Nov. 15, 1955 C. KAUFFMANN ET AL 2,723,715

VENETIAN BLIND WITH ADJUSTABLE SLATS

Filed March 11, 1952

Fig. 1

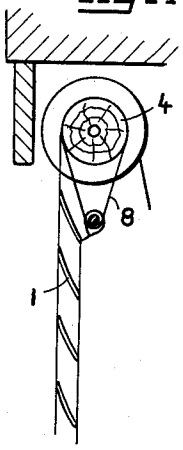


Fig. 2

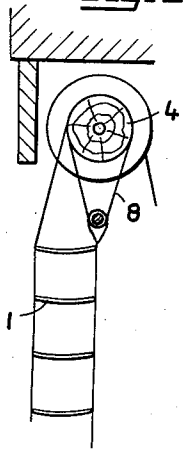


Fig. 3

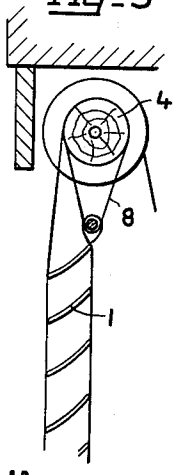
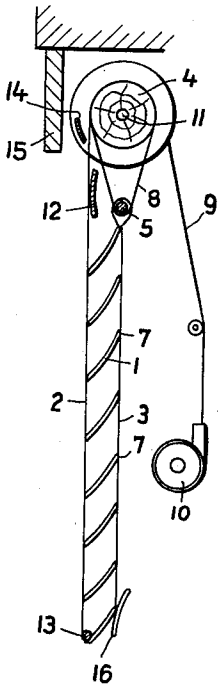


Fig. 4



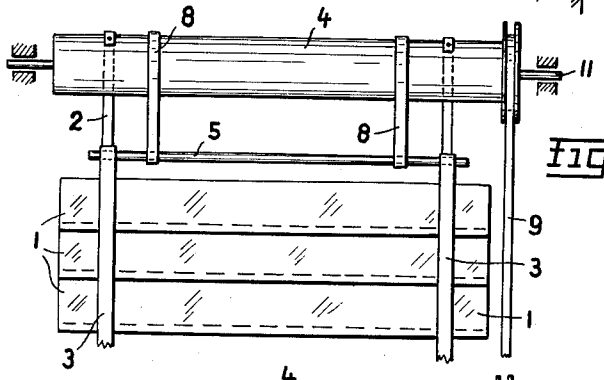
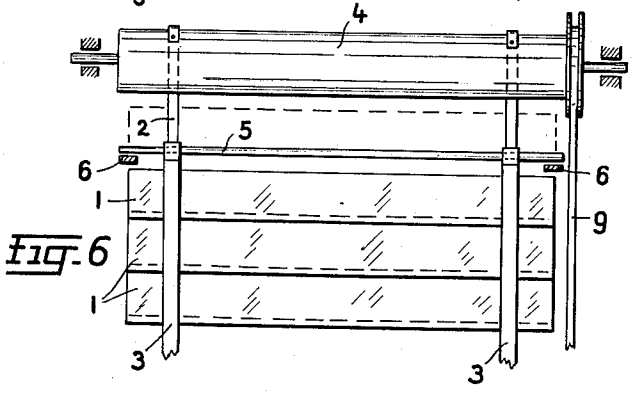


Fig. 5

Fig. 6



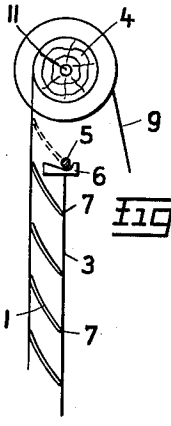


Fig. 7

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VENETIAN BLIND WITH ADJUSTABLE SLATS

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2 Claims. (Cl. 160—133)

Our invention relates to a Venetian blind with adjustable slats strung on ladder bands or supporting straps, respectively.

Venetian blinds composed of slats are well known in the art, which are adapted to be wound up upon a winding roller like a roll-shutter.

