April 22, 1969 PER STEPHEN LAGESON 3,439,726

CORD PULL FOR LOUVERED OR SLATTED SHUTTERS OR BLINDS

Filed Dec. 13, 1966 Sheet 1 of 5

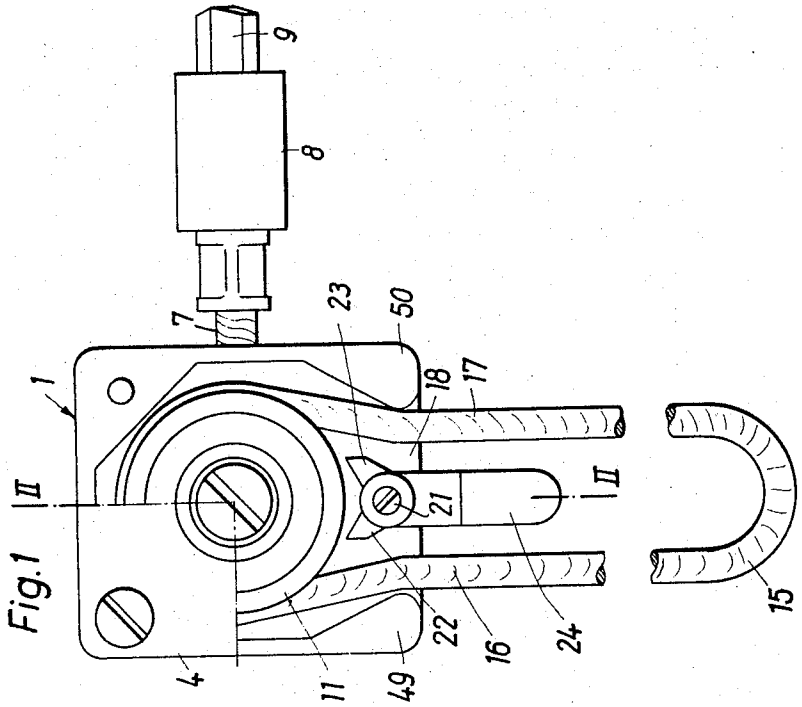

