

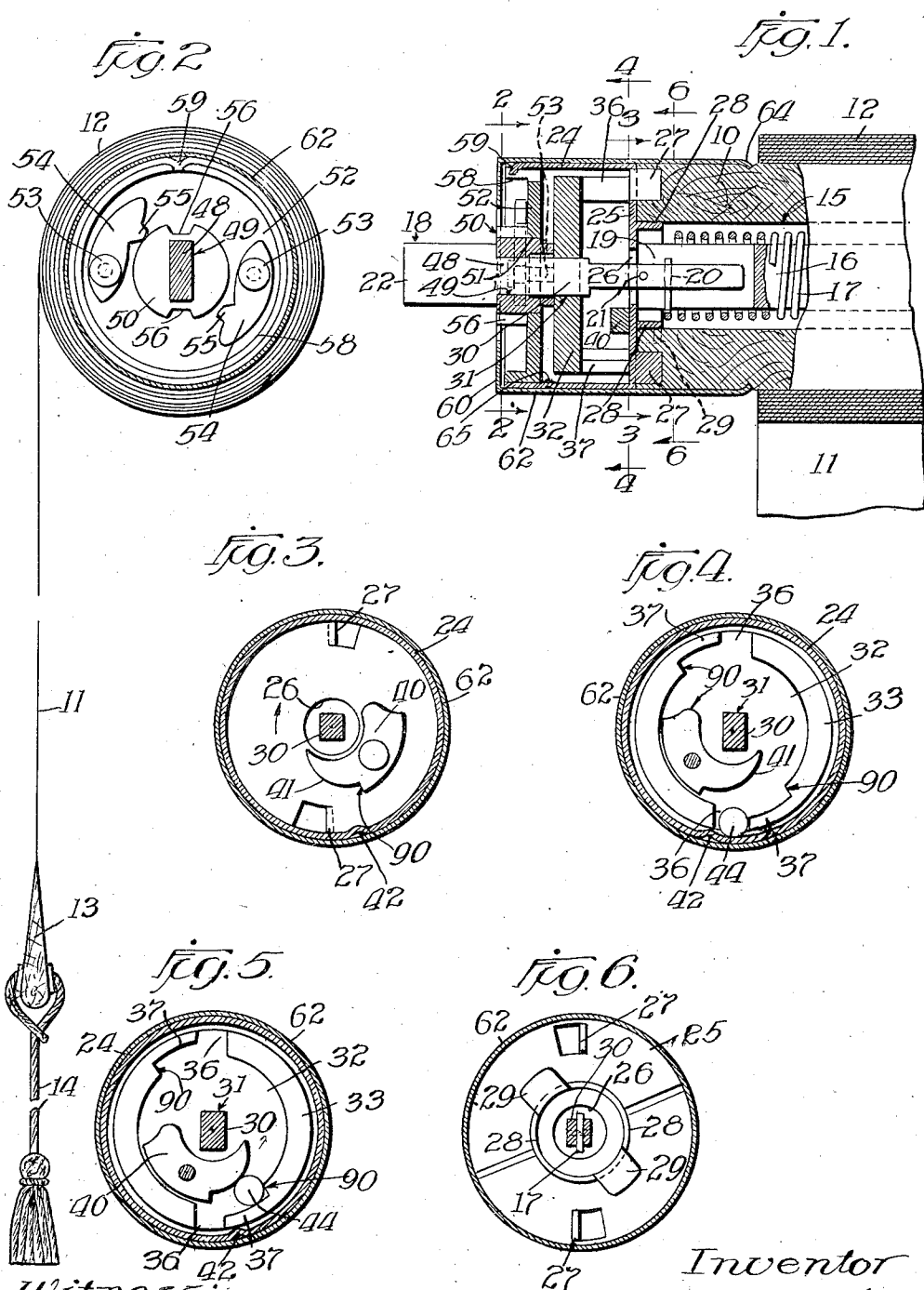
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ROLLER SHADE MECHANISM

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ROLLER SHADE MECHANISM

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10 Claims. (Cl. 156—36)

This invention relates to shade rollers such as are provided with coiled springs which are wound or tensioned as the shade is pulled out to cover a window or the like and which act to roll the shade up on the roller when the locking or stop means is released.

Shade rollers provided with spindles having flattened ends which slip into the usual slot in the usual bracket and are held against rotation therein have been provided before.

