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L. P. BORKOSKI

2,393,138

CORD WINDER

Filed April 27, 1944

Fig. 1

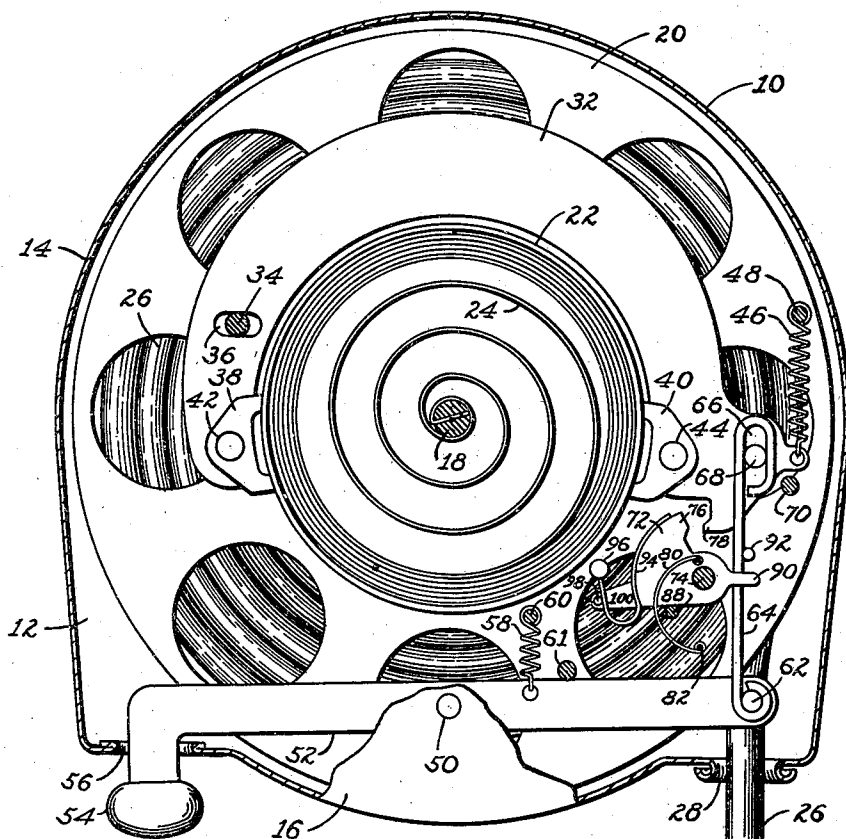


Fig. 2

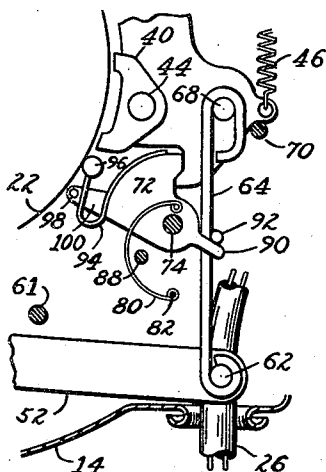
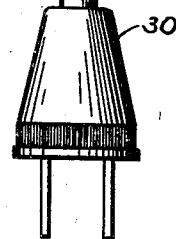
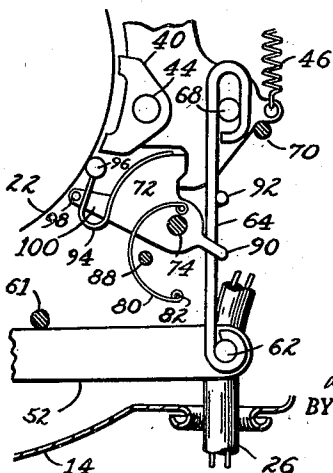


Fig. 3



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2,393,138

CORD WINDER

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Application April 27, 1944, Serial No. 532,999

11 Claims. (Cl. 242-107)

My invention relates to a cord winder which may be used for winding up any flexible cord as, for instance, the electric cord of various household appliances such as vacuum cleaners.

In application Serial No. 529,440, filed April 4, 1944, by Arnold H. Beede, there is shown a cord winder of this nature which is provided with a member sensitive to the direction of movement of the cord for controlling the application of a brake which, when applied, prevents rotation of the drum under the influence of the rewind spring. This member includes a washer of felt or other suitable material through which the cord runs, with sufficient friction to displace the washer in the direction of movement of the cord.

