Dec. 7, 1948. L. R. SMITH 2,455,819

WINDING REEL FOR TAPE MEASURES

Filed Sept. 27, 1945

Fig. 1.

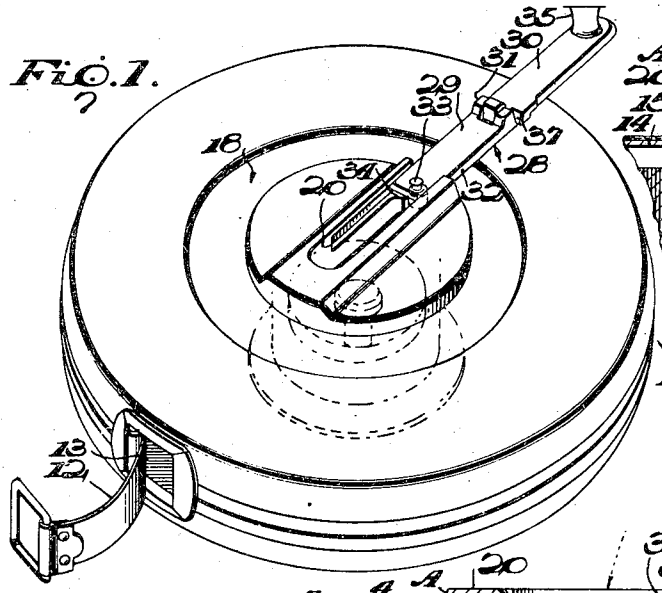


Fig. 5.

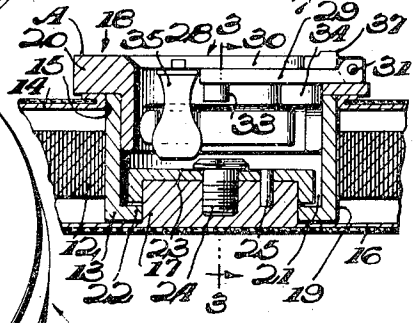


Fig. 2.

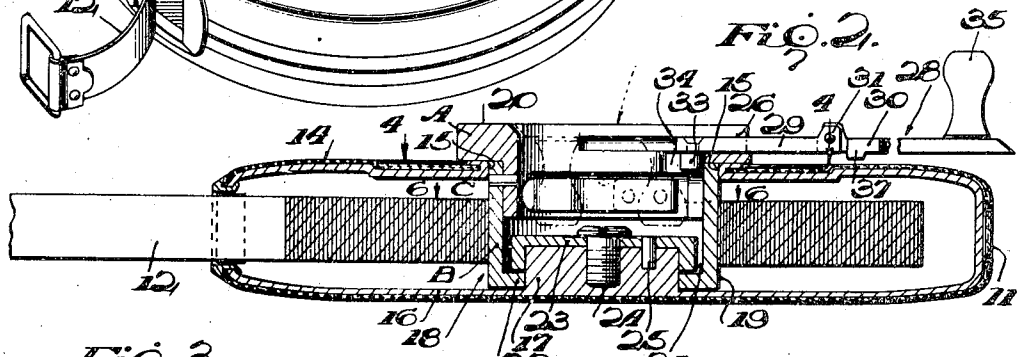


Fig. 3.

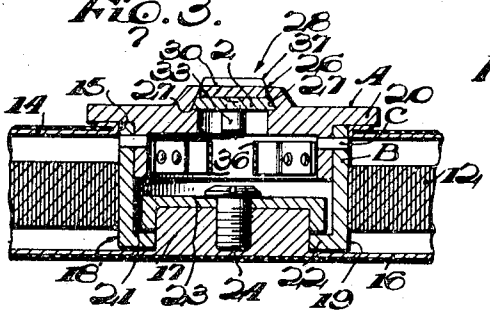


Fig. 4.

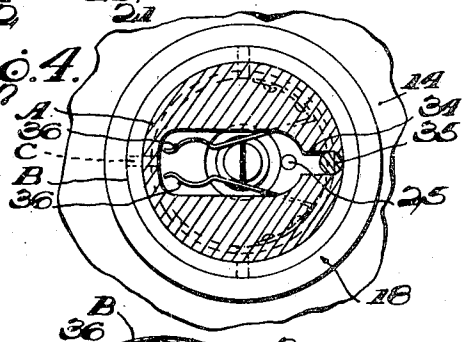
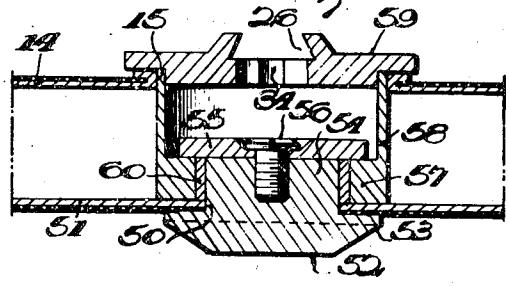


Fig. 7.



