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2,709,488

ONE-WAY TILT VENETIAN BLIND CONSTRUCTION

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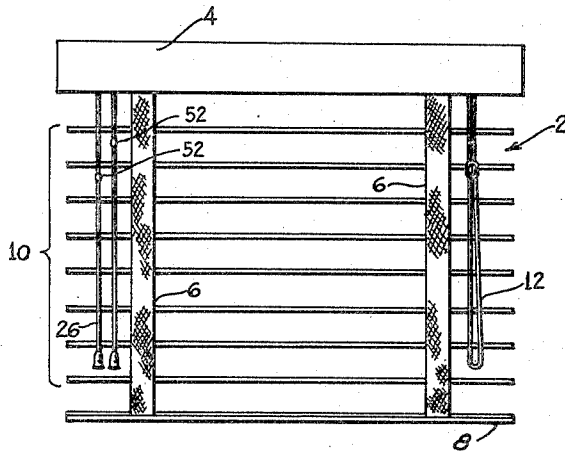


FIG. 1

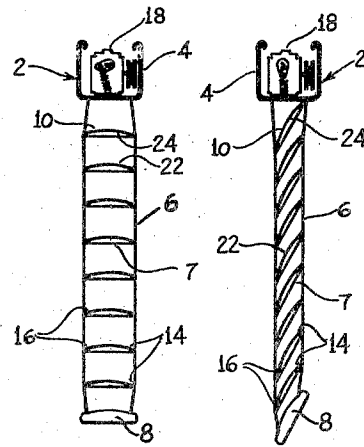


FIG. 2

FIG. 3

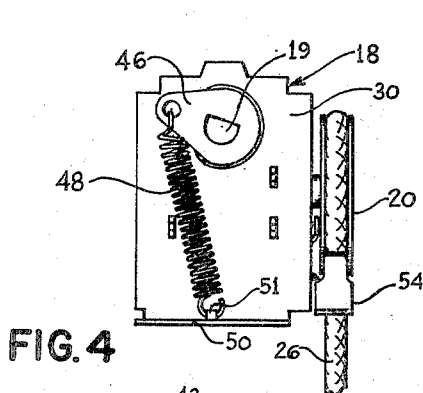


FIG. 4

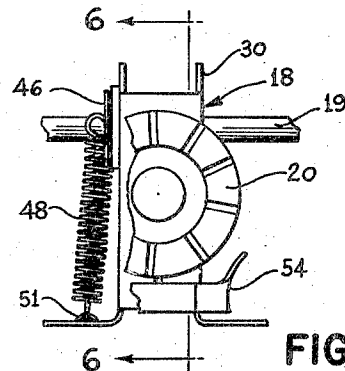


FIG. 5

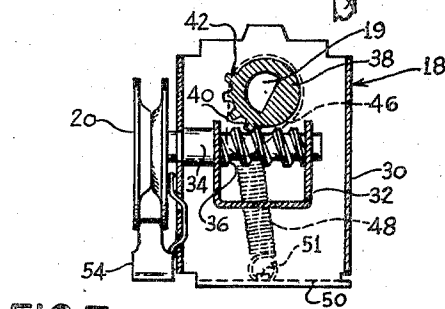


FIG. 7

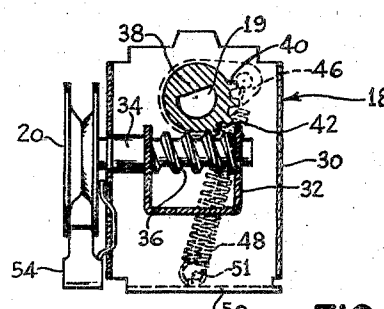


FIG. 6

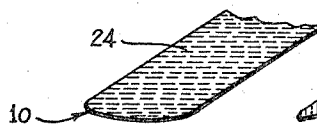


FIG. 8

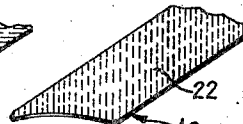


FIG. 9

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ONE-WAY-TILT VENETIAN BLIND CONSTRUCTION

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3 Claims. (Cl. 160—176)

This invention relates to Venetian blinds, and more particularly to a Venetian blind in which the slats of the blind may be turned in one direction only from open or slat-level position to closed position in which the slats lie more or less in a vertical plane, and to a tilter therefor.

