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TILTING MECHANISM FOR VENETIAN BLINDS

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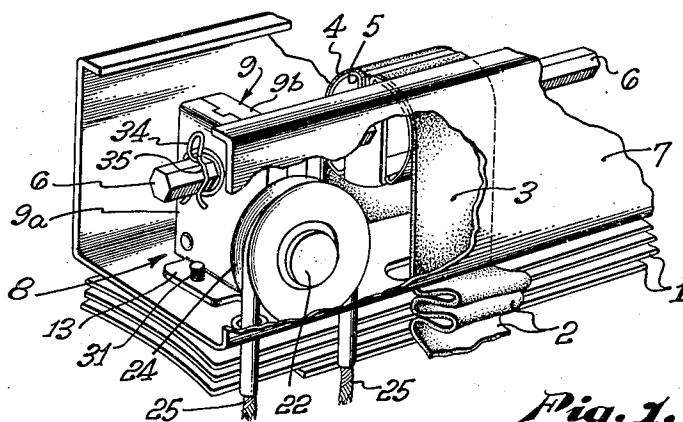


Fig. 1.

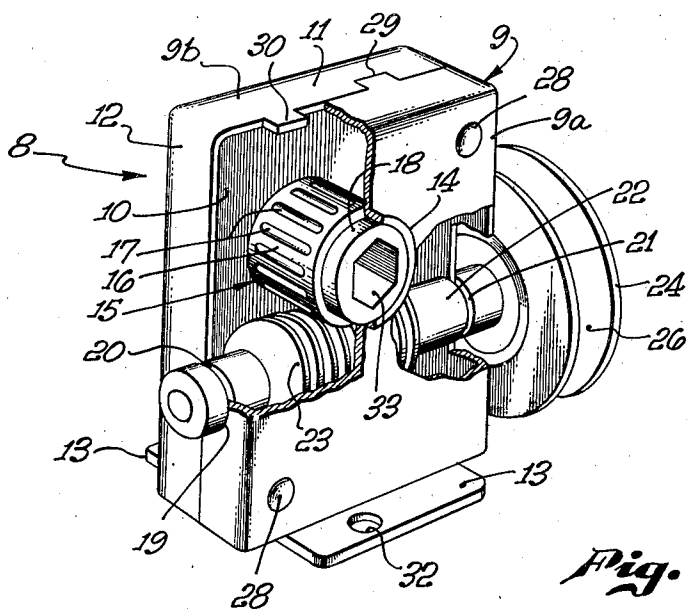


Fig. 2.

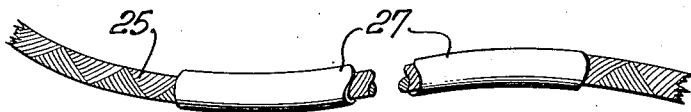


Fig. 3.

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TILTING MECHANISM FOR VENETIAN
BLINDS

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mesne assignments, to Hunter Douglas Corpo-
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1 Claim. (Cl. 160—177)

1

My invention relates to tilting mechanisms for Venetian blinds and has particular reference to a new type of tilting mechanism which may be employed within a hollow head rail.

Heretofore tilting mechanisms employed in connection with Venetian blinds have usually comprised a tilting rail to which the ends of the tape ladders supporting the slats were secured, the tilting rail being provided with a segmental worm wheel adjacent one of its ends to be engaged and operated by a worm which in turn was coupled to a pulley over which a tilting cord was trained. These mechanisms are relatively expensive to manufacture and are difficult to maintain in operation.

It is therefore an object of my invention to provide a tilting mechanism for Venetian blinds which will be inexpensive to manufacture and yet be sufficiently sturdy to provide a relatively long life for the operating parts thereof.

Another object of my invention is to provide a tilting mechanism of the character described in which the tilting mechanism comprises a shaft upon which is mounted a pulley of such shape as will permit the use therewith of a smooth cord such as a cord coated with or impregnated with a flexible plastic material, adapting the same to be readily cleaned by merely wiping the same with a cloth.

Another object of my invention is to provide a tilting mechanism of the character set forth which comprises in a single pre-assembled unit a worm and worm gear suitably supported for rotation within a two-piece housing, the worm gear having a non-circular opening through its center through which a shaft may extend to rotate tilting devices such as short lengths of rollers spaced along the operating shaft.

Other objects and advantages of my invention will be apparent from a study of the following specifications, read in connection with the accompanying drawings, wherein

Fig. 1 is a perspective view of a portion of a Venetian blind illustrating my new tilting device;

Fig. 2 is an enlarged perspective view, partly in section, of the pulley, gear and housing assembly employed in the practice of my invention; and

Fig. 3 is a fragmentary detail view of a portion of a cord which may be employed for operating my tilting device.

Referring to the drawings, I have illustrated in Fig. 1 a Venetian blind structure comprising a plurality of slats 1 supported upon suitable web ladders 2 of conventional construction including a pair of vertical tapes 3 and 4, the ends of which

2

are trained over and are secured to a tilting roller 5 so that partial rotation of the the roller will elevate one of the tapes and lower the other to adjust the angular position of the slats 1 relative to each other. The roller 5 may be of any suitable construction, preferably a section of a cylinder, the actual center of which is provided with an opening of non-circular configuration such as hexagonal, as illustrated in Fig. 1, to permit the mounting thereof upon a rotatable tilting shaft 6. One form of construction of the roller 5 is described and claimed in my copending application Serial No. 584,657, filed March 24, 1945, now U. S. Patent 2,396,425 granted March 12, 1946, the roller 5 as described therein being mounted upon a suitable bearing bracket so that it is not dependent upon the shaft 6 for its support within the head rail 7 of the Venetian blind assembly.

