

June 2, 1964

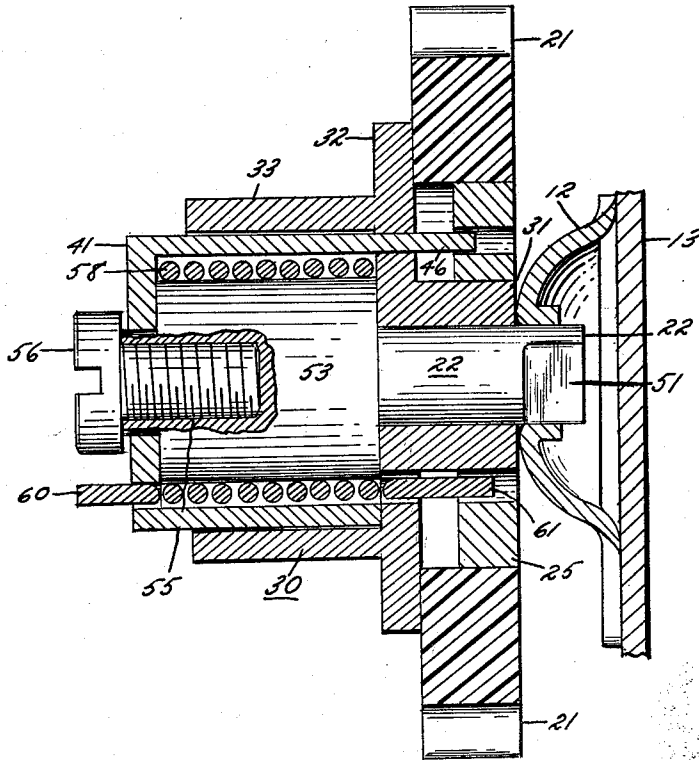
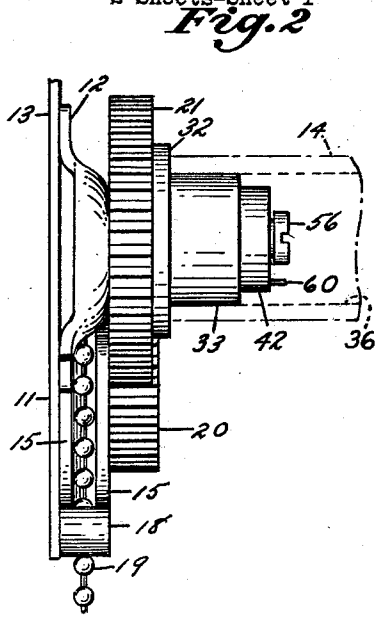
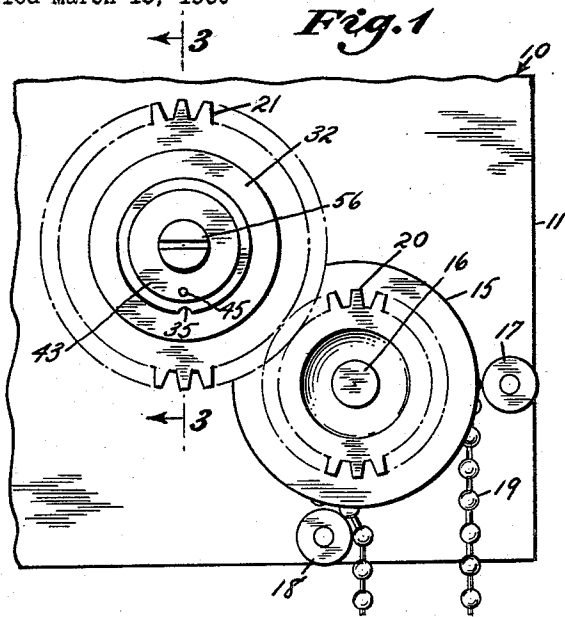
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BRAKE FOR WINDOW SHADES OR BLINDS

Filed March 15, 1960

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BRAKE FOR WINDOW SHADES OR BLINDS