In certain installations, it is desirable to provide Venetian blinds with the two sides of the slats thereof presenting markedly different appearances, as by being of different colors, in order to better control the entrance of light or to carry out desired decorative plans. Such a blind is often desired for use in a building for which it is desired that the surfaces of the blind slats visible from the exterior of the building shall be uniform in color while the surfaces of the slats visible from the interior of the room shall be of another color or colors. Such blind slats, in which the two sides thereof are of different appearance, are termed "two-color" slats.

For installations of such type, conventional Venetian blinds are not entirely satisfactory, since the slats thereof can be turned in either direction from the horizontal. If the conventional Venetian blind structure, including the tilter mechanism, is employed with the described "two-color" blind slats, the desired uniformity of external appearance of all the blinds in the building is destroyed if the slats of some of the blinds are turned in one direction from the horizontal and the slats of others of the blinds are turned in the opposite direction.

Also, it is sometimes desired that, even though both sides of the slats are similar, a Venetian blind be capable of being tilted to closed position in one direction only, as when tilting the slats closed in the other direction would not assume privacy or when some measure of safety from flying window glass in case of external explosion, including atomic bomb attack. It has been found that if a blind is closed by tilting the slats to raise the inner edges (towards the interior of the room) of the slats, the slats will shed particles of glass outwardly and largely prevent their entrance into the room.

The improved Venetian blind of the present invention is so constructed that the slats thereof can be turned from open position to closed position or adjusted position therebetween only in one direction. As a result, it is impossible for the blind slats to be turned towards closed position in the wrong direction or in such a direction as to present the "wrong" or undesired side to either the exterior or interior. Broadly such object may be accomplished by providing in a more or less conventional Venetian blind two-color slats and a novel tilter having a range of operation between slot-level position and slat-closed position in one direction only.

The tilter, in its preferred form, is of the "escapement" type in which the gear sector at each end of its movement runs out of mesh with the worm to permit idle movement of the worm and maintain the tilt cord ends relatively even when in slat-level position and, in addition, has provision for restoring the sector and worm to

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meshing relation after escapement when the blind is in slat-level position.

It is, accordingly, among the objects of the present invention to provide an improved Venetian blind having two-color slats, wherein the slats can be turned from slat-level position to closed or intermediate position in only one direction, and to provide such a blind having an improved "escapement" type tilter.

Various other and more specific and detailed objects of the invention will be more fully apparent from the accompanying disclosure.

The invention is clearly defined in the appended claims. In the claims, as well as in the description, parts may at times be identified by specific names for clarity and convenience, but such nomenclature is to be understood as having the broadest meaning consistent with the context and with the concept of the invention as distinguished from the pertinent prior art. The best form in which the invention is presently embodied is illustrated in the accompanying drawings forming a part of this specification, in which:

Fig. 1 is a view in front elevation of a Venetian blind embodying the present invention.

Fig. 2 is a somewhat diagrammatic end elevation of the blind of Fig. 1, the lift and tilt cords being omitted.

Fig. 3 is a view similar to Fig. 2, but with the blind slats tilted to more or less closed position.

Fig. 4 is an enlarged side elevation of the tilter adjusted to blind-open position as shown in Fig. 2, the tilt rod and a portion of the tilt cord also being shown.

Fig. 5 is a front elevation of the tilter in the adjusted position of Fig. 4, portions of the cord pulley and tilt cord guide being broken away, and a portion of the tilt rod being shown.

Fig. 6 is a vertical cross section of the tilter and tilt rod, taken generally on the line 6—6 of Fig. 5.

Fig. 7 is a view similar to Fig. 6 but with the tilter segment and tilt rod adjusted to the blind-closed position of Fig. 3.

Fig. 8 is an isometric view of one of the slats of the blind, the concave face of the slat being shown uppermost.

Fig. 9 is a similar view of the slat of Fig. 8, the convex face of the slat being shown uppermost.

