

Oct. 7, 1947.

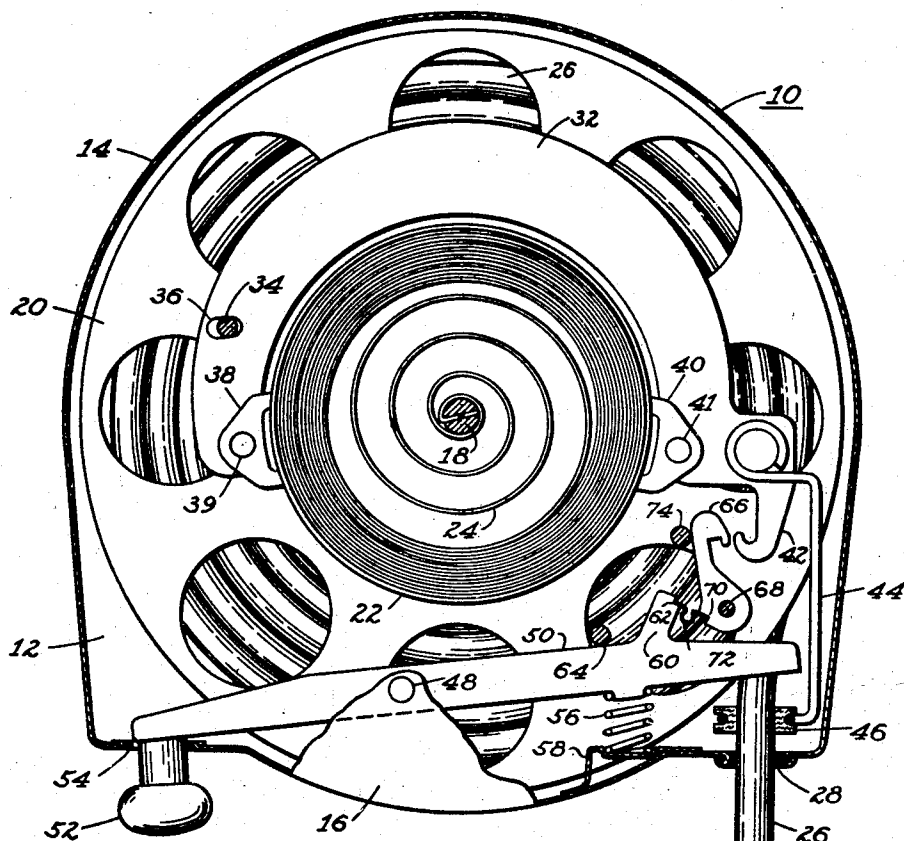
A. H. BEEDE

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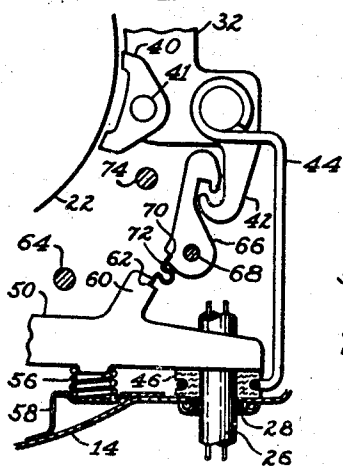
CORD WINDER

Filed April 4, 1944

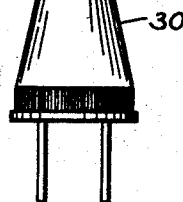
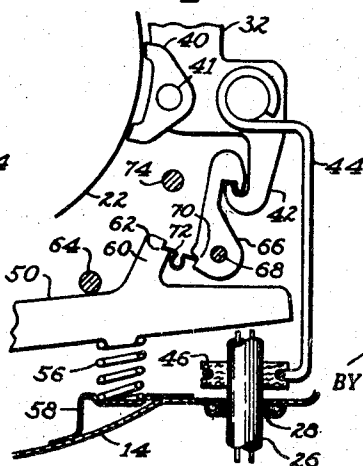
F19. 1



F19. 2



F19. 3



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2,428,446

CORD WINDER

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Application April 4, 1944, Serial No. 529,440

16 Claims. (Cl. 242—107)

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

Reels of this nature commonly employ a spring which is wound up as the cord is unwound, and thereby stores up energy for rewinding the cord. Various types of braking means have been provided for holding the reel against rotation after the cord has been unwound and the spring has been tensioned.

