March 6, 1956 O. HEDIGER 2,737,235

VENETIAN BLIND

Filed March 19, 1953

FIG. 1

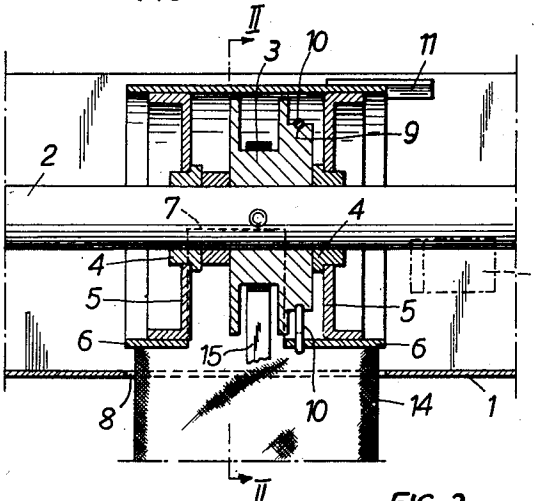


FIG. 2

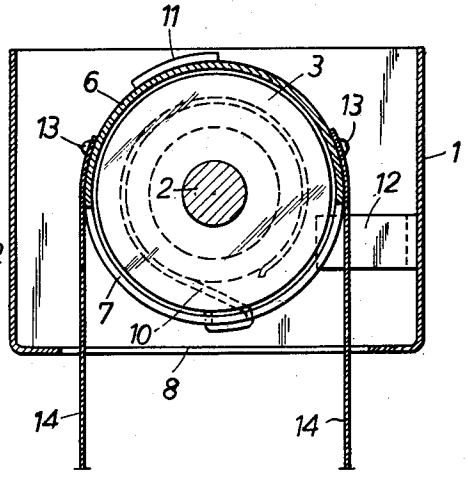


FIG. 3

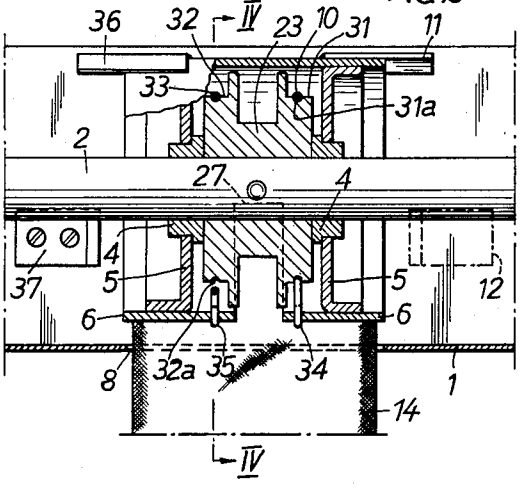
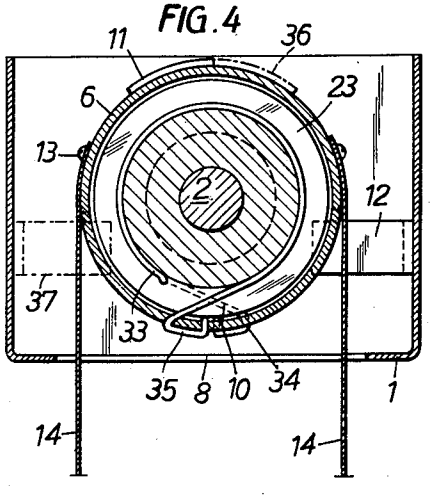


FIG. 4



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VENETIAN BLIND

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6 Claims. (Cl. 160—170)

The present invention relates to winding and adjusting means for use in Venetian blinds with adjustable slats, having a winding shaft and winding drums tightly mounted on the latter, for the pull tapes of the blind.

It is an object of the present invention to provide a device of the aforementioned type permitting adjustment of the slats, as well as lifting and lowering of the blind in a simple manner by means of one and the same operating member upon rotation of the winding shaft.

