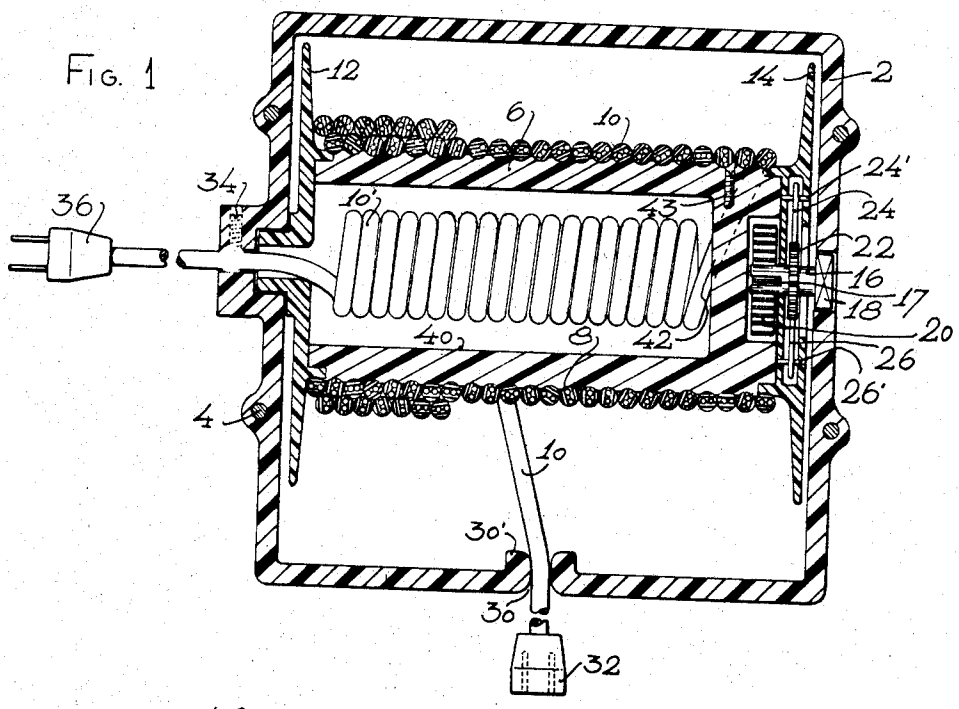
March 12, 1968 S. LADANY 3,372,887

RETRACTABLE CORD DEVICE

Filed March 23, 1966

FIG. 1



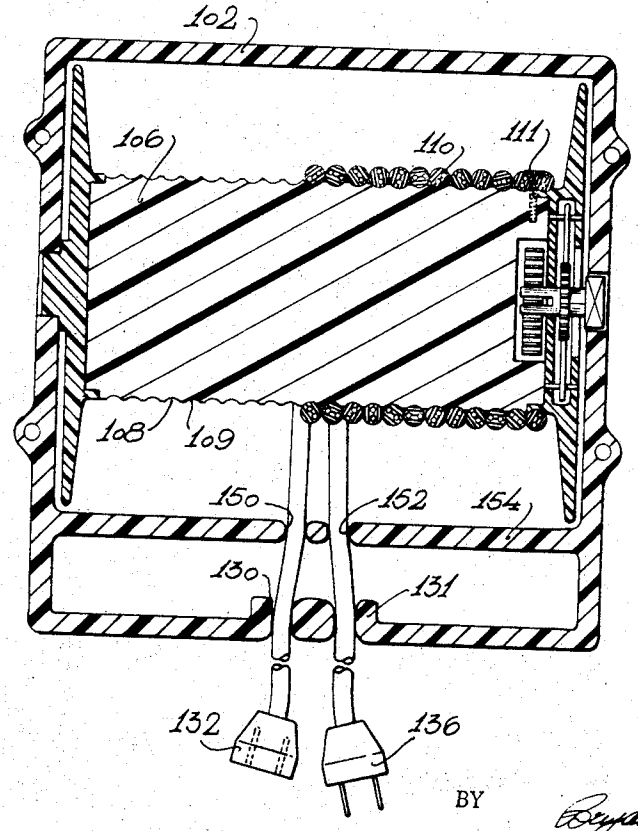


FIG. 2

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United States Patent Office 3,372,887
Patented Mar. 12, 1968

