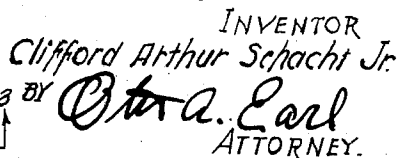


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CABLE WINDING DRUM

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This invention relates to a cable winding drum.

The main objects of this invention are:

First, to provide a counterbalancing assembly for upwardly acting doors which is readily adapted for use in doors of varying heights and which permits the use of cables of suitable length for the particular height of door.

Second, to provide a cable winding drum which is particularly desirable for use in a counterbalancing assembly of the type indicated.

Third, to provide a counterbalancing assembly for upwardly acting doors which is readily adjusted to meet conditions of a particular installation including substantial variations in the winding length or winding strength of a driven torsion spring.

Further objects relating to details and economies of the invention will appear from the description to follow. The invention is defined in the claims.

A structure which embodies the features of the invention is clearly illustrated in the accompanying drawing, in which:

Fig. 1 is a fragmentary elevational view of an upwardly acting door counterbalance assembly embodying the invention, only such parts being illustrated as are deemed necessary to illustrate a practical commercial embodiment of the invention.

Fig. 2 is a fragmentary elevational view of parts shown in Fig. 1 in a different position of adjustment.

Fig. 3 is an enlarged fragmentary outer end or face view of the winding drum illustrating the winding cable in one position of attachment thereof.

Fig. 4 is a fragmentary plan view of the drum viewed downwardly from the top of Fig. 3.

Fig. 5 is a fragmentary sectional view taken on a line corresponding to line 5—5 of Fig. 3 showing a cable attached to the drum in another position or relation thereto from that shown in Figs. 3 and 4.

Fig. 6 is an outer end elevation view of the drum.

Fig. 7 is a fragmentary sectional view on line 7—7 of Fig. 2 illustrating an adjustable supporting means for the drum.

In the accompanying drawing 1 represents a portion of a door frame, 2 a fragment of an upwardly acting door, and 3 the lifting cable thereof. The track 4 with which the door is operatively associated is provided with a vertical portion 5 and a horizontal portion 6. An upwardly acting door having track of this general character is known in the art and therefore is not further detailed, but the door and track structure generally considered may be that illustrated in the Johnson Patent No. 1,983,856, issued December 11, 1934.

The counterbalancing means illustrated comprises the shaft 7 provided with a torsion spring 8. The end of the shaft illustrated is supported by the support 9 adjustably mounted on the bracket 10 secured to the frame member 1 and to which the track 4 is also secured. The support 9 is provided with a foot portion 11 having slots 12 therein receiving the bolts 13 so that the support may be adjusted laterally or sidewise.

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The cable winding drum designated generally by the numeral 14 is mounted on the shaft 7 for adjustment axially thereof, a key or spline being indicated at 15. The support 9 is provided with an arm 16 to which the spring 8 is connected by the member 17, the other end of the spring being connected to the shaft. The connection is not illustrated as means known to the art may be used.

The drum 14 comprises a cylindrical inner portion 18 and an inwardly tapered or conical portion 19, the cylindrical and conical portions having a continuous spiral guide groove 20 for the cable 3.

In the present structure the drum 14, has a generally conical recess 21 in its outer face. The periphery of the conical portion of the drum is provided with a plurality of axially spaced holes 22 which open into the cable guiding groove and which are adapted to receive the end of the cable to be secured by anchoring means 23 in Figs. 3 and 4 and 24 in Fig. 5. As shown in these figures when the cable is disposed in one of the holes the anchoring means is clamped preferably upon the end of the cable after it is inserted in the hole. Or alternately, the full length of cable may be threaded through the hole.

The drum has a slot like opening 25 in its outer end. This opening 25 is of such width as to permit the cable being passed edgewise therethrough. The slot 25 opens into a cable receiving recess 26 which in turn opens to the periphery of the drum and has a curved bottom 27 merging into the groove 20, as is shown in Figs. 3 and 4. In effect this constitutes the outer end of the groove 20.

The slot like opening 25 is inclined oppositely from the bottom of the recess 26 with the result that the front wall of the recess forms a guard for retaining the cable in the recess and from which the cable can be disengaged only by aligning the cable edgewise with the slot like opening 25 and reversing the action of inserting the cable. With this form of cable receiving opening and recess it is practically impossible for the cable to become accidentally disengaged from the drum under such condition as slack in the cable during installation or as might occur under certain operating conditions.