The locking or stop means heretofore provided have usually consisted of pawls pivoted to a member which rotates with the shade roller and arranged to enter notches in a member held against rotation by the spindle. These locking or stop means have been provided merely to hold the shade in the position into which it is pulled out and against rolling up under the action of the spring. They have been released by drawing the shade down sufficiently to disengage the pawls, whereupon the spring imparts sufficient speed to the roller to hold the pawls released and to turn the roller to wrap the shade thereon.

Consequently these locking or stop devices have been ineffective above the speed at which the pawls are released. As a result, if the operator winds the shade up too fast or lets go of the shade, it will wind itself around the roller rapidly, with possible destruction to the shade and annoyance to the operator.

The present invention may be characterized as an improvement upon the invention illustrated and described in the copending application of Ersyl F. Chambless, filed July 25, 1934, Serial No. 736,819, and its object is to provide improved means for preventing too rapid rolling of the shade up on its roller.

Another object is to provide simple and inexpensive means of this sort which will permit placing the flattened spindle of the shade in its bracket with either of its opposite edges directed upwardly, i. e., the device is operative in either of the two positions of this spindle in its bracket.

Another object is to provide means of this sort which is readily combinable with the usual locking or stop means for holding the shade in its different unrolled positions.

Further objects and the features and advantages of the invention will be apparent from the following detailed description taken in connection with the accompanying drawing, in which:

Figure 1 is a fragmentary longitudinal section, on an enlarged scale and partially in eleva-

tion, through one end of a shade roller embodying the present invention;

Figure 2 is a sectional view of the shade roller shown in Figure 1 taken on the line 2—2 of Figure 1;

Figure 3 is a section taken on the line 3—3 of Figure 1;

Figure 4 is a section taken on the line 4—4 of Figure 1 showing the ball member for locking the roller against too rapid upward movement of the shade in released position;

Figure 5 is a section similar to Figure 4 showing the ball member for locking the roller against too rapid upward movement of the shade in locking position; and

Figure 6 is a section taken on the line 6—6 of Figure 1 with the roller omitted.

Referring to the drawing, the shade roller is indicated at 10. Usually it is formed of wood as shown, but it may be made of any suitable or preferred material such as wrapping paper or cardboard tubing, or of metal or the like.

The shade 11, which may be of any suitable shade material, is wrapped upon the roller 10 at 12. The inner end of the wrapped portion is secured to the roller 10, and the opposite end of the shade is usually reenforced by a wood strip 13 and provided with a pull cord 14 by means of which the shade is rolled up on the roller or pulled out to cover the window.

The roller 10 is provided with an internal bore 15 for the reception of the usual wood stick 16 around which is coiled a helical spring 17. The spindle 18 has a flattened inner end of reduced width which fits in a flat-sided slot 19 opening from the adjacent end of the stick 16. The engagement of the flat-sided reduced end of the spindle 18 in the slot 19 is relatively tight and joins the stick 16 and spindle 18 against relative rotation. The spring 17 is secured at one end to the roller 10 in any suitable or preferred manner. The other end of the spring 17 has a diametrically turned portion which is inserted through an opening 20 extending diametrically through the inner end of the spindle 18 to secure this end of the spring to the spindle. The inner reduced end of the spindle is of substantially square section, and a pin 21 may be provided to hold the parts together.

The spindle 18 has a flattened outer end of increased width at 22 to slip into the usual slot in the usual bracket and held against rotation therein. As the free end of the shade 11 is drawn downwardly, the roller 10 rotates about the spindle 18 and winds or tensions the spring 17, and

when the free end of the shade is released the spring 17 tends to turn the roller 10 in the opposite direction to roll the shade up on the roller, as well understood in the art.

5 A thin metal cup-shaped shell 24 is provided at one end with a wall 25 having a central opening 26 through which the spindle 18 passes freely. This shell is disposed with its annular wall coaxial with the roller 10 and with the end wall 25
10 abutting the outer end of the roller. Tongues 27 struck out from the end wall 25 are driven into the end of the roller 10 or engaged in notches therein rigidly to secure the shell 24 to the roller 10 for rotation therewith. A hub 28, securely
15 joined to the inner side of the end wall 25 or formed integral therewith, has an internal diameter slightly larger than the opening 26 which may receive the adjacent slotted end of the stick 16. This hub 28 may fit into the internal
20 bore 15 of the roller 10 and may have tongues 29 turned out into engagement with the roller 10, or into longitudinal slots opening from the end of the bore of the roller, further to secure the shell 21 to the roller 10 for rotation therewith.