The head rail 7 may be of any desired construction though I prefer to employ a channel-shaped piece of metal, the upper ends of the side flanges of the channels being bent inwardly as indicated in Fig. 1 to define a substantially box-like structure extending the length of the blind assembly and within which may be housed the tilting roller 5, the shaft 6 and my tilting mechanism as hereinafter described.

The tilting mechanism illustrated in Fig. 1 is indicated generally by the reference character 8 and is illustrated in Fig. 2 as comprising a housing 9 comprising identical complementary halves 9a and 9b, each of the housing parts comprising an end wall 10 from which projects a top wall 11 and a pair of side walls 12, the lower edge of the end wall 10 being bent outwardly to form an ear 13 by which the housing may be secured in place upon the head rail 7.

The end wall 10 of each of the housings is preferably punched outwardly to define a circular boss 14 which may comprise a journal rotatably mounting a worm gear 15 constructed as a cylinder having a plurality of gear teeth 16 formed thereon by cutting a plurality of regularly spaced grooves 17 about the periphery of the cylindrical gear 15. The ends of the cylindrical gear 15 are preferably of reduced diameter as indicated at 18 to rest upon the interior of the boss 14, the junction between the larger and smaller diameters of the gear 15 abutting the interior of the end walls 10 of the housing members when they are assembled together.

Each of the side walls 12 of the housing member is provided with a semi-circular notch, as indicated at 19, adapted to seat in grooves 20 and 21 formed along the length of a shaft 22 to comprise

journal bearings for the shaft extending at right angles to the axis of rotation of the worm gear 15.

Formed integrally with or attached to the shaft 22 is a worm 23, the threads of which engage with the teeth 16 of the worm gear 15 while the outer end of the shaft 22 has mounted thereon or formed integrally therewith a pulley 24 over which the tilting cord 25 (see Fig. 1) may be trained, the pulley 24 being preferably formed with a V-shaped groove 26 extending about its periphery, the angle of the V being relatively acute so that a small surfaced cord 25 may be successfully used therewith. The cord, as illustrated in Fig. 3, is either impregnated with or coated with plastic 27 particularly over that portion of the cord which will be exposed to contact with the pulley during the normal operation of the tilting mechanism to move the slats from a completely closed position in one direction to a completely closed position in the opposite direction.

The plastic coating 27 is preferably selected of such character as to not only protect the cord but to provide with the V-groove of the pulley a sufficient amount of friction to prevent slippage between the cord and the pulley.

The assembled gear 15, shaft 22, worm 23 and pulley 24 within the housing members 9a and 9b may be readily accomplished merely by placing these members together in the position indicated in Fig. 2, the housing members 9a and 9b being then secured together by any suitable means such as rivets 28 though I prefer to aid in the securing of these members together, and particularly for the correct alignment of these members, to form upon the top wall 11 of each of the housings a notch 29 and a projecting tongue 30 spaced from each other and from the side walls of the housing such distance that the complementary identical halves when placed face to face will interengage their tongues and notches as indicated in Fig. 2.

The assembled housing and gear and shaft structure may be mounted upon the head rail 7 by any suitable means such as screws 31 extended through pre-formed apertures 22 in the ears 13 of the housing members.

The gear 15 is preferably formed with a central longitudinal bore 33 of non-circular configuration to conform with the particular configuration of the rotatable tilting shaft 6 to be employed therewith. Such shaft as noted before is illustrated as a hexagonal shaft and the bore 33 is hexagonal in cross sectional configuration.

Thus it will be apparent that the assembled tilting mechanism 8 may be secured in place within the head rail 7, one or more rollers 5 may be assembled upon the shaft 6 and the shaft passed through the bore 33 of the gear 15 where it is retained from inadvertent removal by means of a cotter pin or other securing device, the particular means illustrated herein being a snap spring 34 adapted to be snapped about an annular groove 35 formed about the shaft 6 adjacent

the end of the shaft which projects through the tilting mechanism assembly 8.

It will be apparent also from the foregoing that the entire assembly of the tilting mechanism 8 may be readily and inexpensively manufactured, the gears, shaft, worm and pulley all being readily capable of manufacture by die casting processes well known to this art, and the housing members 9a and 9b being readily manufactured by ordinary stamping methods employed in the fabrication of sheet metal articles.

While I have shown and described the preferred embodiment of my invention, I do not desire to be limited to any of the details shown and described herein, except as defined in the appended claim.

I claim:

A tilting mechanism for Venetian blinds comprising a pair of complementary housing members disposed face to face with their corresponding edges abutting against one another, each of said housing members being of rectangular box-like shape, two opposite walls of each housing member being formed with aligned semi-circular notches, the notches of one housing member being in registration with the notches of the other housing member and cooperating therewith to form two axially aligned bearing apertures, a worm shaft having two circumferential grooves formed therein, said grooves being spaced apart axially the same distance as said two opposite walls of said housing members, and each groove being of substantially the same width as the thickness of the housing wall, the marginal edges of said bearing apertures being received within said grooves to provide direct journal support for said worm shaft and serving also to constrain the shaft against endwise movement, the bottom walls of said housing members being medially apertured, a transverse worm wheel shaft journaled in said last-named apertures, and fastening members parallel to the worm wheel shaft for holding said housing members together, the engagement of said opposite walls in said circumferential grooves in said worm shaft serving also to prevent displacement of the edges of one housing member with respect to those of the other.

JOSEPH L. HUNTER.

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