The peripheral wall of the drum has a thickened portion 28 in which the opening 25 and recess 26 are formed. The thickened wall portion 28 has a flat inner face 29, with which the cable anchor 23 abuts on both sides of the slot like opening 25. This provides a very strong and secure anchorage for the cable.

The face of the drum has recesses 30 into which the cable openings 22 open. These recesses are adapted to receive the anchors 24 with the anchors seating on both sides of the opening 22. This minimizes the likelihood of fracturing the drum under load.

With this arrangement of parts cables of suitable length and size for the load they are to carry may be used and proper alignment with the door is obtained by the axial adjustment of the drum, see Fig. 2, as compared to Fig. 1. In both Figs. 1 and 2 the cable is illustrated as being fully unwound from the drum, which would be the condition when the door is in fully closed position.

Another advantage is that this feature of selective point attachment of the cable to the drum not only results in the saving of cable, or the use of only enough cable required for the particular height of the door, but permits connection to the drum at points having radii of different length relative to the axis of the drum, thus compensating for substantial differences in the torsion of the driving spring of the drum. For example, if the spring assembled with the door does not have the proper torsion, the door is not effectively or properly counterbalanced. When this situation occurs it has been common practice to send to the factory or warehouse or supplier for a new spring, which procedure delays the erection of the door. With the provision for attachment of the cable to the drum at several points, angularly spaced relative to the spiral

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groove, it is possible to vary the moment of the spring by raising or lowering the point of attachment of the cable to the drum. The raising of the point of attachment of the cable to the drum gives the spring relatively less leverage while the lowering of the point of attachment gives the spring relatively more leverage on the door, so by this manipulation variations in the torsion or lifting moment of the particular spring may be compensated for and proper balancing of the door secured.

It is desirable that the conical portion of the drum have a relatively steep pitch so that the substantial variation in the radius leverage results from attaching the cable to the drum at angularly spaced points relative to the groove thereof.

I have illustrated and described a highly practical embodiment of the invention. I have not attempted to illustrate the various embodiments or adaptations of which it is capable as it is believed this disclosure will enable those familiar with the art to embody or adapt the invention as may be desired.

Having thus described the invention, what is claimed as new and is desired to be secured by Letters Patent is:

1. A cable winding drum having a cylindrical inner end portion and an inwardly tapered outer end portion provided with a continuous spiral cable guide, the outer end face of the drum being recessed and exposed and having a radially thickened peripheral portion along a sector thereof, the drum having a slot in its said thickened portion, open at both ends and of a width permitting a cable to be passed sidewise therethrough, the drum having a cable receiving recess directed toward the axis of the drum and disposed at one side of the slot and opening radially between the periphery of the drum and the inner recessed surface thereof, the recess having a curved bottom extending to the inner end of the slot and merging into the cable guide, the slot being inclined oppositely from the bottom of the recess, the inner face of the said thickened peripheral portion viewed radially of the drum being flat and perpendicular to a radius of the drum passed through said recess providing supporting surfaces for a cable anchor at both sides of the inner end of the slot.

2. A cable winding drum having a cylindrical inner end portion and an inwardly tapered outer end portion provided with a continuous spiral cable guide, the outer end face of the drum being recessed and exposed, the drum having a slot in its outer end open at both ends between its periphery and said recessed face and of a width permitting a

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cable to be passed sidewise therethrough, the drum having a cable receiving recess directed toward the axis of the drum and disposed at one side of the slot and opening radially between the recessed outer face and the periphery of the drum, the recess having an inclined bottom merging into the cable guide, the slot being inclined oppositely from the bottom of the recess, the inner surface of the wall of the drum as viewed radially providing supporting surfaces for a cable anchor at both sides of the inner end of the slot.

3. A cable winding drum having a spiral cable guide, the outer end face of the drum being recessed and exposed, and having a radially thickened peripheral portion along a sector thereof, the drum having a slot in its said thickened portion open at both ends of a width permitting a cable to be passed sidewise therethrough, the drum having a cable receiving recess directed toward the axis of the drum and disposed at one side of the slot and opening radially between the recessed outer face and the periphery of the drum, the recess having a bottom merging into the cable guide, the slot being inclined oppositely from the bottom of the recess.

4. A cable winding drum having a spiral cable guide, the outer end face of the drum being recessed and exposed, the end of the drum having a slot open at both ends between its periphery and said recessed face and of a width permitting a cable to be passed sidewise therethrough, the drum having a cable receiving recess directed toward the axis of the drum and disposed at one side of the slot and opening radially between the recessed outer face and the periphery of the drum, the recess having a bottom merging into the cable guide, the slot being inclined oppositely from the bottom of the recess.

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