Fig.1

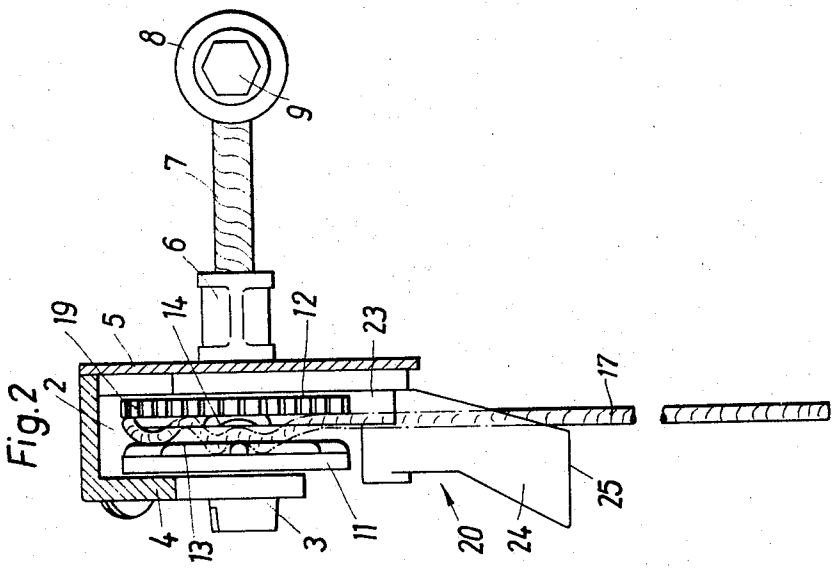

Fig.2

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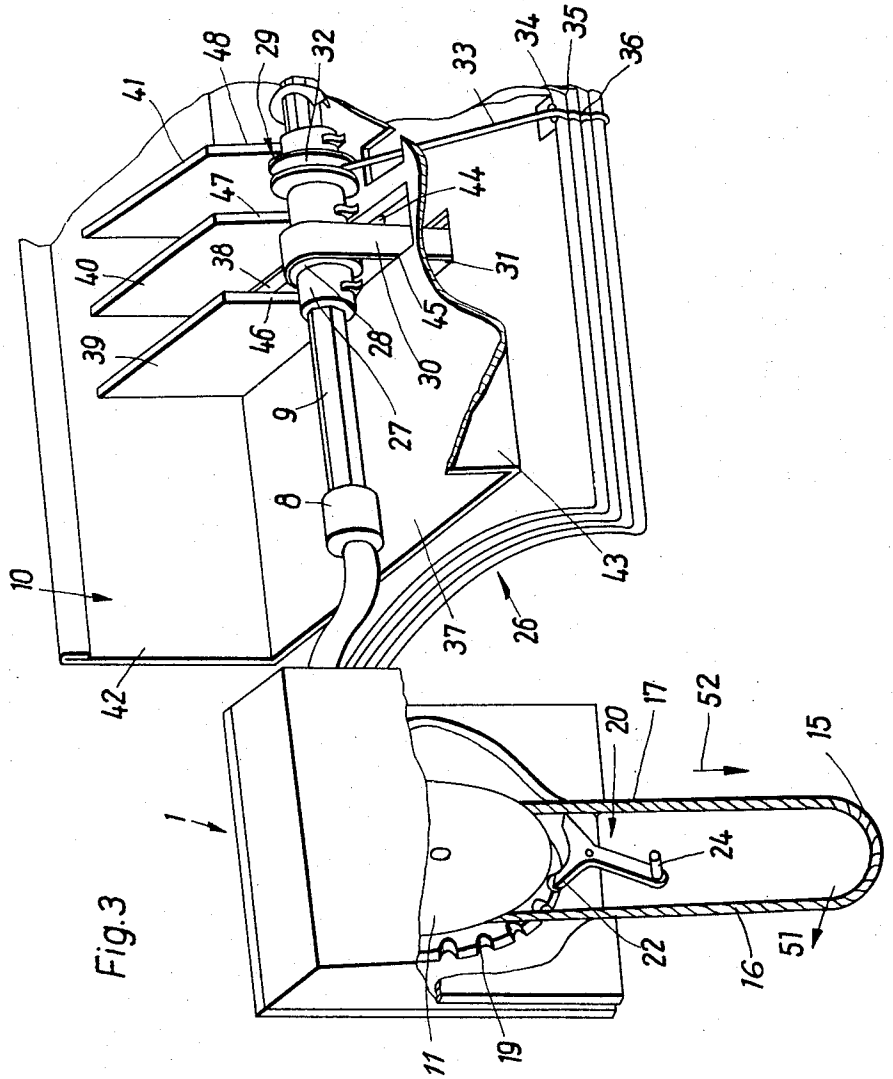

