

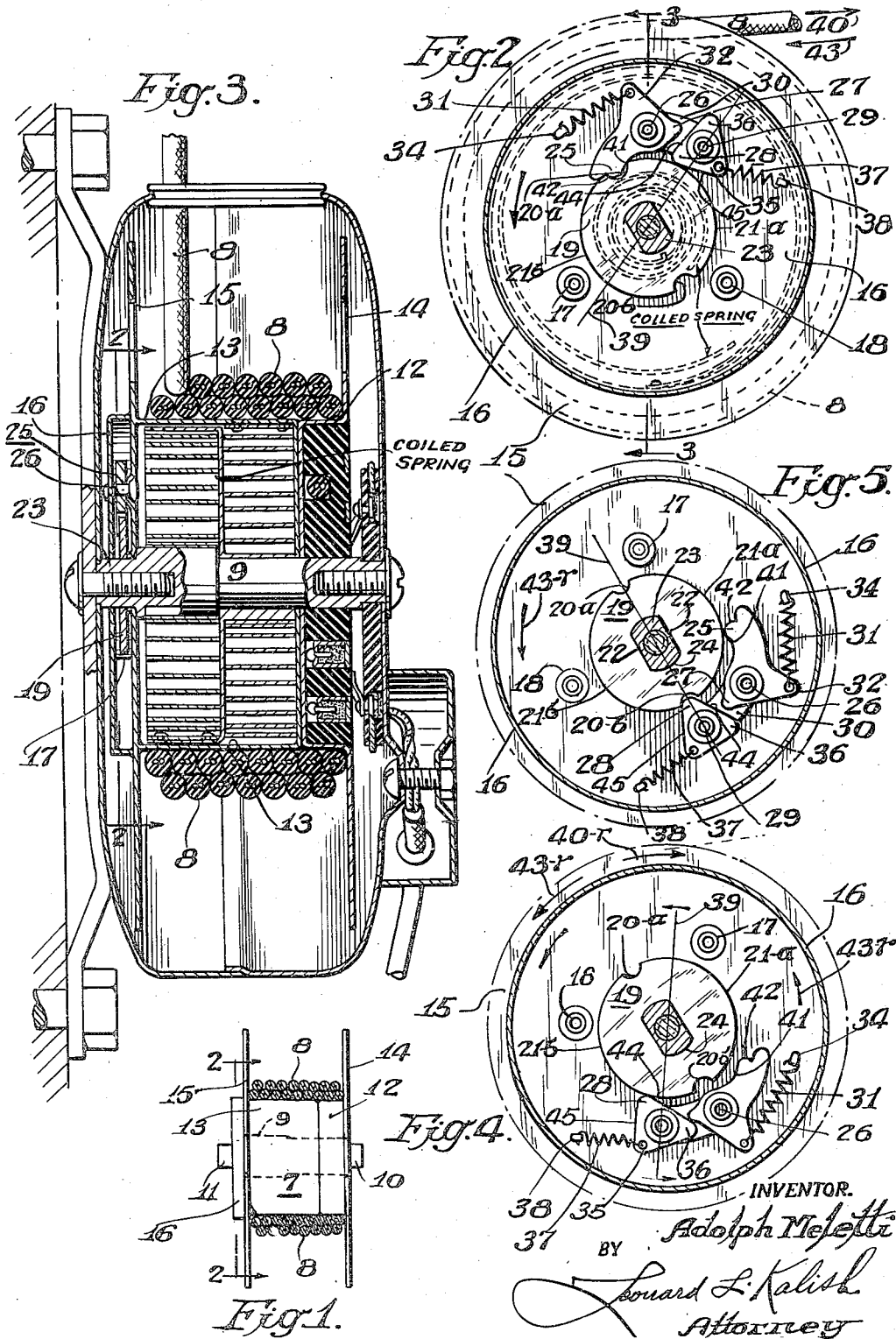
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SPRING-WOUND CORD-CONTROLLED TAKE-UP REEL

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SPRING-WOUND CORD-CONTROLLED  
TAKE-UP REEL

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The present invention relates to certain improvements in spring-wound cord-controlled take-up reels, and it relates more particularly to a construction in such reels which will be controllable by a pull on the cord, so as to lock the reel in any extended or "paid-out" position of the cord and so that it may be released, by a short pull on the cord, so that it will thereafter re-wind the cord.

