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3,415,461

MEASURING TAPE CONSTRUCTION

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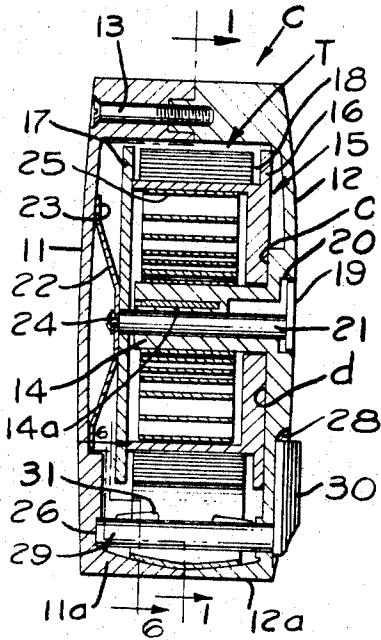


FIG. 2

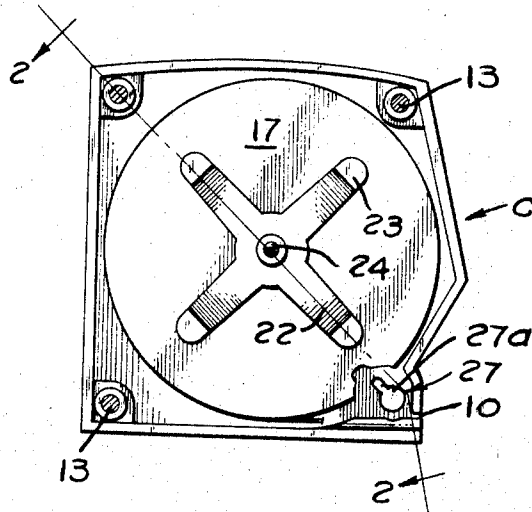


FIG. 1

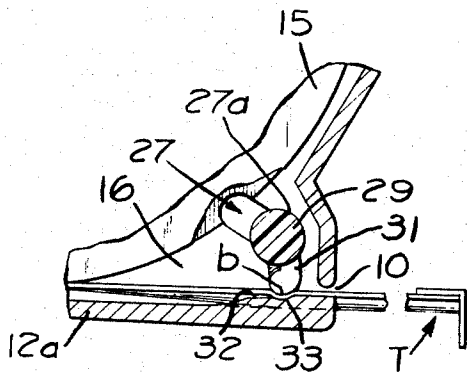


FIG. 6

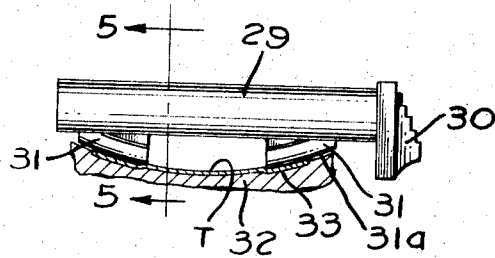


FIG. 4

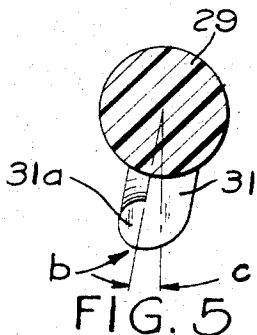


FIG. 5

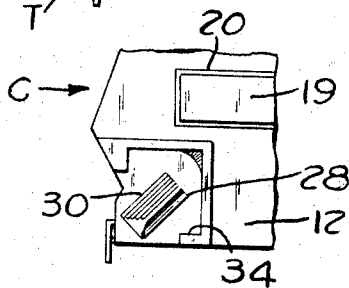


FIG. 3

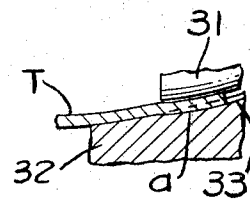


FIG. 4A

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ABSTRACT OF THE DISCLOSURE

A measuring tape construction wherein a casing with a tape opening has a recoilable tapeline in engagement with a ramp inside the opening extending out the opening and wherein a pair of resilient, spaced apart clamp arms are movable into a position of engagement with the edges of the tapeline to clamp it against the ramp and lock it in a selected extended position.

This invention relates to measuring tape constructions and more particularly to locking mechanisms which are incorporated therein to positively secure the tapeline in various positions of extension from the measuring tape casing. Various friction elements have been proposed for securing an extended tapeline in a particular position of extension but these have been generally of a type in which the entire upper surface of the tapeline was frictionally engaged by a clamping element and such constructions have been generally unsatisfactory because, after a short period of use, the tapeline could be moved relatively to the clamping element, with the result that the lock was not held and the measuring indicia were quickly worn away. Further, abrasive foreign particles trapped between the clamping shoe and upper surface of the tapeline tended to be scrubbed by the shoe against the pigmented surface of the tapeline.

