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CLUTCH MECHANISM FOR SPRING WOUND MOTORS

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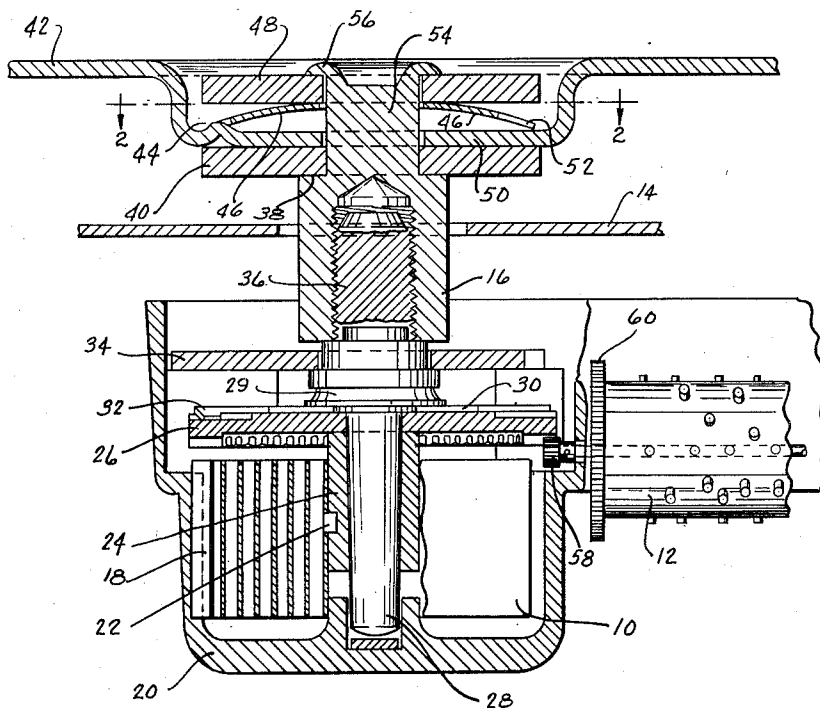


FIG. 1

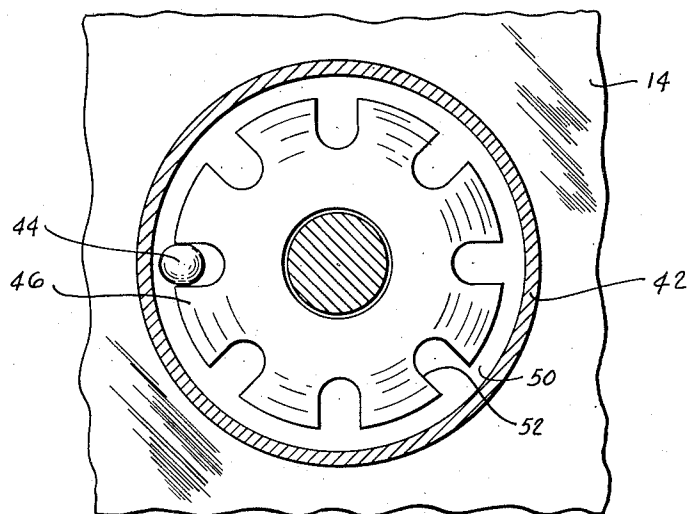


FIG. 2

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CLUTCH MECHANISM FOR SPRING WOUND MOTORS

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1 Claim. (Cl. 64—30)

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The present invention relates to a clutch mechanism connecting a spring wound motor to the means for winding it.

Motors of the kind here concerned with have been used for many purposes, such as, to drive a mechanism for example, a music box, as illustrated herein. In the past, spring motors of this kind have been subject to being overwound with consequent breakage of the driving spring.

The present invention therefore contemplates a spring wound motor and winding mechanism therefor which is connected by a clutch arranged and constructed so that the clutch will slip before the motor spring is wound beyond a certain extent, thereby providing a safety clutch.

In the practice of the invention, I provide a winding plate which is held against a washer on the motor shaft with a selected spring tension that will not exceed the maximum tension to which the spring motor may be wound. Should a greater winding force be applied to the plate, it will slip over the washer so that the motor cannot be further wound, thus limiting the maximum tension to which the motor spring is subjected.

The present invention contemplates the provision of such a safety winding mechanism which is comparatively simple and inexpensive to manufacture and which is so designed that it can be readily assembled with the aforementioned selected tension by comparatively unskilled labor.

These, other and further objects and advantages of the present invention will be clear from the specification which follows and the drawing relating thereto in which

Fig. 1 is a vertical cross section through a spring wound motor and winding means therefor according to my invention.

Fig. 1 is a section on the line 2—2 of Fig. 1.

As an illustration of my invention, I show a spring motor 10 used to drive the drum 12 of a music box. In the practice of my invention, I have used the music box here concerned with in "musical cakes" which are frequently used to celebrate different occasions, such as weddings or birthdays and the like.