The present invention further relates to the construction in spring-wound cord-controlled take-up reels which will be more certain and dependable in its locking, releasing and re-winding action, and which will be simpler in construction and more economical to manufacture, and which will also be more durable.

For the purpose of illustrating the present invention, there is shown in the accompanying drawing a form thereof which is at present preferred, although it is to be understood that the various instrumentalities of which the invention consists can be variously arranged and organized and that the invention is not limited to the precise arrangements and organizations of the instrumentalities as herein shown and described.

In the accompanying drawing, in which like reference characters indicate like parts,

Figure 1 represents a front elevational view, on a reduced scale, of one embodiment of the spring-wound cord-controlled take-up reel embodying my present invention.

Figure 2 represents a side elevational view of one embodiment of my present invention, with the outer sheet-metal casing partly broken away, to expose to view the ratchet-wheel, the locking-pawl, and the pawl-retracting cam, viewed in the direction of arrow 2 on Figure 1, but on a scale approximately  $4\frac{1}{4}$  times the scale of Figure 1, this figure showing the mechanism in its "locked" position.

Figure 3 represents a section on line 3-3 of Figure 2.

Figure 4 represents a side elevational view, similar to that shown in Figure 2, but with the mechanism in the unlocked position, namely, in the position in which the re-winding spring is freed of the locking action of the pawl and may re-wind the cord.

Figure 5 represents a fragmentary side elevational view similar to those shown in Figures 2 and 4, but with the outer sheet-metal casing removed and with the flange-plate 15 of the reel also broken away, this view showing the mechanism in an intermediate "unlocked" position in which the cam has dropped into one of the

notches in the ratchet-wheel; in which intermediate position the cam can be caused to lock or unlock, at will, depending on the direction of initial rotation, for a short distance, determined by the manipulation of the paid-out portion of the cord.

The reel, shown generally in Figures 1 and 3, is of the type adapted for "taking-up" and for "paying-out" an electrical cord, and permitting electrical connections between the stationary housing or support for said reel and the anchored inner ends of the electrical cord.

The reel, exemplified in the embodiment shown generally in Figure 1, comprises a central drum hub 7, upon which the cord 8 is wound, revolvably mounted upon a central shaft 9 having two outer terminal trunnion-like portions 10 and 11, by means of which it is stationarily mountable in any suitable stationary housing or support forming a part of or carried by the particular machine or appliance on which the reel is to be used. The hub 7 may be formed of two hollow chamber-forming portions 12 and 13, respectively; portion 12 housing the electrical collector rings and brushes, and the portion 13 housing the flat spiral take-up spring which intervenes the stationary shaft 9 and the revolvable hub 7, with the inner end of the spring anchored to the stationary shaft 9 and the outer end of the spring fastened to the interior of the hub-portion 13. The flanges 14 and 15 may be formed integrally with the hub-portions 12 and 13, respectively, or separately therefrom, but affixed thereto.

On one side of the reel, as, for instance, and against the flange plate 15 thereof, a shallow-dished sheet-metal housing 16 is provided, which may be affixed thereto by riveting or by screws or by any other suitable means. Within the housing or casing 16, a ratchet-wheel 19 is provided, having one or more notches, as, for instance, notches 20-a and 20-b, and corresponding dwells 21-a and 21-b, and being fixed to the stationary shaft 9 by any suitable keying means, as, for instance, by having a pair of "flats" 22 milled on a reduced-diameter portion 23 of the shaft 9, and having the central shaft-receiving opening 24 of the ratchet-wheel 19 similarly shaped to match the two "flats" 22. A pawl 25 is pivotally mounted at 26, in generally the same plane as the ratchet-wheel 19, and is provided with a heel 27 on the opposite side of the pivot 26, upon which heel 27 the pivoted cam 28 is adapted to operate. The cam 28 is pivoted at 29, and is, likewise, in the same plane as the ratchet-wheel 19 and the pawl 25. The pivots 26

and 29 for the pawl 25 and cam 28, respectively, may be supported by the outer sheet-metal casing 16, as, for instance, by being riveted or screwed thereto or they may be similarly supported by the sheet-metal flange-disc 15, or both, or, they may be riveted to the outer casing 16 and have their inner ends supported by a flat sheet-metal pivot-bearing plate 30 carried by the sheet-metal flange disc 15. Likewise, one or both of the pivots 26 and 29 may serve, along with similar spacer rivets or screws 17 and 18, to fasten the shallow-dished casing 16 to the flange-disc 15 of the reel.

