May 10, 1938. G. F. McKERLIE 2,117,195

VENETIAN BLIND TILTING MECHANISM

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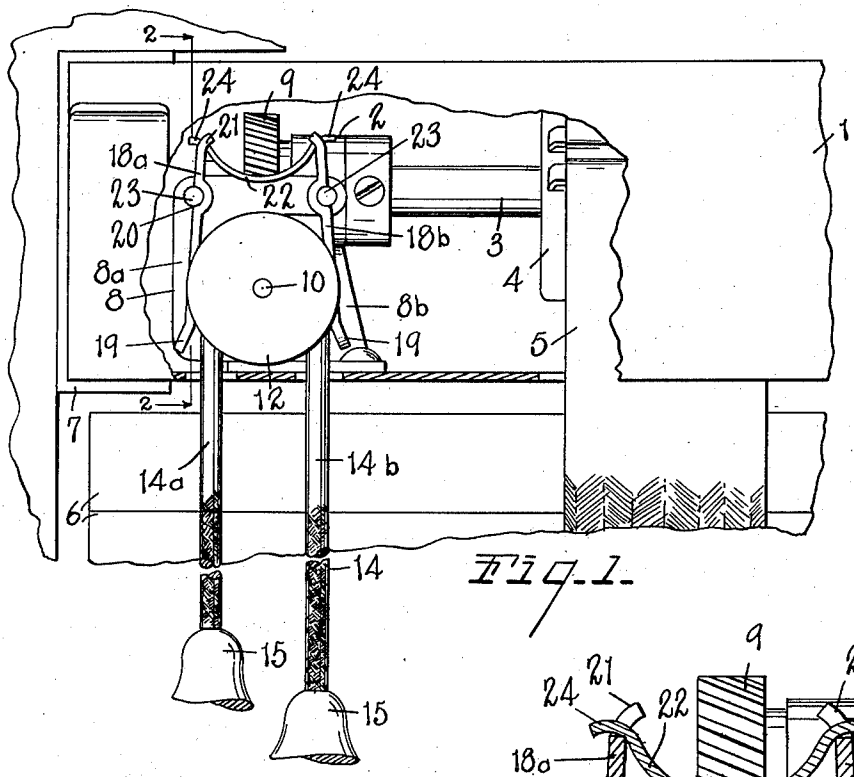


Fig. 1.

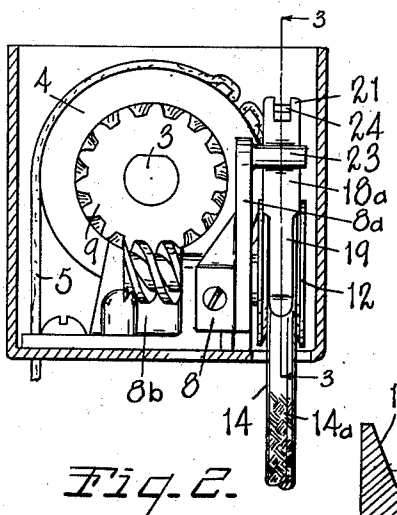


Fig. 2.

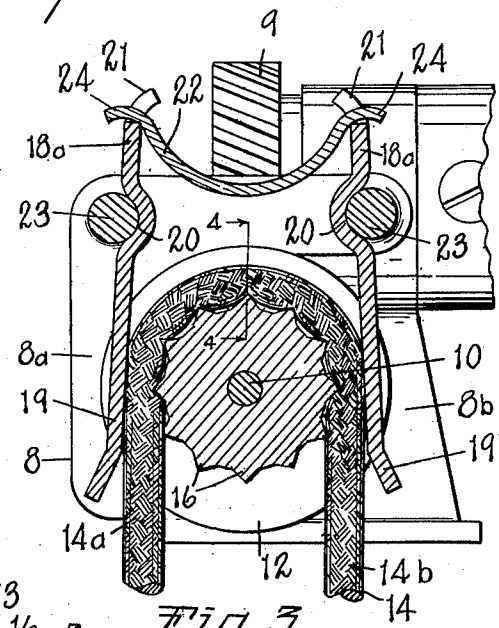


Fig. 3.

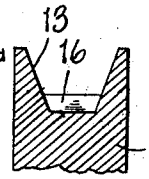


Fig. 4.

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VENETIAN BLIND TILTING MECHANISM

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8 Claims. (Cl. 156—17)

This invention relates to Venetian blind tilting mechanisms and particularly to the worm gear type of tilting mechanisms in which a cord passes over a pulley for driving the tilting mechanism. It has for its objects:

First, to produce in such mechanism a highly satisfactory driving means for the tilting mechanism. Second, to provide such a driving means in which the cord trained over the pulley is held evenly and firmly in contact with the pulley so that there is no creeping of the cord which, in such a mechanism, is highly objectionable because after such a cord has crept it is impossible with a divided cord to actuate the tilting mechanism from one limiting position to the other.

Third, to provide such a structure in which the creeping of the cord is prevented by equalized pressure on the cord trained over the pulley to hold it in position.

Fourth, to provide such a mechanism which may be made inexpensively and easily and which will not require any appreciable repair service when in operation.

