Sept. 29, 1936. G. D. DODGE 2,055,816

VENETIAN BLIND TILTING DEVICE

Filed Sept. 24, 1934 2 Sheets-Sheet 1

Fig. 1

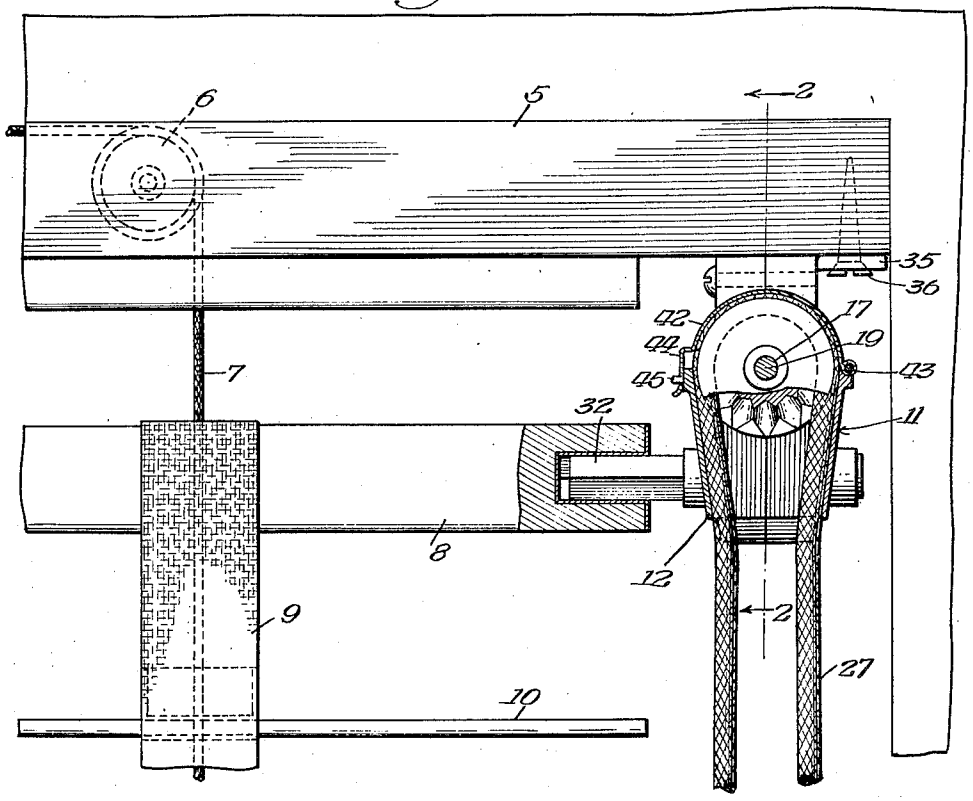


Fig. 2

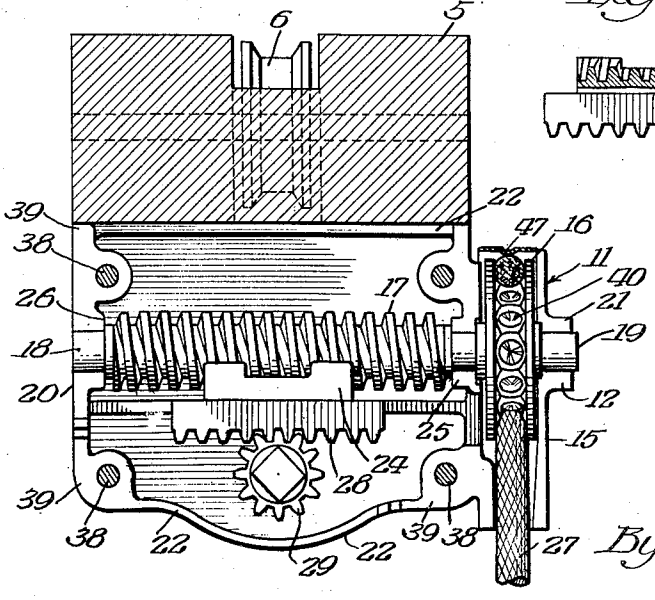


Fig. 3

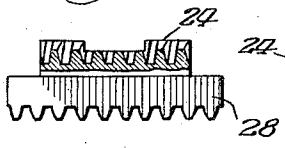
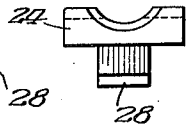