Fig.3

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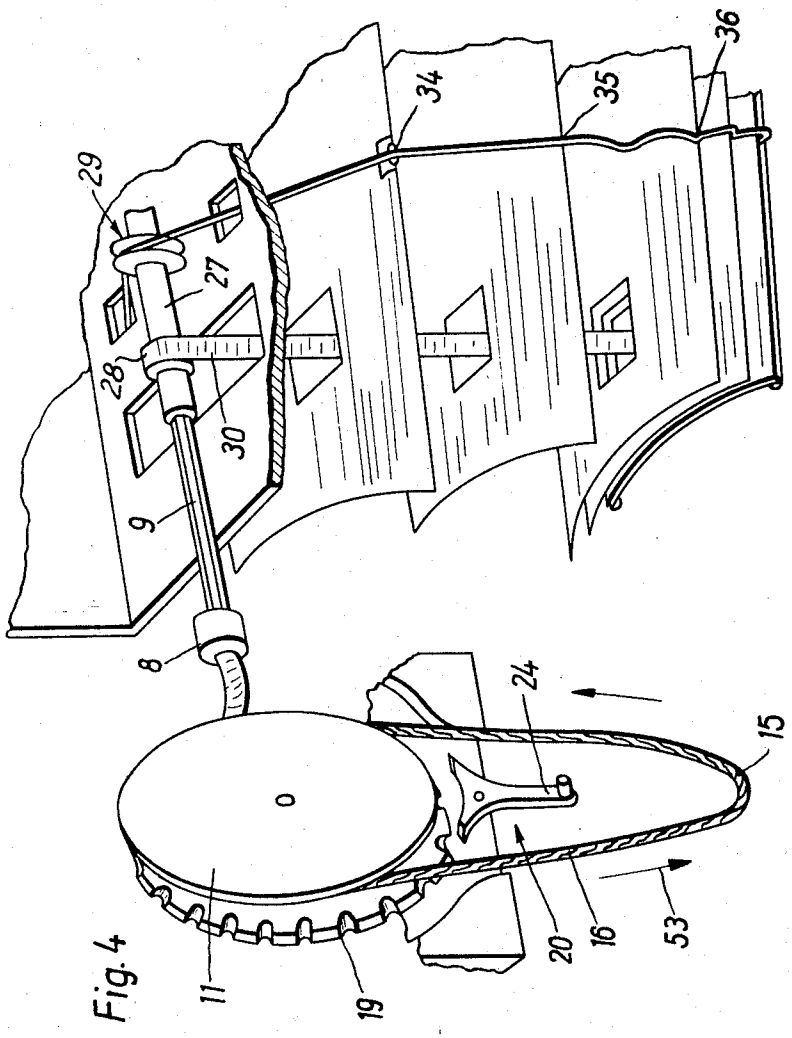

Fig. 4

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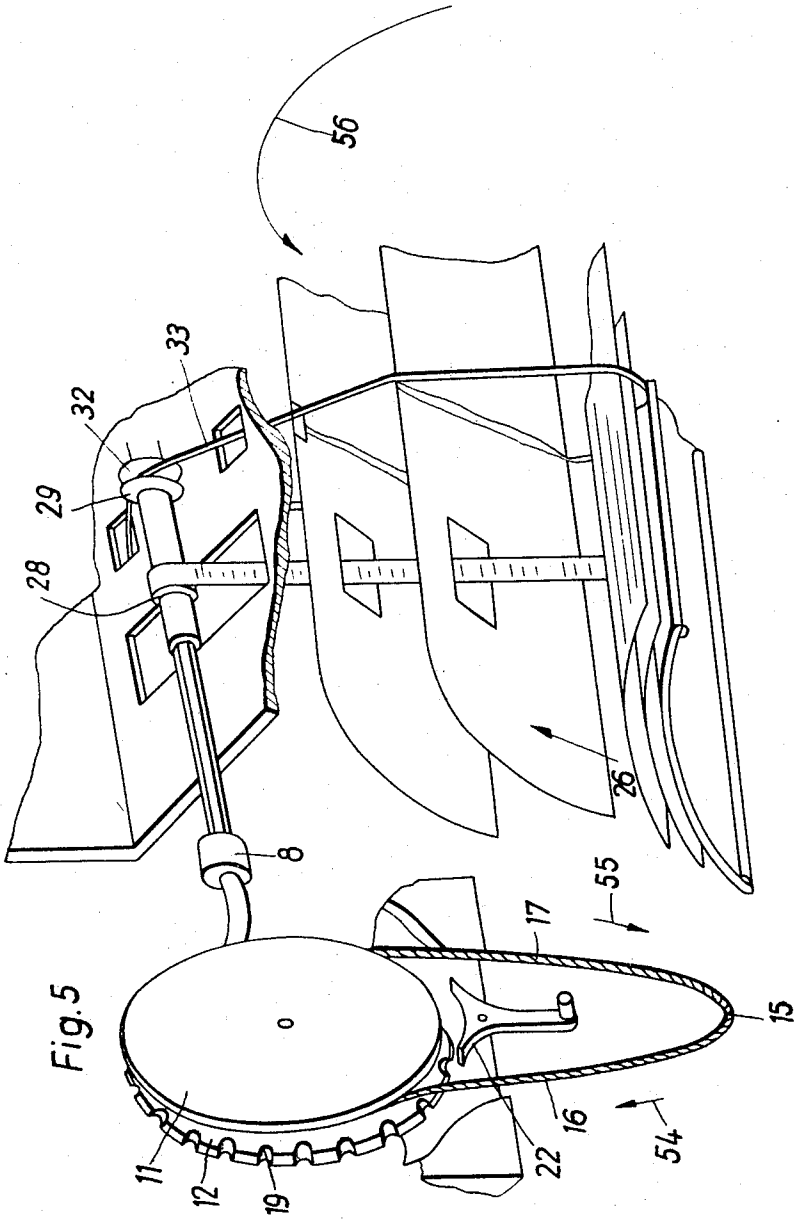

