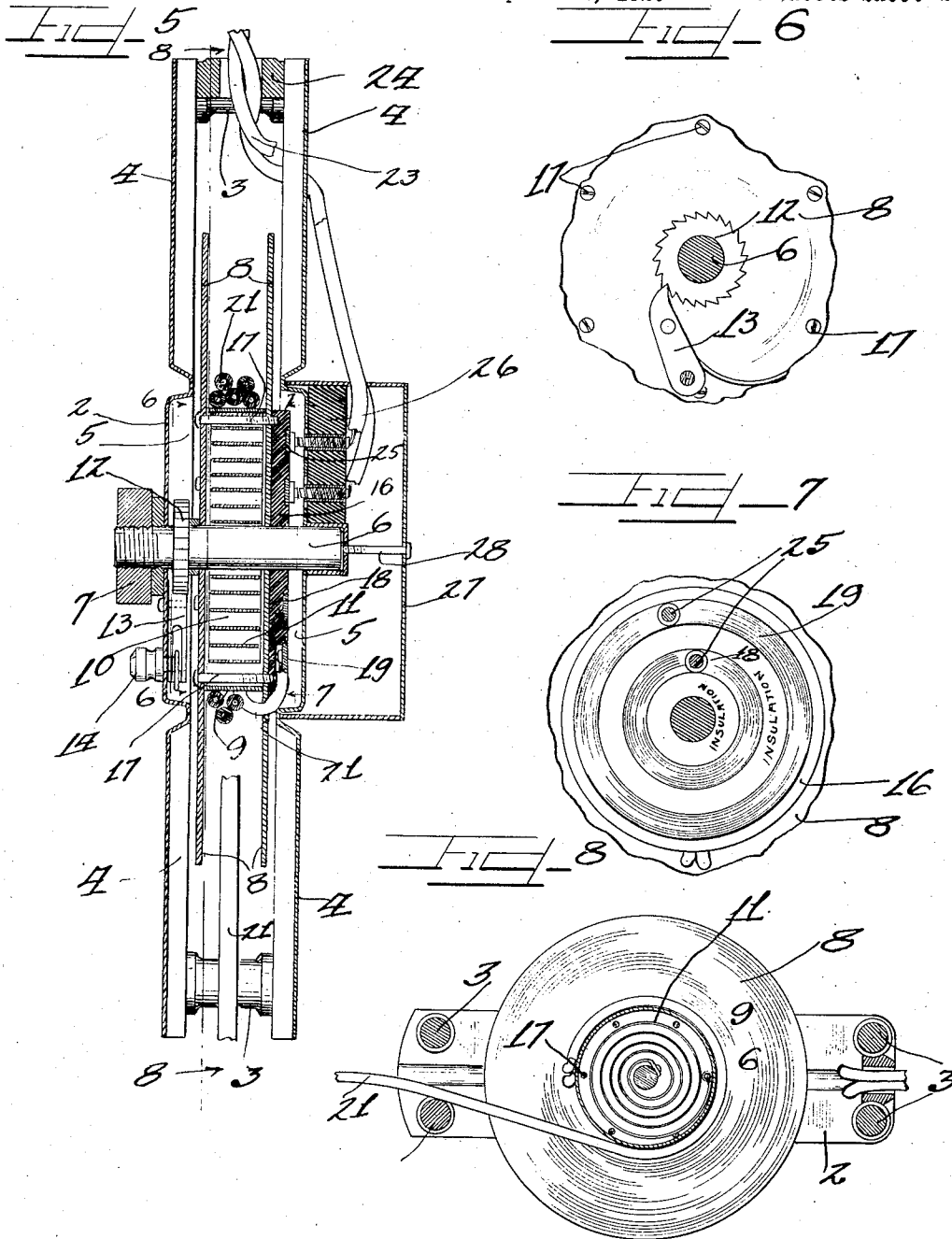
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ADJUSTABLE REEL FOR ELECTRICAL CONDUCTORS