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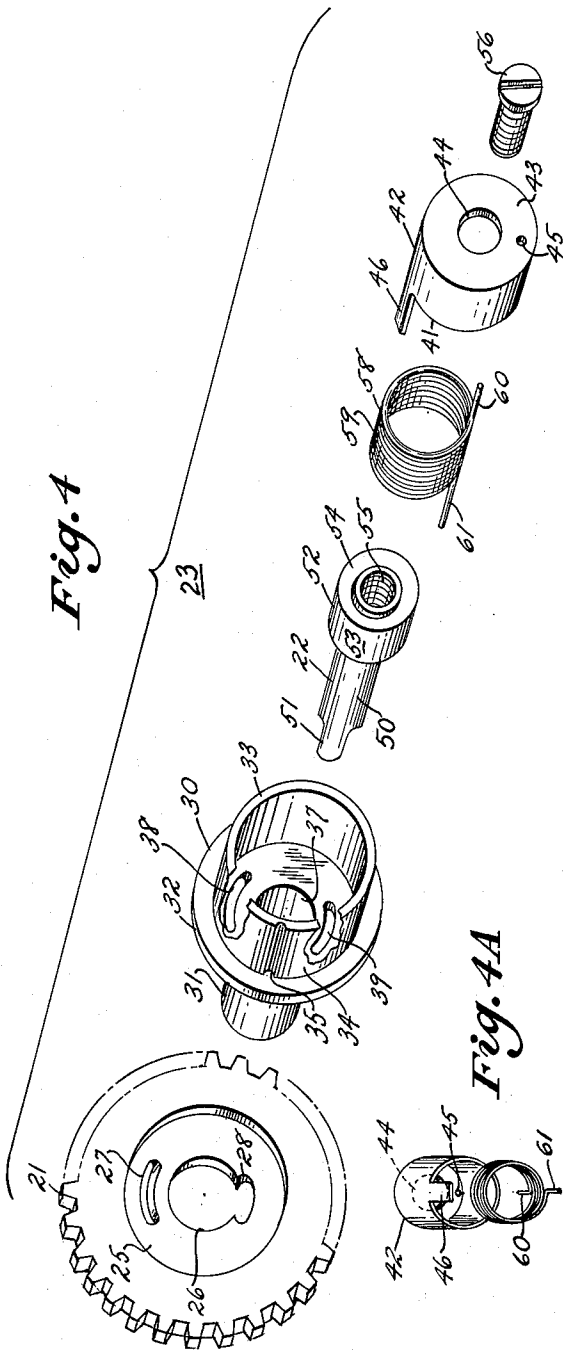


Fig. 4A

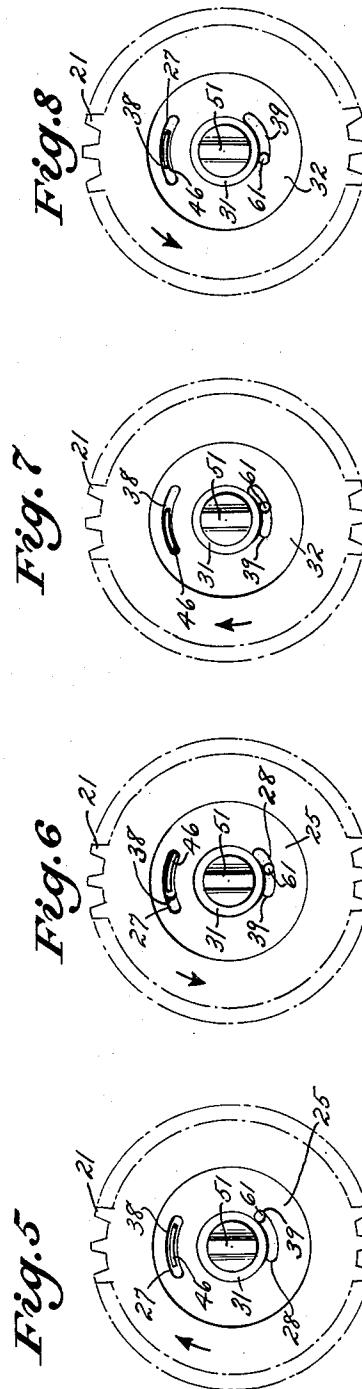


Fig. 5

Fig. 6

Fig. 2

Fig. 8

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BRAKE FOR WINDOW SHADES OR BLINDS

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2 Claims. (Cl. 192—8)

This invention relates generally to the art of mechanical brakes, and more particularly to an improved self-locking brake adapted to be used in conjunction with a window shade or blind roller.