In prior constructions, the supporting straps faced towards the room are connected with the winding roller, while the upper ends of the other supporting straps faced towards the outside are supported in a fixed point. In such an arrangement, in winding up the outer supporting straps have to wind up on a greater diameter than the inner supporting straps so that the outer straps are strained by an exceeding traction, which may lead to an overstress. As a consequence thereof, the slats, during the winding-up operation, are turned towards the top side with their outer edge, i. e. they get a distance from the roller. Then a further winding-up is either not possible or the outer supporting straps tear so that the slats upon the roller will occupy an unallowable and unoperative position. In order to avoid such a condition the supporting straps are disposed in a staggered manner. Since they can be mounted on the upper ends and inner longitudinal edges of the sheets or plates only, while the outer longitudinal edges thereof are unsupported, the range of application of said Venetian blinds is restricted to certain sizes of width.

In accordance with the invention said inconveniences are eliminated by connecting the outer supporting straps, i. e. the straps faced towards the sunny side, with the winding roller. The inner supporting straps, i. e. the straps faced towards the room, are propped with their upper ends in fixed points in a predetermined height, and the slats may be swivelled about the corresponding inner edges. This construction achieves that the outer supporting straps will get a greater winding radius, while during the winding-up operation upon the roller the inner supporting straps may jump in any adequate manner, thus ensuring an unimpeded winding-up operation. As a result, the slats do not tend to occupy a transverse position on the winding roller, an overstressing of the traction cords is avoided, and, moreover, it is possible to use Venetian blinds of unlimited width, since the slats at any desired points intermediate the upper ends may be supported by pairs of traction cords, which are disposed inside and outside, respectively.

If curved slats are to be used, it is arranged that in the transverse position the concave surface of the slats are faced towards the top side. As in moving down the Venetian blind the inner traction cords are caught or trapped on a pre-determined height the slats when the outer traction cords continue to slide can swivel downwardly up to about 180° with their edges which at first still occupy an upright position at the outside, wherein a setting or locking may be carried through in any angle desired by means of the traction strap mounted on the strap disc. This construction does not require any traction members sliding upwardly and downwardly through

the slats and being subjected to high wear. Moreover, a special device for adjusting the slats into an inclined position is unnecessary.

For determining the fixed point the inner straps are suspended for instance on a shaft, which hangs into endless loops extending around the winding roller. The loop band hanging loosely down may also be led several times around the winding roller and secured with their ends on the roller.

By way of example, we have shown several preferred embodiments of our invention in the accompanying drawings, in which

Figs. 1 to 4 show side views of the winding Venetian blind in different positions, in accordance with the invention;

Figs. 5 and 6 show front views of the same; and

Fig. 7 is a side view of another embodiment.

Similar reference numbers refer to similar parts throughout the several views.

The winding Venetian blind according to the invention comprises several adjustable slats **1**, which hang in so-called ladder bands or supporting chains with both an outer supporting strap **2** faced towards the sunny side and an inner supporting strap **3** faced towards the room. The slats **1** may preferably hang intermediate the two supporting straps in double studs. According to the invention the front supporting strap **2** is connected to a winding roller **4** adapted to be rotated by means of a cord **9** or the like in any known manner. The inner supporting strap **3** at first hangs at a freely supporting point **5**, which may be a shaft. The end portions of the inner straps **3** embrace loosely the shaft **5**, for instance, by means of a loop, wherein a lightly rotatable intermediate sleeve may be provided. The outwardly projecting end portions may be carried by supporting seats so that the inner straps **3** are strained when the outer straps **2** will slacken furthermore, whereby the slats **1** may swivel about an inner edge **7** acting as a center of motion. Depending on the degree of drawing on the outer supporting straps **2** the slats **1** move from the perpendicular through the horizontal again into the perpendicular position, while the slats are hanging down. When the winding roller is so rotated that the slats are faced towards the top side, the winding-up operation of the Venetian blind begins, whereby the shaft **5** is lifted out of supporting seats **6** and additionally trapped on the shaft **5**. In winding down the shaft **5** automatically engages the supporting seats **6**.

Another advantageous embodiment may be arranged by disposing the shaft **5** acting as a freely supporting point in an endless loop **8** strung across the winding roller **4** in the form of an endless band. As a result, the inner supporting straps hang freely at the shaft **5** in the loop **8** as long as the outer supporting straps by revolving the roller **4** merely effect an oblique position of slats **1** from the position shown in Fig. 4 through the vertical to the position shown in Fig. 1. During said adjusting operation the shaft **5** rests in the endless loop **8** the motion of which due to the rotation of roller **4** merely results in a loose or idle rotation of shaft **5** which is left stationary during this operation. The action of forces is as follows:

