May 12, 1931. M. EISENSTEIN 1,804,975

AUTOMATIC UNWINDING RULE

Filed May 14, 1930

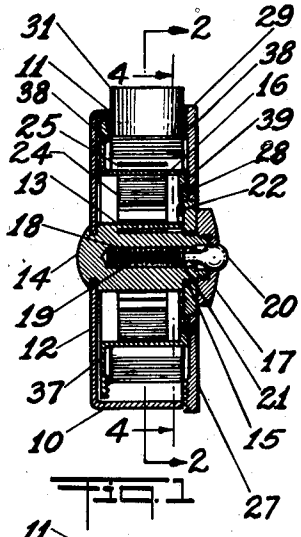


Fig. 1

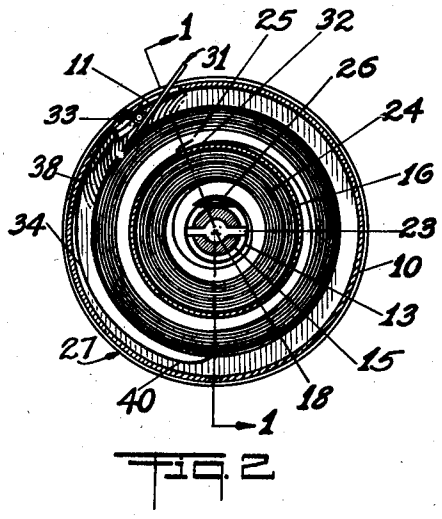


Fig. 2

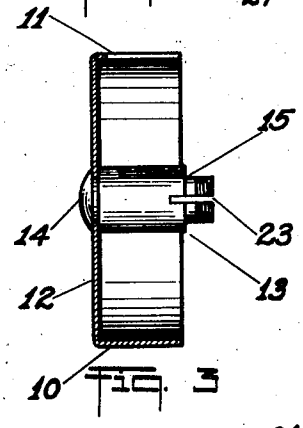


Fig. 3

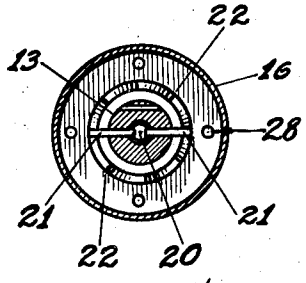


Fig. 4

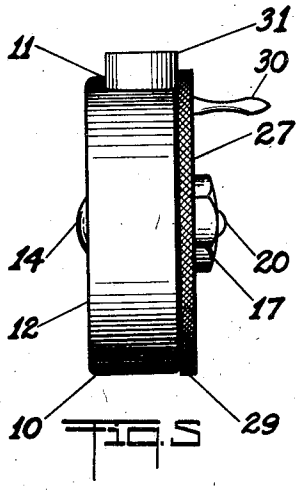


Fig. 5

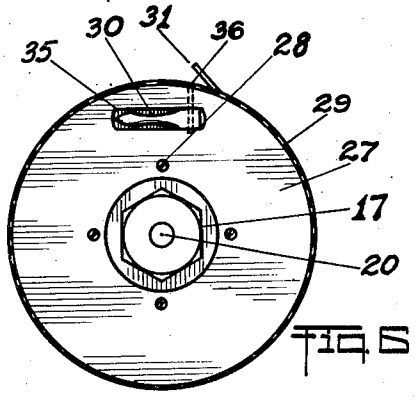


Fig. 6

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UNITED STATES PATENT OFFICE

MAXWELL EISENSTEIN, OF NEW YORK, N. Y.

AUTOMATIC UNWINDING RULE

Application filed May 14, 1930. Serial No. 452,149.

The present invention relates to winding means for flexible measuring rules which assume a rigid elongated concave cross-sectional form when unwound and which flatten out when wound up.

An object of this invention is to provide a casing in which the said concave cross-sectional rule may be rolled up or wound up manually and to provide a spiral spring within the casing which is wound up simultaneously with the rule and which serves to assist in automatically unwinding the rule from the casing.

Another object of this invention is to provide a ratchet for controlling the joint unwinding motion of the spring and rule, and for stopping and holding the said rule when any desired length thereof has been unwound.

Another object of this invention is to provide means for engaging the said rule to assist in unwinding any desired length thereof from the casing.

Another object of this invention resides in the provision of a concave roller to guide and assist the winding and unwinding of the said concave rule at the point of exit from the casing.