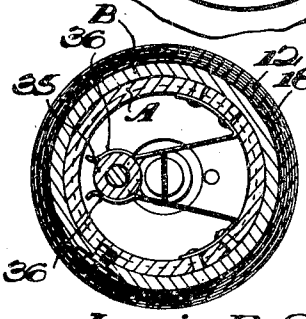


Fig. 6.

Inventor

Louis R. Smith.

By Albert H. Kirchner

Attorney

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WINDING REEL FOR TAPE MEASURES

Louis R. Smith, Portland, Oreg.

Application September 27, 1945, Serial No. 618,955

7 Claims. (Cl. 242—84.8)

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The present invention relates to winding reels for tape measures or the like.

A principal object of the invention is to provide a complete assembly of a tape measure or other tape or band element, and an enclosing casing, with means for winding the element around a central drum in the casing and for permitting it to be withdrawn through an opening in the periphery of the casing.

An important object of the invention is to provide a winding mechanism which will effectively seal the casing against ingress of mosture, dust, dirt, etc.

Another object of the invention is to provide a winding drum of a device of the type indicated with an improved crank arm for operating it.

Related objects include providing a crank arm which will be foldable compactly into retracted position where it will be yieldably held against all tendency to slip out of place, while permitting it, when desired, to be moved to extended position for rotation of the drum and consequent winding of the tape in the casing.

Other objects are concerned with making a device of the character indicated which will be simple in construction, economical to manufacture, durable and foolproof in use, and which will more efficiently and effectively discharge all its intended functions.

The accompanying drawing illustrates certain preferred embodiments of the invention which have in actual practice been tried and found satisfactory and which are therefore at present preferred by me, although I recognize that the invention may be embodied in other and further modified forms, all within the spirit of the invention as defined by the appended claims.

In the drawing:

Figure 1 is a perspective view of a preferred embodiment of the invention, showing the crank handle extended for rotating the drum and winding the tape;

Fig. 2 is a cross sectional view taken diametrically through the entire device;

Fig. 3 is a diametrical cross sectional view taken at right angles to the section of Fig. 5, along the line 3–3 thereof, showing the central drum and hub assembly;

Fig. 4 is a plan view of the central area of the casing, showing the central drum structure in cross section, along the line 4–4 of Fig. 2.

Fig. 5 is a diametrical cross sectional view of the central drum and hub assembly, taken at right angles to the view of Fig. 3, along the line 5–5 of Fig. 2;

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Fig. 6 is a cross sectional view like that of Fig. 4 but taken further down through the central drum, on the line 6–6 of Fig. 2; and

Fig. 7 is a view similar to Fig. 3 but showing a modified type of drum structure.

In the drawing, the reference numeral 10 designates the entirety of a conventional type of casing, which may be made of two generally similar circular halves of stamped metal secured together at their edges and optionally but not necessarily covered with a facing of leather or the like, stitched along a median seam 11, all enclosing a tape 12 of steel or fabric the outer end of which extends through a peripheral opening 13 in the casing. This structure may be of any conventional design and style and forms no part of the present invention.

One of the flat metallic walls or bases of the casing, hereinafter designated the top wall 14, is provided with a central opening 15, and the other or bottom wall 16 has the metal thereof centrally thickened to provide a hub 17 made in the form of an integral circular plug extending a short distance up into the casing. The integrality of the hub and bottom wall prevents moisture and foreign solids from entering the casing through the bottom wall.

A drum, generally designated 18, extends through the opening 15 in the upper wall 14 of the casing and includes an interior generally cylindrical portion 19 and a radially enlarged upper base 20 which is positioned outside of the casing and overlies the wall 14 around the margins of the opening 15. The inner end of the tape 12 is fastened to the outer periphery of the cylindrical portion 19 of the drum, so that upon rotation of the drum the tape is wound thereon.