Fig. 5

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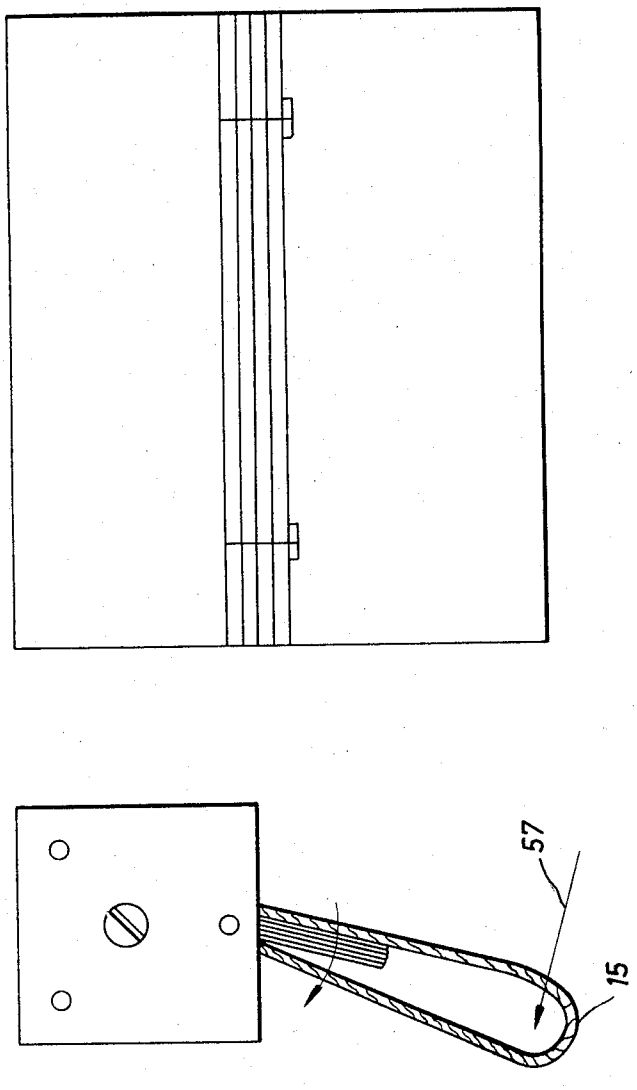
Fig. 6



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3,439,726

CORD PULL FOR LOUVERED OR SLATTED SHUTTERS OR BLINDS

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Int. Cl. E06b 9/308, 9/322
U.S. Cl. 160—170 6 Claims

ABSTRACT OF THE DISCLOSURE

A shaft is connected to a pair of discs rotatable by a pull cord, which pull cord passes through complementary projections formed on the facing surfaces of the discs. The lowermost slat, of a blind, has secured thereto the end of a flexible band, which band passes through openings formed in the overlying slats and has its other end wound about a bushing secured to the said shaft. A pivotally-mounted locking element, actuated upon lateral movement of the pull cord, is movable into engagement with teeth formed on one of the discs, thereby to retain the blind in a desired raised or lowered position. A cord, connected to the front and rear edges of the slats, passes over a V-pulley carried by the shaft and effects a tilting of the slats upon rotation of the discs in one or the other direction by the pull cord.

