Oct. 2, 1956 H. C. BECHTLER 2,765,030

ACTUATING DEVICE FOR BLINDS

Filed April 7, 1953

FIG. 1

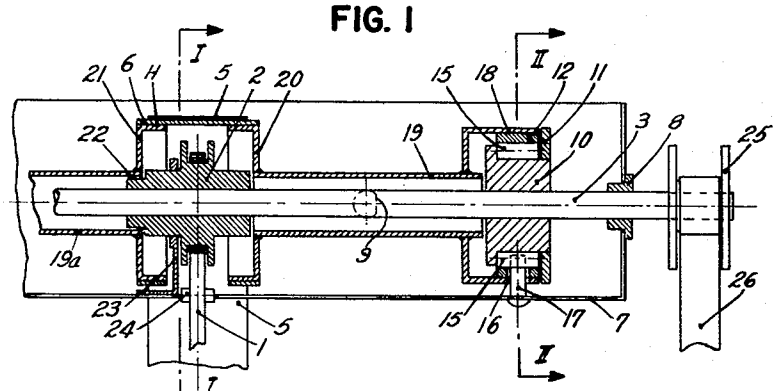


FIG. 2

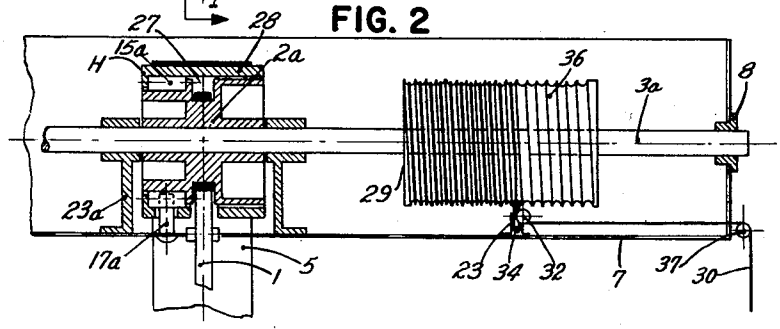


FIG. 3

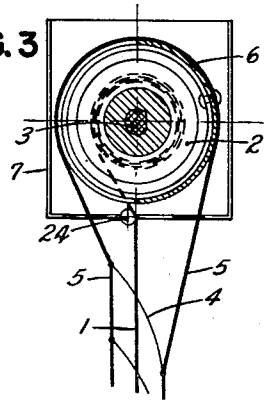


FIG. 4

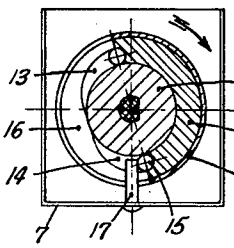
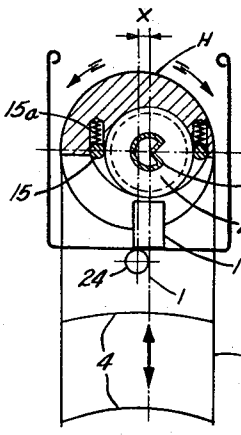


FIG. 5



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ACTUATING DEVICE FOR BLINDS

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7 Claims. (Cl. 160—170)

The present invention relates to actuating means for Venetian blinds. More particularly it relates to means whereby the elevation and inclination of the blinds may be varied in a single operation.

Jalousies, whose forerunners were the Venetian blinds in general use in former decades, are coming into more and more widespread use on account of the simplicity of their employment and versatility of their application. The need therefore exists to adapt such Venetian blinds to all requirements by the simplest means possible in order to compete with the jalousies. In the blinds hitherto known, different means are generally employed for raising and lowering the shutter on the one hand and swivelling the louvres or slats on the other. In order to simplify manipulation, constructions have been proposed by which it is possible to use the raising and lowering means for adjusting the slats in a particular end position, i. e., with the blind completely lowered. There exists, however, a need for a blind with which it is possible to adjust the slats by means of the raising member in any position of raising or lowering. Proposals have also already been advanced for the achievement of this aim, but the constructions proposed have been extremely complicated and therefore expensive.