One of the prime objects of the present invention is to provide a measuring tape construction in which a releasable lock member forms transverse pockets in the sides of a flexible tapeline and disposes locking cams in the pockets in a manner such that what might be termed a mechanical lock as well as a frictional retardation is obtained.

Another object of the invention is to provide an inexpensive and yet highly reliable measuring tape construction of the character described incorporating resilient cams which are of such shape that the lock may not be disengaged by either pushing the tapeline inwardly toward the casing or pulling it outwardly therefrom.

Another object of the invention is to provide a measuring tape construction incorporating relatively simple locking cam means which can be molded in plastic and easily inserted and retained in position without any need for locking cam retaining elements.

A still further object of the invention is to provide a lever actuated lock for a measuring tape of a type wherein the lever can be conveniently disposed on the same side of the tape casing as the conventional tape retrieving button.

In the drawings, FIGURE 1 is a sectional, side elevational view through a measuring tape, taken on the line 1—1 of FIGURE 2, the front end of the tapeline being broken away and the locking cam being omitted to more clearly illustrate the casing construction;

FIGURE 2 is a cross-sectional view of a measuring tape construction incorporating the invention, taken on the line 2—2 of FIGURE 1, the locking cam being shown in inoperative position;

FIGURE 3 is an enlarged, fragmentary, side elevational view of the exterior of the measuring tape casing;

FIGURE 4 is an enlarged, fragmentary, transverse

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sectional view showing the locking cam elements swung down to lock the tapeline in position;

FIGURE 4A is a still more enlarged similar view illustrating the manner in which the edges of the tapeline are displaced by the locking nibs;

FIGURE 5 is a transverse, sectional view taken on the line 5—5 of FIGURE 4 but omitting the tapeline and casing; and

FIGURE 6 is an enlarged, fragmentary, side elevational view showing the cams in locking position.

Referring now more particularly to the accompanying drawings, in which a preferred embodiment of the invention only has been illustrated, a letter C generally designates a conventional measuring tape casing within which is coiled a preferably spring steel tapeline generally designated T which is withdrawable out opening 10 provided in the usual manner in the front wall of the casing C. The casing C is formed, for ease of assembly, in two cup-like parts or side sections 11 and 12 which can be easily secured and assembled in mating relation by screws 13.

Revolvably mounted on the casing section 12, which includes the tubular center post 14, is a tapeline sheave or drum generally designated 15, preferably formed of two mating separate sections 16 and 17 which, when in assembled relation, provide a peripheral groove 18 for receiving the convolutions of the coiled measuring tapeline T. A preferably molded plastic brake actuating button 19 received within a centrally recessed portion 20 of the casing section 12 has a stem 21 extending through the center post portion 14 and mounts a braking spring 22 which normally urges the drum side wall 17 toward the other drum section 16. The spring 22 is formed with a plurality of radially extending legs having foot sections 23 which bear against the inner wall of the casing section 11, and a screw 24 is employed to secure the friction spring 22 to the tape retrieval button stem 21.

Provided within the drum 15 is a spring motor 25 which is secured in a slot 14a in the hub section 14 at one end and to the innermost end of the measuring tape ribbon T at its other end, the tapeline T extending through a slotted opening in the drum peripheral wall to connect to the one end of the spring 25 in the usual manner. When the drum 15 is revolved in a direction to unwind the measuring tape T from the casing C, the spring 25 will be wound up, and when the braking force exerted by spring 22 is released, spring 25 will wind the tape back into the casing. The construction thus far described is conventional and forms no part of the present invention except in combination with the novel elements which will now be described.

In order to provide a positive lock for insuring that the measuring tape remains in a particular position of extension from the measuring tape casing C, a releasable locking cam will now be described which will positively lock the tape in position even though the tape release button is inadvertently depressed to release the braking spring 22 and permit the full force of the spring 25 to be applied to the tape. Provided in the casing section 11 is a blind bearing hole 26 which is transversely aligned with the enlarged portion 27a of a keyhole opening generally designated 27 which is provided through the casing section 12. The keyhole slot 27 is provided in a recessed wall portion 28 of the casing section 12 to receive a cam shaft 29 which extends through to the blind hole 26 as shown in FIGURE 2, and which is operated by a lever 30 integrally connected with shaft 29.