One of the objects of my invention is to provide improved braking means which automatically release when the cord is pulled out and which automatically engage so as to prevent rewinding of the cord when the pull on the latter ceases.

A further object of my invention is to provide a brake which is self-energizing after an initial application when the reel is rotating in a direction to wind up the cord, while automatically releasing when the reel is rotating in the opposite direction.

Another object of my invention is to provide improved brake release mechanism which may be actuated by a single momentary impulse so as to release the brake and maintain it released when it is desired to rewind the cord.

A still further object is to provide means whereby the brake release mechanism may be rendered inoperative at any time as a result of an outward pull on the cord, whereby the brake may be applied before the cord is completely rewound.

Further objects and advantages of my invention will be apparent from the following description and drawings which form a part of this specification and of which:

Fig. 1 is a 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 drawings, reference character 10 designates a casing having a back wall 12, a curved side wall 14 and a front wall 16. Most of the front wall is shown broken away so as to reveal the mechanism contained within the casing. Rigidly secured to the front and back walls of the casing is a shaft 18 on which is rotatably mounted a reel 20. Fixed to the reel is a brake drum 22. A spiral rewind spring 24 has its inner end anchored to the stationary shaft 18 while its outer end is secured so as to rotate with the reel 20,

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as by being fixed to the inner surface of the brake drum 22. An electric cord or the like 26 is adapted to pass through an opening 28 in the casing 10 and to be wound on the reel 20. The end of this cord is provided with the usual electric plug 30 which is large enough so that it cannot pass through the opening 28.

An arcuate brake arm 32 partially encircles the drum 22 and is restrained against rotation by means of a pin 34 carried by the front cover 16 which engages an elongated slot 36 in the arm. Arm 32 carries brake shoes 38 and 40 which are disposed a little more than 180° apart around the brake arm so as to be located chiefly on the same side of a diameter of the drum. These shoes may be separate members pivoted to the arm 32 at 39 and 41, respectively, or they may constitute projections fixed to or integral with the arm. The distance between these shoes is less than the diameter of the drum. The end of the arm 32 opposite from the pin 34 is provided with a releasing hook 42. Attached to this end of the arm is a link member 44 which carries a friction element, such as a felt washer 46 through which extends the cord 26, which element is sensitive to the direction of movement of the cord. There is sufficient friction between the washer and the cord so that the former tends to follow the movement of the latter, but the friction is not sufficient to prevent the cord from passing through the washer when the latter is held against further movement, or to materially retard movement of the cord.

Pivotaly mounted on a pin 48 carried by the front cover 16 is a brake releasing lever 50. One end of this lever carries a button or the like 52 which projects through an opening 54 in the casing. A compression spring 56 is disposed between the lever and a suitable bracket 58 on the casing wall. Lever 50 is also provided with an arm 60 projecting therefrom, which is formed with a notch 62. The end of lever 50 opposite from button 52 is arranged so as to contact the felt washer 46 carried by member 44 when the lever is pivoted to the position shown in Fig. 2. A pin 64 or other suitable stop means is carried by the casing wall 16 and serves to limit pivoting of the lever 50 under the influence of the spring 56.

A latch member 66 is pivotaly mounted on a pin 68 carried by the wall 16 and is formed with a hooked end which is adapted to engage the hook 42 on the brake arm 32. Latch 66 is formed with a notch 70 and an over-center spring 72 engages this notch and the notch 62. The arrangement

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of the parts is such that, in the position shown in Fig. 1, spring 72 tends to rotate latch 66 in a counter-clockwise direction, such rotation being limited by a stop 74 carried by the wall 16, whereas in the position of the parts shown in Fig. 2, the spring 72 tends to rotate the latch 66 in a clockwise direction into engagement with the hook 42.

The above-described device operates as follows: With the parts in the position shown in Fig. 1, the brake is applied so as to prevent rotation of the drum and reel in a counter-clockwise direction. The spring 24 tends to rotate the reel in this direction, and hence there is an inward pull exerted on the cord 26. Inasmuch as the felt washer 46 tends to follow the cord, the member 44 is moved upwardly, as seen in Fig. 1, so as to displace the brake arm 32 in a direction to move the brake shoe 40 substantially tangentially into frictional engagement with the drum. Any slight rotation of the drum in a counter-clockwise direction, once the shoe 40 is in frictional engagement therewith, tends to move the shoe with it and thus further increases the pressure between the drum and the shoe. Thus, the brake is self-energizing, once it has been applied, when the drum rotates counter-clockwise. The reaction to this pressure does not have to be taken by the shaft 18, but is transmitted through the drum to the shoe 38 on the other end of the brake arm, whereby shoe 38 also brakes the drum. The tendency of the drum to rotate the arm 32 is resisted by the pin 34, which however, permits lateral movement of the arm, which thus floats, so to say, and centers itself properly with respect to the drum.

