Feb. 4, 1941. H. K. LORENTZEN 2,230,807

VENETIAN BLIND TILTER CONSTRUCTION

Original Filed July 15, 1938

Fig. 1.

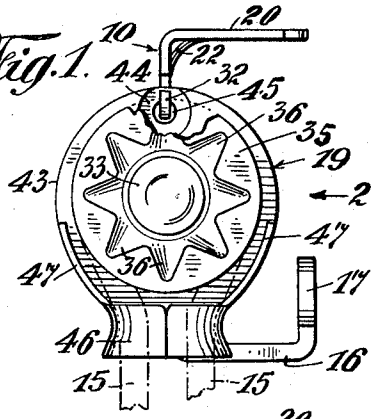


Fig. 2.

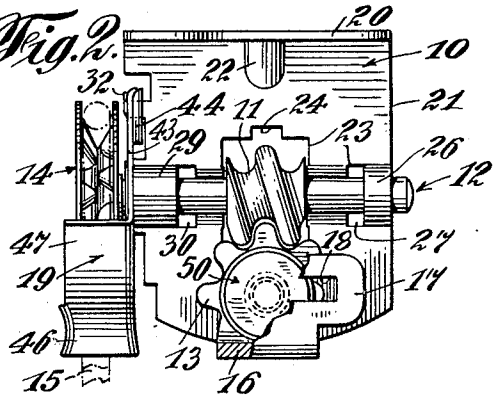


Fig. 3.

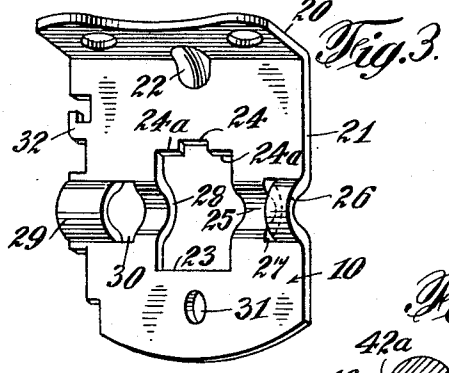


Fig. 5.

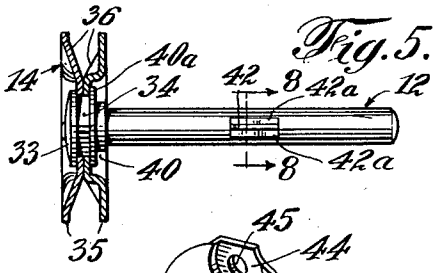


Fig. 8.

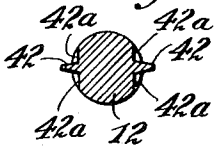


Fig. 6.

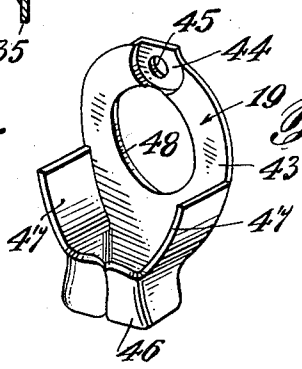


Fig. 4.

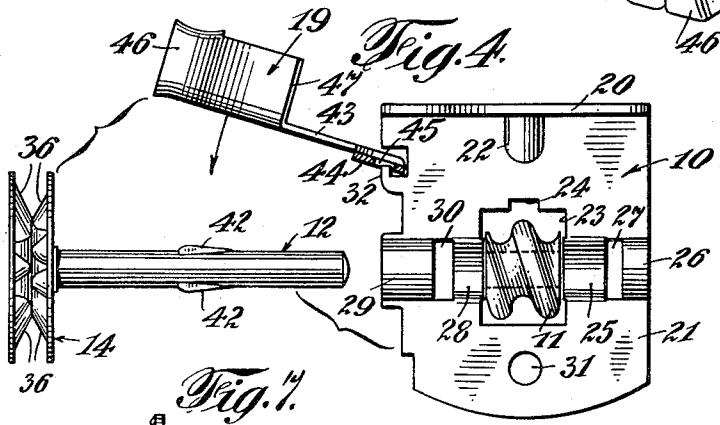
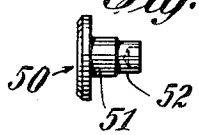


Fig. 7.



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VENETIAN BLIND TILTER CONSTRUCTION

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Original application July 15, 1938, Serial No. 219,303. Divided and this application October 19, 1940, Serial No. 361,872

5 Claims. (Cl. 156—17)

This invention relates to Venetian blind tilting devices, and it is particularly applicable to such devices of the worm-and-gear type. For convenience, these devices are referred to merely as "tilters". The invention was originally presented in my copending application Ser. No. 219,303 filed July 15, 1938, of which this is a division.

Among the general objects of the invention are to simplify the manufacture, reduce the probability of manufacturing errors, reduce the cost, and increase the reliability of Venetian blind tilters.

Another object of the invention is to provide a Venetian blind tilter construction that better lends itself to rapid economical manufacture on a quantity production basis.