As shown particularly in FIGURES 3 and 5, the shaft 29, which is preferably a molded plastic member, is provided with a pair of transversely spaced apart, generally radially extending cam legs or webs 31 having radially offset, curvilinear foot portions 31a for engaging only the side portions of the tapeline T as shown in FIGURE 3.

The usual ramp portion 32 is integrally provided on the bottom wall sections 11a and 12a of the casing sections 11 and 12, respectively, adjacent the tape opening 10 in the casing C and, as shown particularly in FIGURE 3, the ramp provides a curvate upper surface corresponding substantially to the normal concave under surface of the tape T.

Provided in the ramp 32, however, are shallow, transverse grooves 33 and it will be observed (see FIGURE 4) that the lower surfaces of the feet 31a of cam webs 31 are curved in a transverse direction to conform to the extent and shape of the grooves 33. When the cam webs 31 are in lowered position, as shown in FIGURES 4, 4A, and 6, the side portions of the tape are depressed slightly, as shown at a in FIGURE 4A particularly, and are mechanically locked by the foot portions 31a filling the transversely extending shallow grooves which are thus formed in the side portions of the tape. Because the foot portions 31a of the cam webs 31 are offset in the sense that their points of bearing engagement with the tape T are at the location b removed an angular distance c from the general radial line of extent of legs 31, the legs 31 possess a certain resiliency which does not permanently ripple or deform the measuring tapeline. However, because the portions 31a of the cam webs 31 are disposed within the shallow grooves formed in the sides of the tapeline when the device is in locked position, forces tending to move the tapeline T either inwardly or outwardly do not in any way tend to pivot the cam webs 31 in either direction and thus cannot release the tapeline lock. The stop shoulder 34 formed by the marginal wall of the recessed wall portion 28 prevents the lever 30, which is disposed within the recess, from ever being swung downwardly to such a degree that the foot portions 31a of the cam webs 31 would be swung past the shallow depressions 33 formed in the ramp 32.

It will be noted that the flange of the portion 16 of the tape drum 15 is of such diameter as to partially close the reduced portion of keyhole opening 27 (see FIGURE 6). Thus, when the locking cam device is disposed in assembled position, the drum section 16 positively prevents the shaft 29 from being withdrawn out the keyhole opening 27. In operation, with the lock lever 30 disposed in the "up" position in which it is shown in FIGURE 2, the tapeline T is free to be drawn from the casing C and, when the retrieval button 19 is pressed, to withdraw the tapeline T into the casing once again. Pressing the button 19 relieves the pressure on drum end plate 17, and accordingly relieves the pressure on drum section 16 which holds it against the braking surface d provided on the casing section 12.

To positively lock the measuring tapeline T in a particular extended position, the lever 30 is swung clockwise in FIGURE 3 to move the foot portions 31a into engagement with the tapeline T and depress the sides of the tapeline into the shallow grooves 33 in the manner indicated in FIGURES 4, 4a, and 6. The tapeline T shown is flat when coiled but upon escaping from its coiled state assumes its normal concavo-convex configuration. The tapeline T remains locked in position until the lever 31 is once again swung counterclockwise to permit the sides of the resilient tapeline T to spring back to normal position.

The measuring tape assembly may be disassembled by removing screws 13 and lifting off the casing section 11. Thence, when the screw 24 is removed to disassemble the brake 22, the drum end wall 17 may be slid off the stem, 21, and if the spring 25 is slipped from the slot 14a in the center post 14, the drum portion 16 may be similarly removed. It is then possible to remove the cam 19, with the cam webs 31 passing through the reduced portion of the keyhole slot 27 after first being, of course, transversely aligned with it.

It is to be understood that the drawings and descriptive matter are in all cases to be interpreted as merely

illustrative of the principles of the invention rather than as limiting the same in any way, since it is contemplated that various changes may be made in the various elements to achieve like results without departing from the spirit of the invention or the scope of the appended claims.

What is claimed is:

1. In a measuring tape construction or the like: a casing having a tape opening therein; a tape coiled in said casing and having one of its ends extending through said opening; motor means in said casing connected with said tape to return the tape to the casing when a portion of it has been drawn from the casing out said opening; ramp means in said casing adjacent said opening providing surface generally parallel to the plane of the tape with transversely spaced apart pocket means; and releasable means for pressing edge portions of the tape out of their plane into the pocket means to mechanically lock the tape in a particular position of extension.

2. The combination defined in claim 1 in which said releasable means comprises generally radially extending, transversely spaced, resilient arm means swingable down in a path to force said portions of the tape into said pocket means.

3. The combination defined in claim 2 in which said arm means comprises a pair of transversely spaced, arms disposed in said casing to swing down into engagement with the edge portions of the tape and having curvilinear end surfaces.