With the increased use of bamboo and other thin wood blinds in lieu of other conventional paper or cloth shades, the conventional spring-type shade roller has not proven suitable, owing to the relatively heavy weight of the blind itself which the spring roller is unable to overcome during a lifting operation. While it is possible to use a worm and gear motion transmitting means in lieu of the spring roller, owing to the large scale gear reduction employed, the raising or lowering of the shade requires a substantial amount of arm movement on the part of the user, which is both time-consuming and annoying. On the other hand, if a higher gear reduction is employed, the gear system lacks sufficient static friction to maintain the shade in any given adjustment or disposition.

It is therefore among the principal objects of the present invention to provide an improved motion transmitting means whereby a shade may be conveniently raised or lowered with a minimum amount of arm movement on the part of the user, and which will automatically maintain a given adjustment through the action of a self-locking brake.

Another object of the invention lies in the provision of an improved construction of the class described in which the cost of fabrication may be of a reasonably low order, with consequent wide sale, distribution and use.

Still another object of the invention lies in the provision of an improved brake means which will automatically maintain itself in a closed or locked condition when the blind or shade is not in the process of being adjusted, and in which any tendency for the shade or blind to shift in position will result in increasing the locking action of the brake. Still another object of the invention lies in the provision of improved structure of the class described which may be largely fabricated using stampings or screw machine parts, and in which close tolerances of parts are unnecessary.

A feature of the invention lies in the fact that the same may be incorporated into existing window sash structures with a minimum of alteration.

Another feature of the invention lies in the ready adaptability of the novel construction to gear reduction of a desired amount without extensive modification of the parts comprising the brake.

These objects and features, as well as other incidental ends and advantages, will more fully appear in the progress of the following disclosure, and be pointed out in the appended claims.

In the drawings, to which reference will be made in the specification, similar reference characters have been employed to designate corresponding parts throughout the several views.

FIGURE 1 is a fragmentary view in elevation of an embodiment of the invention.

FIGURE 2 is a fragmentary view in elevation as might be seen from the lefthand portion of FIGURE 1.

FIGURE 3 is an enlarged fragmentary vertical sectional view as seen from the plane 3—3 in FIGURE 1.

FIGURE 4 is a view in perspective of the embodiment, showing the same in exploded condition.

FIGURE 4A is a perspective view of a spring member and brake housing, comprising a part of the embodiment.

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FIGURE 5 is a view in elevation, as might be seen from the left-hand portion of FIGURE 4, showing the mutual relation of certain of the component parts when the gear is rotated in a clockwise direction.

FIGURE 6 is a similar view in elevation, corresponding in most respects to that seen in FIGURE 5, but showing the relative position of the illustrated component parts when the gear is rotated in a counterclockwise direction.

FIGURE 7 is a similar view in elevation, illustrating the position of the spring and housing when a force is applied to a shade roller for limited clockwise rotation, and also illustrating the position of the spring and outer housing when a force is applied to the gear for intentional counterclockwise rotation.

FIGURE 8 is a similar view in elevation, illustrating the position of the spring and housing when force is applied to the shade roller for limited counterclockwise rotation, and also illustrates the position of the spring and outer housing when force is applied to the gear for intentional clockwise rotation.