The invention relates to a cord pull for louvered or slatted shutters or blinds which are adapted to be lowered in an opening in a top rail, and the alignment of which can be adjusted, comprising a cord housing for guiding an endless pull cord in a rotatable clamping mechanism, connected firmly with a band roller on which a band is adapted to be wound on and off, in order to raise the louvres or slats or to lower them.

The present invention also comprises so-called fabric blinds, and curtain-like parts with strip-shaped sections, which are adapted to be adjusted at a more or less lowered angle against the horizontal position. As will be explained in the following, the shutter or blind is lifted and lowered by means of a cord or cord pull, wherein the term "cord" is intended to comprise parts such as twine, string, parallel cords, tapes, bands and the like.

It is known in the art to thread the louvres or slats of such blinds on a band which is fixed to at least one stronger lowermost louvre or slat. Here again, the term band or belt comprises any element with long extended cross-section as well as cord-like elements.

It is also known, for adjusting the position of the louvres to mount cords on both sides of these louvres or slats, which can be pulled up or down in opposite directions, in order to incline the louvres in one or the other sense. Also here, the term "cord" includes bands, strips and the like.

The present invention has the object of providing a cord pull, whereby the operation is possible by using only a single cord, both for raising and lowering the blind, for adjusting and turning the louvres or slats and for fixing the blind at a certain height, that is to say, for lowering it, say, only halfways, whilst still making possible the adjustment or turning of the louvres or slats also in this position.

Such an arrangement will not only simplify substantially the operation of the blind, but also reduces the installations and fittings for operating elements to a minimum so that undesirable or obstructing devices adjacent to the window are no longer required. In addition, thereto, the parts used are as simple as possible.

According to the invention, this object is realized in that

there is arranged, coaxially to the band roller, a cord pulley in which a cord, mounted on both sides of the louvres or slats for adjusting their relative position, is guided in a releasable clamping device, and in that the rotatable clamping device is associated with an engageable and releasable locking element actuable in accordance with a movement or actuation of the endless cord.

Due to the releasable clamping engagement, during the reversal of the direction of pull on the endless cord, there occurs always a reversal during which the blind is only slightly lifted or lowered, according to whether the blind had previously been lowered or lifted. This reversal always ends in the position in which the louvres or slats are adjacent to each other almost vertically, and this is then followed by the continued raising or lowering of the blind. In order to retain the blind also in an intermediate position and with a certain inclination of the louvres or slats relative to the horizontal, the said locking element is actuated or released in that the freely suspended end of the endless cord is moved towards one side for locking, whilst the release is effected automatically by pulling briefly the section on the other side, relative to the locking movement.

In a preferred embodiment of the invention, the pull cord is associated with a revolving clamping wheel having one profiled disk with a toothing, whilst the locking element consists of a pivoting ratchet located underneath the disk, having at least one ratchet tooth adapted to engage into the said toothing, which tooth is out of engagement in an intermediate position of the pivoting ratchet and engages into the toothing when pivoted to one side.

The said locking element is preferably Y-shaped; the two divergent legs of the Y form the ratchet teeth and the other arm forms an actuating lever, extending between the sections of the cord protruding from the cord housing. Conveniently, the actuating lever projecting downwardly from the cord housing has at its free end such a width in the axial direction of the revolving clamping mechanism that it extends between the two cord sections coming from the cord housing. This arrangement has the object of making contact between the actuating lever and the cord sections below the cord housing even where the lower end of the endless cord does not extend exactly vertically.