Another object of this invention resides in the provision of a spring for following up the unwinding rule and arresting its outward motion when completely unwound so as to prevent kinking and breakage of said rule.

With these and other objects in view the invention resides in the arrangement and combination of parts for carrying out the correlated functions and in the particular construction of the parts hereinafter described and claimed. It being understood that the embodiment herewith shown is merely illustrative and that various changes in the form, proportion, size and minor details of construction within the scope of the claims, may be resorted to without departing from the spirit of the invention.

Reference will now be had to the drawings, wherein like numerals of reference designate corresponding parts throughout the several views, in which:

Figure 1 is a transverse sectional elevation taken as on line 1—1 in Figure 2.

Figure 2, is an interior plan view of the device partly in section, the section being taken as on line 2—2 in Figure 1.

Figure 3 is a transverse section of the casing and an external view of the shaft, the section of the casing being taken as on line 1—1 in Figure 2.

Figure 4 is a sectional view of the rotor and shaft, the section being taken as on line 4—4 in Figure 1.

Figure 5 is a side elevation of the device.

Figure 6 is a front elevation of the device.

In the illustrated embodiment of the invention, the several views show a dished cylindrical casing 10, having a slot 11, in its outer periphery. One side of the casing is closed by an end wall 12, and centrally therein is a stationary shaft 13, preferably riveted in place and forming a head 14. The shaft 13, has been reduced in diameter at a point 15, to provide a bearing surface upon which a dished rotor 16 may revolve. The rotor 16, is held in position on the shaft 13, by means of a threaded nut 17, which engages a thread on the shaft.

As best shown in Figure 1, the shaft 13, is provided with an aperture 18, for a coil spring 19, which serves to press against a push pin member 20, having two prongs 21, 21, shown in Figure 4; the prongs engage ratchet teeth 22, 22, in the rotor 16, which can thus revolve in one direction only, as long as the prongs 21, 21, and the teeth 22, 22, are pressed into engagement by the spring 19. The prongs 21, 21, are slidably secured against rotation relative to the shaft 13, by means of a slot 23, in the ratchet end of the shaft.

A spiral spring 24, is placed within the dished rotor 16, and has its ends looped and fastened to the dished rotor 16, and the shaft 13, at points 25, and 26, respectively. A disk 27, is mounted on the rotor 16, preferably by means of screws 28. The disk 27, is larger in diameter than the casing 10, and is provided with a knurled surface 29, at its outer periphery and with a handle 30, which is hinged to the disk 27, and may be placed in right angular relation to the disk as best shown in Figure 5, or may be swung to lay flat in relation to the disk 27, as best shown in Figure 6. The casing 10, may thus be gripped in the left hand and the knurled surface 29 of the disk 27, or the handle 30, may be gripped in the right hand and thus wind up the spiral spring 24. On releasing the push pin member 20, the spiral spring 24, may be unwound to any desired amount.

As best shown in Figure 2, a spring rule 31, which assumes a concave rigid elongated form when unwound, has one of its ends fast ned by any suitable means to the rotor 16, at a point 32 adjacent the point 25, on the outer periphery of the dished portion of the rotor. The other end of the spring rule 31, projects from the casing 10, through the slot 11, and is free to move in and out of the casing. The spring rule 31, and the spiral spring 24, have been arranged to wind up or unwind simultaneously in one direction. In the unwinding operation, the spiral spring 24, assists in the unwinding of the spring rule 31.

As shown in Figure 2, there has been provided a roller 33, mounted within the casing 10, adjacent the slot 11; this roller engages an unwound portion of the spring rule which has assumed a rigid elongated concave form. The roller 33 serves to guide and center the spring rule 31, in winding and unwinding and is preferably of concave form.

As shown in Figure 2, there has been provided a spring 34, which is fastened to the casing 10, and has its free end 40, contacting with the spring rule 31, as it winds and unwinds. When the spring rule 31, is suddenly unwound to its full length it has a tendency to reverse its direction of motion in the casing 10, to kink, and ultimately break. To prevent this tendency to breakage the spring 34, follows up the unwinding rule and arrests its outward motion when completely unwound. This arresting action takes place when the spring 34, engages the looped end 25, of the spiral spring 24.

It is thus evident that the automatic unwinding rule thus described may be operated by rotating the disk 27, and the rotor 16 by gripping the knurled surface 29, but is preferably operated by means of the handle 30. It is to be noted that the handle 30, fits in a slot or depression 35, in the disk 27, and is secured thereto by a pin 36, and may be locked in either extended or folded position by suitable spring means (not shown).

