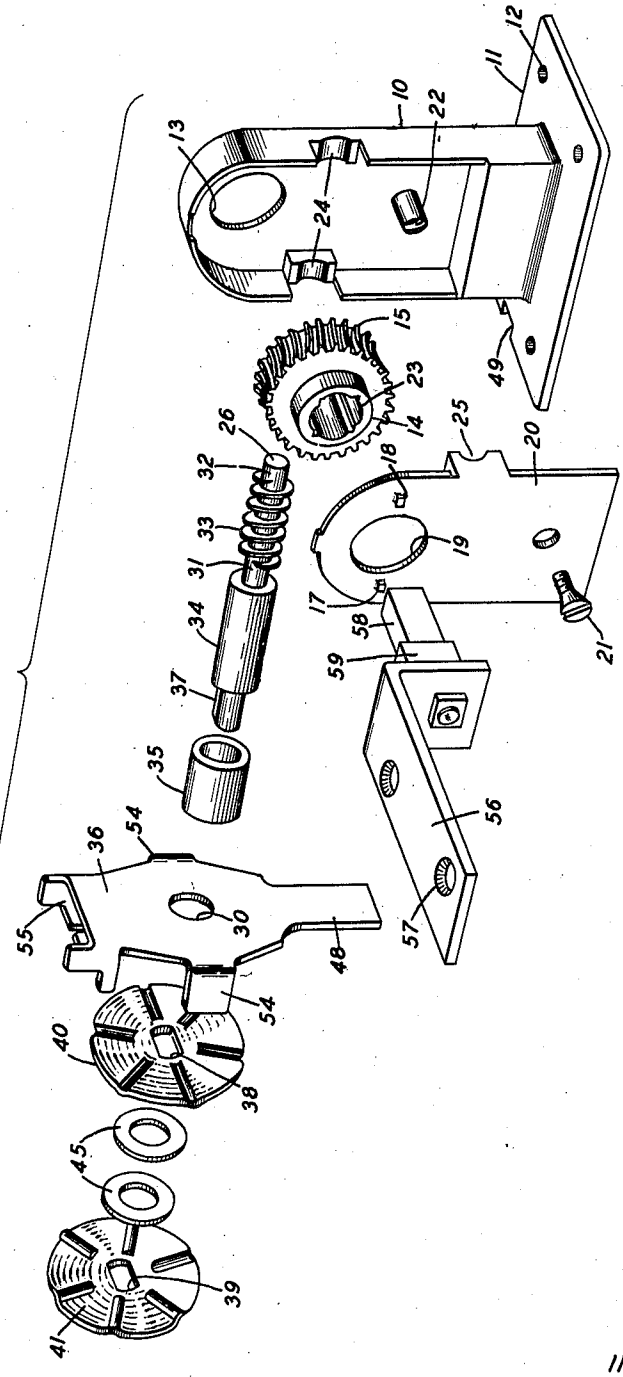
Feb. 22, 1938. W. W. LEWIS 2,108,939

REGULATOR FOR VENETIAN BLINDS

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FIG. 1



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FIG. 2

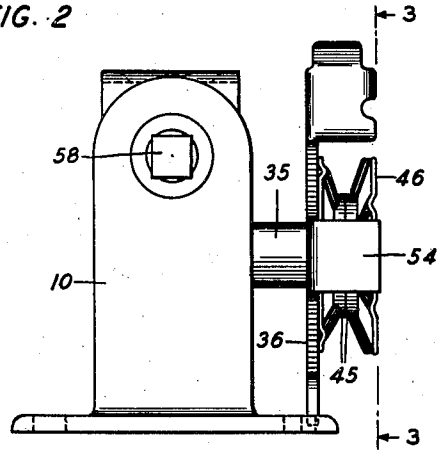


FIG. 2A

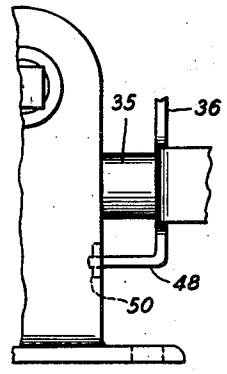


FIG. 3

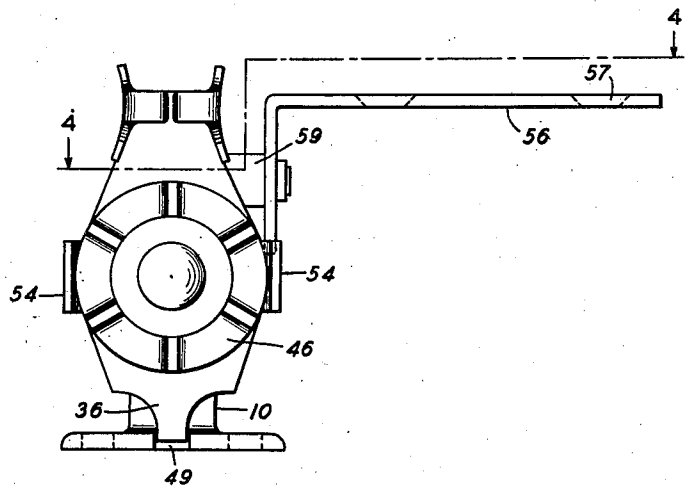
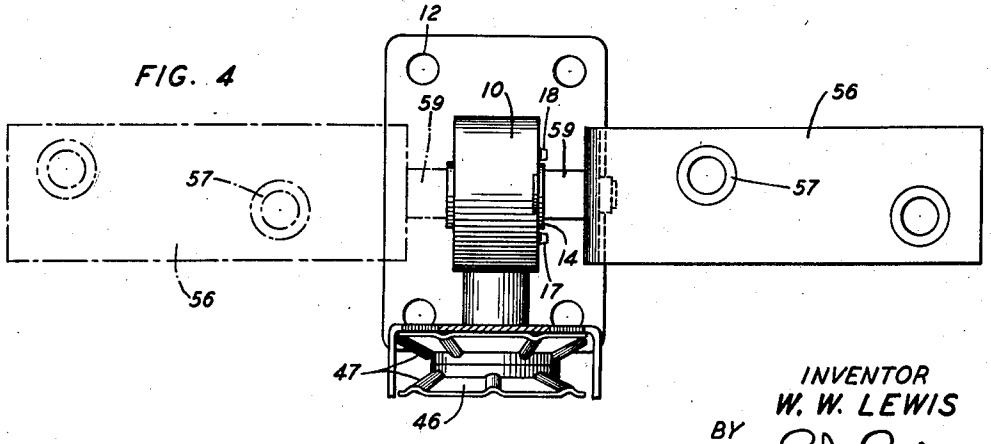


FIG. 4



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UNITED STATES PATENT OFFICE

2,108,939

REGULATOR FOR VENETIAN BLINDS

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Application September 12, 1936, Serial No. 100,463

3 Claims. (Cl. 156—17)

This invention relates to a regulator for Venetian blinds, and more particularly to an improved mechanism for accomplishing the tilting of the shutter members comprising a Venetian blind.

It is an object of the invention to provide a tilting device that is compact and durable, and capable of facile adaptation with various sizes of Venetian blinds without disturbing the actuating assembly.

It is a further object of the invention to provide an enclosed mechanism in which the actuating members are protected from foreign particles thereby obviating frequent cleaning operations.

It is another object of the invention to provide a tilting device which includes a sheave assembly adapted for use with various types of actuating cords.

In a preferred embodiment, the invention contemplates a housing for enclosing a hollow worm gear mounted rotatably therein to mesh with a worm formed on one end of a shaft which is journalled in the housing. Assembled on the opposite end of the shaft is a sheave adapted for use with various types of actuating cords. The hollow worm gear accommodates, coaxially and interchangeably on either side thereof, an angle member which may be secured to and removed from the tilt bar of a Venetian blind without disturbing the worm gear arrangement assembled within the housing.