In accordance with the invention, the device, generally indicated by reference character 10, includes: an anchor bracket element 11, comprising a roller mounting member 12 mounted upon a base plate 13. The member 12 supports one end of a shade or blind roller, generally indicated by reference character 14, there being a similar bracket element (not shown) which supports the opposite end of the roller 14, as is well known in the art. A cord or chain-engaging pulley 15 rotates about a shaft 16 in turn mounted upon the base plate 13, there being a pair of idler pulleys 17 and 18 which maintain the cord or chain 19 in engaged condition with the pulley 15. The shaft 16 also mounts a driving gear 20 which meshes with a driven gear 21 coaxially mounted with respect to a shaft 22 which forms a part of the brake, generally indicated by reference character 23. Where no mechanical advantage is desired, the pulley 15 and driving gear 20 may be eliminated, with a corresponding loss of function, and the chain 19 engaged directly upon a pulley (not shown) which substitutes for the driven gear 21.

The driven gear 21 includes a central portion 25 having a generally circular opening 26 extending therethrough and first and second arcuate slots 27 and 28, the center of curvature of which extends through the center of the opening 26.

An outer brake housing 30 is provided with a short hollow stub shaft 31 upon which the opening 26 is engaged. The shaft 31 extends outwardly of a radially disposed flange 32 which also supports a hollow cylindrical portion 33. The outer surface 34 of the portion 33 is provided with a keyway 35 engaged by a complementary portion in the inner surface 36 of the roller 14 at one end thereof. The flange 32 includes a centrally disposed bore 37 which extends through the shaft 31; and first and second arcuate slots 38 and 39, respectively, which, as best seen in FIGURE 4 are disposed on opposite sides of the bore 37. It will be observed that the slots 38 and 39 are not directly opposite, the purpose of such disalignment being apparent at a point later in the disclosure.

An inner brake housing 41 includes a cylindrical wall 42 and an end wall 43. The end wall 43 includes a centrally disposed opening 44 as well as a small peripherally disposed opening 45. The cylindrical wall 42 includes an axially extending peripherally disposed projection or lug 46 on the inner edge thereof.

The shaft 22 includes a cylindrical main body portion 50 having a flattened outer end portion 51 which engages the roller mounting member 12 to prevent relative rotation therebetween. On the opposite end of the portion 50 is an enlarged inner or head portion 52 of generally cylindrical configuration. The head portion 52 includes an outer cylindrical surface 53 and an end surface 54 into

which extends a threaded bore 55 engageable by screw means 56. As best seen in FIGURE 3, the screw means 56 is provided with a threaded shank preferably slightly longer than the length of the bore 55, so that when the inner housing 41 is engaged thereby, and the screw means 56 is tightened, relative rotational movement between the housing 41 and the shaft 22 is possible.

Positioned upon the head portion 52 of the shaft 22 is a coil spring 58 including a plurality of convolutions 59 and laterally extending first and second end portions 60 and 61 respectively. The configuration of the convolutions 59 is such that the normal unstressed diameter of the same is slightly less than the outer diameter of the head portion 52, so as to normally resiliently grip the surface 53.

The device is assembled as best seen in FIGURES 3 and 4, wherein the inner housing 41 is maintained on the end of the head portion 52 by the screw means 56, although, as mentioned hereinabove, relative rotational movement is possible. The end 60 of the spring 58 is engaged within the peripherally disposed opening 45, and when the main body portion 50 of the shaft 22 is positioned within the bore 37, the projection or lug 46 extends into the slot 38 and the second end 61 of the spring 58 extends into the slot 39. Upon the positioning of the driven gear 21 upon the stub shaft 31, the projection or lug 46 extends into the first arcuate slot 27, and the second end 61 extends into the second slot 28. The flattened outer end portion 51 is then engaged within the complementary opening in the roller mounting member 12 to be held.

Where the roller is at rest, the spring 58 will remain locked upon the head portion 52, and the projection 46 and spring terminal 61 may position themselves within the slots 38 and 39, respectively, in any location varying between the positions illustrated in FIGURES 5 to 8, inclusive.