In order to safeguard the correct functioning, the wide end of the actuating lever is extended forwardly of the cord housing, and a lower orifice of the cord housing, in which the locking element is located, is restricted in order to ensure that the cord sections are located near the locking element.

In a particularly preferred embodiment of the invention, the belt roller and the cord guide pulley are arranged on a bushing, which is mounted in a head having at least two parallel webs or stays in its wall, wherein the wall stays have upwardly open slots whose lower ends have substantially the same radius of curvature as the bushing and into which the said bushing is fitted. This facilitates the manufacture and lowers the costs. The wall webs are preferably located on a base plate, having a downwardly directed projection, such as known in the art, and adapted to engage into a hole in the top rail of the blind.

Further features and advantages of the invention will become apparent from the following description, the appended claims, and the accompanying drawings, in which:

FIG. 1 shows a front elevation of the cord housing with locking element, partly broken away;

FIG. 2 is a side elevation of the housing of FIG. 1 in cross-section along the line II—II in FIG. 1, also partly broken away;

FIG. 3 is a diagrammatical view in perspective of the

cord housing, shown partly broken away, and drawn in position adjacent to the top rail of a blind, with louvres arranged thereunder;

FIG. 4 is a view similar to that of FIG. 3, and shows a functional position for lowering the louvres or slats, individual parts of FIG. 3 having been omitted for the sake of clarity;

FIG. 5 is a drawing similar to FIG. 4 and explains the raising of the louvres;

FIG. 6 is a diagrammatical front elevation for pivoting the cord in order to engage the locking element, for moving the same into the position of FIG. 3.

In all drawings, coresponding parts are marked with the same reference numerals.

FIGS. 1 and 2 show the cord housing **1**. This housing is equipped with a rotatable clamping mechanism **2**, adapted to be rotated about a spindle, for example, in the form of a screw **3** mounted in the end walls **4**, **5**, of the housing. A flexible shaft **7** is connected rigidly to the clamping device **2**, such as by a connection **6**, and terminates in a coupling member **8**, forming the connecting link to a profiled shaft **9** in the top rail **10** of a blind, as described in detail hereinafter.

The clamping mechanism **2** consists of two discs **11**, **12**, arranged coaxially in spaced relationship from each other, and having on the mutually facing sides interengaging projections **13**, **14**. In the winding path formed by these projections **13**, **14**, there rests a cord **15**, having thus two sections **16** and **17**, extending towards the bottom through a hole **18** of the cord housing **1**. As shown, the said disk **12** has a peripheral toothing **19**. The disk **12** is located in front of the rear end wall **5**. A locking element, shown generally at **20**, is mounted in this end wall, and is freely pivotable about an axis, such as a screw **21** located between the end walls **4** and **5**. As viewed from the front, the locking element is Y-shaped. The two divergent legs **22**, **23** form ratchet teeth whilst the symmetrical leg forms an actuating lever. These ratchet teeth co-operate with the toothing **19**, in that manner that, with the actuating lever **24** positioned vertically, they are out of engagement therewith, but engage thereinto with one arm, when pivoted as shown in FIG. 3, for example.

The actuating lever **24** has a certain width. Preferably, its lower end is extended towards the front of the cord housing, as at **25**. The extension, or the widened portion ensures that the sections **16**, **17** of the endless cord make contact with the actuating lever, even if the lower end of the cord is pulled in the forward direction. By means of this engagement, which may be produced by pulling the lower end of the cord in FIG. 1 either to the right or to the left, the rotatable clamping mechanism **2** is fixed in a certain position, since the direction of movement of the lower end **15** of the cord is so chosen that, for example, the torque at the shaft **9** and produced by the blind, causes the locking device to lock automatically. More specifically and with reference to FIGURE 3, the locking device **20** has been rotated to the illustrated position by movement of the cord section **17** to the left, in which position the ratchet tooth **22** engages the toothing **19**. The weight of the slats **26** exerts a torque on the shaft **9** which torque is transmitted to the disc **11** and tends to rotate the disc in a counter-clockwise direction. This torque acts against the tooth **22** thereby retaining the locking device in the illustrated position and preventing rotation of the disc.