The invention may be more readily comprehended from the following description taken together with the accompanying drawings in which:

Fig. 1 is an exploded view showing the various members comprising the regulating mechanism;

Fig. 2 is a side elevation illustrating a preferred method of anchoring the cord guide;

Fig. 2—A is a fragmentary side elevation showing an alternate method of anchoring the cord guide;

Fig. 3 is a view taken along the lines 3—3 of Fig. 2; and

Fig. 4 is a plan view illustrating the interchangeability of the angle-member attached to the tilt bar of a Venetian blind.

The same reference numerals are used to designate identical parts occurring in the several figures of the drawings.

Referring to Fig. 1, a housing 10 contains the tilting mechanism and supports one end of the tilt bar of a Venetian blind in a manner that will be subsequently described in detail. Formed integral with the housing 10 on one end thereof is an attaching plate 11 provided with openings 12 to receive screws, not shown, for attaching the housing 10 to the header bar, not shown, of a Venetian blind.

An aperture 13 formed in the rear wall of the housing 10 provides a bearing for a circular shoulder, not shown, but oppositely disposed and similar to a shoulder 14 formed axially in the exposed face of a worm gear 15. A bearing for the shoulder 14 is supplied by an aperture 19 contained in a face-plate 20 which is removably secured to the housing 10 by an arrangement comprising a screw 21 and an anchor 22 therefore disposed on an inner surface of the rear wall of the housing 10. It is to be understood that the bearings for the worm gear 15 are so aligned as to permit the latter to rotate freely thereon.

The worm gear 15 is also provided with an opening 23 having a squared configuration and extending the axial length thereof. The opening 23 is designed for a purpose which will be more adequately explained hereinafter.

Aligned semi-circular grooves 24, 24 formed in the opposite side walls of the housing 10 and similar grooves 25 provided on the inner surface of the face-plate 20 define, when the face-plate 20 is secured to the housing 10, oppositely disposed and circular bearing surfaces for a shaft 26. Also, the face-plate 20 on its outer surface is provided with spaced projections, or stops 17 and 18, utilized for a purpose which will be more fully described hereinafter.

Intermediate bearing portions 31 and 32 on the shaft 26 journalled in the bearings described above, is formed a worm 33 which meshes with the lowermost teeth of the worm gear 15. Adjacent to the bearing portion 31, the shaft 26 is provided with an integral collar 34 disposed exteriorly of the housing 10 and accommodated in a sleeve 35 and an aperture 30 of a cord guide 36. The collar 34 and sleeve 35 have particular lengths whose purposes will be more adequately explained hereinafter.

On the extreme left end of the shaft 26 is provided a reduced portion 37 of substantially rectangular configuration. The shaft portion 37 is received in similarly shaped apertures 38 and 39 formed axially in a pair of circular end plates 40 and 41, respectively. Positioned intermediate the end plates 40 and 41 are annular spacers 45 whose number depends on the width of opening desired between the end plates 40 and 41. The exposed end of the shaft portion 37 is expanded so that the end plates 40 and 41 are permanently affixed

in a spaced and non-rotatable manner on the shaft 26.

The assembly of the end plates 40 and 41 with the spacers 45 therebetween comprises a sheave 46 over which the actuating cord, not shown, is threaded. The sheave 46 is shown assembled in Figs. 2 and 4.

Each of the circular end plates 40 and 41 is peripherally flared beginning where the surface thereof is not in engagement with a contiguous spacer 45, as shown in Fig. 2. Each peripherally flared portion is provided on an outer surface with a plurality of radially disposed ribs 47. The end plates 40 and 41 are assembled on the shaft portion 37 such that the ribs 47 on one end plate are in opposing relation with those on the other, and, in addition, such that the ribs 47 on one end plate are angularly disposed with respect to those on the other.

This assembly, shown in Fig. 4, forms in the sheave 46 a flared, circumferential groove in which the narrowest portion lies at the peripheries of the annular spacers 45 while its widest portion lies at the peripheries of the end plates 40 and 41.