In accordance with the present invention, this felt washer is replaced by a preferably resiliently supported member in sliding engagement with a rotating portion of the reel, such as the surface of the brake drum, so as to be sensitive to the direction of such rotation. This member is so arranged as to be removed from engagement with the reel when the cord is being unwound to thereby entirely relieve frictional resistance to such unwinding and to reduce wear. Also, in the Beede device, any dirt or dust adhering to the cord as it is drawn into the winder, is wiped off and collected by the felt washer with the result that the frictional resistance between the washer and the cord may change as the former becomes fouled. In the present application, on the other hand, any dirt adhering to the cord has no effect on the operation of the direction sensitive device.

As was the case in the Beede application, the brake of the cord winder in accordance with the present invention may be released by a momentary impulse, after which it remains released until the cord is completely wound on the reel, or until winding the cord is stopped by grasping it and pulling it out slightly.

Further objects and advantages of my invention will be apparent from the following description considered in connection with the accompanying drawing which forms a part of this specification and of which:

Fig. 1 is a plan view of a preferred embodiment of my invention;

Fig. 2 is a view of a portion of the device shown in Fig. 1, but with certain of the parts in a different position; and

Fig. 3 is a view similar to Fig. 2 but with certain of the parts in a still different position.

Referring to the figures, reference character 10 designates generally a housing having a back wall 12, a curved side wall 14, and a top wall 16.

The latter, which serves as a mounting plate for certain parts of the apparatus, is shown chiefly broken away in order to reveal the mechanism of the cord winder.

Rigidly secured to both the front and back walls is a shaft 18 on which is rotatably mounted a cord reel 20. Fixed to the reel is a brake drum 22. A spiral spring 24 has its inner end anchored to the stationary shaft 18, while its outer end is secured to a rotating part of the reel, such as the inner surface of the brake drum 22.

A cord 26 is adapted to be wound on the reel 20 and passes in and out of the casing 10 through an opening 28 formed in the side wall 14. This cord is provided with an enlargement at the outer end thereof which is of greater diameter than that of the opening 28. As shown, this enlargement consists of the usual electric plug connector 30.

An arcuate brake arm 32 partially surrounds the drum 22 and is restrained against rotation by means of a pin 34 which is carried by the front wall 16, and which engages an elongated slot 36 formed in the arm near one end thereof, thus permitting sideways movement and pivoting of the arm. The arm carries a pair of brake shoes 38 and 40 which are shown as separate elements pivotally mounted on the arm by means of pins 42 and 44, respectively. However, pivotal movement between the shoes and the arm is not essential and hence the shoes could be made integral with the arm. As is clearly shown in Fig. 1, the centers of the brake shoes are disposed a little more than 180° apart around the drum and the distance between the faces of the two shoes is slightly less than the diameter of the drum. A coil spring 46 is connected between the end of the arm 32 remote from the pin 34, and a stationary pin 48 carried by the front wall 16. This spring urges the right end of arm 32, as viewed in Fig. 1, upwardly and hence tends to press the shoes 38 and 40 against the surface of the brake drum 22.

Pivotally mounted on a pin 50 carried by the front wall 16 is a brake releasing arm 52 which is provided with a manually operable button or the like 54 which projects through an opening 56 in the side wall 14. A coil spring 58 is connected between the arm 52 and a pin 60 carried by the front wall, and tends to rotate the arm in a counter-clockwise direction, such rotation being limited by a stop 61 projecting from the front wall. The end of the arm 52 opposite from the button 54 is provided with a pin 62 to which is connected one end of a link 64. The opposite end of this link is formed with an elongated slot 66 which

embraces a pin 68 secured to the brake arm 32, the pin and slot providing a certain amount of lost motion between the arm and the link. A stop 70 is carried by the front wall 16 and is disposed so as to limit movement of the arm 32 under the action of the lever 52 and link 64.