The Venetian blind, generally designated as 2, shown in Fig. 1 is as it appears when viewed from the room in which it is installed, the window and window frame at which it is installed being omitted. The blind is provided with a more or less customary head bar 4, the ladder tapes 6 depending therefrom. The slats 10 of the blind are disposed on the cross tapes 7 of the ladder tapes 6 in the usual manner, and a bottom bar 8 is supported by the lower ends of the ladder tapes. The blind is also provided with the usual lift cords 12 which are reeved through the head bar 4 and extend downwardly through the slats 10 to the bottom bar.

To aid in discussing the range of angular motion of the slats 10, the inner edges of such slats (towards the interior of the room) are designated 14, the outer edges of such slats (towards the windowpane) are designated 16, the under sides of the slats 10 (presented to the interior of the room when the slats are tilted) are designated 24, and the top sides of such slats (visible from the exterior of the building when the slats are tilted) are designated 22. As above explained, with a blind of such type, often the surface 22 of each slat 10 is of different appearance or color from the surface 24, and such surfaces are so indicated in Figs. 8 and 9. In the preferred embodiment of the blind of the invention to be described, tilting of the slats is limited to a range having a terminal blind-open position in which the slats lie more or less in horizontal planes and a second ter-

minimal blind-closed position in which the slats 10 lie more or less in a vertical plane with the concave surfaces 24 of the slats presented to the interior of the room, the range of tilt of the slats being on the order of 90°. In the last-mentioned terminal position, the outer edges 16 of the slats will be depressed from horizontal position and the inner edges 14 of the slats will be raised therefrom. It is to be understood, however, that the invention in its broader aspects is not limited to such specific embodiment thereof, since in some installations it may be preferred to have an operative tilting range extending from one position in which the slats lie horizontal to a terminal tilted position in which the outer edges 16 of the slats are elevated and the inner edges 14 thereof are depressed.

In the specific embodiment shown, the head bar 4 is of the enclosed type, a tilter 13 being mounted within a metal channel (Fig. 1), and rotatably receiving a tilt rod 19. Tape rockers (not shown) mounted on the tilt rod 19 receive the upper ends of the ladder tapes 6. The tilter 13 is operated by a cord pulley 20 which receives a tilt cord 26.

The tilter 13, which in some respects is similar to the tilter of Lorentzen U. S. Patent 2,269,213, has a hollow, boxlike body 30 formed of two complementary halves secured together by means of a U-shaped, worm-supporting member 32, projections on the opposite sides of the member 32 extending through slots in the halves of body 30 and being headed, as shown.

A worm shaft 34, on the outer end of which is mounted the pulley 20, is journaled in the front wall of the body 30 and in the member 32, as shown in Figs. 6 and 7. A worm 36, mounted on the shaft 34, is carried between the two upstanding parallel legs of member 32.

The two halves of the body 30 are formed to provide opposed bearings located above the worm 36, such bearings journaled a gear sector 38 which, during the normal tilting range of the slats, is in mesh with the worm 36. The gear sector 38 is provided with a hub having an opening therethrough, the opening having a flat side so as to nonrotatably receive the tilt rod 19.

During the normal tilting range of the blind slats, the teeth on the gear sector 38 remain in mesh with the worm 36. As is evident in Figs. 6 and 7, the teeth on the gear sector 38 are disposed for only a limited angular extent of such gear, the remainder of the gear being devoid of teeth and being of such a diameter as to clear the worm 36. One terminal tooth on the gear sector 38 is designated 40 and the other terminal tooth is designated 42. In the embodiment shown, the teeth extend for about 90° about the periphery of the gear 38.

When the blind is operated within the normal tilting range of the slats 10, the gear sector 38 is not run out of mesh with the worm 36. However, to provide for automatically maintaining the tilt cords at approximately equal length and prevent accumulation of the tilt cord on one side or the other of the cord pulley 20, the gear sector and blind are so constructed as to permit the gear sector 38 to turn slightly beyond that required for normal operation of the slats, at which time the gear sector 38 and worm 36 will run out of mesh and the worm may be rotated one or more turns by operation of the tilt cord without corresponding movement of the gear sector 38. This is similar in certain respects to the construction shown in Nelson U. S. Patent 2,174,994.