Other objects and advantages pertaining to details and economies of construction and operation will appear from the description to follow. A preferred embodiment of my invention is illustrated in the accompanying drawing, in which:

Fig. 1 is a view partly in section of a Venetian blind with my improved tilting mechanism thereon.

Fig. 2 is a view taken from the left hand end of Fig. 1 and partly in section.

Fig. 3 is a detail view partly in section showing the arrangement of the parts of my invention.

Fig. 4 is a detail cross sectional view of one of the cord engaging lugs in the periphery of the pulley wheel.

Referring to the drawing, 1 represents the heading or casing of a Venetian blind. 2 represents the tilting mechanism which is attached to a tilting rod 3 having a drum 4 thereon to which the ladder tapes 5 of the blind are attached. 6 are the blind slats and 7 are the brackets for supporting the header. The tilting mechanism 2 consists of a support 8 comprising a member 8a and a base 8b having a worm gear 9 thereon which is keyed or otherwise fastened to the tilting shaft 3. A shaft 10 is disposed transversely of the shaft 3 and has thereon a worm 11 in engagement with the worm gear 9. Mounted on the shaft 10 is the pulley wheel 12 which is fixed to the shaft in any suitable manner for rotating the same.

The pulley wheel 12 is provided with a grooved periphery 13 over which a cord 14 is trained, having depending portions 14a and 14b. At the ends of the cord are the handles 15. In the grooved periphery are V-shaped cord engaging lugs 16 extending transversely of the groove.

In order to maintain equal pressure on both cord portions 14a and 14b against the lug 16 in the grooved periphery on both sides and the top of the pulley wheel 12, as shown in Figs. 1 and 3, and to assure driving contact between the cord and the sides and top of the pulley wheel at all times, I provide a pair of pressure equalizing levers 18a and 18b. Each of these levers has a cord engaging end 19 each of which exerts equal pressure against the cord within the grooved periphery 13 of the wheel and forces it into engagement with the lug 16 on both sides of the pulley wheel 12 with an amount of pressure equal to that exerted by the cord engaging end 19 of the other lever.

The levers 18a and 18b are formed as metal stampings and each has between its ends a curved bearing recess 20. At the opposite end 21 of each pressure equalizing lever 18a and 18b, a notch is provided for engaging the spring 22. The levers are fulcrumed on pins 23 which are mounted on the support 8. These pins are located in such a manner that the cord engaging ends 19 of the levers 18a and 18b engage the cord on opposite edges on the pulley 12 and are so arranged that the levers 18a and 18b lie between the pins 23 and the pulley with the bearing surfaces 20 engaging the pins 23 because of the outwardly directed pressure of the spring 22 on the levers 18a and 18b and the engagement with the cord of the cord engaging ends 19 of the levers 18a and 18b, which thus engage the cord with equalized pressure.

The spring 22 is a downwardly curved leaf spring having at each end a lug 24 to fit in the notched ends 21 of the levers 18a and 18b. The spring 22 is so disposed that it forces the ends 21 of the levers 18a and 18b apart, thereby forcing the cord engaging ends 19 of the levers 18a and 18b with equal pressure into the grooved periphery 13 of the wheel 12 to hold the cord in position and in engagement with equal pressure with the lug 16 on both sides and top of the pulley wheel 12. By this arrangement the spring 22 also holds the levers 18a and 18b in position on the pins 23 and the force exerted by the ends 19 of the levers 18a and 18b is equalized.

The ends 21 of the levers are bent inwardly and the spring 22 is curved downwardly so that

there is no danger of the spring forcing itself out of engagement with the levers. It will be appreciated that this arrangement may be made very inexpensively since the levers 18 are merely metal stampings and that the assembly of the construction in a manufacturing establishment is very simply effected. It will also be appreciated that for the purposes of repair, if necessary, parts may be disassembled very speedily and replaced without interfering with other parts of the blind mechanism.

In the preferred form of the invention as illustrated in the drawing, it will be noted that the levers 18a and 18b diverge outwardly and downwardly somewhat so that they are biased on the wheel and exert an equalized force best adapted to hold the cord in engagement with the top as well as the sides of the pulley. It will be appreciated that the equalized pressure will not only assist materially in maintaining smooth operation of the tilting mechanism, but for all practical purposes prevents the cord from creeping along the pulley, even when it is subjected to most violent jerks from one operating the blind. Having the levers disposed at opposite edges of the wheel assures not only full and positive contact between the cord and the pulley, but also causes a snubbing action around the pulley which provides all necessary frictional engagement between the cord and the pulley.

It will also be apparent that should the cord 14 become displaced either on or from the pulley, it may be easily readjusted by simply inserting a screw driver or similar instrument through the opening in the header through which the cord depends and between the end 19 of one of the levers 18a or 18b and the cord to lift said end 19 out of engagement with the cord, thereby releasing the friction so that it is a simple and easy matter to adjust the cord to desired position.

I have shown and described my invention in the form preferred by me and wish to claim the same specifically and broadly as pointed out in the appended claims.