A catch member 72 is pivotally mounted on a pin 74 carried by the front wall and is provided with a projection 76 which is adapted to engage a similar projection 78 formed on the end of the brake arm. An over-center spring 80 is connected between the catch 72 and a pin 82 carried by the front wall 16, the tension of the spring tending to draw the opposite ends thereof towards each other. In the position of the parts shown in Fig. 1, the center of the pin 74 being to the right of the line connecting the ends of the spring 80, the spring tends to rotate the catch 72 in a counter-clockwise direction, which rotation is limited by means of a stop 88 carried by the front wall 16. However, in the position of the parts shown in Fig. 2 or 3, the center of the pin 74 is to the left of this line, and hence the spring 80 tends to rotate the catch in a clockwise direction. Catch 72 is provided with an extension 90 which is located so as to be struck by a projection 92 on link 64 when the latter is moved downwardly, to thus pivot the catch in a clockwise direction so as to engage the hooks 76 and 78.

Secured to the catch 72 is a resilient arm 94 of generally U shape. The free end of this arm carries a short cylindrical rod 96 which, in the position of the parts shown in Figs. 2 and 3, is urged into frictional engagement with the drum 22 by the resiliency of the arm. However, in the position of the parts shown in Fig. 1, the member 96 is maintained out of contact with the drum, due to the fact that the left hand portion of resilient arm 94 bears against a pin 98 carried by ears 100 extending from the catch 72.

In Fig. 1 the brake is shown in applied position so as to prevent further winding up of the cord under the influence of spring 24. The coil spring 46 urges the right hand end of the brake arm 32 upwardly so as to move the shoe 40 into frictional engagement with the drum. With the parts in this position, any tendency of the drum to rotate in a counter-clockwise direction under the influence of the spring 24, tends to further lift the brake shoe 40, thus forcing it more tightly against the surface of the drum. The reaction to this force is taken by the brake shoe 38, and thus this shoe is held in frictional engagement with the drum. Incidentally, the greater portion of the force which applies the shoes to the drum, thus is not transmitted to the shaft 18, but is carried by the brake arm 32.

With the parts in the position shown in Fig. 1, the cord 26 may be unwound by grasping it and pulling it outwardly through the opening 28. This causes the reel 20, together with the brake drum 22, to rotate in a counterclockwise direction. This rotation of the drum tends to move the shoe 40 downwardly and away from the drum, thus relieving the frictional engagement between this shoe and the drum, the tension of the spring 46 being light enough so that it is substantially overcome by the tendency of the shoe 40 to be moved downwardly by the rotation of the drum. Thus, the brake, when initially applied by the spring 46, is self-energizing in one direction, but is self-deenergizing in the opposite direction.

The cord may thus be pulled out to any desired extent, the accompanying rotation of the

reel 20 serving to wind up the spring 24. When the outward pull on the cord is relieved, the spring 24 immediately starts to rewind it by rotating the reel in a counter-clockwise direction, but as above described, the spring 46 applies the shoe 40 to the drum and tendency of the drum to rotate in a counter-clockwise direction further increases the braking effect.

When it is desired to wind up the cord, the button 54 is momentarily depressed. This pivots the lever 52 in a clockwise direction, thus moving the link 64 downwardly from the position shown in Fig. 1 to that illustrated in Fig. 2. This movement of the link causes the upper end of the slot 66 therein to engage the pin 68 so as to move this end of the brake arm downwardly, thus completely removing the shoe 40 from contact with the brake drum. At the same time, the projection 92 on the link 64 strikes the projection 90 on the catch 72, thus pivoting the latter in a clockwise direction so as to engage the hooks 76 and 78. This pivoting is first resisted by the over-center spring 80, but is thereafter aided by the spring, which hence tends to maintain the hooks 76 and 78 in engagement. Pivoting of the catch 72 also brings the friction member 96 into engagement with the drum 22 and rotation of this drum in a counter-clockwise direction as the cord is wound up, tends to move the member 96 upwardly, thus aiding the over-center spring 80 in maintaining the hooks 76 and 78 in engagement. Consequently, the button 52 may be released, whereupon the spring 58 pivots the lever 52 in a counter-clockwise direction, the lost motion provided between the pin 68 and the slot 66 in the link 64 permitting this movement of the lever without moving the brake arm 32.

