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TENSION REEL FOR LIGHTING FIXTURE

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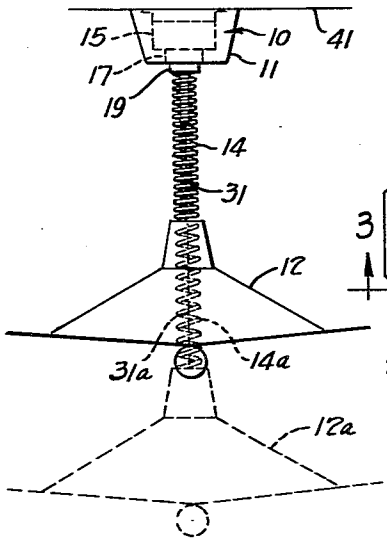


FIG. 1

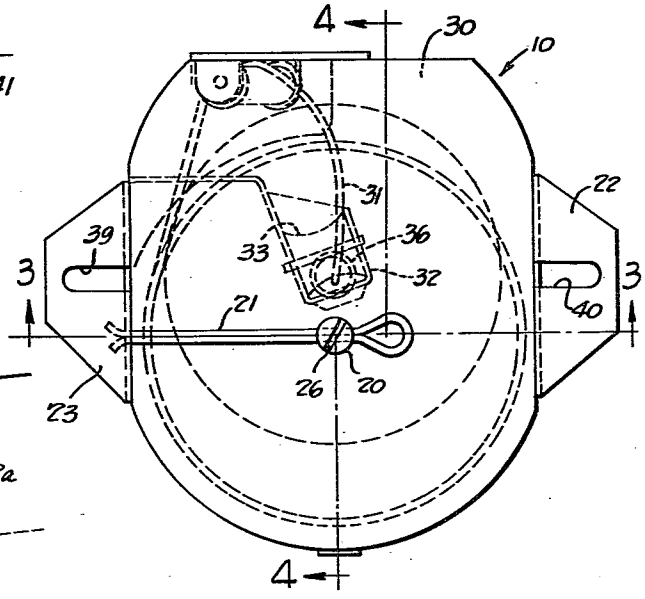


FIG. 2

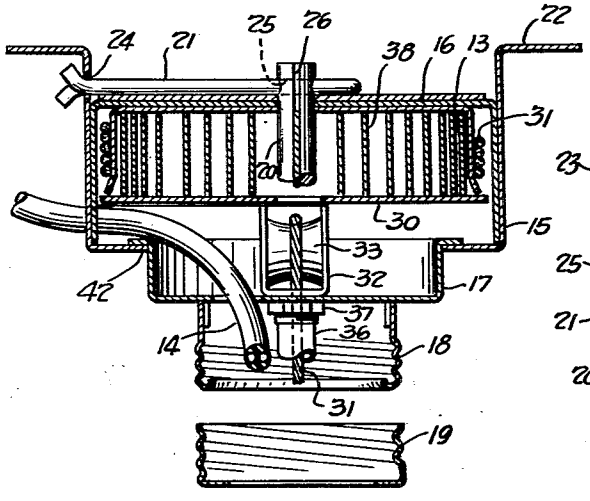


FIG. 3

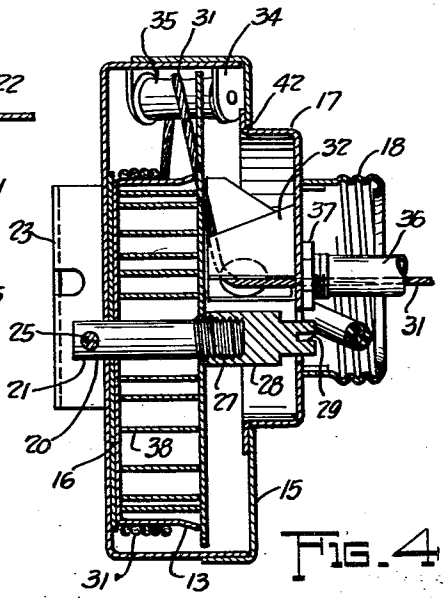


FIG. 4

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TENSION REEL FOR LIGHTING FIXTURE

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1 Claim. (Cl. 242—107.3)

This invention relates to supports for lighting fixtures and particularly to a tension reel support.

Conducive to a better understanding of this invention, it may be well to point out that a common way of supporting lighting fixtures is to use a reeled cable which enables the fixture to be raised and lowered relative to the ceiling of a room at the pleasure of the user. Such fixture supports are ordinarily used in homes having no separate dining area and wherein one portion of the living room is used for such purpose. The fixture is suspended upon a cable which is wound on a drum and counterbalanced by means of a spring or a weight. The reeling mechanism is ordinarily housed in an egg or ball shaped case which is suspended from the ceiling and is visible at all times. Such a device is unsightly and detracts from the appearance of the lighting fixture. Furthermore, such devices ordinarily use a pawl type positioning mechanism in holding the suspended fixture in position, much in the manner employed in window shades. Unless carefully released, the reeling action of the operating spring or weight will snap the fixture upward out of the user's hand with resultant jarring or damaging of the fixture and the light bulbs. In addition, the pawl action of the locking mechanism means that the fixture can be located only at intervals governed by the shape and size of the pawl and the spacing of its co-operating lock notches.

