United States Patent

[11] 3,630,466

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[21] Appl. No. 874,454
[22] Filed Nov. 6, 1969
[45] Patented Dec. 28, 1971
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[54] LATCH MECHANISM FOR A RETRACTILE CORD REEL

6 Claims, 2 Drawing Figs.

[52] U.S. Cl. 242/107.7
[51] Int. Cl. B65h 75/48
[50] Field of Search 242/107, 107.1, 107.11, 107.12, 107.2, 107.3, 107.5, 107.6, 107.7; 191/12, 12.2

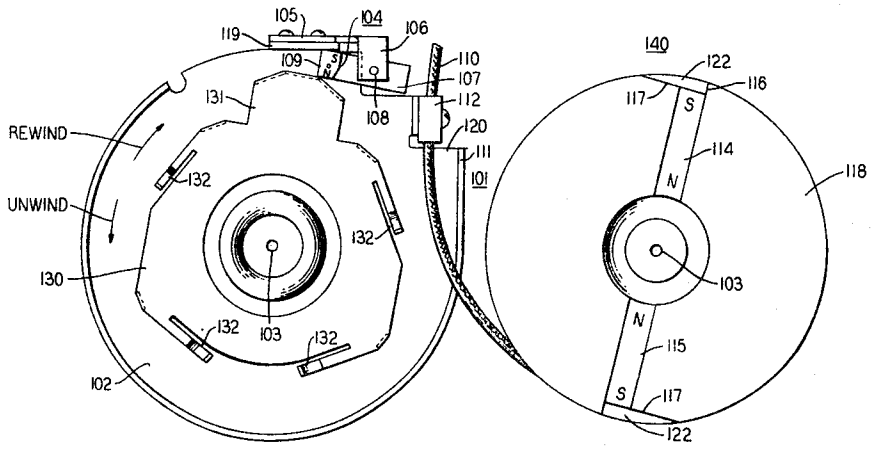
[56] References Cited

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3,462,095	8/1969	Hilsinger, Jr. et al.	242/107.7
3,528,624	9/1970	Tamarin	242/107.7

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ABSTRACT: In a spring-loaded retractile cord arrangement for an electrical appliance or telephone handset, a magnetically actuated catch mechanism is employed to arrest the cord at any preselected position without requiring the user to work against spring tension while holding the cord in that preselected position. Inadvertent locking during the rewind cycle is prevented by inhibiting the latch mechanism with a cam arrangement.