Having thus described my invention, what I claim as new and desire to secure by Letters Patent is:

1. In a Venetian blind tilting mechanism, a driving pulley having a grooved periphery having V-shaped cord engaging lugs extending transversely thereof, a cord trained over said pulley, and means for holding said cord on said pulley with equal pressure on both sides and top of said pulley comprising a pair of levers each having a cord engaging end disposed in said grooved periphery and at opposite edges of the pulley and each having between its ends a bearing recess, and spring engaging means at the end opposite from said cord engaging end, a pair of fulcrum pins for said levers, one engaging the bearing recess of each lever on the side thereof opposite the pulley, and a leaf spring having means at its ends to engage the spring engaging means of the levers and tending to urge the ends of the levers engaged by the spring apart, whereby the cord engaging ends are urged toward said pulley to hold said cord thereon and in engagement with said cord engaging lugs and whereby said levers are held in position against said bearing pins.

2. In a Venetian blind tilting mechanism, a driving pulley having a grooved periphery having V-shaped cord engaging lugs extending transversely thereof, a cord trained over said pulley, and means for holding said cord on said pulley with equal pressure on both sides and top of the pulley comprising a pair of levers each having a cord engaging end disposed in said grooved periphery and at opposite edges of the pulley and each having between its ends a bearing recess, a pair of fulcrum pins for said levers, one engaging the bearing recess of each lever on the side thereof opposite the pulley, and a spring disposed between the free ends of said levers tending to urge said ends apart, whereby the cord engaging ends are urged toward said pulley to hold said cord thereon and in engagement with said cord engaging lugs, and whereby said levers are held in position against said bearing pins.

3. In a Venetian blind tilting mechanism, a driving pulley having a grooved periphery having cord engaging lugs, a cord trained over said pulley, and means for holding said cord on said pulley with equal pressure on both sides and top of said pulley comprising a pair of levers each having a cord engaging end disposed in said grooved periphery and at opposite edges of the pulley and each having between its ends a bearing recess, and spring engaging means at the end opposite from said cord engaging end, a pair of fulcrum pins for said levers, one engaging the bearing recess of each lever on the side thereof opposite the pulley, and a leaf spring having means at its ends to engage the spring engaging means of the levers and tending to urge the ends of the levers engaged by the spring apart, whereby the cord engaging ends are urged toward said pulley to hold said cord thereon and in engagement with said cord engaging lugs, and whereby said levers are held in position against said bearing pins.

4. In a Venetian blind tilting mechanism, a driving pulley having a grooved periphery having cord engaging lugs, a cord trained over said pulley, and means for holding said cord on said pulley with equal pressure on both sides and top of said pulley comprising a pair of levers each having a cord engaging end disposed in said grooved periphery and at opposite edges of the pulley and each having between its ends a bearing recess, a pair of fulcrum pins for said levers, one engaging the bearing recess of each lever on the side thereof opposite the pulley, and a spring disposed between the free ends of said levers tending to urge said ends apart, whereby the cord engaging ends are urged toward said pulley to hold said cord thereon and in engagement with said cord engaging lugs and whereby said levers are held in position against said bearing pins.

5. In a Venetian blind tilting mechanism, a driving pulley therefor having a grooved periphery having cord engaging lugs, a cord trained over said pulley for rotating the same, and means for holding said cord on said pulley with equal pressure on both sides and top of said pulley comprising a pair of levers each fulcrumed at a point between its ends, one fulcrumed at one edge of said pulley and the other fulcrumed at the opposite edge thereof, each having one end in contact with said cord, and a spring disposed between the other ends of said levers and tending to force them apart, whereby the cord contacting ends of said levers hold said cord in engagement with the cord engaging lugs of said pulley.

6. In a Venetian blind tilting mechanism, a driving pulley therefor having a grooved antifriction periphery, a cord trained over said pulley for rotating the same, and means for holding said cord on said pulley with equal pressure on both sides and top of said pulley comprising a pair of levers each fulcrumed at a point between its ends, one fulcrumed at one edge of said pulley and the

other fulcrumed at the opposite edge thereof, each having one end in contact with said cord, and a spring disposed between the other ends of said levers and tending to force them apart, whereby the cord contacting ends of said levers hold said cord in engagement with the anti-friction periphery of said pulley.

7. In a Venetian blind tilting mechanism, a driving pulley therefor having a grooved anti-friction periphery, a cord trained over said pulley for rotating the same, and means for holding said cord on said pulley with equal pressure on both sides and top of said pulley comprising a pair of levers, one fulcrumed at one edge of said pulley and the other fulcrumed at the opposite edge thereof, each having one end in contact with said cord, and a spring tending to force the cord contacting ends of said levers against said cord to hold it in position on said pulley.

8. In a Venetian blind tilting mechanism, a driving pulley therefor having a grooved anti-friction periphery, a cord trained over said pulley for rotating the same, and means for holding said cord on said pulley with equal pressure on both sides and top of the pulley comprising a pair of friction arms pivoted for free action and held in equalized pressure exerting relationship to the cord on both sides of the pulley by spring tension thereby compensating for unequalities in either cord or pulley whereby creeping or slippage of the cord along the pulley is prevented.

GEORGE F. McKERLIE.