The brake is thus held in released position by the catch 72 as long as the drum 22 is rotating in a counter-clockwise direction. Consequently, the cord will be completely wound up unless the operator stops it by grasping the cord. If this is done and the cord is pulled out slightly so as to rotate the drum 22 in a clockwise direction, the frictional engagement between the drum and the member 96 is sufficient to move the latter downwardly, thus pivoting the catch 72 in a counter-clockwise direction against the force of the over-center spring 80. This disengages the hooks 76 and 78, thus permitting the spring 46 to move the brake shoe 40 into engagement with the drum. If the pull on the cord ceases, the rewind spring 24 starts to rotate the reel and drum in a counter-clockwise direction, thus energizing the brake as above described.

It will be noted that, during unwinding of the cord, the friction member 96 is completely removed from contact with the brake drum so that it imposes no resistance to movement thereof. Furthermore, it is entirely out of contact with the cord and consequently dirt adhering to the latter has no effect on the action of the direction sensitive member 96.

While I have shown and described one more or less specific embodiment of my invention, it is to be understood that this has been done for purposes of illustration only, and that the scope of my invention is not to be limited thereby, but is to be determined from the appended claims.

What I claim is:

1. In a cord winder, a reel, a cord, means for rotating the reel in a direction to wind the cord thereon, brake means operative for restraining rotation of said reel only in said direction, manually operable means for rendering said braking

means inoperative to thereby permit winding of the cord, and means sensitive to the direction of rotation of said reel for maintaining said brake means inoperative during rotation in said direction and for rendering said brake means operative in response to rotation of the reel in the opposite direction.

2. In a cord winder, a reel, a cord, means for rotating the reel in a direction to wind the cord thereon, brake means operative for restraining rotation of said reel only in said direction, manually operable means for rendering said braking means inoperative to thereby permit winding of the cord, means frictionally engageable with a rotating portion of said reel for maintaining said brake means inoperative during rotation in said direction and responsive to an initial rotation in the opposite direction for rendering said brake means operative, and means for maintaining the last-mentioned means out of frictional engagement with said rotating portion during continued rotation in said opposite direction.

3. In a cord winder, a reel, a cord, means for rotating the reel in a direction to wind the cord thereon, brake means operative for restraining rotation of said reel only in said direction, manually operable means for rendering said braking means inoperative to thereby permit winding of the cord, a member frictionally engageable with a rotating portion of said reel for maintaining said brake means inoperative during rotation in said direction, means responsive to operation of said manually operable means for moving said member into frictional engagement with said rotating portion, said member being responsive to an initial rotation in the opposite direction for rendering said brake means operative, and means for maintaining said member out of frictional engagement with said rotating portion during continued rotation in said opposite direction.

4. In a cord winder, a reel, a cord, a spring for rotating the reel in a direction to wind the cord thereon, a brake drum rotatable with said reel, a brake member frictionally engageable with said drum for restraining rotation of said reel, means tending constantly to apply said member to said drum, a manually operable member for releasing said brake member from said drum, catch means for maintaining said brake member released from said drum, and means sensitive to rotation of said reel in a direction unwinding the cord therefrom for releasing said catch means to thereby permit the first-mentioned means to apply said brake member to said drum.

5. In a cord winder, a reel, a cord, a spring for rotating the reel in a direction to wind the cord thereon, a brake drum rotatable with said reel, a brake member frictionally engageable with said drum for restraining rotation of said reel, means tending constantly to apply said member to said drum, a manually operable member for releasing said brake member from said drum, catch means for maintaining said brake member released from said drum, means frictionally engageable with said drum and sensitive to initial rotation of said reel in a direction unwinding the cord for releasing said catch means to thereby permit the first-mentioned means to apply said brake member to said drum, and means for maintaining the last-mentioned means out of frictional engagement with said drum during continued rotation of the reel in the direction unwinding the cord.

6. In a cord winder, a reel, a cord, a spring for rotating the reel in a direction to wind the cord thereon, a brake drum rotatable with said reel,

a brake member frictionally engageable with said drum, spring means constantly tending to apply said member to said drum, a manually operable member for releasing said brake member from said drum, a catch member engageable with said brake member for maintaining the latter released from said drum, means responsive to operation of said manually operable member for engaging said catch member with said brake member, and means sensitive to rotation of said reel in a direction unwinding the cord for disengaging said catch member from said brake member to thereby permit said spring means to apply the brake member to said drum.