The pawl 25 is spring-tensioned so that it will constantly be urged in the direction of the ratchet-wheel 19, by means of a helical tension-spring 31, or the like, one end of which is hooked to the spring-anchorage ear 32 of said pawl, and the other end of which is hooked onto the spring-anchorage 34 extending from or pressed out of either the sheet-metal of the casing 16 or the sheet-metal of the flange 15.

The cam 28 is likewise provided with a spring-anchorage ear 35, and also with a pawl-retracting arm 36, which is in operative juxtaposition to the heel 27 of the pawl 25. A helical tension-spring 37 has one of its ends hooked onto the spring-anchorage ear 35 of the cam 28, while its other end is hooked onto the spring-anchorage 38 carried by or pressed out of the sheet-metal of the casing 16 or of the reel-flange 15. The spring-anchorage 38 is so disposed in relation to the pivot 29 and the pawl 28, that the spring 37 will at all times urge the cam-point 28 toward and against the ratchet-wheel 19, regardless of whether the cam point 28 is to the left of the "center-line" 39 which passes through the axes of the shaft 9 and pivot 29, as in the "locked" position of the mechanism in Figure 2, or whether the cam-point 28 is to the right of such "center-line" 39.

When in the locked position, as in Figure 2, it is merely necessary to pull on the extended or paid-out portion of the cord 8 a very short distance, in the direction of the arrow 40, thereby to turn the reel, and, with it, the pawl 25 and cam 28 (in relation to the stationary ratchet-wheel 19) in the direction of the arrow 40—r for something approximately slightly more than one-half of a revolution of the reel. This rotational motion of the reel and of the pawl 25 and cam 28, first causes the pawl 25 to be "kicked" out of the notch 20—a, because of the gradual inclination of the surface 41 thereof which is at an acute angle to the radius from a pivotal center 26 of the pawl (whereas the opposite pawl-surface 42 is approximately at a right angle to such radius) thereby lifting the pawl 25 onto the dwell 21—a, and as the pawl 25 further recedes from the notch 20—a (in the direction of the arrow 40—r) the cam-point 28 moves towards, and finally drops into, notch 20—b, in something less than one half a revolution after the pawl 25 has been "kicked" out of the notch 20—a, resulting in the intermediate position or phase of the mechanism shown in Figure 5. If the operator then releases the extended or "paid-out" portion of the cord 8, in the direction of the arrow 43, the spiral take-up spring (not shown) within the spring-chamber portion 13 of the hub 7, will start and continue revolving the reel in the direction of the arrow 43—r, retracting or taking up the cord 8 in the direction of the arrow 43, as fast as it is released by the hand of the operator. This continuous take-up rotation of the reel in the direc-

tion of the arrow 43—r, from the intermediate position or phase of the mechanism shown in Figure 5, results from the switching of the cam-point 28 to the right of the "center-line" 39, to the position shown in Figure 4, by the initial rotary motion of the reel in the direction of the arrow 43—r from the intermediate position shown in Figure 5. Thus, the first bit of rotational motion in the direction of the arrow 43—r, from the intermediate position shown in Figure 5, "kicks" the cam-point 28 out of the notch 20—b, to the right of the "center-line" 39, and onto the dwell 21—a, and this cam-motion brings the pawl-retracting arm 36 of the cam 28 down onto the heel 27 of the pawl 25, thereby raising the pawl 25 entirely clear of the ratchet-wheel, resulting in the "unlocked" phase or position of the mechanism shown in Figure 4.

While continued take-up rotation in the direction of the arrow 43—r permits the cam-point 28 to drop into the notch 20—a and then again into notch 20—b and then again into notch 20—a, and so on, and thus to momentarily revert back to the Figure 5 phase and to release its "hold" on the heel 27 of the pawl 25, yet such momentary reversion to the Figure 5 phase does not permit the pawl 25 to lock into either of the notches 20—a or 20—b because the circumferential setting spacing of the pawl 25 and cam-point 28 is such that when the cam-point 28 drops into a notch in a Figure 5 phase, the pawl 25 will be juxtaposed to one of the dwells 21—a or 21—b, and before the pawl 25 reaches a position opposite to the next notch 20—a or 20—b, the cam-point 28 has already been "kicked" out to the right of the "center-line" 39 and onto the next dwell 20—a or 20—b (by the continued rotation in the direction of the arrow 43—r) so as to again depress the heel 27 of the pawl 25 and thus again raise the pawl 25 clear of the ratchet-wheel by the time the pawl 25 reaches the position opposite the next notch 20—a or 20—b. In this manner continuous take-up rotation may be maintained, without ever bringing the mechanism into the locked phase of Figure 2, so long as the cord is permitted to recede in the direction of the arrow 43; that is, after the mechanism has first been "released" from the Figure 2 phase into the Figure 5 phase by first pulling the cord out slightly (just enough to drop the cam-point 28 into the next notch 20—a or 20—b) and then releasing the cord in the direction of the arrow 43.