Further objects of the invention are to reduce the number of parts and reduce the number of manufacturing operations for Venetian blind tilters.

Various other objects will be apparent from the accompanying disclosure.

Fig. 1 of the drawing is a front elevation of a tilter involving the present invention, a section of the pulley being cut away.

Fig. 2 is a side elevation partially in section, showing the tilter of Fig. 1 when viewed from the direction of the arrow 2.

Fig. 3 is an isometric view of a bracket stamping incorporated in the tilter.

Fig. 4 is an exploded view showing in unassembled relation certain parts of the tilter.

Fig. 5 is a plan view, partially in section, showing a shaft and pulley assembly incorporated in the tilter.

Fig. 6 is a perspective view of an oscillatory cord or chain guide incorporated in the tilter.

Fig. 7 is an elevation of a pivot stud by which the gear is mounted.

Fig. 8 is a detail section taken on line 8—8 of Fig. 5.

As shown more particularly in Figs. 1 and 2, the tilter comprises a supporting bracket designated as a whole by 10, a worm 11, a shaft 12 rotatably mounted on the bracket, and a gear 13 pivotally attached to the bracket and meshing with the worm. On the forward end of the shaft 12 there is a pulley 14 adapted to be driven, for example, by a cord 15 to rotate the worm 11 in either direction and thereby oscillate gear 13. Gear 13 is formed on one leg of a U-shaped rocking member 16; and the other leg 17 is slotted at 18 to detachably receive a tilt bar connecting member (not shown) as is well understood in the art. Pivoted between the pulley 14 and the bracket 10 there is an oscillatory cord guide, designated as a whole by 19.

The supporting bracket 10 is unitary sheet-metal stamping having the various parts shown in Fig. 3. This stamping has a horizontal leg 20 that is adapted to be screwed to the head bar or other supporting structure from which the Venetian blind is suspended. It also has a vertical leg 21 on which the actuating elements of the tilter are mounted. Formed between legs 20 and 21 is an impressed rib 22 which strengthens the bracket. Approximately centrally of the vertical leg 21 there is formed a rectangular opening 23 having its upper edge recessed at 24. On opposite sides of the opening 23 the metal of the bracket is cut, and pressed into arcuate straps which form journals for the worm shaft 12. One journal is formed by arcuate straps 25 and 26 which are so pressed as to face in opposite directions, and which are separated axially of the journal by a space 27 formed by cutting out the metal of the bracket. Similarly on the other side of the opening 23 another journal is formed by arcuate straps 28 and 29 which are pressed out in opposed relation and are separated axially of the journal by space 30. The vertical dimension of cut-outs 27 and 30 is greater than the diameter of shaft 12, to permit the arcuate straps to be so shaped as to provide the journals with radial clearance. The purpose of this clearance will be disclosed later on. Near its bottom the vertical leg 21 of the bracket is provided with a hole 31 to receive the pivot stud of the gear 13. On the forward edge of the vertical leg there is a hook 32 to pivotally support the oscillatory cord or chain guide 19.

The shaft 12 is initially formed with a round head 33 adjacent which is a square shank portion 34 (Fig. 5). The pulley 14 is composed of two more or less conically shaped sheet-metal stampings 35, 35. These stampings have radial ribs 36 (eight shown in each stamping) which act to grip the cord 15 and prevent it from slipping on the pulley to any great extent. Each of the pulley stampings 35, 35 is provided with a centrally positioned square hole corresponding to the square shank 34 of the shaft. The stampings 35, 35 may be identical; and the diagonal of the square hole in the stamping is preferably on a diameter which is located one-quarter of the distance between adjacent radial ribs. With such coordination of the square hole with the ribs, assembly of the two stampings to form a pulley will

bring the ribs 36 on one stamping in staggered relation with the ribs 36 on the other stamping, as shown (for example) in Fig. 4. Ribs in staggered relation grip the pulley cord more effectively than do ribs in aligned relation.

After the two pulley stampings have been assembled onto the square shank portion of the shaft 12, the axially projecting metal of the shank is swaged by a cylindrical tool, thus displacing the metal from annular space 40 and forming an integral collar 40a. This collar tightly binds the pulley stampings 35, 35 together and permanently affixes the pulley 14 to the shaft 12.

This construction has decided manufacturing advantages as it permits assembly after the parts have been finished, e. g. after nickel plating, cadmium plating, or the like. If the parts are first assembled to the condition of Fig. 5 and then plated, the plating solution cannot be cleaned out of the crevices and it remains and causes corrosion. This difficulty is eliminated by plating the pulley discs 35, 35 and the shaft 12 (or the head 33 thereof) before assembly. Assembly does not necessitate replating as the swaging at 40 is hidden behind the pulley 14 where it is not exposed to view. Further advantage arises out of the fact that the manufacturer must supply tilters with different types of pulleys, e. g. for operation with cords and for operation with bead chains. Finished pulley parts of the different types can be stocked, and then assembled with shafts as customers' orders require.