Fig. 4



Inventor:-
George D. Dodge
By:- Cox & Moore
Atty's

Sept. 29, 1936. G. D. DODGE 2,055,816

VENETIAN BLIND TILTING DEVICE

Filed Sept. 24, 1934 2 Sheets-Sheet 2

Fig. 5

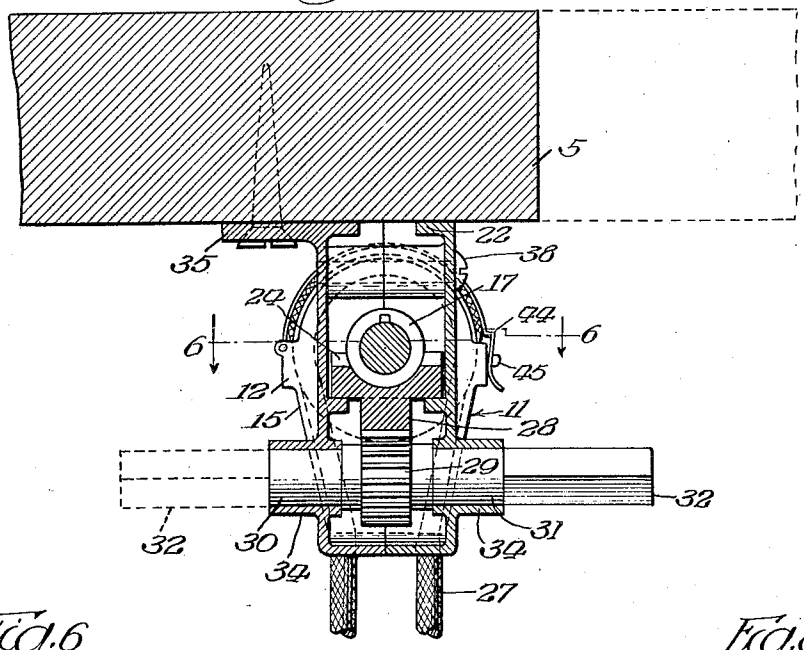


Fig. 6

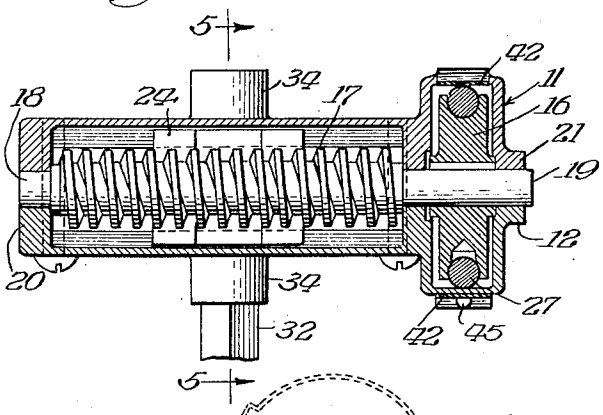


Fig. 8

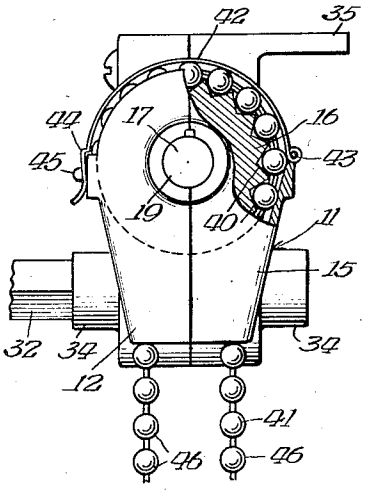
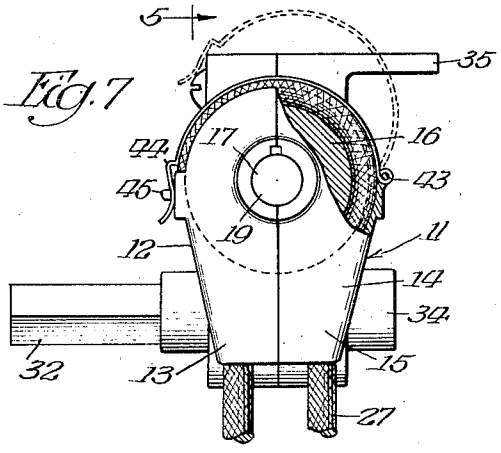