In the usual Venetian blind, the slats are biased towards blind-open position due to the fact that upon tilting the slats to blind-closed position the slats and bottom bar are raised slightly by action of the tilting mechanism on the ladder tapes, one branch of each ladder tape being raised slightly more than the other branch of the tape is lowered in tilting the slats. Accordingly, when the gear sector 38 is run out of mesh with the worm 36 at blind-closed position, the gear sector is biased back into meshing engagement with the worm by the weight of the slats

and bottom bar. However, when the gear sector 38 is run out of mesh with the worm 36 at blind-open terminal position, the slats will have moved only slightly past level position and there will be insufficient bias to restore the sector to meshing engagement with the worm.

Accordingly, in the preferred form of the invention, a lever 46 is nonrotatably received on the tilt rod 19 beside the gear sector 38, the lever extending generally horizontally from the tilt rod when the slats are in blind-open position. The end of the lever 46 receives a tension spring 43 secured to a tab 51 struck from the base 50 of the tilter body 30 so as to supply a torque to the tilt rod 19.

The lever 46 is assembled on the tilt rod 19 so as to project in the proper direction to bias the tilt rod in the direction to remesh the gear sector 38 with the worm 36 when they are turned out of mesh at blind-open position. As the slats are turned towards blind-closed position, the end of the lever 46 moves downwardly so as to release tension on the spring 43; and, in blind-closed position, the lever 46 is substantially vertical, there being no substantial tension in the spring 43 with the lever 46 so positioned.

Although not essential to the present invention, it is desirable that the tilt cord 26 be provided with cord-limiting beads 52, 52, whereby the range of travel of the tilt cord is correlated with the range of angular motion or tilt of the tilt bar and slats. When the tilt cord is centered on the cord pulley 20, neither bead 52 will engage the cord guide 54. As the cord accumulates on one side or the other of the cord pulley 20, the limit bead 52 on the other side will engage the cord guide 54 and limit cord movement, upon which the short end of the tilt cord may be pulled to turn the slats through their range of travel and run the gear sector 38 out of mesh with the worm 36 and then idly rotate the worm until the other bead 52 engages the cord guide 54. Then, upon pulling the short end of the tilt cord, the gear segment and worm will be remeshed and the cord will be evened up.

I claim:

1. A Venetian blind, comprising: a series of horizontally extending, articulated slats mounted for tilting movement between open position and closed position in which the slats lie more or less in a vertical plane, and a tilter of the worm-and-gear-sector type for tilting the slats from open to closed position in one direction only, the gear sector being constructed and arranged to run out of mesh with the worm at blind-open and at blind-closed position, and a spring member operatively connected with the gear sector and stressed upon running the gear sector out of mesh with the worm at blind-open position so as to resiliently bias the gear sector towards the worm at such position, the spring member being substantially unstressed upon running the gear segment out of mesh with the worm at blind-closed position.

2. In a Venetian blind having a series of horizontally extending, articulated slats mounted for tilting movement between open position and closed position in which the slats lie more or less in a vertical plane: mechanism for tilting the slats from open towards closed position in one direction only, said mechanism including a tilter of the worm-and-gear-sector type, in which the gear sector is constructed and arranged to run out of mesh with the worm at blind-open and at blind-closed position, a tilt rod connected with the gear sector of the tilter and from which the slats of the blind are suspended, a lever nonrotatably mounted on the tilt rod adjacent the tilter, and a spring connected with the lever and stressed in a direction to resiliently urge the gear sector towards the worm upon running the gear sector out of mesh with the worm at blind-open position, said spring being substantially unstressed at blind-closed position.

3. In a Venetian blind having a series of horizontally extending, articulated slats mounted for tilting movement between open position and closed position in which the

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slats lie more or less in a vertical plane: mechanism for tilting the slats from open towards closed position in one direction only, said mechanism including a tilter of the worm-and-gear-sector type in which the gear sector is constructed and arranged to run out of mesh with the worm at blind-open and at blind-closed position, a tilt rod connected with the gear sector of the tilter and from which the slats of the blind are suspended, a lever nonrotatably mounted on the tilt rod adjacent the tilter, and a tension spring extending between the lever and a portion of the body of the tilter and stressed in a direction to resiliently urge the gear sector towards the worm upon running the

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gear sector out of mesh with the worm at blind-open position, said spring being substantially unstressed at blind-closed position.

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