As a consequence, the actuating cord, not shown, is threaded in serpentine fashion on the sheave 46 so as to provide relatively large frictional engagement therebetween. In addition, the sheave 46 is readily adaptable for use with a ball and chain type of cord, as well as a link chain type of cord. Further, the above design renders the sheave 46 suitable for use with either a cord of substantially smooth surface, or one having an irregular surface. Obviously, also, the tapering configuration of the circumferential groove in the sheave 46 extends the utility of the latter to various types and sizes of actuating cords without disturbing the assembly.

The length of the collar 34 depends on the location of the sheave 46 relative to the position of the housing 10. In cases where it may be desirable to locate the sheave 46 some distance removed from the housing 10, the collar 34 and its associated sleeve 35 may be given such lengths as suit the particular case. Accordingly, it is by this means that there is provided a flexibility which is both advantageous and desirable without impairing firmness and sturdiness.

The cord guide 36 is formed with a depending rectangular tongue 48 disposed in a similarly shaped accommodating recess 49 which is provided in the attaching plate 11. This arrangement serves to anchor the cord guide 36 non-rotatably and rigidly thereby obviating movements of the latter when force is applied to the actuating cord in effecting actuations of the sheave 46. This method of anchoring the cord guide 36 is clearly illustrated in Figs. 1 and 2.

An alternate method of effectuating the same purpose is delineated in Fig. 2—A. In this arrangement, the tongue 48 is bent 90 degrees relative to the vertical plane of the cord guide 36, and is lodged in a recess 50 provided in an end wall of the housing 10.

The cord guide 36 is also provided with right-angled portions 54, 54 disposed along the horizontal axis of the sheave 46 to overlie portions of the circumferential groove formed therein. The right-angled portions 54, 54 serve to retain the actuating cord in the circumferential groove of the sheave 46. This is clearly illustrated in Figs. 1 and 3. In addition, the cord guide 36 is provided, on the end opposite to the tongue 48, with a substantially rectangular opening 55 (Fig. 1) through which the actuating cord is passed. The position of the opening 55 is such that more than one-half of the circumferential groove of the sheave 46 is held in engagement with the actuating cord when force is applied thereto. Obviously, the size and configuration of the opening 55 are such as permit free movements of the actuating cord therethrough.

An angle plate 56 is secured to one end of the tilt bar, not shown, by screws, not shown, received in apertures 57 formed in the horizontal side thereof. The opposite end of the tilt bar may be supported in any suitable manner that allows free rotary movements imparted thereto in a manner that will be subsequently explained. The angle plate 56 is suitably adapted on its vertical side with a squared projection 58 which is accommodated in the axial opening 23 of similar configuration provided in the worm gear 15. A shoulder 59 provided on the projection 58 limits the extent to which the latter can be projected into the opening 23, and, in addition, cooperates with the stops 17 and 18 to limit the rotary movement of the angle-plate 56 in both clockwise and counter-clockwise directions.

Inasmuch as the opening 23 extends throughout the entire axial length of the worm gear 15, it will be understood that the angle-plate 56 may be interchangeably and coaxially assembled therewith on either side of the housing 10. The opening 23 is proportioned such that the top slat may be brought up flush with the under surface of the tilt bar throughout the entire length thereof. This is not accomplished in present commercial types of tilting devices since the latter are of such structure as prevent one end of the top slat from being brought up flush with the tilt bar. It is obvious, of course, that such use is permissible without disturbing the gearing arrangement supported by the housing 10. In Figs. 3 and 4, the full lines indicate the angle-plate 56 inserted in the right-hand side of the housing 10, while in Fig. 4, the broken lines indicate the angle-plate 56 assembled on the left-hand side of the housing 10.