25 Outwardly of its reduced inner end the spindle 18 has a slightly widened flat-sided portion 30 which fits in a corresponding rectangular opening 31 at the axis of a metal collar 32 and secures this collar 32 against rotation on the
30 spindle 18. The collar 32 has an integral rim 33 directed toward and which may bear at its outer end against the inner surface of the end wall 25 of the shell 24, which shell, so long as the shade is not rolled up too rapidly, is adapted to turn freely with respect to the collar 32. Opening
35 radially through the rim 33 and aligned vertically in operative position of the device are a pair of diametrically opposite slots 36, and the inner periphery of the rim 33 has notches or scarfs 37, one extending from each of the slots
40 36 in the direction in which the shell 24 turns with respect to the collar 32 in rolling the shade 11 to raised position. The vertically aligned slots 36 open from the end of the rim 33 and each,
45 with its notch or scarf 37, enables placing the spindle 18 in its bracket with either of the opposite edges of its flat-sided outer end 22 directed upwardly, i. e., enables operation of the device in either of the two positions of the spindle 18 in its bracket.

50 Riveted or otherwise suitably secured to the inner surface of the end wall 25 of the shell 24, as, for example, by forming the same integral therewith, is an arcuate cam member 40 which
55 travels about the inner periphery of the rim 33 upon rotation of the roller 10 with respect to the spindle 18. The leading end of this cam 40, as the shell 24 turns when the shade is being rolled up, has an inclined cam surface 41. Disposed
60 freely within the rim 33 and confined between the collar 32 and the end wall 25 of the shell 24 is a locking ball member 44 which, with the shade positioned in its brackets, drops into the lower slot 36 which constitutes a pocket therefor. The other slot 36 constitutes a pocket for
65 the ball member 44 when the shade is disposed with the spindle 18 in reversed position in its bracket. The annular wall of the shell 24 holds the ball member 44 against dropping out of the pocket 36 and, at the same time, is provided
70 with an inwardly raised hump 42 which, as the roller 10 rotates in the direction of the arrow, as shown in Figures 3 and 4, will strike the ball member 44. If the shade 11 is not being rolled

up too fast, this engagement of the hump or boss 42 with the ball member 44 will not be sufficient to propel the ball member 44 up out of its pocket 36 and into the adjacent notch or scarf 37, and the cam 40 will rotate past the ball member 44
5 clear of the same to allow continued upward rolling of the shade.

If, however, the operator rolls the shade up too fast or lets go of the free end of the shade, the increased speed of rotation of the roller 10
10 will cause the hump or boss 42 to strike the bottom of the ball member 44 with sufficient force to propel the ball member 44 upwardly into engagement with the cam surface 41 of the cam 40. The cam surface 41, due to its inclination, 15 reflects the ball member obliquely into the adjacent notch 37. Thereupon the inclined cam surface 41 at the leading end of the cam 40 forces the ball circumferentially against the shoulder 90 in the rim 33 and wedges tightly against the
20 ball member to lock the roller 10 against further rotation in the direction of the arrows in Figures 3 and 4 until the shade 11 is pulled down slightly to permit the ball member to drop into the pocket 36. The shade may then be raised in
25 the usual manner so long as it is not rolled up at sufficient speed again to bring the ball member 44 into action. If the speed of upward movement of the shade is again too great, as, for example, if the free end of the shade is released or
30 the shade rolled up too quickly, the ball member 44 will again be propelled out of its pocket 36 into the adjacent notch 37 and engaged by the inclined cam surface 41 to lock the shade against too rapid upward movement.

35 The speed of rotation of the roller 10, at which the ball member 44 is brought into action to stop upward movement of the shade, may be varied readily by varying the height or inward radial extension of the hump or boss 42. For example, 40 by extending the hump 42 radially inwardly slightly more, the speed at which the ball member 44 is brought into locking action is reduced, and by extending the hump 42 radially inwardly slightly less than that shown, the speed at which
45 the ball member is brought into locking action may be increased. When the ball member 44 is positioned in the notch 36 it is disposed radially outwardly of the inner periphery of the rim 33 so that the cam will completely clear the
50 same.