The primary object of this invention, therefore, is to provide a tension reel for lighting fixtures whose controlling mechanism is housed within the ceiling canopy usually used with such fixture, entirely concealed therein and invisible to the observer.

Another object is to provide a tension reel of the type stated that can be used with any type of canopy suspension.

Still another object is to provide a tension reel for lighting fixtures which permits the suspended fixture to be moved smoothly up or down at the touch of a finger and holds the fixture at any desired height instantly upon release.

A further object is to provide such a reel that can be adjusted to support fixtures of different weight.

Other objects are to provide a tension reel that is economical to manufacture, simple to install, and rugged and reliable in action.

These and other objects of the invention will become apparent from a reading of the following specification and claim, together with the accompanying drawing wherein:

Figure 1 is a front elevation of the tension reel that is the subject of this invention, showing it mounted in a ceiling canopy and supporting an electric fixture therefrom in alternate raised and lowered positions;

Figure 2 is a top plan view of the tension reel in its unmounted condition;

Figure 3 is a vertical sectional view taken along the line and in the direction of the arrows 3—3 of Figure 2; and

Figure 4 is a vertical sectional view taken along the line and in the direction of the arrows 4—4 of Figure 2.

Referring more particularly to Figure 1, there is seen the tension reel assembly, broadly indicated by reference numeral **10**, mounted with a ceiling canopy **11** and having an electric light fixture **12** suspended from the end of its cable **31**. Electric current is carried to the fixture **12** through a coiled cord **14** which surrounds the cable **31**. The cord **14** is of a type readily available and is constructed to have inherent resiliency so that it may be stretched to lengthen it, but will spring back to a normally shortened overall length upon release.

Reference numerals **12***a*, **14***a* and **31***a* indicate alternate positions of the several elements when the fixture is pulled to its lowered position.

The reel housing consists of two sheet metal halves comprising a bottom portion **15** and a cover portion **16**. The bottom portion **15** has two upwardly and outwardly extending ears **22** and **23** which act as supporting members for the assembled housing. Reference numerals **39** and **40** indicate slots cut in the ears **23** and **22** respectively, through which mounting screws, not shown, are passed to anchor the housing to the electrical outlet in the ceiling **41**. An extension cup **17** is mounted in a hole **42** in the bottom portion **15**.

A drum shaft **20** is mounted in a hole in the cover **16** and is locked against rotation, for a purpose to be disclosed hereinafter, by means of a long cotter pin **21** which passes through a diametric bore **25** in the end of the shaft **20**. The end of the cotter pin **21** extends through a hole **24** in the ear **23** and is locked therein by bending the ends of the pin at an angle to its long axis as shown in Figures 2 and 3.

A drum **13** is rotatably mounted on the shaft **20**. A flat ribbon spring **38** is housed within the drum and coiled around the shaft **20**. One end of the spring **38** is locked in a slot **26** in the shaft **20**. The other end of the spring is attached to the drum **13**. The lower end **27** of the shaft **20** is threaded to receive a bushing **28** having a slot **29** at the end thereof, as shown in Figure 4.

A brake plate **30** is mounted on the shaft **20** between the drum **14** and the bushing **28**. The brake plate **30** is free of the housing all around its edge but conforms to and is substantially rectangular in shape, so that it cannot rotate on the shaft **20**, as shown in Figure 2. The upper face of the brake plate **30** abuts the edge of the drum **13** and the lower edges of the coiled ribbon spring **38**, but the drum and spring are free to move on shaft **20** relative to the brake plate **30** against pressure brought to bear by the brake plate, by means of the threaded bushing **28** as described hereinafter.

Reference numeral **32** indicates a bracket which is mounted at the center of the extension cup **17** by means of a lock nut **37** which engages a nipple **36** attached to the bottom of the bracket **32**. A center roller **33** is journaled in the bracket **32** adjacent the base of the nipple **36**.

Reference numeral **34** indicates a side bracket having a roller **35** journaled thereon which is mounted on the side of the housing. The roller **35** is mounted in a plane substantially parallel to that of the face of the drum **13**.