For this purpose each winding drum of the device according to the invention is housed in a tilting member rotatably mounted on the winding shaft and to the periphery of which adjusting tapes for the slats are secured. The device further comprises coupling springs having their one end anchored on the tilting members and forming each a loop applied under pre-tension around and to the associated winding drum. The device, moreover, comprises stationary abutments adapted to cooperate with at least one abutment provided on the tilting members. The whole arrangement is such that upon rotation of the winding shaft and due to the friction occurring between the spring loop and the winding drum, the tilting members are concurrently rotated by a certain amount for angular adjustment of the slats between two end positions, one of which at least is limited by engaging abutments.

The device according to the invention above all has the advantage of simplicity, since besides the said springs no further parts are required for effecting the coupling of the tilting members to the winding drums and the winding shaft, respectively.

The manner in which the above and other advantages and objects of the invention are accomplished will be readily understood from a reference to the following specification when read in conjunction with the accompanying drawing, in which two embodiments of the invention are represented, by way of example.

Fig. 1. is a vertical axial section through a part of the device according to a first embodiment of the invention,

Fig. 2 is a section taken on line II—II of Fig. 1,

Fig. 3 shows a second embodiment of the invention in a section corresponding to the one of Fig. 1, and

Fig. 4 is a section taken on line IV—IV of Fig. 3.

In the first embodiment represented in Figs. 1 and 2, reference numeral 1 designates an upwardly open casing of U-shaped cross section laterally closed by end walls (not shown) in which a winding shaft 2 is journalled. Two winding drums 3, of which only one is represented on the drawings, are tightly mounted in spaced relationship on said shaft 2. Bearing rings 4 are mounted, freely rotatable on the winding shaft 2, on both sides of each drum 3. Discs 5 secured to said rings 4 carry at their outer periphery a tilting member 6 formed as a rocking sleeve coaxially housing the drum 3 and having an intermediate cut-out section 7 extending approximately over half of its circumference and through which a tape 15, secured to the drum 3 and wrappable or looped around

the latter, leads downwardly through a bottom aperture 8 of the casing 1. The peripheral surface of a lateral extension of the drum 3 is provided with a groove or guide 9 (Fig. 1) in which the loop forming portion of a coupling spring 10 is seated in a pre-loaded condition. One end of the spring 10 is anchored to the tilting member 6 as best seen in Fig. 2. To the periphery of the tilting member 6 an abutment 11 is secured so as to axially project beyond the latter. This abutment 11 is adapted to cooperate with an abutment 12 secured to a side wall of the casing 1. Slat carrying tapes 14, the width of which approximately corresponds to the width of the tilting member 6 and which lead downwardly through the opening 8 in the bottom of the casing, are secured to the periphery of the tilting member 6 by means of rivets 13 and serve to angularly adjust the slats (not shown).

For explaining the operation of the described winding and adjusting device it is assumed that the tilting member 6 occupies the position shown in Figs. 1 and 2, which corresponds to an approximately horizontal, intermediate position of the slats (not shown) secured to the tapes 14, while the blind occupies any intermediate position. Rotation of the winding shaft 2 for lifting of the blind, in the present case in the clockwise direction according to Fig. 2, will result in the tilting member 6 rotating in clockwise direction too, owing to the friction present between the spring 10 and the drum 3. The friction causing the coupling of the parts 3 and 10 is rendered still stronger as the spring loop is influenced by the drum 3 in the closure sense. Such rotation of the tilting member 6 entails a lifting of the one and a lowering of the other of the tapes 14 fastened to this tilting member and thus an angular adjustment of the slats. Upon further rotation of the winding shaft 2 and of the spool or drum 3, the tilting member 6 is accordingly rotated until the abutments 11 and 12 meet each other; in the represented embodiment this corresponds approximately to a quarter turn of the tilting member 6 out of the indicated position of Fig. 1. The slats in this moment are tilted to one of their end positions. Upon still further rotation of the shaft 2 for the purpose of lifting the blind, a concurrent rotation of the tilting member 6 is prevented by the engaging abutments 11, 12 and the spring loop slides in its groove 9 of the drum 3.