The present invention solves this problem by a particularly simple actuating device for such blinds in which the draw cords for raising and lowering the blind can be wound on to drums connected to the winding shaft and the slats are suspended by means of supporting cords secured to swivelling assemblies, the raising or lowering of the blind and the adjustment of the slats being effected by one and the same means. Provision is made in this connection whereby the means encompassing the swivelling motion of the slats in order to enable the slats to be swivelled in any position of raising or lowering of the blind, couple automatically with the winding shaft at each and any change of direction of the winding shaft within the limits within which the blind can be raised or lowered, so that the slats are swivelled on any further movement of the winding shaft and whereby on continuance of the rotary movement of the winding shaft in the same direction the coupling means are released as soon as the predetermined terminal position of the swivelling movement is reached. The actuating device is characterized by the fact that two overrunning clutches, both arranged coaxially with the winding shaft and each acting in one direction of rotation, are provided as the means for coupling the winding shaft to the swivelling assembly.

The actuating device according to the invention not only solves admirably the problem presented, but also enables any desired method of propulsion to be used, that is to say, a simple draw strap or cord, with the dead weight of the blind causing the rotary movement of the winding shaft in the direction encompassing the lowering of the blind, or an endless cord acting in either direction, and whether using crank rods acting through bevel gears, or motor drive means. It further exhibits the special

advantage that only few moving parts, easily manufactured by mass-production methods and subject to little wear, are required. Since such blinds are frequently operated by children or other careless persons, it is a particularly important advantage that the inventive activating device is very simple and easy to operate and the harmful wrong manipulations are practically impossible.

The object of the invention is described and illustrated by reference to the accompanying drawings of an embodiment applied to a blind. In the drawing:

Figure 1 is an actuating device in which only one clutch is provided for the blind;

Figure 2 is an embodiment of the actuating device in which a separate clutch is provided for each swivelling assembly;

Figure 3 is a sectional view taken along the line I—I of Figure 1;

Figure 4 is a sectional view taken along the line II—II of Figure 1; and

Figure 5 is a sectional view of a further embodiment.

The blinds indicated are blinds in which draw cords **1** act on the bottom slat and are, when the blind is raised, wound on to the appurtenant drums **2**. In the lowered condition of the blind, the clearances between the slats **4** are fixed in the known manner by supporting cords **5**. How the slats are connected to the supporting cords is irrelevant in the present connection. The supporting cords are suspended from and secured to the swivelling assembly H in such a way that when the swivelling assembly rotates about its axis the slats are swivelled.

The drums **2** are mounted on the winding shaft **3**, **3***a*, which may for example be provided with a flat **9** or a groove in order to prevent rotational movement of the drum relatively to the shaft. The swivelling assemblies H are so connected to the winding shaft **3**, **3***a* by means of a disconnectable clutch acting in either direction of rotation that all the swivelling assemblies of a blind are impelled through a predetermined angle, for example 180°, when the winding shaft begins to turn, whereupon the clutch is automatically disconnected. An overrunning clutch acting in both directions of rotation serves as the clutch.

Figures 1 to 4 illustrate an actuating device in which one or a plurality of specially designed overrunning clutches are used to couple the swivelling assemblies H to the winding shaft **3**, **3***a*.

In the embodiment to Figures 1, 3 and 4, bearings **8** are provided in the casing **7** in which bearings the winding shaft **3** is mounted. Additional, intermediate bearings **23** can be provided as required. A roller or collar **10**, provided with a flange and held by a groove or a flat **9**, is mounted on the winding shaft **3**; the said roller forms a part of the clutch. The co-operating member of the clutch is a ring **12** rotatable about the roller **10** and disposed coaxially therewith. The said ring is provided on its inner periphery with radial and contrarily directed recesses **13**, **14** adapted to accommodate locking rollers **15**. The said recesses are so designed as to constitute guide tracks for the locking rollers. The locking rollers **15** are prevented from falling out by the flange of the roller **10** on the one hand and the co-rotating retaining disk **11** secured to said roller on the other hand. The ring **12** is provided over a part of its periphery with a radial slot **16**. Through the said slot projects the disconnecting pin **17**, which is secured in the casing **7** and extends so far into the clutch as to be able to act on the locking rollers **15**.

The ring **12** and the roller **10** thus constitute, together with the locking rollers **15**, an overrunning clutch acting in both directions.