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4 Sheets-Sheet 2



WITNESSES

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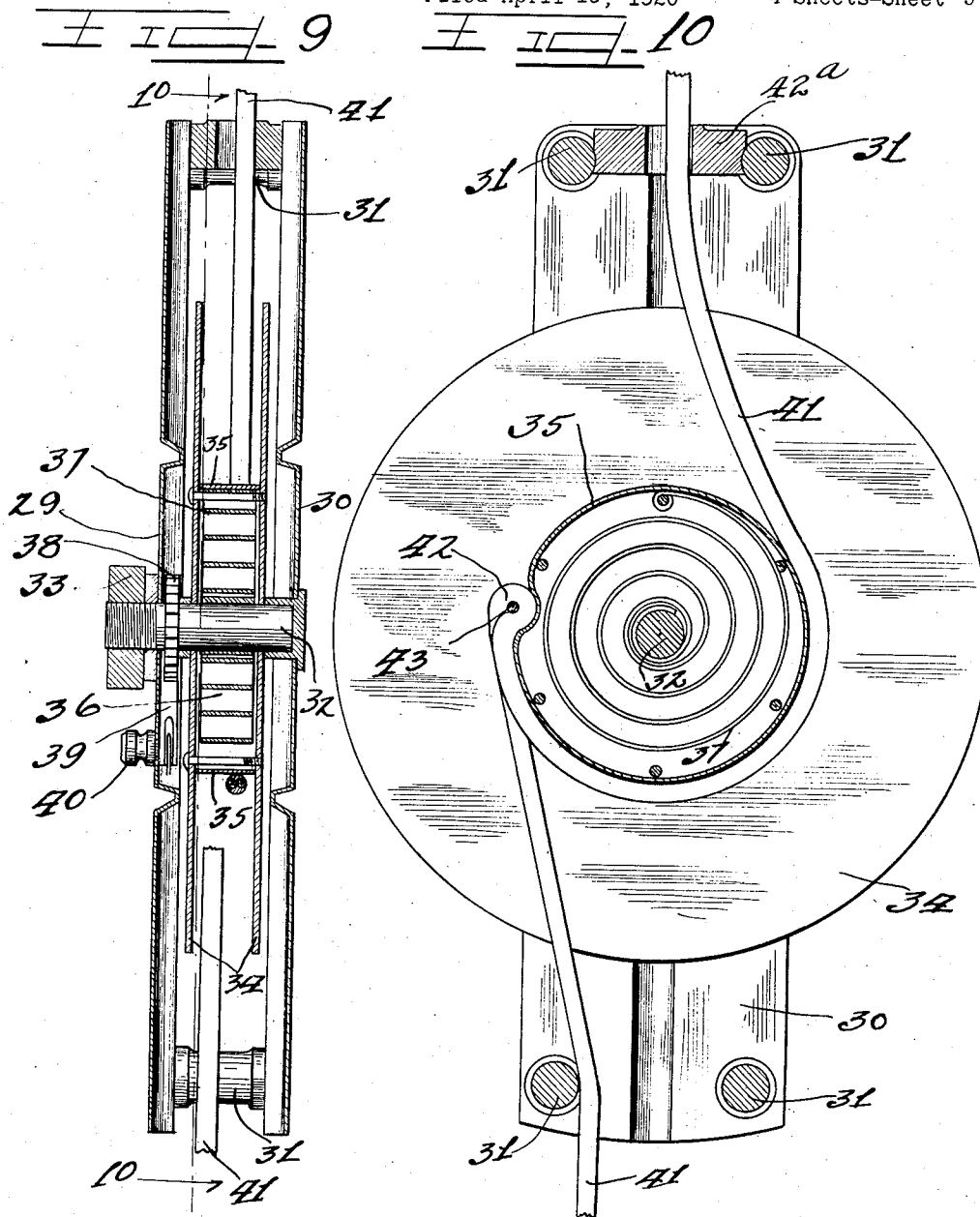
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ADJUSTABLE REEL FOR ELECTRICAL CONDUCTORS