Where the initial force is applied by the roller 14 tending to rotate the roller clockwise, as seen from FIGURE 1 and FIGURE 7, the spring 58 will remain locked upon the head portion 52, and the roller together with housing 30 may freely rotate clockwise until the projection 46 contacts the left-hand end of the slot 38, as seen in FIGURE 7. At this point, the force tending to cause the clockwise rotation merely serves to tighten the spring 58 upon the head portion 52 which is fixed against rotation by the engagement of the outer end portion 51 in the member 12. The force in such case is transmitted through the inner housing 41 to the spring terminal 60.

Where a force is applied by the roller tending to rotate the roller in a counterclockwise direction, as seen from FIGURE 1 and FIGURE 8, a limited degree of free rotation is possible until the spring terminal 61 contacts the left end of the slot 39, as seen in FIGURE 8, to again result in tightening the spring 58 upon the head portion.

When it is desired to intentionally rotate the roller 14, as, for example, when lowering a shade, motion is imparted to the gear 21. If the gear 21 is rotated clockwise, as seen in FIGURES 1 and 5, the rightward end of the slot 28 moves against the spring terminal 61 and imparts movement thereto tending to loosen the grip of the spring 58 upon the head portion 52. While in such loosened condition, the rotational drive is transmitted to the spring 58 by the terminal 61 through its engagement in the opening 39 to bear against the leftward end of that opening (said engagement being shown in FIGURE 8) which transmits motion to the housing 30, causing the housing 30 to rotate in the clockwise direction, thereby rotating the roller 14.

If the gear 21 is rotated counterclockwise as viewed in FIGURES 1 and 6, as, for example, when raising the shade or blind, the rotational motion first causes the rightward end of the slot 27 to contact the projection 46, continued motion being transmitted back to the spring terminal 60 to cause the loosening of the spring 58. The rota-

tion of the spring is transmitted by the projection 46 against the leftward end of the slot 38 of the housing 30, the engagement shown in FIGURE 7, to result in rotation in the desired direction of the roller.

In either of the above-described conditions, the termination of application of intentional force to the gear 21 permits the spring 58 to again contract upon the head portion 52 to lock the device against further rotation.

We wish it to be understood that we do not consider the invention limited to the precise details of structure shown and set forth in this specification, for obvious modifications will occur to those skilled in the art to which the invention relates.

We claim:

1. Improved brake means for controlling rotational motion of a window shade roller, comprising: a first shaft, means for maintaining said shaft against rotation, a coil spring surrounding said shaft, said spring having a normal constrictive force sufficient to prevent relative motion between said shaft and said spring, said spring having first and second end portions extending axially away from the coil portion of said spring; a first housing member relatively movably mounted on one end of said shaft and at least partially surrounding said spring; said first housing member having an opening therein engaging a first end portion of said spring, said first housing member having a substantially peripherally disposed axially extending projection thereon positioned substantially parallel to and co-extensive with said second end of said spring; a second housing member at least partially surrounding said first housing member, and having lost motion means engaging said second end of said spring and said projection on said housing; said second housing member having a hollow shaft at least partially surrounding said first shaft in concentric disposition, and motion-imparting means supported by said hollow shaft and having lost motion means engaging said second end portion of said spring and said projection on said first housing member.

2. In a combination window shade roller and braking means for controlling rotational motion of said shade roller, the improvement comprising: a first shaft, means for maintaining said shaft against rotation, a coil spring surrounding said shaft, said spring having a normal constrictive force sufficient to prevent relative motion between said shaft and said spring, said spring having first and second end portions extending axially away from the coil portion of said spring; a first housing member relatively movably mounted on one end of said shaft and at least partially surrounding said spring; said first housing member having an opening therein engaging a first end portion of said spring, said first housing member having a substantially peripherally disposed axially extending projection thereon positioned generally parallel to and co-extensive with said second end of said spring; a second housing member at least partially surrounding said first housing member, and having lost motion means engaging said second end of said spring and said projection on said housing; said second housing member having a hollow shaft at least partially surrounding said first shaft in concentric disposition, and motion-imparting means supported by said hollow shaft and having lost motion means engaging said second end portion of said spring and said projection on said first housing member; said shade roller being interconnected for rotation with said second housing member.

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