Rigidly connected to the ring **12** of the said clutch is

a sleeve 18. Secured to said sleeve is a tube 19 which carries the socket-shaped member 20 and is connected by the tubular member 6 to the socket-shaped member 21 and the tube 19a. The parts 19, 20, 6, 21 and 19a together constitute a swivelling assembly, rotatable about the axis of the shaft 3, for securing the supporting cords 5. Further swivelling assemblies can be connected at suitable points via the tube 19a rotatably mounted at 22.

Between the socket-shaped members 20 and 21 of the swivelling assembly the winding drum 2 is so arranged as to be non-rotatably connected to the shaft 3. The drum 2 is supported by an intermediate bearing and has a shoulder or journal 22 for the tube 19a. Mounted in the bottom of the casing 7 is the spindle for a guide pulley 24 over which the draw cord 1 is so guided that it cannot chafe against the sides of the casing.

If the winding shaft 3 is turned in any way, for example by loosening of the pull strap 26, which winds on to the drum 25, under the influence of the dead weight of the blind, and in the direction contrary to that indicated by the arrow in Figure 4, one of the two locking rollers 15 immediately moves, by running up the guide track formed by the recess 13, into the locking position and propels the ring 12 and with it the sleeve 18, and with the sleeve 18 the entire swivelling assembly H, until the locking roller concerned comes into abutment with the releasing or disconnecting pin 17. Hereby the interlocking action between the roller 10 and the ring 12 is abolished again, so that the ring 12 can rotate freely about the roller 10. Thereby, however, the connection between the winding shaft 3 and the swivelling assembly H is also abolished, so that the swivelling assembly H, when the winding shaft turns further, remains in the position taken up on disconnection of the clutch, whereas the drum 2 continues to turn together with the shaft and therefore the blind of the present embodiment can be lowered.

By holding still the draw strap 26, the lowering movement of the blind can be interrupted at any point. If the shaft is now turned in the contrary direction, i. e. in the direction of the arrow shown in Figure 4, by pulling the strap 26, the other locking roller 15 in the recess 14 immediately moves into the locking position, so that the winding shaft again propels the swivelling assembly. By this means the slats are swivelled into the desired position. If the pull on the strap 26 is continued, the roller 15 comes into abutment with the disconnecting pin 17, whereby the clutch is disconnected again, the swivelling assembly remains stationary in the position last reached, and the blind is raised by the winding of the draw cords on to the drums 2. The magnitude of the aforesaid angle of swivel is determined by the relative positions of the recesses 13 and 14 for the rollers 15.

Figure 2 shows an embodiment in which each drum 2a rigidly mounted on the winding shaft 3a is coupled directly to the appurtenant swivelling assembly. A tubular connection between a plurality of swivelling assemblies is therefore not necessary in this embodiment. The contrarily directed recesses accommodating the locking rollers 15a are located directly in the inner periphery of the swivelling assembly, which latter is rotatably mounted on corresponding slide surfaces of the drum 2a. The pin 17a, in this embodiment also, takes care of the disconnection of the clutch. Should the shaft 3a be rotated in a direction contrary to the previous direction, it impels the drum 2a, one of the rollers 15 immediately moves into the locking position and therefore impels the swivelling assembly also until disconnection takes place. After the attainment of the disconnection position, the blind can be raised or lowered further, as may be desired, by continued rotation in the same direction.

In the embodiment according to Figure 2, certain parts of the winding shaft 3a are openly mounted within the width of the blind. This permits provision of a winding drum 29, mounted on the shaft, onto which drum the draw cord 30 is wound. Preferably, the drum 29 is provided with helical grooves 36 to accommodate the separate turns of the cord 30. In this case the cord is taken over a guide pulley 32, the mounting for the said guide pulley being displaceable in the longitudinal direction according to the length of cord wound on to the drum 29, such displacement being effected by a finger engaging in the grooves. The pull cord 30 is taken downwards via a further guide pulley 31. If there is enough room, the arrangement may be such that the bearing or mounting 33 carrying the guide pulley is stationary and engages in the grooves 36 by a finger 34 and the winding drum 28 is so mounted on the shaft 3a as to be axially displaceable in the lengthwise direction, in order, according to the direction of rotation, to encompass a travelling movement, in one direction or the other, of the winding drum 29 held against rotation on the shaft 3a, according to the length of pull cord 30 wound on.

These arrangements afford the great advantage that it is not necessary to provide, in addition to the casing 7, a considerable space for the accommodation of a winding drum 25.