These processes will now be described in detail with reference to the accompanying drawings.

FIG. 3 shows the starting position in which the louvres **26** or slats of the blind are in the topmost position, pulled up against the lower side **37** of the top rail **10**. In this case, the locking element **20** is so positioned that the ratchet tooth **22** engages into the toothing **19** of the disk **12**.

As may be seen, a bushing **27** is fitted on to the shaft **9**. This bushing carries a band roller **28**, which may be formed by the outer periphery of the bushing itself, as well as a cord guide pulley **29**. A band **30** is wound about the band guide roller **28** and passes through orifices **31** in the louvres **26**, and is connected to the lowermost louvre or slat. The winding on and off of this band **30** causes the louvres or slats to be raised and lowered, respectively.

The cord guide pulley **29** has the form of a disk with a groove **32** with V-shaped cross-section. A cord **33** is guided in this groove **32** and is connected with both sides of the louvres or slats, such as at **34**, **35**, **36**, etc., wherein between the connecting points there is always a length of cord which determines the distance between this side of the louvres relative to their width, when the louvres or slats are positioned in the extended position. A to-and-fro movement of the cord **33** relative to the shaft **9** causes the movement of the louvres or slats from a substantially vertical position through the horizontal position into the other substantially vertical position.

In the raised position, the louvres **26** or slats are positioned substantially horizontally, because they are pulled up against the lower side **37** of the top rail **10**.

A head member is fitted into the top rail **10** and serves as a bearing means for the bushing **27**. This member may consist, for example, of wall portions **39**, **40**, **41** arranged on a base plate **38**. These parts have a width such that they rest between vertical side walls **42**, **43** of the top rail. The base plate **38** has a downwardly directed projection **44** adapted to engage into an opening **45** in the lower wall **37** of the top rail in order to fix the head member in position. The wall portions **39** through **41** have vertical slots **46**, **47**, **48**, starting from the upper edge, which terminate at the bottom in a radius of curvature corresponding to the radius of curvature of the bushing **27**, and into which the bushing is inserted as shown in the drawing and fixed without any further means. The parts **28**, **29** assure to some extent the axial alignment of the shaft **9**.

As may be seen from FIG. 1, the opening **18** is restricted by reinforced partition sections **49**, **50** of the cord housing, so that the sections **16**, **17** of the cord are near the locking element **20**.

FIG. 3 shows the starting position of the blind, in which the louvres or slats **26** are in the topmost position, in which the firm pull of the band **30** assures the horizontal positioning of the louvres or slats **26** along the bottom wall **37**. When the slats **26** are brought into this position, the lower end **15** of the cord is moved to the left, as shown by the arrow **51**, causing the section **17** of the cord to push the actuating lever **24** into the inclined position, so that the ratchet tooth **22** is brought into engagement with the toothing **19** of the disc **12**. The engagement is maintained by the weight of the louvres or slats **26**.

When the blind is to be lowered, the section **17** is pulled in the direction of the arrow **52**, see FIGURE 3. This movement causes the toothing **19** to rotate slightly in a clockwise direction, and the engagement of the ratchet tooth **22**, caused by the reaction forces, is released so that the locking device **20** relaxes into the vertical position of the actuating lever **24**, as shown in FIG. 4. This release may also be produced or supported by a lateral movement of the cord **15**. The cord is now so pulled that the section **16** moves downwardly, as shown by the arrow **53**. This causes the band **30** to unwind from the roller and the louvres or slat **26** move downwardly in a substantially vertical position, that is to say, as viewed in the drawing, the edges shown in front are lower than the rear edges.

