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TAPE MEASURE

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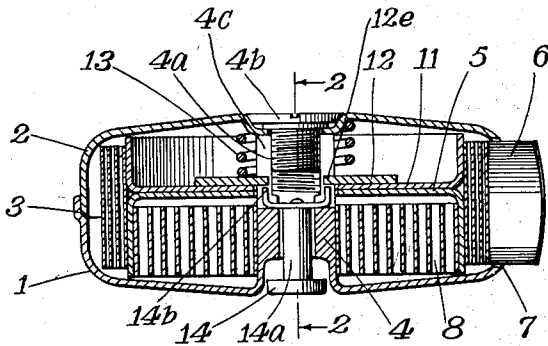


Fig. 1.

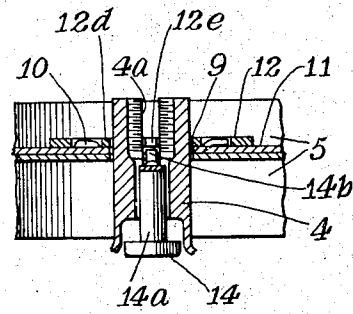


Fig. 2.

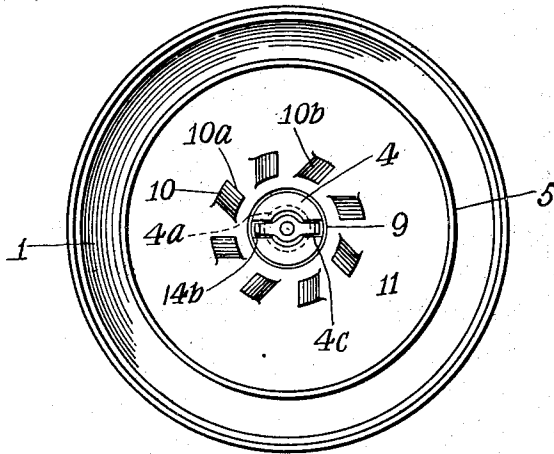


Fig. 3.

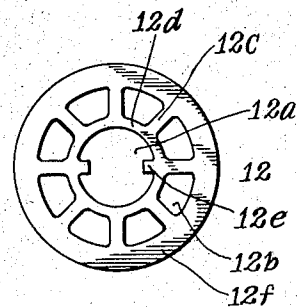


Fig. 4.

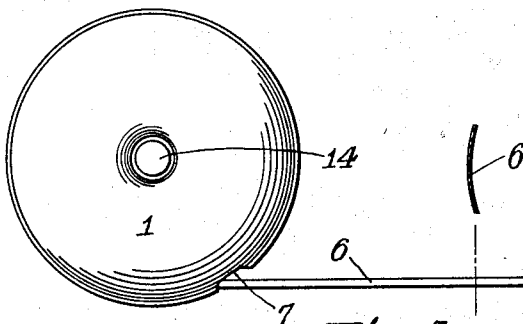


Fig. 5.

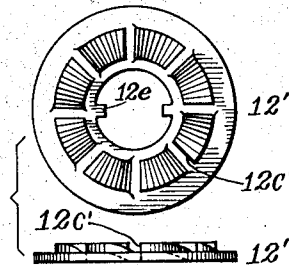


Fig. 6.

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TAPE MEASURE

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3 Claims. (Cl. 33—138)

This invention relates to spring actuated tape measures of a known type that is characterized by a casing containing a revoluble drum operated by a coiled spring that is tensioned by pulling the tape out from the casing and upon being released pulls the tape into the casing and winds it on the drum. The drum is started by releasing a non-rotatable pawl which is mounted on a post in the casing, from a toothed ratchet on the drum which is rotatable; and the drum is stopped by allowing the pawl to re-engage the ratchet on the drum.

The present invention has for its objects to improve the durability of the tape winding and halting mechanism; to attain a more positive operation of the drum and tape; to provide a novel pawl or detent structure so arranged as to be assembled rapidly and easily.

The objects of the invention and its advantages will be understood more readily by first taking notice of the fact that when either a tape of concavo-convex cross sectional shape, or a heavy flat tape, is used, an unusually great amount of spring power must be exerted on the drum in order to start the drum suddenly when the operator presses the release button. Further, it is to be noted that if the winding spring is made sufficiently powerful to accomplish the desired instantaneous starting of the drum it will, because of its power, continue to exert an unusual amount of torque or peripheral pull after the drum has begun to rotate. Consequently the peripheral spring will rotate the drum so fast (because only a small amount of spring power is required to maintain rotation) that a pawl detent and associated parts, if made according to the usual practice, will be quite unable to withstand the battering, bending and wearing stresses that are brought upon them by the instantaneous engagement of the detents and the drum ratchet.

The present invention is designed to reduce the net amount of shock that can be exerted by a powerful drum spring upon any individual pawl element or detent. That object is attained partly by distributing the total force of impact among a relatively greater number of detents, partly by reinforcing all of the detents with an outer reinforcing ring and partly by fastening together all of the inner ends of the detents by means of an inner reinforcing ring. Furthermore, the lugs that anchor the pawl to the central post are now arranged so as to be subjected to shearing stresses but not to bending action when the stationary detents are struck by the ratchet teeth of the

rotating drum. Thus the durability of the lugs is increased.

An additional advantage of the novel design is that a relatively powerful spring can be employed to press the pawls against the ratchet elements on the drum, and this large spring can encircle the post, as distinguished from earlier pawl-actuating springs that necessarily have to be concealed within the post and consequently were of small size and weak, and not positive in the action on the pawl.

With the foregoing and certain other objects in view, which will appear later in the specifications, my invention comprises the devices described and claimed and the equivalents thereof.