In order again to bring the mechanism into the "locked" phase of Figure 2, in any extended or paid-out position of the cord 8, it is only necessary again to give the cord a short pull when the mechanism is passing through one of its Figure 5 phases, when the cam-point 28 is in one of the notches 20—a or 20—b, thereby "kicking" the cam-point 28 out of the notch to the left of the "center-line" 39 and onto the dwell to the right of the notch, so that its cam-retracting arm 36 can no longer depress heel 27 of the pawl 25, and by then slackening the cord, the reel will revolve slightly in the direction of the arrow 43—r until the now-unlocked pawl 25 drops into the next notch and thereby locks the reel in the Figure 2 phase.

Thus, it will be seen that whether the reel becomes "unlocked" as in Figure 4, or "locked" as in Figure 2, depends entirely on whether the cam-point 28 is "kicked" out of the notch (from the intermediate phase of the mechanism shown in Figure 5) to the right of the "center-line" 39 into the Figure 4 phase or to the left of the "center-

line" 39 into the Figure 2 phase. This, in turn, is determined by whether the initial rotary motion from the intermediate phase shown in Figure 5 is in the direction of the arrow 43—r or in the direction of the arrow 40—r. If the initial rotary motion (from the Figure 5 phase) is in the direction 43—r, by merely permitting the cord to recede from the grip of the operator in the direction of the arrow 43, then the cam-point 28 is "kicked" out of the notch to the right of the "center-line" 39 and the mechanism is brought into the "unlocked" or re-winding phase of Figure 4 and a continuous take-up rotation in the direction of the arrow 43—r is permitted, while if the initial rotary motion (from the Figure 5 phase) is in the direction of the arrow 40—r as by a short jerk on the cord 8 in the direction of the arrow 40, then the cam-point 28 is "kicked" out of the notch to the left of the "center-line" 39, thereby bringing the mechanism into its "locked" phase shown in Figure 2, after but a slight counter-rotational motion in the direction of the arrow 43—r, namely, just sufficient to drop the pawl 25 into the next notch.

In withdrawing the cord 8, in the direction of the arrow 40, the dropping of the cam-point 25 into one of the recesses in the ratchet-wheel 19 (which is the recess which immediately follows the recess just vacated by the pawl 25) produces an audible "clicking" sound, which acts as an audible signal which will be heard issuing from the positive locking and unlocking mechanism. The first "click" after the cord has been pulled a short distance in the direction of the arrow 40 indicates that the mechanism is then in the releasing position or phase. If, upon hearing this "click," the cord is permitted to be pulled back into the reel, it will be continuously rewound by the reel. If, however, instead of permitting the cord to be retracted directly upon hearing first the "click," it is, instead, pulled just slightly beyond the point where it "clicks," and then the tension on the cord released, it will settle itself into the locking position shown in Figure 2. Thus to switch the mechanism from the intermediate position of Figure 5 (where the "click" is heard) into either the unlocking position of Figure 4 or the locking position of Figure 2, it is merely necessary either to release the cord (to rewind it) or to pull the cord just a little further and then relax the tension (to "lock" the mechanism).

The two side-surfaces 44 and 45 of the cam-point 28 being both at an acute angle to the pivotal radius bisecting the cam-point 28, the cam-point 28 is incapable, in and of itself, of making any "locking" engagement in either of the notches, regardless of the direction of the rotation, because, on account of this angularity, the lips of the notches will "kick" the cam-point 28 out of the notch, in either direction. Thus, the cam, in effect, acts as a switch, to switch the mechanism from the "unlocked" to the "locked" position, and, vice versa, by simply causing the cam to "kick out" in one direction or the other, in respect to the "center-line" 39.

The present invention may be embodied in other specific forms without departing from the spirit or essential attributes thereof, and it is therefore desired that the present embodiment be considered in all respects as illustrative and not restrictive, reference being had to the appended claims rather than to the foregoing description to indicate the scope of the invention.