Fig. 7



Inventor:-
George D. Dodge
By: Cox & Moore
Attys

Patented Sept. 29, 1936 2,055,816

UNITED STATES PATENT OFFICE

2,055,816

VENETIAN BLIND TILTING DEVICE

George D. Dodge, Evanston, Ill.

Application September 24, 1934, Serial No. 745,218

14 Claims. (Cl. 156—17)

This invention relates to Venetian blinds and particularly to a device used in connection with Venetian blinds to cause the slats to be tilted.

The primary object of the present invention is to provide a new and improved operating device for shifting or tilting the slats of a Venetian blind.

A further object of the invention is to provide an attractive appearing device to tilt blind slats, which device is completely housed within an ornamental casing, and which is provided with a gear, nut and pinion, and rack arrangement, whereby the tilting bar of the blind is positively and noiselessly moved or shifted to proper tilted position.

Numerous other objects and advantages will be apparent throughout the progress of the following specification.

The accompanying drawings illustrate a selected embodiment of the invention, and the views therein are as follows:

Fig. 1 is a detail elevation of a Venetian blind, partly in section, and embodying the invention.

Fig. 2 is a detail longitudinal sectional view on the line 2—2 of Fig. 1.

Fig. 3 is a detail elevation, partly in section showing the traveling nut.

Fig. 4 is an end view of the traveling nut shown in Fig. 3.

Fig. 5 is a detail transverse sectional view of the device on the line 5—5 of Fig. 6.

Fig. 6 is a detail longitudinal sectional view of the device on the line 6—6 of Fig. 5.

Fig. 7 is a detail end elevation, partly in section of the device.

Fig. 8 is a detail end elevation, partly in section of the device showing chain operation instead of cord operation.

The Venetian blind herein shown, for the purpose of illustration, comprises an upper supporting member or top bar 5 carrying pulleys 6 over which operating cords 7 pass, the cords 7 being used for the purpose of raising and lowering the blind. A tilting bar 8 is positioned immediately below the supporting member or top bar 5, and this tilting bar has spaced tapes 9 fastened thereto which support slats 10 in the proper spaced relationship. The tilting bar 8 is for the purpose of tilting the slats at the desired angle, conforming with the angle which the tilting bar assumes.

A tilting device 11 is provided to tilt the tilting bar 8 and consequently the slats 10. This tilting device 11 comprises a casing 12 which is made in two parts 13 and 14, Fig. 7, which parts are substantially alike in construction and arrangement. A bellhousing 15, integrally formed with the casing, is for the purpose of receiving and shielding a sheave or pulley 16 which is rigidly secured to a screw shaft 17. The screw 17 has its ends 18 and 19, Fig. 2, revolubly mounted in bearings 20 and 21 formed in the ends of the housing, as clearly shown in Figs. 2 and 6. The sections 13 and 14 of the casing may be provided with an internally extending flange 22, Fig. 2, for holding the side faces of the casing a predetermined distance apart.

A traveling nut 24 has threaded engagement with the screw 17 and is adapted to move therealong. The nut 24 is, in reality, only about one-half of a nut, the threads being formed in one surface thereof. The other surface of the nut is smooth to permit movement of the nut within the casing. The construction of the nut 24 reduces friction between the nut and the screw to a minimum, and, at the same time, allows sufficient engagement between the nut and screw to cause proper movement of the nut when the screw 17 is turned. As shown, the nut 24 is positioned on one side of the screw 17, preferably at the bottom, and engages an inner surface of the housing, thereby preventing rotation of the nut. Stops 25 and 26, Fig. 2, limit the slidable movement of the nut in both directions.