4. The combination defined in claim 3 in which the curvilinear end surfaces are provided on feet extending angularly from said arms so that engagement occurs at points offset from the arms and the arms can flex.

5. In a measuring tape construction or the like: a casing having a tape opening therein; a tape coiled in said casing and having one of its ends extending through said opening; motor means in said casing connected with said tape to return the tape to the casing when a portion of it has been withdrawn from the casing outside the opening; ramp means in said casing adjacent said opening providing surface generally parallel to the plane of the tape with pocket means; and releasable means for pressing a portion of the tape out of its plane into the pocket means to mechanically lock the tape in a particular position of extension; said releasable means comprising a rotatable shaft spanning said casing transversely to the extent of said tape and journaled in said casing; said shaft having generally radially extending arm means swingable down in a path to force said portion of the tape into said pocket means; said arm means comprising a pair of transversely spaced plastic arms disposed in said casing to swing down into engagement with the edge portions of the tape and having curvilinear end surfaces; the curvilinear end surfaces being provided on feet extending angularly from said arms so that engagement occurs at points offset from the arms and the arms can flex.

6. In a measuring tape construction or the like: a casing having a tape opening therein; a tape coiled in said casing and having an unwound portion extending through said opening; releasable means carried on said casing for holding a portion of said tape within the casing in impermanently kinked condition and mechanically locking the tape in a particular condition of extension; said releasable means comprising a shaft extending transversely to the extent of said tape and having generally radially extending tape engaging cam means thereon; said casing having a side wall with a keyhole slot therein out which said releasable means may be drawn; and motor means for retracting said tape including a spring drum having a side of a size to partly cover said slot and thereby prevent withdrawal of the releasable means unless the drum is first removed.

7. In a measuring tape construction or the like: a casing having a tape opening therein; a tape coiled in said casing and having one of its ends extending through

said opening; motor means in said casing connected with said tape to return the tape to the casing when a portion of it has been drawn from the casing out said opening; ramp means in said casing adjacent said opening providing surface generally parallel to the plane of the tape with pocket means; and releasable means for pressing a portion of the tape out of its plane into the pocket means to mechanically lock the tape in a particular position of extension; said releasable means comprising a shaft extending transversely to the extent of said tape and having generally radially extending tape engaging cam means thereon; said casing having a side wall with a keyhole slot therein out which said releasable means may be drawn; and said motor means including a spring drum having a side of a size to partly cover said slot and thereby prevent withdrawal of the releasable means unless the drum is first removed.

8. In a measuring tape construction or the like: a casing having a tape opening therein; a tape coiled in said casing and having an unwound portion extending through said opening; pocket means provided in said casing; and releasable, resilient, transversely spaced cantilever arm means carried on said casing and movable toward said tape into engagement therewith for pressing the edges of the tape into said pocket means and holding a portion of the tape thereby mechanically locked in a particular position of extension.

9. The combination defined in claim 8 in which a rotatable shaft spans said casing transversely to the extent of said tape and is journaled therein; and said cantilever arm means extends generally radially down from said shaft.

10. In a measuring tape construction or the like: a casing having a tape opening therein; a tape coiled in said casing and having one of its ends extending through said opening; motor means in said casing connected with said tape to return the tape to the casing when a portion of it has been drawn from the casing out said opening; ramp means in said casing adjacent said opening providing surface generally parallel to the plane of the tape; and lock means comprising a member having a pair of

relatively narrow projecting arms with transversely spaced, enlarged tape engaging pads thereon extending angularly from said arms for engaging the side edges of the tape at points offset from the arms and clamping the tape against the ramp means; and actuator means having a portion extending out the casing for moving the lock means down to a position in which said pads clamp the tape against the ramp means and removing the lock means to a position in which they do not.

11. In a measuring tape construction or the like: a casing having a tape opening therein; a tape coiled in said casing and having one of its ends extending through said opening; motor means in said casing connected with said tape to return the tape to the casing when a portion of it has been drawn from the casing out said opening; ramp means in said casing adjacent said opening providing surface generally parallel to the plane of the tape; and lock means comprising a member having a pair of relatively narrow projecting arms with transversely spaced, enlarged tape engaging pads thereon for engaging the side edges of the tape and clamping the tape against the ramp means, the pads being curvilinear in a transverse direction to conform to the curvature of the tape and also curvilinear in the other direction; and actuator means having a portion extending out the casing for moving the lock means down to a position in which said pads clamp the tape against the ramp means and removing the lock means to a position in which they do not.

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U.S. Cl. X.R.

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