With the parts in the position shown in Fig. 1, an outward pull on the cord 26 tends to rotate the reel and the drum in a clockwise direction, thus tending to release the brake, inasmuch as rotation of the drum in this direction relieves the pressure between the drum and the brake shoe 40. Moreover, the initial outward movement of the cord causes the felt washer 46 and the member 44 to move downwardly, as seen in Fig. 1, thus moving the brake arm 32 downwardly so as to remove the shoe 40 from contact with the drum. While the shoe 38 may still be in contact with the drum, there is no force present to produce friction between this shoe and the drum, and hence the drum may rotate in a clockwise direction as the cord is pulled out without having to overcome any braking effect. As the drum is rotated in this direction it winds up the spring 24.

Whenever the outward pull on the cord is relieved, the spring immediately starts to rotate the drum in a counter-clockwise direction so as to pull the cord in. However, the initial movement of the cord in this direction moves the felt washer 46 to the position shown in Fig. 1, thus applying the brake as above explained and preventing further rewinding of the cord.

When it is desired to rewind the cord, the button 52 is pressed inwardly so as to pivot the lever 50 to the position shown in Fig. 2, and the end of the lever strikes the felt washer 46 so as to move it downwardly, thus releasing the brake. Also, movement of the arm 60 on the lever 50 from the position shown in Fig. 1 to that shown in Fig. 2, causes the over-center spring 72 to pivot the latch 66 in a clockwise direction so that the hooked end thereof overlaps the hook 42 on the brake arm. However, as illustrated in Fig. 2, these two hooks do not immediately engage.

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As soon as the felt washer is moved by the lever 50, the brake is released and the spring 24 immediately starts to rotate the reel in a counter-clockwise direction so as to pull in and wind up the cord. The button 52 may now be released, whereupon the parts assume the position shown in Fig. 3. As soon as the button is released, the spring 56 pivots the lever 50 away from the felt washer 46, whereupon the washer is moved by the incoming cord in a direction to apply the brake. However, before the brake arm is moved sufficiently to apply the brake the hook 42 thereon engages the latch 66, which holds the brake in released position. Return of the lever 50 to its normal position causes the over-center spring 72 to tend to rotate the latch 66 in a counter-clockwise direction. However, this latch is in engagement with the hook 42 on the brake arm and is thus restrained from pivoting under the influence of spring 72. Consequently, the brake remains disengaged and the reel continues to wind up the cord.

The cord is thus wound up until further movement of the cord into the casing is stopped by the plug 30 contacting the casing. The brake remains disengaged, but obviously further rotation of the drum is prevented by the fact that the plug cannot pass through the opening 28.

The next time the cord is pulled out, the initial movement of the cord causes the felt washer to move downwardly, thus moving the hook 42 on the brake arm sufficient to permit disengagement of the latch 66, which latch is pivoted in a counter-clockwise direction by the spring 72. Thereafter, the brake remains disengaged as long as the cord is being pulled out, but as soon as the pull on the cord is relieved, the spring 24 starts to rewind it, with the result that the felt washer 46 is moved upwardly so as to apply the brake.

Obviously, if the cord is grasped during the rewinding, the brake may be applied by merely pulling the cord out sufficiently to move the felt washer so as to disengage the hook 42 from the latch 66. Hence, it is possible to partially rewind the cord and to apply the brake so as to hold the reel in the desired position.

While I have shown 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 member, a cord member, means for rotating the reel member in a direction to wind the cord member thereon, brake means for restraining rotation of said reel member, means sensitive to the direction of movement of one of said members resulting from the rotation of said reel member for releasing said braking means during unwinding of the cord member and for tending to apply said braking means during winding of the cord member, and manually operable means for rendering the direction-sensitive means inoperative to apply said braking means during winding of the cord member.