For the purpose of lowering the blind or for adjustment of the slats in opposite direction, the shaft 2 is rotated in counter-clockwise direction (Fig. 2), for example by the effect of the dead weight of the slats, suspended from the drum 3 by means of winding tapes (not shown). The spring 10, due to its pre-tensioned mounting on the drum 3 couples the latter with the tilting member 6 in this case too, so that the tilting member 6 is concurrently rotated and the slats are tilted. Since in this case the spring loop is influenced by the friction in the groove 9 in the sense of opening, relatively little power suffices to loosen the coupling between the drum 3 and the tilting member 6, so that no special abutments are necessary for limiting the rocking movement of the tilting member 6. As soon as the slats have attained their respective end position, the spring 10 slides in the groove 9.

It is understood that the slats may be adjusted in any intermediate position by a corresponding rotation of the winding shaft 2 in the described manner. The preloading of the spring 10 and the cross section of the groove 9 are such, that the friction present between the drum 3 and the spring 10 guarantees a lasting connection of the parts 3 and 6 within the desired rocking range of the tilting member 6.

The second embodiment represented in Figs. 3 and 4 is of similar construction as the one shown in the Figs.

1 and 2 with the difference that two springs are anchored to each tilting member as hereinafter described. As in the first embodiment an upwardly open casing 1 of U-shaped cross section is laterally closed by end walls (not shown) in which a winding shaft 2 is journalled. Two winding drums 23, of which only one is represented in the figures, are tightly mounted in spaced relationship on said shaft 2. Bearing rings 4 are mounted, freely rotatable on the winding shaft 2 on both sides of each drum 23. Discs 5 secured to said rings 4 carry at their outer periphery a tilting member 6 formed as a rocking sleeve coaxially surrounding the drum 23 and having an intermediate cut-out section 27 extending approximately over half of its circumference and through which extends pull tape (not shown) for the blind, which is secured to the drum 23 and wrappable around the latter, which tape leads downwardly through a bottom aperture 8 of the casing 1. The drum 23 has two lateral extensions 31, 32 provided each with a circumferential groove 31*a* and 32*a*, respectively. These grooves 31*a* and 32*a* are adapted each to receive a loop forming portion of a coupling spring 10 and 33 respectively, which springs are wound around the drum in opposite direction to each other as best seen in Fig. 4 and seated in pre-loaded condition. One end of each of the springs 10 and 33 is hooked to be anchored as at 34 and 35 respectively to the tilting member 6. Two abutment plates 11 and 36 are secured to the periphery of the tilting member 6 so as to project beyond the latter. The abutment 11 is adapted to cooperate with a stationary abutment 12 secured to a side wall of the casing 1 for determining one end position of the tilting member, while the abutment 36 similarly is adapted to cooperate with another stationary abutment 37 for determining the other end position of the tilting member 6. As in the embodiment according to Figs. 1 and 2, slat carrying tapes 14, the width of which approximately corresponds to the width of the tilting member 6, lead downwardly through the opening 8 in the bottom of the casing and are secured to the periphery of the tilting member 6 by means of rivets 13. As in the first described embodiment they serve to angularly adjust the slats (not shown).

The operation of the second embodiment is the same as the one of the first embodiment. However, such a construction with two springs, pre-loaded in opposite direction, is particularly suitable when the winding shaft is positively operated by means of a gear in both directions of rotation and, unlike the first embodiment, cannot rotate in the sense of lowering of the blind due to the dead weight of same, as soon as a corresponding blocking member is released. In the second embodiment upon rotation of the shaft in either direction one of the spring loops is influenced in the direction of opening and the other in the direction of closing, the latter then guaranteeing a perfect coupling of the tilting member with the winding drum until the corresponding abutments engage each other, thereby stopping further rotation of the tilting member and keeping the slats in one end position.

In both embodiments as well the construction as also the maintenance and operation of the described device are simple and no expensive spare parts, difficult to replace, are required.