A threaded collar **18** is attached to the bottom of the extension cup **17**. The steel fixture supporting cable **31** passes through the nipple **36**, over the center and side rollers **33** and **35** respectively and around the face of the drum **13** with its end attached to the drum **13**, as is shown most clearly in Figure 4. The coiled electric cord **14** surrounds the cable **31** and enters the reel housing through the collar **18**. The electric cord leaves the housing through a hole in the wall thereeof and is attached to the electric circuit entering the outlet box from which the fixture is suspended.

It will now be apparent that pulling the cable **31** downward out of the nipple **36** will cause the cable to unreel

from the drum 13. Rotation of the drum in turn winds up the spring 38. Release of the cable 31 causes the stored up energy of spring 38 to rotate the drum in the opposite direction, thereby rewinding the cable 31 upon the drum. After the reel assembly 10 is mounted in the outlet box, it is covered by the canopy 11 which slips over the collar 18 and is held in place by means of a threaded locking collar 19, as shown in Figure 1. Adjustment of the reel to the weight of the fixture is brought about as follows:

Assuming that the weight of the average fixture is approximately six or seven pounds upon the original assembly of the reel, the cable 31 is fully reeled on the drum 13. The cotter pin or winding key 21 is slipped through the slot 26 of the shaft 20. Rotation of the pin 21 causes the spring 38 to be wound around the shaft 20 against the pull of the drum and cable 31. The pin 21 is turned until the torque developed by the spring 38 just balances the pull of the fixture on the cable, or between six and seven pounds. The end of the pin 21 is then inserted through the hole 24 in the ear 23 and locked in place. The shaft 20 is now immovable. It will be noted that the cotter pin 21 can be locked only in a position giving a minimum adjustment of one revolution of the shaft 20. Exact balance is then achieved by means of the brake plate 30. A screw driver is inserted in the slot 29 of the brake plate bushing 28. Rotation of the bushing 28 causes the supported brake plate 30 to press against the edge of the drum 13 and the ribbon spring 38. The frictional forces created by the pressure of the brake plate 30 against the drum and spring edges 13 and 38 respectively is sufficient to prevent rotation of the drum 13 when the full weight of the fixture is suspended from the end of the cable 31.

The additional spring torque created by pulling the fixture down is not sufficient to overcome the frictional drag created by the brake plate 30. As a result, the fixture will remain stationary in any position to which it is lowered. However, if the fixture is lifted, as must be done to raise it, the fixture weight of six or seven pounds may be reduced to three or four pounds momentarily. This reduction of the pull on the cable 31 is sufficient for the torque of coiled spring 38 to overcome the drag of the brake plate 30 and the drum 13 is rotated easily, thus re-reeling the cable 31 onto the drum 13. Release of the fixture restores the original load and the rotation of the drum stops, holding the fixture at the new point. At the same time, raising of the fixture causes the coiled cord 14 to contract to a taut new position. Thus both the cable 31 and the cord 14 are always neatly taut, there being no unsightly loops created as a result of raising the fixture.

It will be noted that no pawls or other mechanical ratchet means are employed in this device so that the supported fixture will remain at the exact position where released, without any minor upward or downward movement.

It will now be clear that there is provided a device which accomplishes the objectives heretofore set forth. While the invention has been disclosed in its preferred form, it is to be understood that the specific embodiment thereof as described and illustrated herein is not to be considered in a limited sense as there may be other forms or modifications of the invention which should also be construed to come within the scope of the appended claim.

I claim:

A tension reel for lighting fixtures comprising in combination, a closed sheet metal housing having an opening in the bottom wall thereof, a vertically extending drum shaft journaled in the top wall of the housing and extending therethrough, said shaft having a diametric bore at the top end thereof, an axially extending slot and a threaded bottom end, a drum rotatably mounted on said shaft having a vertically extending cable reeling peripheral face and a circular downwardly faced edge, a ribbon spring coiled around said shaft, nested within said drum and having its lower edge aligned with the downwardly faced edge of the drum, one end of said spring being anchored in the shaft slot, the other end of said spring being anchored on said drum, a cable attached to said drum, reeled around the face thereof and passing through the housing opening, means on the free end of the cable for suspending a lighting fixture therefrom, means engaged with the shaft bore to rotate the shaft and attached spring to load the drum against rotation by the pre-determined weight suspended on the reeled cable, means for holding said shaft spring at the required torque, a brake plate mounted on the shaft below the drum against the aligned edges of the spring and drum, a bushing mounted on the threaded end of the shaft and rotatable against the brake plate to press same into frictional engagement with the aligned edges of the spring and drum, the adjusted position of the bushing being such that the frictional pressure exerted by the brake plate against the spring and drum edges will counterbalance the increased torque of the spring due to the rotation of the drum caused by the un-reeling of the cable brought about by the application of a force greater than the predetermined one, thereby holding the drum against rotation in the new position at all times, the brake plate frictional pressure being less than that required to overcome the spring torque acting to rotate the drum when the applied force is less than the predetermined one.

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