Outwardly of the collar 32, the continuation 48 of the widened and flat-sided portion 30 fits in a rectangular opening 49 at the axis of a metal
55 bushing 50 and secures this bushing 50 against rotation on the spindle 18. The bushing 50 has an annular inwardly stepped portion which fits into a circular opening 51 at the axis of a metal disc 52, and supports the disc 52 for rotation upon
60 the bushing. Pivoted at diametrically opposite positions to the outer side of the disc 52 at 53 are a pair of locking pawls or dogs 54. These pawls or dogs 54 have projections 55 arranged to drop into diametrically opposite notches 56 in the bushing 50 for locking the shade in different positions as its downward or upward movement is
65 stopped or reduced in speed sufficiently to permit one of the projections 55 to drop by gravity into the upper notch 56, as well understood in the art. The diametrically opposite notch 56 receives the projections 55 in the same manner
70 when the spindle 18 is reversed in its bracket.

The projections 55 and/or notches 56 are formed to permit at all times free rotation of the 75

disc 52 in the direction in which the shade is drawn downwardly and to lock the shade against upward movement under the action of the spring 17 except at speeds sufficient centrifugally to hold the pawls 54 out of locking engagement. The inner ends of the pivots 53 may extend through the disc 52 and into endwise abutting engagement with the outer side of the collar 32, as shown.

The outer periphery of the disc 52 has an integral annular flange or rim 58 which telescopes relatively tightly into the outer end of the shell 24. The disc 52 is connected for rotation with the roller 10 by punching the outer end of the shell 24 inwardly into a notch in the rim 58 as shown at 59, or in any other suitable or preferred manner. The disc with its pawls 54 is held in place in the shell 24 by the annular flange 60 at the outer end of an outer thin metal shell 62 which fits telescopically over the shell 24 and over the outer end of the roller 10. This outer shell 62 is rigidly secured to the roller 10 as by crimping the inner end of its annular wall into engagement with the outer periphery of the roller 10 as shown at 64 in Figure 1. The shell 24 may be provided internally with humps 65 punched inwardly at circumferentially spaced locations to limit the inward movement of the disc 52 into the shell 24 in positioning the same therein.

The device is extremely simple in construction and, though positive and reliable, is composed of but few parts, and hence is inexpensive to manufacture and mount in a shade roller.

I do not intend to be limited to the precise details shown or described.

I claim:

1. In combination, a spindle having an end engageable in a bracket and held against rotation thereby, a shade roller rotatable with respect to said spindle and having a shade windable thereon, means preventing too rapid rolling of said shade on said roller, said means comprising a locking member, said roller having a pocket for said locking member, cam means, and protruding means rotatable with the roller and adapted for striking said locking member with sufficient force when said shade is rolled up too rapidly to propel said locking member out of said pocket for wedging engagement with said cam means whereby to lock said roller against continued rotation at too rapid speed in the direction in which said shade is rolled up on said roller.

2. In combination, a spindle with a flattened end having two positions of engagement in a bracket and held against rotation thereby, a shade roller rotatable with respect to said spindle and having a shade windable thereon, means preventing too rapid rolling of said shade on said roller, said means comprising a locking member, said roller having a pair of pockets for said locking member, one disposed generally along the bottom of the roller in each of the different positions of said spindle in its bracket, cam means, and protruding means rotatable with the roller and adapted for striking said locking member with sufficient force when said shade is rolled up too rapidly to propel said locking member out of the lowermost pocket for wedging engagement with said cam means whereby to lock said roller against continued rotation at too rapid speed in the direction in which said shade is rolled up on said roller.

3. In combination, a spindle, a collar held against rotation on said spindle, a rim on said collar, said rim having a pair of generally diametrically opposite pockets therein, a shade roller

rotatable with respect to said spindle and having a shade windable thereon, said rim having notches in the inner periphery thereof, one extending from each of said pockets in the direction of rotation of said roller in rolling the shade up on the roller.

4. In combination, a spindle, a collar held against rotation on said spindle, a rim on said collar, said rim having a pair of generally diametrically opposite pockets therein, a shade roller rotatable with respect to said spindle and having a shade windable thereon, said rim having notches in the inner periphery thereof, one extending from each of said pockets in the direction of rotation of said roller in rolling the shade up on the roller, a cam rotatable with the roller, and a locking ball member engageable in one of said pockets and adapted to be propelled out of said pocket and into the adjacent notch when said shade is rolled up too rapidly.