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 a device for winding and adjusting the slats of Venetian blinds having a fixed casing, a winding shaft within said casing, and winding drums for respective pull tapes mounted on said shaft for rotation therewith; tilting members disposed about said drums, respectively, for rotation relative to said shaft, pairs of tapes for adjusting the angularity of said slats and connected to said tilting members, respectively, at opposed locations, guide means mounted on said shaft for rotation therewith within said tilting members, respectively, coupling spring means including springs each having two ends, one end of said springs being frictionally mounted on said guide means, respectively, and the other end of said springs being secured to said tilting members, respectively, and cooperating abutment means disposed on said tilting members and said casing, respectively, whereby upon actuating said winding shaft said tilting members are first rotated with said shaft by frictional engagement of said springs with said guide means to thereby adjust the angularity of said slats, rotation of said tilting members being terminated upon cooperation of said abutment means, respectively, so that upon further actuation of said winding shaft to wind said pull tapes on said drums said tilting members are prevented from further rotation.

2. In a device according to claim 1, wherein said drums and respective guide means are integral with each other, said guide means being provided with a circumferential groove, respectively, in which a respective spring is seated.

3. In a device according to claim 1, wherein one spring is supplied for each of said tilting members, said springs being coiled about said shaft in the direction corresponding to the direction for raising said slats, said abutment means including abutments on said tilting members, respectively, and on said casing, said casing abutments being angularly advanced in the direction for raising said slats relative to the point of securement between said springs and said tilting members, respectively, whereby rotation of said tilting members in the direction for lowering said slats will automatically be limited by bias of said springs.

4. In a device according to claim 1, wherein two springs are supplied for each of said tilting members, said springs being coiled about said shaft in opposite directions, said abutment means including abutments on said tilting members, respectively, and on said casing on either side of said tilting members, respectively, for positively limiting the rotation of said tilting members in either direction.

5. In a device for winding and adjusting the slats of Venetian blinds having a fixed casing, a winding shaft within said casing, and winding drums for respective pull tapes mounted on said shaft for rotation therewith; pairs of bearing means mounted on said shaft on either side of said drums, respectively, tilting members mounted on said pairs of bearing means, respectively, for rotation relative to said shaft, said tilting members being provided with arcuate cut-outs for said pull tapes, respectively, pairs of tapes for adjusting the angularity of said slats and connected to said tilting members, respectively, at opposed locations, guide means secured to said drums, respectively, and provided with circumferential grooves, respectively, coiled springs seated in said grooves of said guide means, respectively, and frictionally retained thereon adjacent one end and being secured adjacent the opposite end to said tilting members, respectively, remote from said one end, said springs coiling about said shaft in the direction corresponding to the direction for raising said slats, and cooperating abutment means disposed on said tilting members, respectively, and on said casing, said casing abutments being angularly advanced in the direction for raising said slats relative to the points of securement between said springs and said tilting members, respectively, whereby rotation of said tilting members is limited in one direction by said abutment means and is automatically limited in the other direction by bias of said springs.

6. In a device for winding and adjusting the slats of Venetian blinds having a fixed casing, a winding shaft within said casing, and winding drums for respective pull tapes mounted on said shaft for rotation therewith; pairs of bearing means mounted on said shaft on either side of

said drums, respectively, tilting members mounted on said pairs of bearing means, respectively, for rotation relative to said shaft, said tilting members being provided with arcuate cut-outs for said pull tapes, respectively, pairs of tapes for adjusting the angularity of said slats and connected to said tilting members, respectively, at opposed locations, pairs of guide means secured to said drums, respectively, on either side thereof and each provided with a circumferential groove, pairs of coiled springs seated in said grooves of said guide means, respectively, and frictionally retained thereon adjacent one end and being secured adjacent the opposite end to said tilting members, respectively, remote from said one end, said

springs of each of said pairs coiling about said shaft in opposite directions, and cooperating abutment means disposed on said tilting members, respectively, and on said casing on either side of said tilting members, respectively, whereby rotation of said tilting members is limited by said abutment means.

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