Referring to FIGURE 5, the direction of the cord can now be reversed in any intermediate position so that the section **16** moves upwardly, as indicated by the arrow **54**, whilst the section **17** moves downwardly, as shown by the arrow **55**. Although this causes the band roller **28** to rotate in the sense of raising the lowermost louvre or slat **26**, this lifting movement is small in view of the small diameter of said roller. During this movement, the cord **33**, guided in the groove **32** of the cord pulley **29**, is carried along in one direction, whereby the front

edges of the louvres or slats **26** are lifted from the lower position of FIG. 4 into the upper position relative to the rear edges, such as shown in FIG. 5. This movement may be arrested in any position, so that the louvres or slats **26** can be set at any position during the movement, as shown by the arrow **56**.

If the blind is to be fixed, for example, in a partly lowered position, without the risk of the weight of the slats **26** causing the blind to be lowered further, the lower end **15** of the cord is moved to the left, as shown by the arrow **57** in FIG. 6, so that the ratchet tooth **22** engages into the toothing **19** as shown in FIGURE 3. Since it follows from the preceding description that the weight of the louvres or slats tends to rotate the disk **12** with the toothing **19** in an anticlockwise direction (FIG. 3), this rotation causes the automatic locking of the ratchet tooth **22** in the toothing **19**.

Release may be affected by pulling the cord as shown in FIG. 3, whereupon the blind may then be further lowered, by actuating the cord in the direction of the arrow **53**, or raised, by actuating the cord along the arrows **54, 55**.

As may be seen, a single ratchet tooth is sufficient for the purposes of the invention. The symmetrical construction shown in the drawings has also the further advantage that the same elements may be used for a left-hand or a right-hand fitting between cord housing **1** and top rail **10**. Naturally, in addition thereto, certain configurations of the toothing **19** and of the ratchet teeth **22, 23** may also cause locking in the other direction, in which case the movements of the cord must be effected in the opposite directions.

I claim:

1. A cord pull arrangement for a blind formed of a plurality of slats, said arrangement comprising,

(a) a top rail,

(b) a shaft rotatably supported by the rail, said shaft carrying a band roller and a V-pulley,

(c) a flexible band wound on said band roller, said band extending through openings formed in the slats and having its end secured to the lowermost slat,

(d) a cord passing over said V-pulley and secured to the forward and rear edges of the slats,

(e) a housing,

(f) a rotatable clamping device carried by said housing, said device comprising a pair of axially-spaced discs having complementary projections formed on the facing surfaces thereof, one of said discs being provided with peripheral teeth,

(g) an endless pull cord passing between the said projections and having a loop portion extending through an opening formed in said housing,

(h) a drive connection between the said shaft and clamping device, and

(i) a freely rotatable locking member carried by said housing, said member including an actuating lever extending between the said loop portion and a locking tooth normally spaced from the said peripheral teeth, said locking tooth being brought into engagement with one of the peripheral teeth upon pivotal movement of the locking member effected by a lateral movement of the pull cord against the said actuating lever.

2. The invention as recited in claim **1**, wherein the said locking member has a substantially Y-shaped symmetrical configuration, the symmetrical leg constituting the said actuating lever and the diverging legs constituting a pair of locking teeth.

3. The invention as recited in claim **2**, wherein the said actuating lever has an end portion of increased thickness.

4. The invention as recited in claim **2**, wherein the said housing has a lower opening formed therein, wherein the said actuating lever extends through said opening; and including guide means restricting said opening laterally of said locking member, said guide means positioning the pull cord in close proximity to the said actuating lever.

5. The invention as recited in claim **1**, including parallel vertically-disposed wall members carried by the said rail, said wall members having formed therein aligned slots which terminate in arcuate walls of predetermined radius; and wherein the said band roller and V-pulley are formed on a bushing having substantially the said predetermined radius and rotatably supported by the said arcuate walls.

6. The invention as recited in claim **5**, wherein the said wall members are secured to a base plate, said base plate including an offset projection fitted into an aperture formed in the said rail.

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