A tilting cord 27 passes over the pulley 16, and its purpose is to rotate the screw 17. When the screw 17 is rotated in its bearings 20 and 21, the nut 24 will be caused to move axially along the screw. If, however, the cord 27 should be pulled in the direction to tend to urge the nut when at the limit of its travel, such as when it strikes the stops 25 or 26, the cord will merely slip over the pulley. Therefore, no damage can be done to any of the operating parts, and none of the parts will be forced or become jammed.

The nut 24 carries a rack 28 at its lower end, which has meshing relationship with a pinion 29, Fig. 2. The pinion 29 is provided with end bushings 30 and 31, Fig. 5, which extend an equal distance on opposite sides of the pinion 29. A square shaft 32 is fixed to the end bushing 31 and extends outwardly a predetermined distance from the casing. This shaft 32 engages a slotted opening 33, Fig. 1, formed in an end of the tilting bar 8. The opening 33 is also rectangular in cross-section, and therefore, during rotative movement of the square shaft 32, the tilting bar 8 will be tilted through various angles. When the tilting cord 27 is operated to rotate the pulley 16, the screw shaft 17 will rotate and cause longitudinal movement or translation of the nut 24. When the nut 24 translates, the pinion 29 will be caused to rotate due to the meshing relationship of the rack 28 and the pinion 29. Rotative movement of the pinion 29 causes rotative movement of the square shaft 32 which in turn causes similar movement of the tilting bar 8.

The end of the tilting bar opposite the device 11, is provided with a suitable bracket or hanger, (not shown) which is fixed to the top bar 5 and

pivotally connected to the tilting bar 8 to permit rotative or tilting movement of the tilting bar.

It is often desirable that some blinds have right-hand cord tilting operation while others have left-hand operation. To provide either right or left hand cord operation, it is a simple matter to reverse the position of the pinion 29 and its corresponding shaft 32 to the desirable position. This can be done by merely turning the pinion end-for-end so that the shaft 32, instead of being in the position shown in full lines in Figs. 5 will assume the position shown in dotted lines in this same figure. This end-for-end or reverse arrangement of the pinion can be accomplished because the bushings 30 and 31 are of exactly the same length and are mounted in bosses or bearings 34 which are substantially the same size. The invention, therefore, provides a cord tilting device which is applicable for either right-hand or left-hand use.

The casing 12 is provided with extending ears or flanges 35, Figs. 1 and 5, to permit the tilting device to be fastened to the top bar with any desirable fastening means, such as with screws 36.

If it is desirable at any time to replace or change the tilting cord 27, it can be very easily and readily done without the use of any tools. An upper slot or opening 37 is formed in the upper part of the housing above the pulley so that the tilting cord 27 may be easily and readily arranged about the pulley and threaded through the casing.

The two parts 13 and 14 of the casing are fastened together by screws threadedly engaging the openings 38 formed in the ears or bosses 39, Fig. 2.

The pulley 16 is provided with a plurality of circumferentially spaced sockets 40, more clearly shown in Figs. 2 and 8, to permit use of a chain 41 (Fig. 8) instead of the customary operating cord 27. The spaced sockets 40 in no way harm or cause wear to the cord, but, to the contrary, assists in maintaining the gripping action between the cord and the pulley. In cases where it is desirable, for any reason, to use a chain instead of a cord, the pulley 16 is constructed to receive either.

Inasmuch as the parts are rigidly constructed and operate easily and simply, no damage can be done to the device if chain operation is desired in place of cord operation.

The casing 12 is provided with a hinged cover or cap portion 42 (Figs. 1 and 8) which is hinged to the main part of the casing as indicated at 43. The outer free end of the cover or cap portion 42 is provided with an extending ledge 44 for locking the cover portion in position with its co-operating locking ear 45, or for releasing the cover or cap from the ear. The cap or cover 42 is arranged relatively close to the spaced balls 46 of the chain so that the chain will not slip about the pulley and the balls will not become dislodged from the sockets 40 during fast operation. It has also been found practicable to force the metal of the cap inwardly as indicated at 47 (Fig. 2) so that when the conventional cord 27 is employed, a slight drag or friction will be created on the cord. This slight friction assures the cord remaining in position at all times and prevents over-running of the pulley. The friction, however, is so slight that there will be no wear on the cord.