2. In a cord winder, a reel member, a cord member, means for rotating the reel member in a direction to wind the cord member thereon, brake means for restraining rotation of said reel member, means sensitive to the direction of movement of one of said members resulting from the rotation of said reel member for releasing said braking means during unwinding of the

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cord member and for tending to apply said braking means during winding of the cord member, and means operable by a single momentary impulse for rendering and maintaining the last-mentioned means inoperative to apply said braking means during winding of the cord member.

3. In a cord winder, a reel, a cord, means for rotating the reel in a direction to wind the cord thereon, brake means for restraining rotation of said reel, and an element in frictional engagement with said cord so as to be moved in one direction during unwinding of the cord and in the opposite direction during winding, and means operable by movement of said element in said one direction for releasing said braking means and operable by movement of said element in said opposite direction for applying said braking means.

4. In a cord winder, a reel, a cord, means for rotating the reel in a direction to wind the cord thereon, brake means for restraining rotation of said reel, and an element in frictional engagement with said cord so as to be moved in one direction during unwinding of the cord and in the opposite direction during winding, means operable by movement of said element in said one direction for releasing said braking means and operable by movement of said element in said opposite direction for applying said braking means, and manually operable means for rendering the last-mentioned means inoperative to apply said braking means.

5. In a cord winder, a reel, a cord, means for rotating the reel in a direction to wind the cord thereon, brake means for restraining rotation of said reel, and an element in frictional engagement with said cord so as to be moved in one direction during unwinding of the cord and in the opposite direction during winding, means operable by movement of said element in said one direction for releasing said braking means and operable by movement of said element in said opposite direction for applying said braking means, and means operable by a single momentary impulse for rendering the last-mentioned means inoperative to apply said braking means.

6. In a cord winder, a reel having a braking surface, a brake member movable into and out of frictional engagement with said surface, a cord, means tending to rotate the reel in a direction to wind the cord thereon, an element in frictional engagement with said cord so as to be moved in one direction during unwinding of the cord and in the opposite direction during winding, and a link member connecting said element to said brake member for moving the latter out of engagement with said braking surface when said element is moved in said one direction and for moving said brake member into frictional engagement with said surface when the element is moved in said opposite direction.

7. In a cord winder, a reel having a braking surface, a brake member movable into and out of frictional engagement with said surface, a cord, means tending to rotate the reel in a direction to wind the cord thereon, an element in frictional engagement with said cord so as to be moved in one direction during unwinding of the cord and in the opposite direction during winding, a link member connecting said element to said brake member for moving the latter out of engagement with said braking surface when said element is moved in said one direction, and for moving said brake member into frictional engagement with said surface when the element

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is moved in the opposite direction, a latch member engageable with said brake member for holding the latter out of frictional engagement with said surface, and a manually operable member for engaging said latch member with said brake member.

8. In a cord winder, a reel having a braking surface, a brake member movable into and out of frictional engagement with said surface, a cord, means tending to rotate the reel in a direction to wind the cord thereon, an element in frictional engagement with said cord so as to be moved in one direction during unwinding of the cord and in the opposite direction during winding, a link member connecting said element to said brake member for moving the latter out of engagement with said braking surface when said element is moved in said one direction, and for moving said brake member into frictional engagement with said surface when the element is moved in the opposite direction, a latch member engageable with said brake member for holding the latter out of frictional engagement with said surface, a manually operable pivoted lever, and an over-center spring between said lever and said latch member for moving the latter into engagement with said brake member when said lever is pivoted.

9. In a cord winder, a reel having a braking surface, a brake member movable into and out of frictional engagement with said surface, a cord, means tending to rotate the reel in a direction to wind the cord thereon, an element in frictional engagement with said cord so as to be moved in one direction during unwinding of the cord and in the opposite direction during winding, a link member connecting said element to said brake member for moving the latter out of engagement with said braking surface when said element is moved in said one direction, and for moving said brake member into frictional engagement with said surface when the element is moved in the opposite direction, a hook carried by said brake member, a latch member having a hook engageable with said hook member for holding said brake member out of frictional engagement with said surface, and means operable by a single momentary impulse for engaging the hook of said latch member with said hook member, the hooks being shaped so as to be retained in engagement by the force applied to said brake member by said element during winding of said cord.