In view of the fact, that the tilt bar of a Venetian blind is secured to the angle-plate 56, as aforescribed, it will be understood that the angle of inclination of both the tilt bar and the angle-plate 56 is always the same. This assumes, of course, that the tilt bar is not warped. Further, it will be understood that the angle of inclination of the shutter members comprising the Venetian blind is always identical with that of the tilt bar since the latter controls the positions of the shutter members in the well-known manner.

In operation, let it be assumed that the horizontal portion of the angle-plate 56 attached to the tilt bar lies in a horizontal plane when looking into the angle-plate 56, shown in Figs. 1 and 3. Accordingly, the tilt bar and shutter members lie in the same plane. Then, when a user pulls the cord to actuate the sheave 46 in a clockwise direction (Fig. 3), the worm 33 on shaft 26 moves the worm gear 15 in a counter-clockwise direction. The angle bracket 56, being fixedly disposed in the worm gear 15, is likewise moved in the same direction therewith. Obviously, this motion is also imparted to the tilt bar and shutter members all of which are turned in a corresponding direction. The amount of tilting movement of the angle-plate 56 in a counter-clockwise direction will be limited by the en-

gagement between the shoulder 59 and the stop 18.

When a user pulls the cord to actuate the sheave 46 in a counter-clockwise direction, the worm 15 is moved in a clockwise direction to carry the angle-plate 56 therewith in the same direction. Obviously, a corresponding movement is imparted to the tilt bar and shutter members. The amount of tilting movement of the angle-plate 56 in a clockwise direction will be limited by the engagement between the shoulder 59 and the stop 17.

When the angle-plate 56 is positioned in the rear wall of the housing 10, the former, due to worm gear arrangement, will be caused to move in the same direction in which the sheave 46 is actuated by the user. It is to be understood that the particular direction of movement imparted to the angle-plate 56 depends merely on whether the latter is assembled on the right-hand or left-hand side of the housing 10, as shown in Fig. 4.

It is obvious, of course, that in cases where it is most expedient to place no limit on the rotary movements of the angle-plate 56, the stops 17 and 18 may be omitted.

Further, it will be understood that stops 17 and 18 are also provided on the wall of the housing 10 opposite to the face-plate 20 so as to effect engagements with the shoulder 59 to limit rotary movements of the angle-plate 56 in the manner described above.

While the aforedescribed apparatus is capable of modification by those skilled in the art, it is understood that it is to be limited only by the scope of the appended claims.

What is claimed is:

1. In a tilting mechanism for a Venetian blind including a tilt bar and a header bar, the combination comprising a housing attachable to the header bar, the housing having securing means and a compartment, means attachable to tilt bar, a projection of a configuration other than circular provided on the attachable means, means rotatably mounted in the compartment and arranged to receive the projection so that the attachable means can be mounted interchangeably on either side of the housing, and means having a portion rotatably mounted in the compartment in engagement with the rotatable means and another portion projecting externally of the compartment to support a pulley.

2. In a tilting mechanism for a Venetian blind including a tilt bar and a header bar, the combination comprising a housing attachable to the header bar, the housing comprising fastening means and a compartment, means attachable to the tilt bar, a projection of a configuration other than circular provided on the attachable means, means rotatably mounted in the compartment and having a portion shaped in each of two opposite sides thereof to receive the projection so that the attachable means can be mounted interchangeably on opposite sides of the housing, and means having a portion rotatably mounted in the compartment in engagement with the rotatable means and another portion projecting externally of the compartment to support a pulley.

3. In a tilting mechanism for a Venetian blind including a tilt bar and a header bar, the combination comprising a housing attachable to the header bar, the housing having fastening means, a compartment and apertures associated with the compartment in aligned pairs, means attachable to the tilt bar, a rectangular projection provided on the attachable, means, a gear in the compartment and having journals rotatable in the apertures of one aligned pair, at least one of the journals being formed with a rectangular opening to receive the projection, a worm shaft having one end extending through the compartment for rotation in the apertures of another aligned pair and the opposite end projecting exteriorly of the compartment to support a pulley, and a worm fixed on the end of the shaft within the compartment to mesh with the gear.

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