The cylindrical portion 19 is generally hollow, having a lower bore 21 sleeved over the hub 17, with an instanding circular flange 22 journalled on the hub. A crown type washer 23 is secured to the inner end of the hub 17 by a central screw 24 with its peripheral flange in the bore 21 of the drum, overlying the flange 22 thereof and thereby mounting the drum for rotation on the hub while holding it against axial movement. A pin 25 may, if desired or thought necessary, be set through the washer and into the hub to fix the two against relative rotation and eliminate tendency of the screw 24 to unscrew.

An important feature of the invention is concerned with providing convenient means for manually rotating the drum on the hub 17 as its bearing. This construction includes a track-

way 26, made in the form of a slot cut through an axially thickened zone extending diametrically across the outer surface of the upper base 20 of the drum, which slot is closed at its inner end and open at its outer end. As best shown at 27 in Fig. 3, the side walls of this trackway are undercut, or downwaardly and outwardly beveled. A crank arm, generally designated 28, is slidably mounted in the trackway and comprises an inner member 29 to the outer end of which an outer member 30 is connected by a hinge 31. The side edges of the inner member are beveled, as shown at 32 in Fig. 1, complementally to the bevels 27, thus preventing removal of this member axially from the drum, and a small abutment element, in the form of a pin or post 33, extends from the inner end of the member 29 a short distance down into the trackway, so as to enter a lower slot 34 and abut the inner periphery of the drum 18 when the crank arm 28 is slid out along the trackway, thus limiting this movement and preventing withdrawal of the crank arm in a direction radial of the drum.

The outer member 30 of the crank arm is made longer than the inner member and is provided with a knob 35 which extends down into the interior of the drum when the two members are folded on each other as shown in Fig. 5. A single bowed leaf spring 36, or a pair of such springs, are mounted in the hollow of the drum to receive this knob and bear against it during its entering movement as the folded crank arm slides inwardly in the trackway, thus preventing unintended movement of the folded crank arm along the length of the trackway.

The face of the outer member 30 of the crank arm which is opposite that from which the knob 35 projects is provided with a short thickened and slightly widened area 37 forming a lug which will penetrate the undercut 27 when the outer member is slid into the trackway, thus holding the outer member down therein. This holding action is effective not only when the arm is folded and slid back into the trackway, as shown in Fig. 5, but also when the arm is unfolded, as shown in Figs. 1 and 2, and is slid back into the trackway just far enough for the lug 37 to be received in the trackway. In this latter position the arm is extended for cranking the drum and the interlock of the lug and the trackway keeps the arm from becoming accidentally folded.

With the construction thus described, the folded arm 28, completely enclosed within the trackway 26, in its normal inoperative position, is yieldably held therein by the undercut 27 and by the cooperation of the springs 36 with the knob 35. In this position, shown in Fig. 5, the arm substantially completely closes the trackway and the opening 15 is thereby made practically dust-proof. Finger pressure against the lug 37 is sufficient to slide the folded arm out of the trackway to the extent shown in full lines in Fig. 2, which frees the lug from the trackway so that the outer member 30 of the arm may be unfolded to alignment with the inner member of the arm, as shown in full lines in Fig. 2. This is the maximum extension of the arm and provides the greatest leverage for rotating the drum. In this position the fit of the post 33 in the slot 34 serves to steady the connection of the arm and its trackway, and the drum is easily and powerfully rotated. The extended arm 28 may advantageously be pushed slightly back into the trackway, enough to engage the lug 37 with the undercut 27. In this position the leverage is only slightly reduced, but the unfolded arm is stiffened, since the outer member is held against upward folding by the fit of the lug beneath the undercut 27. In this position this fit of the lug and undercut also braces and steadies the arm against lateral wobbling in the trackway, thus supplying the function of the post 33 and slot 34, which are no longer engaged together.

The parts hereinabove described are subject to very little wear and should last indefinitely. However, replacement of any part is readily made, and assembly and disassembly are easily effected by removing the screw 24 through the slot which forms the trackway 26, and then lifting the drum 18 past the hub 17 and out through the upper opening 15 with the washer 23. The fastening between the inner end of the tape and the outer wall of the drum, which may take the form of a screw passing through a perforation in the tape and threaded into the drum wall, is readily made or broken with the drum removed from the casing and with the tape wound in the casing, with its inner end projecting therefrom through the opening 15. Operations on this connection are more easily made if a substantial length of the tape is withdrawn through the peripheral opening 13 of the casing so that the convolutions of the tape which remain in the casing can be expanded away from the winding drum.