The invention provides a Venetian blind slat-tilting device which is constructed with a screw-driven traveling nut operating in a completely enclosed ornamental housing. The casing forms a bearing for the screw which is operated by means of a tilting cord or chain which passes over a pulley designed to accommodate both. The rack is rigid with the nut, and therefore comprises an integral part thereof. When the operator pulls the cord or chain to turn the pulley, the screw will revolve and the traveling nut will move. The movement of the nut and its co-operating rack causes the square shaft 32 to turn through the intermediary of the pinion 29. The device is practically fool-proof due to the fact that it cannot be forced, when a cord is used, because the traveling nut, when it reaches its limit of travel in either direction, is stopped by the stops 25 or 26, and continued pull on the cord merely causes the operating cord to slip around the pulley. Due to the rigid construction of the device, no harm can be done even though the pulley is chain operated.

The tilting device is practical, has an attractive appearance, and there are no exposed gears shown, or other elements extending from the casing. The operation of the device is positive and noiseless and positively and efficiently holds the blind in its proper position. The device is rigid in construction, can be readily and economically manufactured and assembled, and can be applied to existing blinds.

Changes may be made in the form, construction and arrangement of the parts without departing from the spirit of the invention or sacrificing any of its advantages, and the right is hereby reserved to make all such changes as fairly fall within the scope of the following claims.

The invention is hereby claimed as follows:

1. A tilting device comprising a casing, a screw rotatably mounted in said casing, a nut translatable on said screw during revoluble movement thereof, a rack carried by the screw, a pinion in mesh with said rack, and a shaft rotated by said pinion.

2. A Venetian blind tilting device comprising a casing, a screw mounted in bearings in said casing and arranged longitudinally thereof, a nut threadedly engaging the screw and adapted for axial movement along the screw, a multi-sided shaft transversely of said casing and extending therethrough, a pinion in said casing and fixed to said shaft, and means on the nut and engaging the pinion for causing rotation of said shaft during longitudinal movement of said screw.

3. A Venetian blind tilting device comprising a casing, a screw mounted in bearings in said casing and arranged longitudinally thereof, a nut threadedly engaging the screw and adapted for axial movement along the screw, a multi-sided shaft transversely of said casing and extending therethrough, a pinion in said casing and fixed to said shaft, means on the nut and engaging the pinion for causing rotation of said shaft during longitudinal movement of said screw, a bellhousing integral with said casing, and a pulley arranged in said bellhousing and fixed to said screw, said bellhousing having a slot formed in its upper end, whereby a tilting cord can be placed about said pulley and threaded between the sides of the pulley and the sides of the bellhousing.

4. A Venetian blind tilting device comprising a casing, a pinion arranged in said casing, bearings formed in each part of the casing, bushings on each side of the pinion and engaging a respective bearing in each part of the casing, and a shaft fixed to the pinion and extending outwardly from one side thereof.

5. A Venetian blind tilting device comprising a two-part separable casing, a pinion arranged in said casing, bearings formed in each part of the casing, bushings on each side of the pinion and engaging a respective bearing in each part of the casing, and a shaft fixed to the pinion and extending outwardly from one side thereof and projecting a predetermined distance from the end of one of said bushings, whereby the pinion may be inserted endways in said casing, thereby providing a lifting device capable of right or left-hand operation.

6. A Venetian blind tilting device, capable of both left-hand and right-hand operation, comprising a two-part casing, each part of the casing having an opening therein providing bearings for a pinion, extensions on each side of the pinion and mounted in said bearings, a shaft fixed to one of said extensions, said pinion and shaft adapted to be reversed in said casing, whereby the shaft may extend through said bearings on either side of the casing, a tilting cord, and means controlled by the movement of the tilting cord for causing rotation of said pinion.

7. A Venetian blind tilting device, capable of both left-hand and right-hand operation, comprising a two-part casing, each part of the casing having an opening therein providing bearings for a pinion, extensions on each side of the pinion and mounted in said bearings, a shaft fixed to one of said extensions, said pinion and shaft adapted to be reversed in said casing, whereby the shaft may extend through said bearings on either side of the casing, a screw rotatably mounted in said casing, a nut translatable along said screw when the screw is rotated, and a rack fixed to said nut and engaging the pinion.