Near its center the shaft 12 is swaged to form oppositely projecting fins 42, 42. As shown in Fig. 4, these fins are wedge-shaped in their plane axially of the shaft; and as shown in Fig. 8, they are also wedge-shaped in a cross-axial plane. On either side of the fins 42, 42 there are zones 42a, 42a which are depressed below the contour of the shaft. The purpose of these fins will be pointed out a little later.

The cord guide 19 has a disc portion 43 apertured at 48 and having at its top an instruck zone 44 perforated at 45. At the bottom, the guide is formed into a throat 46 through which the ends of the cord or chain pass; and from the throat 46 guide wings 47, 47 project upwardly to extend part way around the circumference of the pulley 14.

In assembly, the cord guide 19 is applied to the hook 32, as indicated in Fig. 4, the hole 45 being placed on the hook and the cord guide being swung downwardly so that the aperture 48 is aligned with the journals in the bracket stamping. The worm 11, preferably a machined brass worm, is positioned in opening 23; and the free end of shaft 12 is then telescoped through aperture 48 of the cord guide, through the journal formed by straps 28 and 29, through the worm 11 and into the journal formed by straps 25 and 26. This movement is effected with fins 42, 42 positioned in a vertical plane so that they may pass through the journal clearances. When the fins 42, 42 reach the worm 11, the pulley and shaft assembly are forcibly telescoped into the worm, so that the fins are forced into driving and holding engagement with the worm. Thus, mere assembly of the shaft-pulley unit with the bracket and worm, affixes the worm to the shaft and prevents accidental withdrawal of the shaft. As fins 42, 42 enter the worm they displace metal from the worm; and the shaft depressions 42a, 42a provide space to accommodate this displaced metal. Thus, the assembly operation does not result in the formation of burrs at the end of worm 11, which would interfere with the free rotation of the worm.

Either before or after the assembly above described, the U-shaped rocker 16 may be assembled onto the bracket by pivotally attaching gear 13 to the bracket. Preferably the gear is affixed by a pivot stud 50 (Fig. 7), having a shank portion 51 which passes through the gear and which has a reduced extension 52 that passes through the hole 31 in the bracket and is riveted thereto.

It will be noted that the tilter disclosed provides a simple construction, that the parts are relatively few, and that the assembly is simple and well adapted for quantity production.

In compliance with the patent statutes, I have disclosed the best forms in which I have contemplated applying my invention, but it will be understood that the disclosure is illustrative of the invention and does not limit the scope of the same.

What I claim is:

1. In a Venetian blind tilter of the type in which a worm-and-gear are assembled with a supporting structure, the worm being on a shaft having an end which projects forwardly from the supporting structure, and said forwardly projecting end of the shaft being provided with an operating pulley; the improvement which comprises: the shaft having a preformed head on its forwardly projecting end, the pulley being located behind said preformed head, and the shaft being swaged behind said pulley whereby the pulley conceals the swaging when the tilter is in use, the swaging acting to clamp the pulley against said preformed head.

2. In a Venetian blind tilter of the type in which a worm-and-gear are assembled with a supporting structure, the worm being on a shaft having an end which projects forwardly from the supporting structure, and said forwardly projecting end of the shaft being provided with an operating pulley; the improvement which comprises: the shaft having a preformed head on its forwardly projecting end and a non-circular shank behind and adjacent to said head, the shank being enlarged with respect to the size of the shaft, the pulley being located on said shank in driving relation thereto, and the shank being swaged behind said pulley whereby the pulley conceals the swaging when the tilter is in use, the swaging acting to secure the pulley in place on said shank.

3. In a Venetian blind tilter of the type in which a worm-and-gear are assembled with a supporting structure, the worm being on a shaft having an end which projects forwardly from the supporting structure, and said forwardly projecting end of the shaft being provided with an operating pulley; the improvement which comprises: the shaft having a preformed head on its forwardly projecting end and a square shank behind and adjacent to said head, the shank being enlarged with respect to the size of the shaft, the pulley being formed of a pair of duplicate sheet metal members apertured to correspond with said shank and located on said shank, the pulley members having cord-gripping projections in staggered relation as assembled on the shank, and the shank being swaged behind said pulley whereby the pulley conceals the swaging when the tilter is in use, the swaging acting to clamp the two pulley members together and hold them in place on said shank.

4. For a Venetian blind worm-and-gear tilter, a pulley and shaft assembly comprising: a shaft

having a preformed head at one end and a preformed non-circular shank portion adjacent to said head, said shank portion being enlarged with respect to the size of the shaft, and stamped sheet-metal pulley members apertured to correspond with said enlarged non-circular shank portion and telescopically related thereto, the metal of said shank being swaged to permanently attach the pulley members to the shaft.

5. For a Venetian blind worm-and-gear tilter, a pulley and shaft assembly comprising: a shaft having a head at one end and a non-circular shank portion adjacent to said head, and stamped sheet-metal pulley members apertured to correspond with said non-circular shank portion and telescopically related thereto, the metal of said shank being swaged to permanently attach the pulley members to the shaft.

HANS K. LORENTZEN.