In the foregoing explanation the drum 18 has been described as if it were made in one integral piece. Actually, however, it is convenient to make the drum in two parts, designated respectively A and B in the figures, and secure them concentrically together by some such means as the pin or headless rivet C. The effect of course is the same as if the two parts were integral portions of a single casting.

In whatever form the drum be made, it includes, in the preferred embodiments of the invention, a central or axial bore into which the hub extends and which is rotatable around the hub, with or without an interposed bushing. The drum also includes, in the preferred embodiments, a counterbore which is of greater internal diameter than the bore, so that the two meet in an internal radial shoulder which provides an abutment for the washer which holds the drum on the hub against axial withdrawal while permitting rotation of the drum on the hub.

The modification shown in Fig. 7 is an adaptation of the principles of the invention for incorporation in a tape casing of conventional form originally made with an opening 52 in its bottom wall 51 for reception of the usual protruding end of a shaft or its bearing. In this form of the construction a hub in the form of a plug 52 is secured in tight relation in the opening 50, as by cementing its peripheral flange 53 to the margins of the opening, with a cylindrical portion 54 extending up into the casing. A flat washer 55 is held by a screw 56 (and, if desired or thought necessary, also by a pin like the pin 25 of Figs. 2 and 5) down on the top of the cylindrical portion 54 so as to overlie and hold down, against axial withdrawal, an internally flanged or counterbored lower end 57 of a drum 58 which extends out through the opening 15 in the top wall 14 of the casing and is there closed by a radially enlarged cover or drum upper base 59. A bushing 60 may be interposed between the cylindrical portion 54 of the hub and the counterbore of the drum so that the drum is easily rotatable on turning the handle 28 (not shown) which is mounted in the

trackway 26 and is in all respects formed, positioned and operated like the handle 28 described in connection with the preferred embodiment, including cooperation with a spring or springs 35.

It will be evident that in either of the constructions the screw 24 or 56 may be readily removed by a screwdriver inserted through the top of the drum and that this removal will release the drum for withdrawal through the opening 15 in the upper wall of the casing. In this way all the mechanism can be disassembled for repair, replacement or any other purpose, including replacement of a broken tape or change to another tape.

It is believed that from this description of preferred embodiments of the invention it will be apparent that the arrangements disclosed, not all of which need be used in the complete combinations described or shown, accomplish the several objects and provide the several advantages hereinabove stated.

I claim:

1. A winding reel for a tape measure or the like comprising a generally cylindrical drum, a trackway formed in a base of the drum comprising a slot open to a periphery of said base, and a crank arm slidably retained in the trackway and comprising inner and outer members hinged together for folding down on each other and for alignment with each other with the outer member extending from the open end of the trackway.

2. The combination claimed in claim 1, in which the trackway side walls are undercut and the adjacent side edges of the inner member are complementally shaped for retention in the trackway.

3. The combination claimed in claim 1, including a projection extending from the inner member inwardly of the drum to abut the drum side wall when the inner member is slid outwardly, whereby lengthwise withdrawal of the crank arm from the trackway is prevented.

4. The combination claimed in claim 1, in which the trackway side walls are undercut and the adjacent side edges of the inner member are complementally shaped for preventing withdrawal of the inner member axially from the drum, and including a projection extending from the inner member inwardly of the drum to abut the drum side wall when the inner member is slid outwardly, whereby lengthwise withdrawal of the crank arm from the trackway is prevented.

5. The combination claimed in claim 1, in which the trackway side walls are undercut and the adjacent side edges of the inner member and of the inner portion of the outer member are complementally shaped for retention of both members in the trackway when said members are in their folded condition.

6. The combination claimed in claim 1, in which the trackway side walls are undercut and the adjacent side edges of the inner member are complementally shaped for preventing withdrawal of the inner member axially from the drum, and in which the inner portion of the outer member is thickened to provide a boss projecting above the base of the drum when the members are in folded condition, said boss providing a finger abutment to facilitate sliding the folded crank arm outwardly in the trackway.

7. The combination claimed in claim 1, in which the trackway side walls are undercut and the adjacent side edges of the inner member are complementally shaped for preventing withdrawal of the inner member axially from the drum, and in which the inner portion of the outer member substantially fills the undercut when the members are aligned and said inner portion is positioned in the trackway, whereby folding of the members from said position is prevented.

LOUIS R. SMITH.

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