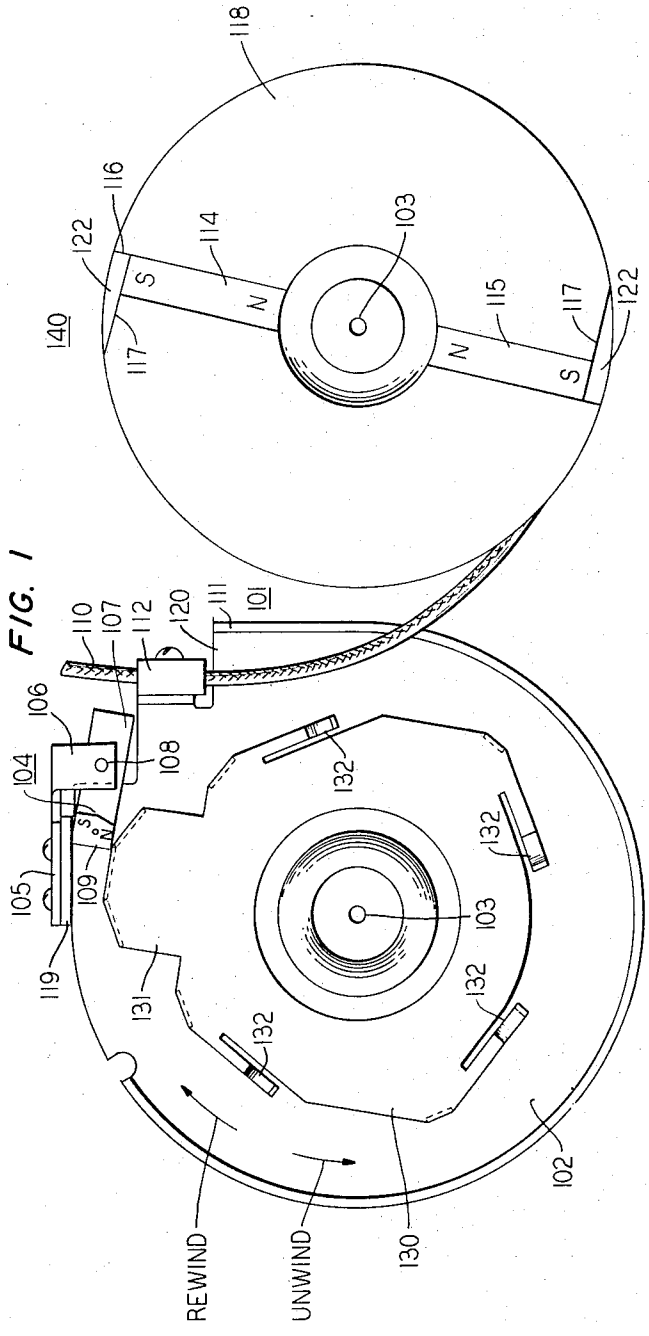


FIG. 1

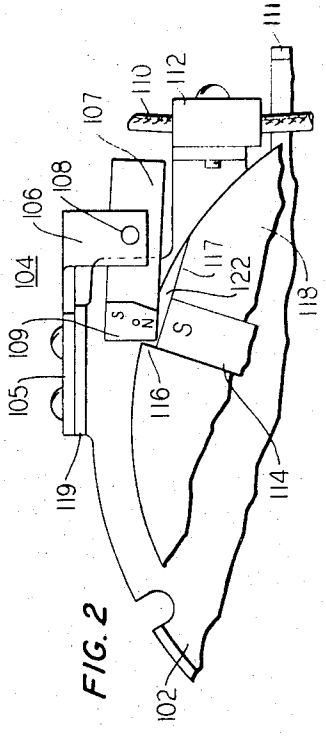


FIG. 2

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LATCH MECHANISM FOR A RETRACTILE CORD REEL

BACKGROUND OF THE INVENTION

1. Field of the Invention

This invention relates to spring-loaded reels for automatically retracting and storing lines or cords and, particularly, to automatic catches for such devices that serve to hold the cord in any particular position of travel at the option of the user without placing tension on the cord.

2. Description of the Prior Art

Various forms of tension-relieving catch mechanisms for retractile cords are known in the prior art including the type commonly employed on roll-up window shades. Gravity operated catches are also employed on various retractile cord arrangements. For overall reliability and low cost, the type of catch or latching mechanism disclosed by H. A. Hilsinger, Jr. in U.S. Pat. No. 3,378,214, issued Apr. 16, 1968, is preferred over other conventional types, particularly for electrical appliances or telephone set cords. Hilsinger discloses a reel comprising a pair of cord retaining flanges, and an integral connecting but is affixed to a stationary mounting or reel casing. One or more magnets are mounted in radial fashion near the periphery of one of the reel flanges and a spring-loaded, pivotally mounted, magnetically attractable catch is affixed to the reel casing. When one of the reel magnets moves past the catch as the wheel rotates, magnetic force is exerted on the catch to bring it into arresting engagement with a detent on the reel. Engagement is designed to occur, however, only if the reel is rotating in the windup or reel-in direction and further, only if the speed of the reel magnet past the catch is sufficiently slow to permit the magnetic force to overcome the spring bias and the inertia of the catch that normally maintains the catch in the nonoperated on unengaged position.

One problem encountered in the operation of the described magnetic latching mechanism is that it is exceedingly difficult to achieve a perfect balance of forces so that latching occurs only when desired. In U.S. Pat. No. 3,462,095 issued to H. A. Hilsinger, Jr. and W. J. Kindermann on Aug. 19, 1969, the spring loading of the catch has been replaced by controlling its action with a small magnet affixed to the catch pawl. Here again, however, ideal force balancing is difficult to achieve and inadvertent locking may occur as a result. Additionally, whether spring or dual magnetic locking control is employed, the catch or latch pawl repeatedly clicks against the detented flange during reel-out which creates undesirable noise.

Accordingly, an object of the invention is to prohibit inadvertent locking in a retractile cord reel. Another object is to eliminate the ratchetlike noise that is associated with the catch mechanism of certain retractile cord reels.

SUMMARY OF THE INVENTION

The stated objects and additional objects are achieved in accordance with the principles of the invention by a modification of the basic catch arrangements of the earlier Hilsinger patents cited and described above. The modification in accordance with the invention involves the use of a cam mounted on the inside face of the reel that normally turns with the reel by means of friction between the reel face and the cam. The operation of the cam in both the unwind and windup modes is such that the pawl of the latch mechanism is inhibited or prevented from engaging a detent on the wheel unless positive latching is initiated by the operator. Moreover, with the latch normally held positively out of engagement, free-wheeling rotation of the wheel in either direction is made possible and the annoyance of noisy latch clicking is eliminated.