If the supporting straps are loaded with for instance 10 kgs. each, which are only carried by the outer supporting straps during the winding-up operation similar to that of a roll-shutter, the shaft **5** will receive the half, i. e. likewise 10 kgs., when the Venetian blind is let down. Said 10 kgs., however, due to the band **8** strung endless around the shaft, extend with 5 kgs. over the front side of the roller **4** and with 5 kgs. over the rear side thereof. Thus, the outside of the roller is loaded by a tensile stress of 10+5=15 kgs., while the rear side thereof will be loaded with 5 kgs. only. In the further course of slacking action of straps all the slats **1** will smoothly hinge down in

any desired angle, as shown in Figs. 1 to 4. Any special advantage of this arrangement is that the construction as a whole hangs at the roller only so that any auxiliary supports are unnecessary. Moreover, special adjusting cords for inclining the slats are not needed, since this movement will be effected by further rotating the roller 4 after the Venetian blind has fully been let down. The winding Venetian blind may also be actuated by driving rods.

The several slats are curved so as to be able to choose the diameter of the winding roller 4 as small as possible. When the slats occupy their horizontal position the concave surface is faced towards the upper side. The size of slats depends on both the distance of supporting straps and the size of the winding roller.

The winding Venetian blind according to the invention may be guided sideways. This may be obtained for instance by providing the inner edge of slats with projecting end portions, which extend into narrow perpendicular grooves so as to slide therein. Said grooved rails may be rotatable about the vertical axis, so that a clamping action is achieved with respect to the sliding projections of slats, by the aid of which the slats can also be adjusted if the Venetian blind is only partly let down. Alternatively, it is possible to use broad box guides in which the slats can slide down over their total width, and to provide the slats with clamping ledges.

In loosely suspending Venetian blinds for rooms, which are not guided, the sideways sliding of the slats out of the supporting straps may be effected by clamping them, for instance by means of tongues stamped out, at the straps, or, alternatively, for instance, by auxiliary bands or cords extending through the slats, which bands or cords preferably pass behind the supporting straps and between intermediate studs of said supporting straps, said studs being staggered to the right and to the left.

The winding Venetian blind according to the invention is applicable as external as well as internal Venetian blind. Further advantages of the embodiments shown are the capability of lightly winding up and adjusting, respectively, as well as an exceedingly noiseless and foolproof handling.

If the slats of the winding Venetian blind are of a too small weight to ensure a convenient adjusting operation, it is preferred to employ special counterweights.

In inclining the slats, the weight of the traction strap **9** and, in certain cases, the elastic force of a strap winder **10**, too, counteract against the load received by the supporting straps **2**. Moreover, frictional losses in the center of motion **11** are to overcome. If the load of the slats, for instance in the case of thin-walled aluminum rods, the inclining movement of slats may be made more reliable by providing counterweights. There is used, for instance, a counterweight **12** at the supporting strap, having preferably the form of a curved slat so as to be able of nestling to the winding roller. It is also possible to secure a counterweight bar **13** to the edge of the undermost slat or, alternatively, a counterweight **14** to the strap disc. Besides, the bar **12** preferably serves to cover the intermediate space between the shaft **5** and a covering plate **15** so as to shut out the sunbeams.

In order to avoid a too high drawing up or entangling of the winding Venetian blind, the undermost slat may be provided with one or two bridge parts **16**, which are secured to the rear edge of the bar and the front legs of which engage the covering plate **15**, whereas the rear legs thereof engage the Venetian blind wound up. In addition, it is also possible to use usual stops or setting parts.

We claim:

1. In a rollable Venetian blind, a winding roller, outer slat supporting straps connected to the roller, inner slat supporting straps normally supported at their upper ends at points below said roller, stiff slats between said straps and winding means for said roller whereby operation thereof to rotate the roller causes the outer edges of the slats to be raised or lowered with the inner edges of the slats constituting pivot points for placing the slats at the desired angular positions for controlling the passage of light between the slats, the support for the upper ends of the inner straps comprising an elongated rod parallel with said roller to which the inner straps are connected and endless loop members independent of the outer straps surrounding the roller and rod for the suspension of the rod and the inner straps carried thereby.

2. In a rollable Venetian blind as in claim 1, wherein the slats are formed of stiff material and are curved in general conformity with the surface of said roller in directions normal to their longitudinal axes with the convex sides of the slats directed downwardly and the concaved sides directed upwardly to facilitate winding of the slats on the roller.

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