5. In combination, a spindle, a collar held against rotation on said spindle, a rim on said collar, said rim having a pair of generally diametrically opposite pockets therein, a shade roller rotatable with respect to said spindle and having a shade windable thereon, said rim having notches in the inner periphery thereof, one extending from each of said pockets in the direction of rotation of said roller in rolling the shade up on the roller, a locking ball member adapted to drop by gravity into the lowermost pocket, a boss rotatable with the roller and adapted for striking said locking ball member with sufficient force when said shade is rolled up too rapidly to propel the ball member out of said pocket and into the adjacent notch, and a cam having a cam surface for wedging engagement with the ball member when said member is in said notch, whereby to lock the roller against continued rotation at too rapid speed in the direction in which said shade is rolled up on said roller.

6. In combination, a spindle having an end engageable in a bracket and held against rotation thereby, a shade roller rotatable with respect to said spindle and having a shade windable thereon, a collar fixed to said spindle, said collar having a pocket therein, a shell rotatable with the roller, a ball member disposed in said pocket at permissible speeds of said roller, protruding means for propelling said ball member out of said pocket when the speed of the roller is too great, and a cam rotatable with said shell and cooperable with said ball member whereby to lock said roller against rotation at too rapid speed in the direction in which said shade is rolled up on said roller.

7. In combination, a spindle having an end engageable in a bracket and held against rotation thereby, a shade roller rotatable with respect to said spindle and having a shade windable thereon, a collar fixed to said spindle, said collar having a pocket therein, a shell rotatable with the roller, a ball member adapted for disposition in the pocket in said collar, a cam rotatable with said shell and cooperable with said ball member whereby to lock said roller against rotation at too rapid speed in the direction in which said shade is rolled up on said roller, said cam being rotatable past said ball member in the direction in which said shade is rolled up on said roller so long as the speed is not too great, and means operated by stopping and reducing the speed of the downward and upward movements of the shade to lock the same in different positions.

8. In combination, a spindle having a flattened end for two positions of engagement with a

bracket and held against rotation thereby, a shade
 roller rotatable with respect to said spindle and
 having a shade windable thereon, an inner shell
 having an annular wall and an end wall secured to
 5 the end of said roller for rotation therewith, a
 collar disposed within said shell and held against
 rotation by said spindle, a rim on said collar di-
 rected toward the end wall of said shell, a cam
 on the end wall of said shell rotatable around the
 10 inner periphery of the rim of said collar, a locking
 ball member confined between said collar and the
 end wall of said shell, said collar having a pair of
 diametrically opposite slots in the rim thereof,
 one forming a pocket for said ball member in each
 15 of the respective positions of said spindle in its
 bracket, said ring having notches in the inner
 periphery thereof, one extending from each of
 said slots in the direction of rotation of said roller
 in rolling the shade up on the roller, an internal
 20 boss on said inner shell for propelling the ball
 member out of the lowermost pocket and into
 the adjacent notch for locking engagement with
 the cam when the speed of the roller is too great,
 a bushing held against rotation on said spindle
 25 and provided with diametrically opposite notches,
 a disc disposed within said shell outwardly of said
 collar and rotatable upon said bushing, a pair

of pawl members pivoted to said disc and having
 projections adapted to drop into said notches to
 lock the shade in different positions, and an outer
 shell having a radial flange at its outer end for
 holding the parts in said first shell and with an
 5 annular wall surrounding said first shell and the
 adjacent end of the roller and secured thereto.

9. In combination, a spindle, a collar held
 against rotation on said spindle, said collar having
 a pocket therein, and a shade roller rotatable with
 10 respect to said spindle and having a shade wind-
 able thereon, said collar having a notch extend-
 ing from said pocket in the direction of rotation
 of said roller in rolling the shade up on the roller.

10. In combination, a spindle, a collar held
 against rotation on said spindle, said collar having
 a pocket therein, a shade roller rotatable with
 respect to said spindle and having a shade wind-
 able thereon, said collar having a notch extending
 from said pocket in the direction of rotation of
 20 said roller in rolling the shade up on the roller,
 and a locking member positioned in said pocket
 to permit rotation of said roller with respect to
 said spindle and positioned in said notch to lock
 said roller against too rapid rotation on said
 25 spindle.

JOSEPH W. FAY.

CERTIFICATE OF CORRECTION.

Patent No. 2,040,301.

May 12, 1936.

JOSEPH W. FAY.

It is hereby certified that error appears in the printed specification of the above numbered patent requiring correction as follows: Page 4, first column, line 16, claim 8, for the word "ring" read rim; and that the said Letters Patent should be read with this correction therein that the same may conform to the record of the case in the Patent Office.

Signed and sealed this 9th day of June, A. D. 1936.

Leslie Frazer

(Seal)

Acting Commissioner of Patents.