3,372,887

RETRACTABLE CORD DEVICE

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Filed Mar. 23, 1966, Ser. No. 536,695
4 Claims. (Cl. 242—107.13)

ABSTRACT OF THE DISCLOSURE

A retractable cord device comprises a housing, a spring-loaded drum rotatably mounted within the housing, a cord adapted to be wound upon the drum, the drum being formed with a spiral groove for the reception of the cord. The housing is formed with a shaped orifice through which the cord passes as it is unwound from the drum, the orifice including an inwardly extending annular lip which snugly engages the cord and applies a resistance to the passage of the cord. In a modification, the mid-point of the cord is fixed to the drum and the two ends of the cord pass through a pair of adjacently-disposed orifices. A cord guide is provided between the orifices and the drum for displacing the cord ends from the perpendicular as they pass through the orifices.

The present invention relates to retractable cord devices and is particularly, but not exclusively, useful with respect to electrical cords.

An object of the invention is to provide a winding drum type of retractable cord device which is simple in construction and efficient in operation. A further object is to provide such a device particularly useful for electrical cords in that it does not require a sliding contact arrangement for maintaining electrical continuity through the cord while the winding drum is rotated.

The various novel features of my invention are set forth with particularity in the appended claims, but will be better understood by reference to the accompanying drawings, in which FIGS. 1 and 2 are longitudinal sectional views of two forms of retractable cord devices constructed in accordance with the invention.

The device of FIG. 1 includes a cylindrical housing **2** which is preferably made of two parts held together by fasteners **4**. Disposed within the housing is a drum **6** formed with a spiral groove **8** on its peripheral surface for the reception of the electrical cord **10** adapted to be wound upon, and unwound from, the drum during the retraction and extension of the cord. The drum **6** is formed with a pair of vertical end disks or plates **12** and **14**, plate **12** being journalled within a recess in housing **2**, and plate **14** being journalled on a pin **16** formed with a square head **18** received in a square-opening in the housing **2** to prevent the rotation of the pin. A coil spring **20** is disposed within a recess formed at the end of drum **6** adjacent to plate **14**. One end of the spring is fixed to pin **16** by being inserted within slot **17** thereof, and the other end is fixed to the drum, the spring thus storing energy upon rotation of the drum in the unwinding direction and releasing the energy to drive the drum in the winding direction. For locking the drum against rotation when the cord is extended, there may be provided a toothed wheel **22** fixed to pin **16** and a pair of pawls **24** and **26** pivotably mounted on pins **24'** and **26'** carried by end plate **14**. Such locking means are well known and are effective to lock the drum against rotation and to release the drum when a quick snap is given to the cord, permitting it to be retracted by spring **20**.

Housing **2** is formed with a shaped orifice **30** through which one end of the cord **10** (i.e. the end containing the socket **32**) passes as it is unwound from the drum. Orifice **30** has a diameter substantially equal to that of cord

10 and is shaped with an inwardly extending annular lip **30'** which snugly engages the cord and applies a resistance to the cord as it passes through the orifice. That is, as the cord is pulled through the orifice by the spring-loaded drum while being rewound onto the drum, it makes continuous frictional contact wtih the lip of the orifice, except for the very short time it is substantially perpendicular to the orifice as it passes therethrough from the drum. The resistance produced by this frictional contact is sufficient so that the cord is placed under tension as it is retracted within the housing, and therefore will more positively seat itself within groove **8** on the drum as it is retracted. When the cord has completed one layer of windings on the drum, the windings themselves form a spiral groove upon which the second layer of windings will form, and so on until the complete cord is wound upon the drum.

The opposite end of the cord **10** is fixed to the housing by fastener **34** and terminates in an electrical plug **36**.