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4 Sheets-Sheet 3



WITNESSES

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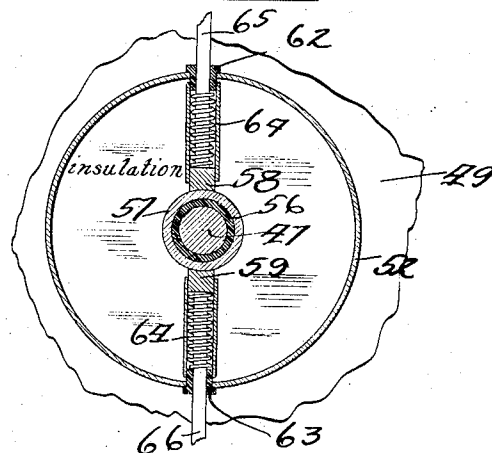
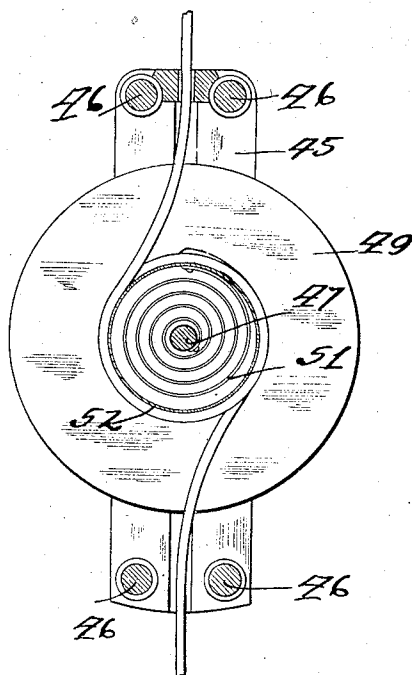
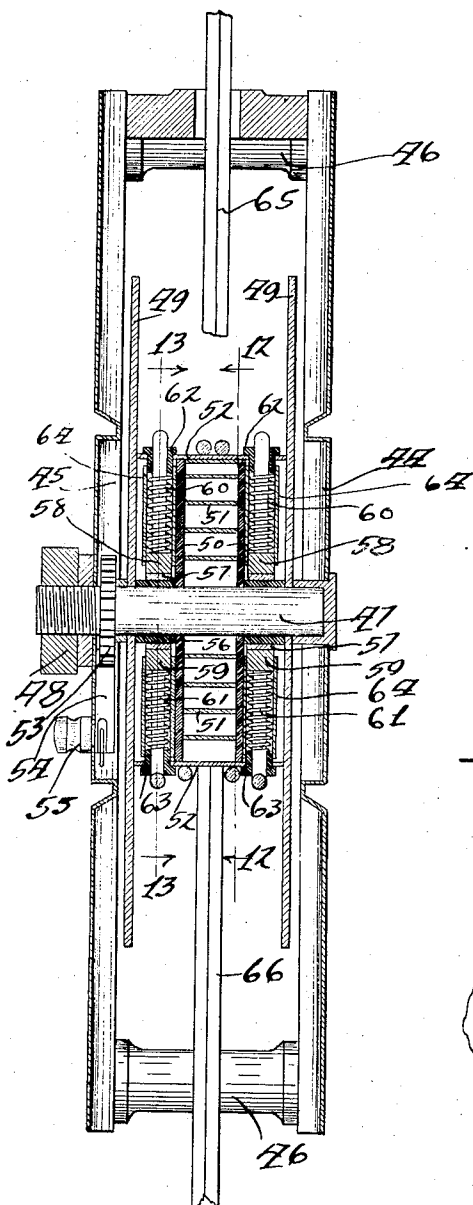
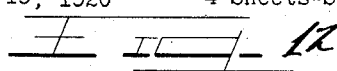
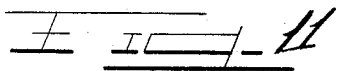
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H. L. HAYDEN ET AL

ADJUSTABLE REEL FOR ELECTRICAL CONDUCTORS

Filed April 19, 1920

4 Sheets-Sheet 4



Witnesses

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Patented Mar. 10, 1925.

1,528,877

UNITED STATES PATENT OFFICE.

HARRY L. HAYDEN, OF WHITEFISH, MONTANA, AND ARTHUR N. SANFORD, OF VASHON, WASHINGTON.

ADJUSTABLE REEL FOR ELECTRICAL CONDUCTORS.

Application filed April 19, 1920. Serial No. 374,851.