10. In a cord winder, a reel having a braking surface, a brake member movable into and out of frictional engagement with said surface, a cord, means tending to rotate the reel in a direction to wind the cord thereon, an element in frictional engagement with said cord so as to be moved in one direction during unwinding of the cord and in the opposite direction during winding, a link member connecting said element to said brake member for moving the latter out of engagement with said braking surface when said element is moved in said one direction, and for moving said brake member into frictional engagement with said surface when the element is moved in the opposite direction, a hook carried by said brake member, a latch member having a hook engageable with said hook member for holding said brake member out of frictional engagement with said surface, a manually operable pivoted lever, a spring biasing said lever in one direction, and an over-center spring between said lever and said latch member for moving the hook

of the latter into engaging position with said hook member when said lever is pivoted against the force of the biasing spring, the hooks being shaped so as to be retained in engagement by the force applied to said brake member by said element during winding of said cord.

11. In a cord winder, a reel member having a cylindrical braking surface, an arcuate brake arm extending around said surface and having projections for contacting said surface spaced more than 180° apart, means for restraining said arm against rotation, a cord member adapted to be wound on said reel member, means for rotating the reel member to wind said cord member thereon, and means sensitive to the direction of movement of one of said members for moving said arm so that at least one of said projections moves substantially tangentially into frictional engagement with said surface during winding of said cord member and for moving said arm in the opposite direction during unwinding.

12. In a cord winder, a reel member having a cylindrical braking surface, an arcuate brake arm extending around said surface and having projections for contacting said surface spaced more than 180° apart, means for restraining said arm against rotation, a cord member adapted to be wound on said reel member, means for rotating the reel member to wind said cord member thereon, means sensitive to the direction of movement of one of said members for moving said arm so that at least one of said projections moves substantially tangentially into frictional engagement with said surface during winding of said cord member and for moving said arm in the opposite direction during unwinding, and means for rendering the last-mentioned means inoperative to move said arm during winding sufficiently to move the projection into engagement with said surface.

13. In a cord winder, a reel member having a cylindrical braking surface, an arcuate brake arm extending around said surface and having projections for contacting said surface spaced more than 180° apart, means for restraining said arm against rotation, a cord member adapted to be wound on said reel member, means for rotating the reel member to wind said cord member thereon, means sensitive to the direction of movement of one of said members for moving said arm so that at least one of said projections moves substantially tangentially into frictional engagement with said surface during winding of said cord member and for moving said arm in the opposite direction during unwinding, and means responsive to a single momentary impulse for rendering the last-mentioned means inoperative to move said arm during winding sufficiently to move the projection into engagement with said surface.

14. In a cord winder, a reel member having a cylindrical braking surface, an arcuate brake arm extending around said surface and having projections for contacting said surface spaced more than 180° apart, means for restraining said arm against rotation, a cord member adapted to be wound on said reel member, means for rotating

the reel member to wind said cord member thereon, means sensitive to the direction of movement of one of said members for moving said arm so that at least one of said projections moves substantially tangentially into frictional engagement with said surface during winding of said cord member and for moving said arm in the opposite direction during unwinding, a latch member engageable with said arm for rendering the last-mentioned means inoperative to move said arm during winding sufficiently to move the projection into engagement with said surface, a member operable by a single momentary impulse for engaging said latch member with said arm, movement of the arm in said opposite direction by said last-mentioned means disengaging said latch member from the arm.

15. In a cord winder, a reel member, a cord member, means for rotating the reel member in a direction to wind the cord member thereon, brake means for restraining rotation of said reel member, means sensitive to the direction of movement of one of said members resulting from the rotation of said reel member for releasing said braking means during unwinding of the cord member and for tending to apply said braking means during winding of the cord member, latching mechanism manually operable for rendering the direction-sensitive means inoperative to apply said braking means during winding of the cord member, said direction-sensitive means being operable in response to movement of one of said members in unwinding direction to release said latching means.

16. In a cord winder, a reel, a cord, means for rotating the reel in a direction to wind the cord thereon, brake means for restraining rotation of said reel, and an element in frictional engagement with said cord so as to be moved in one direction during unwinding of the cord and in the opposite direction during winding, direction-sensitive means operable by movement of said element in said one direction for releasing said braking means and operable by movement of said element in said opposite direction for applying said braking means, and latching mechanism manually operable for rendering said direction-sensitive means inoperative to apply said braking means during winding of the cord, said element being operable in response to movement of the cord in unwinding direction to release said latching means.

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