Having thus described the invention, what I

claim as new and desire to protect by Letters Patent is:

1. A spring-wound and cord-controlled take-up reel, including a pivotally mounted reel, relatively stationary pivotation means therefor, take-up means operatively deposited between said reel and said pivotation means, tending to rotate said reel in a take-up direction, a ratchet-wheel fixedly carried by said pivotation means and having a recess and having a dwell on either side of said recess, a pivoted pawl carried by said reel in operative alignment with said ratchet-wheel having a locking face in the direction of the take-up motion of the reel and having a non-locking face in the direction of the pay-out motion of the reel, a spring connected with said pawl urging said pawl in the direction of the ratchet-wheel, a pivoted cam carried by said reel in operative juxtaposition to said ratchet-wheel and to said pawl and having a cam-point extending into the notch of said ratchet-wheel when said notch is on a center-line of the reel-pivotation and cam-pivotation; said cam-point having non-locking cam-surfaces on both sides thereof, a spring connected with said cam and urging said cam-point toward said ratchet-wheel when deflected out of said notch in either direction, and means on said pivoted pawl and means on said cam, in operative juxtaposition to each other, whereby said cam will deflect the pawl clear of the ratchet-wheel when the cam-point is deflected in the direction of the pay-out rotation of the reel and whereby the cam will free the pawl for locking engagement with the notch of the ratchet-wheel when the cam-point is deflected in the direction of the take-up rotation of the reel.

2. A spring-wound and cord-controlled take-up reel, including a pivotally mounted hub onto which the cord is to be wound, relatively stationary pivotation means therefor, a spring operatively deposited between said hub and said pivotation means, tending to rotate said hub in a take-up direction, a notched wheel fixedly carried by said pivotation means and having two recesses or notches and having dwells between said recesses, a pivoted pawl carried by said hub in operative alignment with said notched-wheel having a locking face in the direction of the take-up motion of the hub and having a non-locking face in the direction of the pay-out motion of the hub, a spring connected with said pawl urging said pawl in the direction of the notched-wheel, a pivoted cam carried by said hub in operative juxtaposition to said notched-wheel and to said pawl and having a cam-point adapted to extend into a recess of said notched-wheel when said recess is on a center-line of the hub-pivotation and cam-pivotation; said cam-point having non-locking cam-surfaces on both sides thereof, a spring connected with said cam and urging said cam-point toward said notched-wheel when deflected out of said recess in either direction, and a heel-like arm carried by said pivoted pawl and an arm on said cam, in operative juxtaposition to said heel-like arm of the pawl, so arranged that juxtaposition to said cam will deflect the pawl clear of the notched-wheel when the cam-point is deflected in the direction of the pay-out rotation of the hub and whereby the cam will free the pawl for locking engagement with the recess of the notched-wheel when the cam-point is deflected in the direction of the take-up rotation of the hub.

3. An automatic cord-controlled locking and

releasing mechanism for spring-wound take-up reels having a pivotally mounted hub onto which the cord is to be wound, and having relatively stationary pivotation means therefor, and a spring operatively deposited between said hub and said pivotation means tending to rotate said hub in a take-up direction; said automatic cord controlled locking and releasing mechanism including a notched wheel fixedly carried by said pivotation means and having two recesses or notches and having dwells between said recesses, a pivoted pawl carried by said hub in operative alignment with said notched-wheel having a locking face in the direction of the take-up motion of the hub and having a non-locking face in the direction of the pay-out motion of the hub, a spring connected with said pawl urging said pawl in the direction of the notched-wheel, a pivoted cam carried by said hub in operative juxtaposition to said notched-wheel and to said pawl and

5 having a cam-point adapted to extend into a recess of said notched-wheel when said recess is on a center-line of the hub-pivotation and cam-pivotation; said cam-point having non-locking cam-surfaces on both sides thereof, a spring connected with said cam and urging said cam-point toward said notched-wheel when deflected out of said recess in either direction, and a heel-like arm carried by said pivoted pawl and an arm on said cam, in operative juxtaposition to said heel-like arm of the pawl, so arranged that said cam will deflect the pawl clear of the notched-wheel when the cam-point is deflected in the direction of the pay-out rotation of the hub and whereby the cam will free the pawl for locking engagement with the recess of the notched-wheel when the cam-point is deflected in the direction of the take-up rotation of the hub.

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