To all whom it may concern:

Be it known that we, HARRY L. HAYDEN and ARTHUR N. SANFORD, citizens of the United States, and residents of the city of Whitefish, in the county of Flathead and State of Montana, and town of Vashon, in the county of King and State of Washington, respectively, have invented certain new and useful Improvements in an Adjustable Reel for Electrical Conductors; and we do hereby declare that the following is a full, clear, and exact description of the same, reference being had to the accompanying drawings, and to the numerals of reference marked thereon, which form a part of this specification.

This invention relates to an improved type of adjustable reel for flexible electrical conductors and more particularly to a type of reel adapted to be used in connection with those portable electrical devices which are moved about considerably while being used.

Considerable annoyance is experienced in the use of vacuum cleaners, portable electric lights, etc., due to the fact that the conductors which are used for supplying current thereto often become entangled with various objects in the room and are often damaged thereby. When work is being done in damp places supply leads or conductors which are allowed to rest on the damp floor or in the water are very apt to cause trouble due to short circuiting. The manually operated conductor reels which have been used heretofore have proven inadequate to remedy these difficulties due to the labor involved in their operation. It has been found that the average person will allow the conductors to become entangled and damaged before they think to adjust the hand operated reel.

It is an object, therefore, of this invention to provide an automatic reel for electrical conductors whereby a constant tension is maintained thereon irrespective of the position of the device to which said conductors are supplying current.

It is another object of this invention to provide a spring operated reel for electrical

conductors adapted to maintain a constant tension thereon and having means associated therewith for varying said tension.

It is a further object of this invention to provide an automatic reel for electrical conductors having movable contact means whereby the incoming or supply conductors are always electrically connected with the outgoing conductors on the reel.

It is an important object of this invention to provide an automatic reel for electrical conductors adapted to normally maintain a constant uniform tension thereon, and having means whereby said tension may be released if desired.

Other and further important objects of this invention will be apparent from the disclosures in the drawings and specification.

The invention (in a preferred form) is illustrated in the drawings and hereinafter more fully described.

On the drawings: Figure 1 is a view in side elevation of a device embodying the principles of this invention as used in connection with a portable electric lamp.

Figure 2 is a view in end elevation of a reel for electrical conductors embodying the principles of this invention.

Figure 3 is a view in front elevation and Figure 4 is a top plan view thereof.

Figure 5 is an enlarged section taken on line 5—5 of Figure 3.

Figure 6 is a fragmentary section on line 6—6 of Figure 5.

Figure 7 is a fragmentary section on line 7—7 of Figure 5.

Figure 8 is a slightly reduced section on line 8—8 of Figure 5.

Figure 9 is a central longitudinal section taken through a modified form of electrical conductor reel embodying the principles of this invention.

Figure 10 is a section on line 10—10 of Figure 9.

Figure 11 is a longitudinal central section taken through an electrical conductor reel embodying the principles of this invention showing a modified brush and collector ring construction.

Figure 12 is a section on line 12—12 of Figure 11.

Figure 13 is a fragmentary section on line 13—13 of Figure 11.

5 As shown on the drawings: The automatic reel embodying this invention is indicated as a whole by the reference numeral 1 and the supporting structure therefor comprises the longitudinal frame plates 2, 10 which are held in spaced relation by the pillars 3 therebetween. Where the wire bears against these pillars as for example, at the left of Figure 8 or the bottom of Figure 10, they are preferably made in the form of 15 rollers, but when the wire is separated from them by a sleeve as for example, at the right of Figure 8 or the top of Figure 10, there is no advantage in making them revoluble. For convenience in manufacture, the pillars 20 are made and mounted alike whether intended to revolve or not. Said frame plates 2 are preferably formed from sheet metal and are provided with longitudinal stiffening ribs 4. The central portion of each of the 25 frame plates 2 is somewhat widened and said widened portions are depressed to form the outwardly projecting annular chambers 5. Journalled centrally in said chambers 5, as clearly shown in Figure 5, is the rotatable transverse shaft 6, which extends 30 through one of the chambers and is threaded on the outside to receive the knurled winding knob 7. Spaced reel plates 8 are rotatably mounted on said shaft 6 between 35 the frame plates 2, and a ring plate 9 secured between said reel plates provides an annular chamber 10 surrounding the shaft. A motor spring 11 in said chamber 10 has one end thereof secured to the shaft 6 and 40 the other end secured to the inner side of the ring plate 9, as shown in Figure 8. Said motor spring 11 may either comprise a flat ribbon spring or a spiral wire spring as desired. To provide for winding the motor 45 spring a ratchet 12 is fixedly secured to the shaft 6 inside the frame plate 2. Said ratchet and shaft are prevented from reverse rotation by a spring pressed pawl 13 pivoted on the inner side of the frame 50 plate 2. The finger knob 14, which is secured to the pawl 13 for manually releasing the same to allow the tension on the spring 11 to be released, is slidable in a slot 15 in the plate 2, as shown in Figures 55 3 and 5.