In the drawing Fig. 1 is a cross section of a tape measure embodying my improvement, the section being taken in a plane that includes the axis of the drum.

Fig. 2 is a part sectional detail, taken on the line 2—2 of Fig. 1, showing the push button and its associated parts in relation to the pawl disk.

Fig. 3 is a plan view of the parts shown in Fig. 1, the upper case member, the tape, the compression spring and the pawl disk being removed.

Fig. 4 is a plan view of the pawl disk in preferred form.

Fig. 5 is a plan view of a tape measure case with the concavo-convex tape projecting therefrom in a straight line.

Fig. 6 is a plan and edge view of a modified form of pawl disk.

The invention is shown as it appears when applied to a tape measure consisting of flanged casing members 1, 2, united at a peripheral joint 3. A hollow upstanding post 4 is threaded internally at 4a to take a screw 4b that fastens members 1, 2 together. A tape 6 of ribbon metal runs through an opening 7 in the case, being drawn in and wound swiftly on a drum 5 by a coiled spring 8. This spring is anchored at one end to post 4, its other end being fixed to the rim of drum 5. The drum rotates freely on its bearing 9 while the tape is being pulled out from the case and is prevented from counter-rotation by a pawl device, that will be described fully, and a co-operating circular row of ratchet teeth 10 that are struck up from the web 11 of the drum. These teeth have abrupt abutment faces 10a and sloping top faces 10b.

A pawl plate 12, Fig. 4, is provided to releasably engage the ratchet teeth 10 and a push button 14 is used to disengage the pawl from the ratchet. To an end of the push button stem 14a is fixed a

U-shaped clip having fork-like upward extensions 14b that project into the slots 4c beneath the lugs 12e to lift member 12. Button 14 and pawl plate 12 are restored by a compression spring 13. The pawl plate 12 surrounds post 4 and so presents a large bearing area for spring 13 which may be unusually large and of sufficient strength to hold plate 12 pressed very firmly against web 11, assuring quicker and more effective locking of the pawl and ratchet teeth than was heretofore possible with a small spring which was concealed in the post and permitted the pawls to be jolted away from the ratchet teeth and to slip, skidding past a few teeth before engaging.

Pawl plate 12 has the general form of a disk or washer and is preferably stamped from sheet steel. It has a central opening 12a and apertures 12b, the latter being spaced circularly to present radial detents 12c that connect an inner annular ring 12d and an outer ring 12f. Short lugs 12e project radially inward from the inner ring and are received in longitudinal slots 4c formed in post 4. Thereby pawl plate 12 is kept from rotation, yet is permitted some movement lengthwise of post 4.

Because of its structure, pawl plate 12 has great strength to withstand the shocks and battering due to suddenly halting the straight incoming tape and the rotating drum. The inner ring 12d and outer ring 12f support and reinforce the radial detents 12c at both ends and prevent them from twisting and overrunning the ratchet teeth 10. Preferably as many detents 12c are provided as there are ratchet teeth 10 on the web of the drum. The detents are spaced accurately in a circle so that the shock brought upon them by the sudden impact of abutment faces 10a on drum 5 is distributed among, say, eight detents 12c, as shown in Fig. 4. There results from this arrangement freedom from wear, less likelihood of twisting or bending the detents and less tendency to batter and wear away the abutment faces 10a of the ratchet teeth.

Pawl plate 12 can be lifted from the post 4 after removing screw 4b, case member 2 and compression spring 13. Drum 5 can then be lifted from post 4. Thus any part can be replaced easily in event of breakage.

Fig. 6 shows an alternative pawl plate structure comprising circumferentially spaced abutment teeth 12c' that are formed by striking up portions of a metal disk 12' instead of punching them out to leave circumferentially spaced apertures, as was shown in Fig. 4.

By the means above described a drum halting mechanism has been provided that is well adapted to withstand hard usage to which it is subjected when either a heavy flat tape, or a concavo-convex tape is employed. A concavo-convex tape requires more spring power to pull it into the casing than does an ordinary flat tape, and a heavy flat tape requires more spring power than a light tape, but increased spring power increases the wear on the drum halting mechanism, and this invention, by improving that mechanism, makes it possible to produce tape measures with heavy flat tapes or concavo-convex tapes that will operate as easily and positively and with as little wear on the drum halting mechanism as has heretofore been possible with tape measures employing light tapes and light drum springs.

Having thus described my invention, what I claim and desire to secure by Letters Patent is:

1. A tape measure having in combination a tape, a casing containing a spring actuated rotatable drum provided with ratchet teeth, a longitudinally slotted hollow drum-carrying post fixed to the casing, a pawl plate comprising an inner ring surrounding said post and having lugs projecting inwardly therefrom and received in the slots of said post, an outer ring and radial bars spaced apart peripherally and connecting said inner and outer rings, a spring surrounding the post and arranged to yieldingly press said pawl plate against said ratchet teeth, a push button received in the post and members thereon operatively engaging said lugs within the slots of the post.

2. In combination a tape measure comprising a concavo-convex tape, a casing, a slotted post having a spring actuated drum rotatable thereon, said drum having ratchet teeth, a pawl plate comprising an inner ring having lugs projecting radially inward and entering the slots of said post and terminating therein, an outer ring, detent members connecting said inner and outer rings and spaced apart circularly, a push button having members disposed in operative engagement with said lugs at places within the slots of said post.

3. A pawl plate for a tape measure, comprising an inner ring having lugs projecting radially inward and shorter than the wall thickness of the drum post of the tape measure to which the pawl plate is adapted to be applied, an outer ring, and detent members connecting said inner and outer rings and spaced apart circularly.

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