Such music boxes must therefore be relatively inexpensive to manufacture but be comparatively strong to withstand the ordinarily rough and thoughtless usage to which they will be subjected. In the past, the driving springs of music boxes have often been overwound because of the fact that users thereof are not careful persons. While I have illustrated my invention as applied to a musical toy, it will be understood that it can be

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used with any spring operated motor which it is desired to protect against over winding.

The motor and winding mechanism may be carried, in any satisfactory manner, on the plate 14 of a housing for the mechanism through which the undercut winding shaft 16 extends.

A torsion spring 18 is housed in the motor housing 20. One end of the spring 18 is secured to the housing 20 and the other end 22 of the spring in the sleeve 24 extending down from the undercut gear 26.

The gear 26 and its integral sleeve 24 are mounted for rotation on the shaft 28, the lower end of which is journaled in the housing 20 and the upper end of which is journaled in the collar 29 of the spring ratchet 30.

The upper face of the gear 26 is provided with gear teeth which are engaged by the beveled fingers 32 of the ratchet 30. I have found that three such fingers 32, equally spaced on the ratchet 30, provide very satisfactory results in the winding operation.

Seated on the collar 29 of the ratchet 30, I mount the motor closure plate 34, which is also carried on the walls of the housing 20.

Fitted onto the collar 29, I mount the threaded element 36 on which the internally threaded winding shaft 16 is screwed.

I shall now describe the winding mechanism which is constructed so that the spring 18 of the motor cannot be overwound but is arranged so that the winding mechanism will slip should a tension greater than a selected magnitude be applied to the motor torsion spring.

Mounted on the shoulder 38 of the winding shaft 16 in frictional engagement therewith, as will be described, I provide the washer 40.

Frictionally held against the washer 40, I provide the winding plate 42, which has the upset lug 44 on one surface thereof.

In order to force the winding plate 42 against the shoulder 38 of the winding shaft 16 with selected force of friction, I mount the bowed or convex spring washer 46 between the upper washer 48 and the winding plate 42.

In order to prevent the spring washer 46 from slipping over the dish in part 50 of the winding plate which it engages, I preferably provide a plurality of spaced inwardly extending slots 52 on the periphery of the spring washer 46.

Upon assembling the spring washer 46 between the winding plate 42 and the upper washer 48, the upset lug 44 is mounted in any slot 52 which may be adjacent the lug. By providing a plurality of slots 52, the work of assembling the

spring washer 46 in position becomes simpler and easier.

In order to press the spring washer 46 against the winding plate 42 with a selected pressure or force, I preferably hollow out the upper part 54 of the winding shaft 16 and peen over the circumference of this upper part. Thus, the space between the peened portion 56 and the shoulder 38 will always be substantially the same so that the spring washer 46 forces the dished in part 50 of the winding plate through the lower washer 40, against the shoulder 38 always with the same force or pressure.

It will be understood that this selected force may be obtained by means of a lock nut instead of the peened portion but this would be somewhat more costly and would require greater skill in assembly since the distance between the lock nut and the shoulder 38 should always be the same.

In operation, the spring motor is wound by means of the winding plate 42, which for illustration may be turned in a clockwise direction and through the ratchet 30 rotates the gear 26 to tighten the torsion spring 18. The beveled fingers 32 permit the winding plate 42 to also be turned in a counterclockwise direction so that easy required intermittent winding movement is possible.

After the spring 18 is wound to the desired tension, further winding force will be resisted by it, which resistance will exceed the frictional force with which the spring washer 46 forces the winding plate 42 against the lower washer 40 and this lower washer against the shoulder 38.

When this occurs, the lower washer 40 will slip over the shoulder 38 and the dished in part 50 will slip over the lower washer 40, or either may happen, thus preventing over-winding of the spring 18.

It will thus be recognized that I have provided by means of the upper and lower washers, spring washer and winding plate a clutch that will slip whenever a force greater than desired is applied to the winding shaft 16 and thus spontaneously disconnect it from the spring motor which is thereby automatically protected against possibility of over winding.

After the spring is wound, the gear 26 through its engagement with the counter gear 58 drives the music drum 12. Although it is not necessary to illustrate a governor for the motor and music box, since it forms no part of the invention, such a governor may be driven by the gear 60 at the end of the drum.

It will now be recognized that I have provided a simple inexpensive clutch connecting a winding element to a spring operated motor which will spontaneously slip when the motor is wound to a selected magnitude so that danger of over winding the spring is thereby eliminated.

While I have described in specific detail an illustrative embodiment of my invention, it will be understood that other modifications will now occur to those skilled in the art without departing from the spirit and scope of my invention.

I claim:

In a clutch mechanism for connecting a winding member to a spring wound motor, a winding member, a winding shaft having a shoulder, an upper washer, a lower washer, a lug on the winding member, a spring washer convex in shape and having a plurality of spaced slots extending inward from the periphery, said lower washer mounted on the shoulder of the winding shaft, said winding member positioned on said lower washer and said spring washer positioned between the upper washer with the lug positioned in a slot, and means on the winding shaft forcing the upper washer against the spring washer to urge the winding member against the lower washer and the lower washer against the shoulder with a selected pressure less than the maximum torsion of the spring wound motor.

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