7. In a cord winder, a reel, a cord, a spring for rotating the reel in a direction to wind the cord thereon, a brake drum rotatable with said reel, a brake member frictionally engageable with said drum, spring means constantly tending to apply said member to said drum, a manually operable member for releasing said brake member from said drum, a catch member engageable with said brake member for maintaining the latter released from said drum, means responsive to operation of said manually operable member for engaging said catch member with said brake member, and means sensitive to rotation of said reel in a direction winding the cord for maintaining said catch member in engagement with said brake member and sensitive to rotation of said reel in the opposite direction for disengaging said catch member from said brake member to thereby permit said spring means to apply the brake member to said drum.

8. In a cord winder, a reel, a cord, a spring for rotating the reel in a direction to wind the cord thereon, a brake drum rotatable with said reel, a brake member frictionally engageable with said drum, spring means constantly tending to apply said member to said drum, a manually operable member for releasing said brake member from said drum, a catch member engageable with said brake member for maintaining the latter released from said drum, means responsive to operation of said manually operable member for engaging said catch member with said brake member, means frictionally engageable with said drum and sensitive to rotation of said reel in a direction winding the cord for maintaining said catch member in engagement with said brake member and sensitive to initial rotation of said reel in the opposite direction for disengaging said catch member from said brake member to thereby permit said spring means to apply the brake member to said drum, and means for maintaining the last-mentioned means out of frictional engagement with said drum during continued rotation of the reel in said opposite direction.

9. In a cord winder, a reel, a cord, a spring for rotating the reel in a direction to wind the cord thereon, a brake drum rotatable with said reel, a brake member frictionally engageable with said drum, spring means constantly tending to apply said member to said drum, a manually operable member for releasing said brake member from said drum, a catch member engageable with said brake member for maintaining the latter released from said drum, means responsive to operation of said manually operable member for engaging said catch member with said brake member, a resilient arm carried by said catch member frictionally engageable with said drum and sensitive to initial rotation of said reel in a direction unwinding the cord for disengaging said catch member from said brake member to thereby permit

said spring means to apply the brake member to the drum and means maintaining said resilient arm out of frictional engagement with said drum when said catch member is disengaged from said brake member.

10. In a cord winder, a reel, a cord, a spring for rotating the reel in a direction to wind the cord thereon, a brake drum rotatable with said reel, a brake member frictionally engageable with said drum, spring means constantly tending to apply said member to said drum, a manually operable member for releasing said brake member from said drum, a catch member engageable with said brake member for maintaining the latter released from said drum, means responsive to operation of said manually operable member for engaging said catch member with said brake member, a resilient arm carried by said catch member frictionally engageable with said drum and sensitive to rotation of said reel in a direction winding the cord for maintaining said catch member in engagement with said brake member and sensitive to initial rotation of said reel in the opposite direction for disengaging said catch member from said brake member to thereby permit said spring means to apply the brake member to the drum, and means maintaining said resilient arm out of frictional engagement with said drum when said catch member is disengaged from said brake member.

11. In a cord winder, a reel, a cord, a spring

for rotating the reel in a direction to wind the cord thereon, a brake drum rotatable with said reel, a brake member frictionally engageable with said drum, spring means constantly tending to apply said member to said drum, a manually operable lever, a bias spring acting on said lever, link means providing a lost motion connection between said lever and said brake member such that movement of said lever against said bias spring moves said brake member away from said drum while movement of said lever in the opposite direction is ineffective to move the brake member, a pivoted catch member engageable with said brake member to hold the latter away from said drum, means on said link for pivoting said catch member into engagement with said brake member when said lever is moved against said bias spring, a resilient arm carried by said catch member frictionally engageable with said drum and sensitive to rotation of said reel in a direction winding the cord for maintaining said catch member in engagement with said brake member and sensitive to initial rotation of said reel in the opposite direction for disengaging said catch member from said brake member to thereby permit said spring means to apply the brake member to the drum, and means maintaining said resilient arm out of frictional engagement with said drum when said catch member is disengaged from said brake member.

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