8. A Venetian blind tilting device, capable of both left-hand and right-hand operation, comprising a two-part casing, each part of the casing having an opening therein providing bearings for a pinion, extensions on each side of the pinion and mounted in said bearings, a shaft fixed to one of said extensions, said pinion and shaft adapted to be reversed in said casing, whereby the shaft may extend through said bearings on either side of the casing, a screw rotatably mounted in said casing, a nut translatable along said screw when the screw is rotated, a rack fixed to said nut and engaging the pinion, a wedge-shaped pulley fixed to said screw, a tilting cord engageable with said pulley for rotating said pulley, and stop means on the inside of said casing adapted to engage the end of said nut to limit the movement of said nut.

9. A Venetian blind tilting device, capable of both left-hand and right-hand operation, comprising a two-part casing, each part of the casing having an opening therein providing bearings for a pinion, extensions on each side of the pinion and mounted in said bearings, a shaft fixed to one of said extensions, said pinion and shaft adapted to be reversed in said casing, whereby the shaft may extend through said bearings on either side of the casing, a screw revolubly mounted in said casing, a nut threadedly engaging said screw and adapted to be translated along said screw during rotation of said screw, and teeth formed on the bottom of the nut and engaging the pinion, whereby the pinion will be rotated during translation of the screw.

10. A Venetian blind tilting device, capable of both left-hand and right-hand operation, comprising a two-part casing, each part of the casing having an opening therein providing bearings for a pinion, extensions on each side of the pinion and mounted in said bearings, a shaft fixed to one of said extensions, said pinion and shaft adapted to be reversed in said casing, whereby the shaft may extend through said bearings on either side of the casing, a screw revolubly mounted in said casing, a nut threadedly engaging said screw and adapted to be translated along said screw during rotation of said screw, teeth formed on the bottom of the nut and engaging the pinion, whereby the pinion will be rotated during translation of the screw, a pulley fixed to the screw, a tilting cord about said pulley for operating the screw, and means for limiting the translation of said nut.

11. A Venetian blind tilting device, capable of both left-hand and right-hand operation, comprising a two-part casing, each part of the casing having an opening therein providing bearings for a pinion, extensions on each side of the pinion and mounted in said bearings, a shaft fixed to one of said extensions, said pinion and shaft adapted to be reversed in said casing, whereby the shaft may extend through said bearings on either side of the casing, a screw revolubly mounted in said casing, a nut threadedly engaging said screw and adapted to be translated along said screw during rotation of said screw, teeth formed on the bottom of the nut and engaging the pinion, whereby the pinion will be rotated during translation of the screw, a pulley fixed to the screw, a tilting cord about said pulley for operating the screw, and means comprising abutments for limiting the translation of said nut, said tilting cord sliding about said pulley when tension is applied thereto and the nut has reached the limit of its travel.

12. A Venetian blind tilting device comprising a casing, a pulley rotatively mounted in the casing, pulley-operating means for said pulley, a pinion rotatably mounted in the casing, means operated by rotation of the pulley for rotating the pinion, said casing having a slot provided therein adjacent the pulley, and a cover hinged to said casing and extending about the pulley to maintain the pulley-operating means in proper position relative to the pulley.

13. A Venetian blind tilting device comprising a casing, a pulley rotatively mounted in the casing, a pinion rotatably mounted in the casing, means operated by rotation of the pulley for rotating the pinion, said casing having a slot provided therein adjacent the pulley, said pulley having sockets formed in its periphery whereby the pulley is adapted to be operated by either a chain or a cord, and a cover hinged to said casing and extending about the pulley to maintain the chain or cord in proper position relative to the pulley, said cover being formed with an inwardly extending portion to assist in maintaining the chain or cord in position relative to the pulley.

14. A tilting device for Venetian blinds comprising a casing, a screw rotatably mounted in said casing, a nut translatable on said screw during revoluble movement of the screw, a pinion, means between the nut and the pinion for operating said pinion, and a shaft rotated by said pinion.

GEORGE D. DODGE.