An insulating plate 16 is secured to the outside of the reel plate 8 on the side opposite the ratchet 12 by screws 17, which also act to support the ring plate 9 in position between the reel plates. Collector rings 18 60 and 19 are imbedded in said insulating plate 16 and are electrically connected to the inner ends of the flexible conductors 21 as shown in Figure 5.

65 The flexible conductors 23 which lead

from a source of electrical energy, enter the reel frame through the block 24 between the pillars 3. Said conductors are electrically connected with the conductors 21 by the spring-pressed brushes 25, which slid- 70 ably contact the collector rings 18 and 19 and which are insulated from the frame plate 2 and from each other by the insulating block 26. To keep moisture and dust away from the brushes and brush holder a 75 dust cap 27 is secured to the frame plate 2 by means of a machine screw 28. The conductors 23 extend downwardly between the frame plates 2, outwardly through apertures in one of them, and then through apertures in the dust cap 27 to the brushes 25. 80

Figures 9 and 10 show a modified device embodying the principles of this invention in which the electrical conductors entering and leaving the reel are continuous. This modified form of device comprises the longitudinal frame plates 29 and 30, which are held in spaced relation by the pillars 31. Said frame plates 29 and 30 are identical in construction with the 90 frame plates 2, which already have been described. Journalled centrally in said frame plates 29 and 30, as shown in Figure 9, is a rotatable transverse shaft 32. Said shaft 32 extends through the frame plate 29 95 and the outer end thereof is threaded to receive a knurled winding knob 33. Spaced reel plates 34 are rotatably mounted on the shaft 32 and a ring plate 35 secured between said reel plates provides an annular 100 chamber 36 surrounding the shaft. A motor spring 37 in said chamber 36 has one end thereof secured to the shaft 32 and the other end secured to the ring plate 35.

To provide for winding said motor spring 105 a ratchet 38 is fixedly secured to the shaft 32 inside the frame plate 29. Said ratchet 38 is prevented from reverse rotation by a spring-pressed pawl 39 pivoted on the inner side of the frame plate 29. The finger knob 110 40, which is secured to the pawl 39, provides for manually releasing the same to release the tension on the motor spring 37.

As clearly shown in Figure 10, electrical conductors 41 enter through the apertured 115 block 42^a between the pillars 31, and a loop 42 of said conductors is engaged around a pin 43 extending perpendicularly from the reel plate 34. The inner side of said loop 42 is engaged between said pin 43 and a depression in the ring plate 35. Thus both 120 the entering and emerging portions of the conductors 41 are lengthened or shortened when the reel is rotated and a constant tension is maintained on said conductors. 125 Screws connecting the reel plates 34 add rigidity to the reel and help to support the ring plate 35 in position between said reel plates.

Figures 11 to 13 inclusive show an elec- 130

trical conduction reel embodying the principles of this invention wherein a modified brush and collector ring construction is disclosed. In this construction the spring motor and collector ring mechanisms are supported between the longitudinal frame plates 44 and 45. Said longitudinal frame plates are secured in spaced relation by the pillars 46 and are constructed the same as frame plates 2, which have already been described. Journalled centrally in the frame plates 44 and 45 is a rotatable transverse shaft 47. Said shaft 47 extends through the frame plate 45 and the outer end thereof is threaded to receive a knurled winding knob 48. Spaced reel plates 49 are rotatably mounted on the shaft 47, and midway between said spaced reel plates a pair of circular insulating plates 50 are also rotatably mounted on said shaft 47. A motor spring 51, mounted in the chamber between said plates 50, has one end thereof secured to the shaft 47 and the other end secured to a ring plate 52, which is secured to the peripheries of the plates 50 and the inner sides of the reel plates 49.