Drum **6** is formed with a cylindrical cavity **40** in which is disposed a span **10'** of the cord between its plug **36** (i.e. the fixed end) and the first winding on drum **6**. The end of span **10'** opposite to the plug end passes through a bore **42** in the drum to its peripheral surface and is fixed by a fastener **43**. Span **10'** is given a preformed spiral in the direction opposite to the unwinding direction of the drum. In this manner, even though one end of the cord is fixed the drum may be rotated for extending or retracting the opposite end of the cord without the need of a sliding contact arrangement between the cord ends. By giving the span a spiral in the direction opposite to the unwinding direction of the drum, the drum may be rotated a large number of rotations before the span of the cord becomes taut.

FIG. 2 illustrates another device constructed in accordance with the invention. In this device, the need of sliding contacts is avoided by having both ends of the cord wound and unwound from the drum **106**. For this purpose, housing **102** includes a pair of shaped orifices **130** and **131**, both similar to orifice **30**, through which orifices the socket end **132** and the plug end **136** of the cord pass as the two ends are simultaneously withdrawn from the device. The peripheral surface of drum **106** is formed with a pair of spiral grooves **108** and **109** which receive the two ends of the cord as they are wound upon the drum. The mid-point of the cord is fixed to the drum by a fastener **111**. The remaining structure of the drum, particularly its end plates, spring, and locking elements, may all be the same as in the FIG. 1 embodiment.

In FIG. 2, there is also provided a cord guide disposed between the shaped orifices and the drum. The cord guide displaces from the perpendicular the exit angle of the cord as it passes through its orifice, thereby increasing the resistance and tension of the cord during its retraction. Actually, in FIG. 2 there are two such cord guides, one for each of the two ends of the cord wound and unwound from the drum. The cord guides in the FIG. 2 embodiment are constituted by a pair of openings **150** and **152** in a plate or partition **154** formed by the housing between the drum **106** and the shaped orifices **130** and **131**. The openings **150** and **152** are disposed so that they displace their respective ends of the cord from the perpendicular as these ends pass through orifices **130** and **131**. The resistance on the ends of the cord is thereby increased, and therefore the cord will more positively seat within the grooves **108** and **109** as the cord is retracted by the drum spring.

A similar type of cord guide could of course also be provided in the FIG. 1 design.

It is thus seen that in both embodiments, an even tension is applied to the cord as it rewinds itself upon the drum thus assuring that it will rewind properly. Also,

there is no necessity for the provision of sliding contacts, such as slip rings or the like, since in FIG. 1 the span 10' within the cavity in drum 6 permits the rotation of the drum even though one end of the cord is fixed, and in FIG. 2, both ends of the cord are unwound and wound at the same time.

Many changes, variations and applications of the illustrated embodiments may be made within the scope of the invention as defined in the following claims.

I claim:

1. A retractable cord device comprising a housing, a drum rotatably mounted within said housing, a cord adapted to be wound upon and unwound from said drum for retracting and extending the cord, said drum being formed with a spiral groove for the reception of said cord when wound thereupon and spring means adapted to store energy upon rotation of the drum in the unwinding direction and to release energy to drive the drum in the winding direction, said housing being formed with an orifice through which one end of the cord passes as it is unwound from the drum, said orifice having a diameter substantially equal to that of the cord and being shaped with an inwardly extending annular lip which snugly engages the cord and applies a resistance to the passage of the cord therethrough so that the cord is placed under tension as it is retracted within the housing and wound onto the spiral groove of said drum.

2. A device as defined in claim 1, wherein said housing includes a pair of said shaped orifices formed adjacent to each other, the cord being fixed at its mid-point to said drum, and both ends of the cord being wound upon and unwound from said drum at the same time and passing through said pair of shaped orifices as said cord is retracted and extended.

3. A device as defined in claim 2, wherein said housing includes a cord guide disposed between said shaped orifices and drum, said cord guide displacing from the perpendicular the exit angle of both ends of the cord as they pass through the orifices thereby increasing the said resistance and tension of the cord.

4. A device as defined in claim 1, wherein the opposite end of said cord is fixed to said housing and wherein said drum is formed with an internal cavity and with a bore communicating same with the peripheral surface of the drum, a spiralled span of the cord at said opposite end being disposed within said cavity and extending through said bore to the peripheral surface of said drum, permitting the drum to be rotated for extending or retracting said one end of the cord while said opposite end is fixed to said housing.

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