As best shown in Figure 1, the rotor 16, is provided with a side plate 37, in spaced relation with the side disk 27. At the outer periphery of the side plate 37, and the side disk 27, and facing the side edges of the spring rule 31, there may be provided a series of projections or serrations 38, 38, to frictionally engage with the edges of the rule and assist the unwinding of said rule simultaneously with the unwinding movement of the spring 24. This feeding expedient may be resorted to when the spring rule 31, is more than 6 feet long. A resilient gasket (not shown) may be placed at the junction 39, where the side disk 27, is fastened to the rotor 16, and the screws 28, used to adjust the distance between the members 27, and 37, and thus provide means for varying the degree of engagement of said rule, with the said members.

A device of my improved construction is comparatively simple, can be easily and cheaply produced, and while particularly designed to operate in combination with flexible spring rules which assume a rigid elongated concave or arcuate cross-sectional form when unwound, it may be used to operate in combination with ordinary flat steel tapes when a frictional rule-engaging and feeding device is incorporated therein, such as 38, 38.

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

1. In an automatic unwinding rule, the combination with a dished casing having one of its sides open, a stationary shaft in said casing, a dished rotor mounted on said shaft, a spiral spring within the rotor and connected at its opposite ends respectively to said rotor and shaft, said rotor comprising a disk serving to close the open side of the casing and having gripping means thereon for winding said spiral spring.

2. In an automatic unwinding rule, the combination with a dished casing having one of its sides open, a stationary shaft in said casing, a dished rotor mounted on said shaft, a spiral spring within the rotor and connected at its opposite ends respectively to said rotor and shaft, said rotor comprising a side disk serving to close the open side of the casing and having gripping means thereon for winding said spiral spring, and ratchet means for controlling the unwinding of said spiral spring.

3. In an automatic unwinding rule, the combination with a dished casing having one of its sides open, a stationary shaft in

said casing, a dished rotor mounted on said shaft, a spiral spring within the rotor, a concave spring rule wound on the outer periphery of the rotor, said rotor comprising a side disk larger in diameter than the casing and serving to close the open side of the casing and having gripping means thereon for winding said spiral spring and being provided with ratchet teeth, a push pin member provided with engaging means for said ratchet teeth, and the said shaft being centrally chambered to receive said push pin member.

4. In an automatic unwinding rule, the combination with a casing and a stationary shaft therein, a dished rotor mounted on said shaft, a spring measuring rule wound on the outer periphery of said rotor, spring means within the rotor for unwinding said rule from the casing, ratchet means for controlling the said unwinding, said spring means and spring measuring rule being adapted to wind and unwind simultaneously.

5. In an automatic unwinding rule, the combination with a dished casing having one of its sides open, a dished rotor mounted in said casing, a spring measuring rule and a spiral unwinding spring for said rule mounted in said casing, said rotor being adapted to engage and wind said spiral unwinding spring and spring measuring rule within said casing simultaneously, the said rotor being provided with a detachable side disk for covering the open side of said dished casing.

6. In an automatic unwinding rule, the combination with a dished casing of a dished rotor mounted in said casing, said rotor comprising two spaced side walls and one of said side walls being provided with a handle, a spring measuring rule attached to and wound manually on the outer periphery of said rotor by means of said handle, spring means within the rotor for rotating said rotor and for automatically unwinding said spring rule, and the said side walls of the rotor being provided with means for engaging with the side edges of the said spring measuring rule and assisting in unwinding said rule.

7. In an automatic unwinding rule, the combination with a dished casing of a dished rotor mounted in said casing, said rotor comprising two spaced side walls and one of said side walls being provided with a handle, a spring measuring rule attached to and wound manually on the outer periphery of said rotor by means of said handle, spring means within the rotor for rotating said rotor and for automatically unwinding said spring rule, the said side walls of the rotor being provided with means for engaging with the side edges of the said spring measuring rule and assisting in unwinding said rule, a roller for guiding the free end of said rule and a spring for arresting its outward motion from the casing when unwound, and the said spring measuring rule being of arcuate cross-section and rigid when unwound and of rectangular cross-section and flexible when wound in said casing.

Signed at New York in the county of New York and State of New York this 12th day of May, A. D. 1930.

MAXWELL EISENSTEIN.