To provide for winding the motor spring 51, a ratchet 53 is fixedly secured to the shaft 47 inside the frame plate 45. Said ratchet 53 is prevented from reversely rotating by a spring-pressed pawl 54 pivoted on the inner side of the frame plate 45. The finger knob 55, which is secured to the pawl 54, is provided for manually releasing said pawl to release the tension on the motor spring 51.

A pair of insulating rings 56 are now rotatably mounted on the shaft 47 between the insulating plates 50 and the reel plates 49, and a collector ring 57 is secured on each of said insulating rings, as clearly shown in Figures 11 and 13. Oppositely positioned pairs of brushes 58 and 59 make a sliding contact with said collector rings 57 and are pressed resiliently against said collector rings by the coil springs 60 and 61. Said coil springs 60 and 61 engage the under sides of apertured insulating bosses 62 and 63, which are secured in apertures in the ring plate 52, and are restrained from lateral movement by the guide plates 64. The entering or supply conductors 65 are engaged through the insulating bosses 62 and connected to the brushes 58, while the outgoing conductors 66 are connected to the brushes 59 in a like manner. Connection between the entering and outgoing conductors in thus maintained through the brushes 58 and 59 and the collector rings 57.

The operation is as follows: In the preferred form the supply conductors 23 are permanently connected with the brushes 25, their outer ends being connected to a plug or socket whereby they may be connected

with a source of current. The conductors 21, which are wound on the reel, have their inner ends connected to the collector rings 18 and 19, with which the brushes 25 make contact and thus said conductors 21 are always electrically connected with the conductors 23. When the conductors 21 are unwound from the reel the tension of the motor spring 11 on the inner periphery of the ring plate 9 tends to maintain a constant tension on said conductors. The tension on said motor spring 11 may, of course, be increased by winding with the knob 7, or may be released by holding the pawl 13 away from the ratchet 12 with the knob 14 and allowing the shaft 6 to rotate in a reverse direction. The rollers 3 on the side of the device toward the conductors 21 tend to reduce the friction and wear on them.

In the modified form of device shown in Figures 9 and 10, there are no brushes or collector rings and the conductors 41 pass continuously through the reel. Said conductors 41 are secured to the ring plate 35 of the reel by the loop 42 around the pin 43, and a constant tension is maintained on both the entering and leaving portions thereof. Means are provided for winding the motor spring 37 and releasing the tension thereon as heretofore described.

In the reel shown in Figures 11 to 13 inclusive the operation of the motor spring and winding mechanism is the same as hereinbefore described. Electric current entering through the conductors 65 is conveyed to the collector rings 57 through the brushes 58 and is transmitted from said collector rings to the brushes 59 and the outgoing conductors 66. This form of device is compact and may be economically manufactured. The brushes and collector rings are also well protected from injury.

While the device of this invention is primarily intended as a reel for flexible electrical conductors, it may also be advantageously used as a reel for any flexible means on which a constant tension is desired.

We are aware that numerous details of construction may be varied through a wide range without departing from the principles of this invention, and we therefore do not purpose limiting the patent granted otherwise than necessitated by the prior art.

We claim as our invention:

In a device of the class described, an enclosing frame, a shaft rotatable therein, a reel mounted to rotate on said shaft, a spring having one end fixed to said shaft and its other end fixed to said reel, means within said frame for normally preventing rotation of said shaft in the direction of the tension of said spring, means outside of said frame for increasing the tension of said

spring, means also outside of said frame for releasing said tension, a conductor leading into said frame, a conductor wound on said reel and leading out of said frame, and
5 means for maintaining electrical connection between said conductors during winding and unwinding action.

In testimony whereof we have hereunto

subscribed our names in the presence of two subscribing witnesses.

HARRY L. HAYDEN.

ARTHUR N. SANFORD.

Witness for Harry L. Hayden:

W. K. TRIPPET.

Witness for Arthur N. Sanford:

HOWARD H. HANSEN.