BRIEF DESCRIPTION OF THE DRAWING

FIG. 1 is a partially exploded view of a retractile cord reel mechanism, in accordance with the invention, shown with the latch inhibited by a cam; and

FIG. 2 is a sketch, partially broken away, of the latch mechanism employed in a retractile cord reel mechanism in accordance with the invention, shown in the latched condition.

DESCRIPTION OF AN ILLUSTRATIVE EMBODIMENT

In FIG. 1 a cord **110**, which may be a telephone handset cord for example, is shown protruding from a cord reel assembly **101**. The cord reel assembly **101** includes a cord reel **140** comprising a pair of cord-retaining flange members, only one of which **118**, the inside member, is shown. In the drawing the cord reel **140** has been removed from and folded outwardly from a cover disc **102** which, when the apparatus is fully assembled, is fitted over the reel **140**. The reel **140** is mounted for rotational movement about a center shaft or hub **103**. Inside the cover disc **102**, and also mounted on the hub **103** is a latch-inhibiting cam **130** with a plurality of spring tabs **132** bent outwardly against the inside of the cover **102** so that the cam **130** is spring-biased for a friction drive relation with the inside of the flange **118**.

The basic construction of the reel **140** may be substantially identical to any one of a number of conventional cord-retracting reels having internally mounted conducting spring members that terminate the individual conductors of the cord **110**. Such springs typically form a part of the electrical circuit if the cord is a telephone set or an electrical appliance cord. Reels of this type typically exert a steady retracting force on the cord irrespective of the amount of the cord accommodated by the reel and irrespective of the particular rotational position of the reel. A reel of this general form is shown in U.S. Pat. No. 1,247,358 issued to J. Zwilling on Nov. 20, 1917.

As shown in FIG. 1, the outer casing or cover member **102** includes a portion **111** which forms an accommodating entrance slot **120** for the cord **110**. The cord **110** is further positioned by a guide bracket **112** which is an extension of the outer casing or cover **102**. Mounted on the reel cover **102** is a catch or latch assembly **104** that includes a cantilever mounting strip **105**, a vertical bracket **106** and a pawl **107** mounted for pivotal movement about a pin **108**.

A small magnet **109** is affixed to the left or operating end of the pawl **107**. Alternatively, the magnet **109** may be constructed as an integral part of the pawl and may, for example, be mounted in an accommodating aperture of the pawl. As shown, the poles of the magnet **109** extend respectively to the bottom and top of the pawl **107**. The bracket **119** is preferably constructed on a magnetic material such as steel, for example. As a result, the normal or unlatched condition of the pawl **107** is as shown in FIG. 1, with the magnet **109** attracted to and held against the bracket **119**.

Also shown in FIG. 1 are two diametrically opposed bar magnets **114** and **115** mounted radially on the inside surface of the flange **118**. Alternatively, it may be desirable to mount the flanges on an auxiliary superimposed flange rather than directly upon one of the line-retaining flanges. At the point on the periphery of the flange **118** where the end of the magnet **114** is exposed, the edge is notched by a recessed area **122** bounded by a flat cam portion **117** and a vertical stop portion or shoulder **116**. A similar recessed portion or notch is provided at the exposed end of the magnet **115**.

When pull force is exerted on the cord **110** to unwind it from its accommodating reel **140**, the reel rotates to a point at which one of the magnets **114** or **115** moves underneath the magnet **109** of the pawl **107**. If the reel **101** is rotated with sufficient speed, insufficient time is permitted for the attractive force between the unlike poles of the magnet **109** and the magnets **114** or **115** to overcome the catch inertia and the magnetic attraction between the magnet **109** and the bracket **119**. Accordingly, the pawl, under the conditions described, remains in its unoperated position as illustrated in FIG. 1. In accordance with the invention, as the cord **110** is unwound to rotate the reel **140** counterclockwise, the cam **130** by virtue of its frictional drag against the reel also rotates counterclockwise. After approximately one revolution the cam surface of the cam lobe **131** is intercepted by the projecting lip on

the pawl **107**. As unwind continues, the cam **130** remains in position thus inhibiting pawl action irrespective of the unwinding speed. As a result, the ratchetlike clicking noise that might otherwise be generated by the pawl **107** momentarily striking the flat portion **117** of the notches **122** is eliminated. When the cord **110** is withdrawn to the desired length, it is permitted to rewind slowly in the clockwise direction. The cam **130** also rotates clockwise to clear the pawl inhibit condition.