Figure 5 shows an embodiment in which the swivelling assembly H and the drum 2b are offset by the amount X on the winding shaft 3b, in such a way that the supporting cord causes a preponderance of weight on the draw cord entry side. The said preponderance of weight is of advantage because through it the disconnected overrunning clutch is prevented from moving into the locked position through being impelled by the rotating winding drum. This is particularly important in the almost completely lowered condition of the blind, in which the effort of the draw cord becomes increasingly small.

In order to ensure instant response of the swivelling assembly to any movement of the winding shaft, a compression spring 15a is, in the embodiment to Figure 5, assigned to each locking roller.

Various changes and modifications may be made without departing from the spirit and scope of the present invention and it is intended that such obvious changes and modifications be embraced by the annexed claims.

Having thus described the invention, what is claimed as new and desired to be secured by Letters Patent, is:

1. In an actuating device for Venetian blinds having slats, supporting cord means for holding said slats, draw cord means connected with the lowermost of said slats, drum means for said draw cord means, rotatable winding shaft means carrying said drum means, whereby rotation of said shaft means causes vertical displacement of said slats by winding of said draw cord means onto said drum means, and casing means extending longitudinally of said shaft means; ring means disposed freely about said shaft means, the inner periphery of said ring means being provided with contrarily directed recesses, said ring means operatively engaging said supporting cord means for movement therewith, and rollers disposed within said recesses, respectively, whereby upon rotation of said shaft means to displace said slats vertically, said rollers disposed within said recesses, respectively, couple said ring means with said shaft means to effect simultaneous axial displacement of said supporting cord means thereby causing tilting of said slats, said coupling automatically being interrupted upon tilting of said slats to a predetermined position in either direction.

2. In an actuating device according to claim 1, said shaft means including collar means, said ring means being disposed about said collar means for engagement therewith upon actuation of said shaft means.

3. In an actuating device according to claim 2, said collar means being integral with said drum means.

4. In an actuating device according to claim 1, including flange means on said shaft means cooperating with said ring means for retaining said rollers within said recesses, respectively.

5. In an actuating device according to claim 1, includ-

ing pull cord means for actuating said shaft means, and further drum means for winding said pull cord means, said further drum means operatively engaging said shaft means.

6. In an actuating device for Venetian blinds having slats, supporting cord means for holding said slats, draw cord means connected with the lowermost of said slats, winding drum means for said draw cord means, rotatable winding shaft means carrying said drum means, whereby rotation of said shaft means causes vertical displacement of said slats through said draw cord means, and casing means extending longitudinally of said shaft means; ring means disposed freely about said shaft means, the inner periphery of said ring means being provided with contrarily directed recesses and with a radial slot communicating with said recesses, said ring means operatively engaging said supporting cord means for movement therewith, pin means on said casing and extending through said slot of said ring means at least partly into said recesses, selectively, and rollers disposed within said recesses, respectively, whereby upon rotation of said shaft means to displace said slats vertically, said rollers disposed within said recesses, respectively, couple said ring means with said shaft means to effect simultaneous axial displacement of said supporting cord means thereby causing tilting of said slats, said coupling automatically being interrupted thereafter by said pin means to terminate said axial displacement.

7. In an actuating device for Venetian blinds having slats, supporting cord means for holding said slats, draw cord means connected with the lowermost of said slats, winding drum means for said draw cord means, rotatable

winding shaft means carrying said drum means, whereby rotation of said shaft means causes vertical displacement of said slats by winding of said draw cord means onto said drum means, and casing means extending longitudinally of said shaft means; collar means integral with said drum means, ring means disposed freely about said collar means, the inner periphery of said ring means being provided with contrarily directed recesses and with a radial slot communicating with said recesses, said ring means operatively engaging said supporting cord means for movement therewith, pin means on said casing and extending through said slot of said ring means at least partly into said recesses, selectively, rollers disposed within said recesses, respectively, helical drum means on said shaft means within said casing, and pull cord means cooperating with said helical drum means for rotating said shaft means, whereby upon rotation of said shaft means by said pull cord means said slats are displaced vertically, said rollers disposed within said recesses, respectively, coupling said ring means with said shaft means the effect simultaneous axial displacement of said supporting cord means thereby causing tilting of said slats, said coupling automatically being interrupted upon tilting of said slats to a predetermined position in either direction.

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