In view of the foregoing description, it is evident that as the cord **110** is released gradually from a fully or partially unwound condition, the rewind springs, not shown, operate to rotate the reel **140** in the clockwise or rewind direction, and the pawl **107** comes into arresting engagement with the radial surface **116** of one of the notches **122**, as shown in FIG. **2**, with the result that the user is no longer required to maintain holding force on the cord **110** in order to prevent further rewind.

If the cord **110** is pulled sharply and released abruptly from a fully or partially wound condition, the reel **140** moves to a position where neither of the magnets **114** or **115** is in close proximity to the pawl **107**. At this point the speed of rewind should be sufficiently great to prevent the pawl **107** from swinging downwardly into an arresting engagement with the flange **118** when the next notch passes under the latch. In accordance with the invention, the operation of the cam **130** ensures a free-wheeling action during the rewind mode irrespective of rewind speed. Specifically, free-wheeling rewind occurs by virtue of the fact that the reel **140** and the cam **130** both rotate clockwise until the surface of the cam lobe **131** impinges on the pawl **107** stopping the cam and inhibiting further pawl action. The reel **140** continues to rewind in free-wheeling, which is to say that there is no possibility of detent action, unless the reel is intentionally stopped or until the cord is completely rewound. Additionally, as in the unwind mode, the ratchetlike clicking noise that would otherwise be caused by interaction of the pawl **107** and the rotating magnets **114** and **115** is once again avoided. Despite the free-wheeling feature, however, the latch **107** may be engaged at any time during rewind by giving the cord **110** a sharp tug and allowing it to rewind slowly to a detent position.

It is evident that in the absence of a latch-inhibiting pawl being employed in accordance with the invention, the opposing magnetic forces which tend to maintain the pawl in the unoperated condition and which also tend to bring it into arresting engagement with the reel are critical in determining the speed at which the latch will operate. This criticality is in effect eliminated by the described pawl-inhibiting action of the cam **130**.

Although two latch-operating magnets **114** and **115** are shown in the embodiment of the invention disclosed herein, either a single magnet or several magnets similarly disposed may be employed, the particular number selected being determined primarily by reel size, cost and the degree of rewind desired before the catch operates when the cord is released from a random position.

It is to be understood that the embodiment described herein is merely illustrative of the principles of the invention. Various modifications may be made thereto by persons skilled in the art without departing from the spirit and scope of the invention.

What is claimed is:

1. A retractile cord reel, comprising, in combination, a spring-loaded reel member mounted for rotational movement, a cover member, a latch member mounted for pivotal movement on said cover member, means for normally biasing said latch member out of arresting engagement with said reel member, means responsive to the release of said reel from an engaged condition with said latch for inhibiting the operation of said latch thereby to enable said reel to rewind in a free-wheeling mode, wherein said inhibiting means comprises a cam coaxially mounted for rotational movement with said reel member, said cam being spring loaded against said reel thereby to provide friction drive of said cam by said reel member, said friction drive being interrupted by a lobe of said cam coming into inhibiting relation with said latch.

2. A retractile cord reel, comprising, in combination, a spring-loaded reel member mounted for rotational movement, a cover member, a latch member mounted for pivotal movement on said cover member, means for normally biasing said latch member out of arresting engagement with said reel member, means responsive to the release of said reel from an engaged condition with said latch for inhibiting the operation of said latch thereby to enable said reel to rewind in a free-wheeling mode, wherein said inhibiting means comprises a cam coaxially mounted for rotational movement with said reel member, said cam being spring loaded against said reel thereby to provide friction drive of said cam by said reel member, said friction drive being interrupted by a lobe of said cam coming into inhibiting relation with said latch, wherein said biasing means comprises magnetic means.

3. A retractile cord reel comprising, in combination: a spring-loaded reel member mounted for rotational movement; a fixed cover member; a latch, engageable with said reel for arresting movement of said reel, pivotally mounted on said cover member; magnetic means mounted on said reel for exerting an attractive force on said latch at preselected points during the rotational movement of said reel; a cam mounted for rotational movement normally in friction drive relation with said reel; said cam including a lobe portion for engaging said latch thereby to prevent engagement with said reel during a free-wheeling reel-in or reel-out mode irrespective of said magnetic means.

4. Apparatus in accordance with claim **3** wherein said cam includes spring tab members bearing against the inside of said cover member thereby to force said cam against said reel in friction drive relation, said friction drive relation being overcome whenever said lobe rotates against said latch.

5. Apparatus in accordance with claim **3** wherein said latch includes a magnet poled for mutual attractive relation with said magnetic means on said reel.

6. Apparatus in accordance with claim **5** wherein said reel member includes at least one notched portion on the edge thereof, coinciding with the location of said magnetic means to facilitate engagement with said latch.

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