Jan. 20, 1959 K. A. KLENZ 2,869,636

VERTICAL VENETIAN BLIND

Filed Feb. 8, 1955 2 Sheets-Sheet 1

FIG_1_

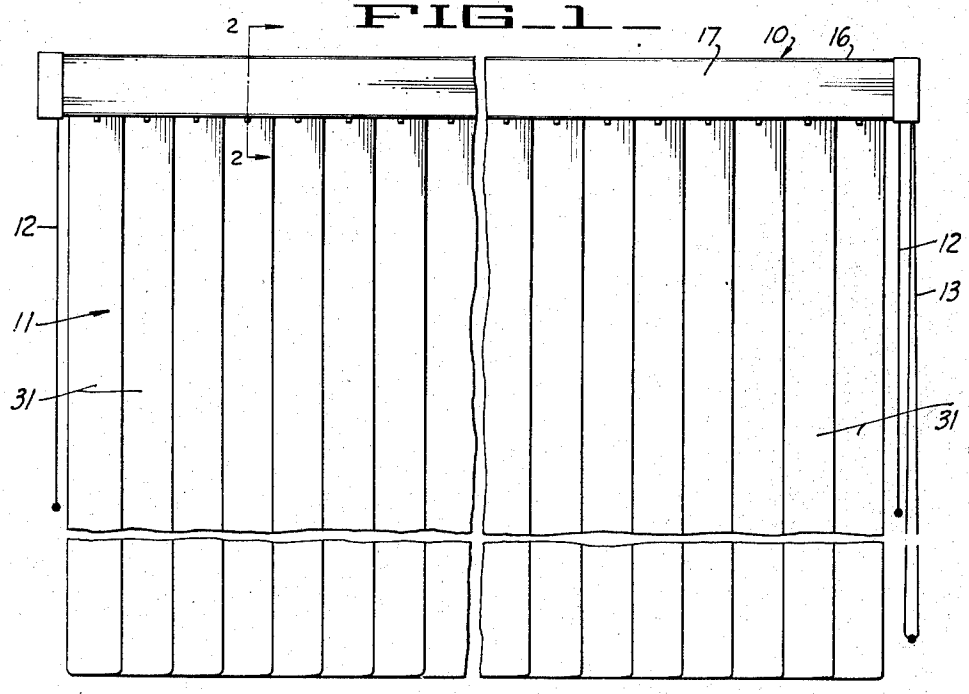


FIG_2_

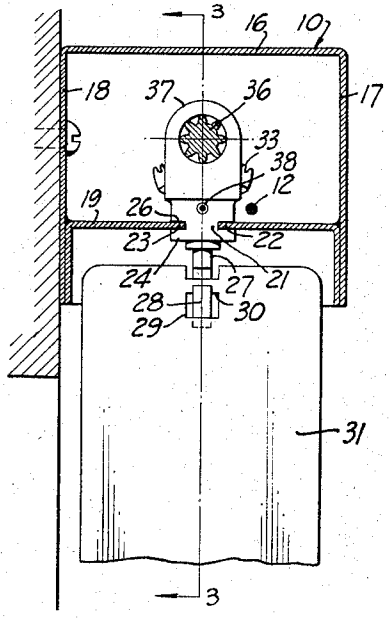
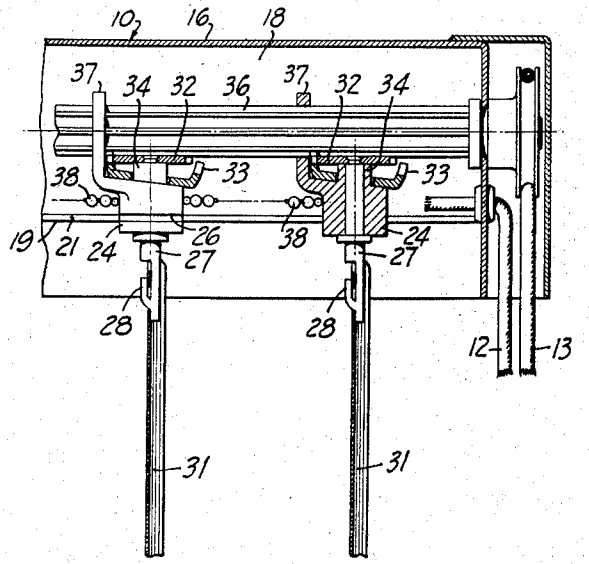


FIG_3_



INVENTOR.
Karl A. Klenz

BY
Fleit & Swain
ATTORNEYS

Jan. 20, 1959 K. A. KLENZ 2,869,636

VERTICAL VENETIAN BLIND

Filed Feb. 8, 1955 2 Sheets-Sheet 2

FIG_4_

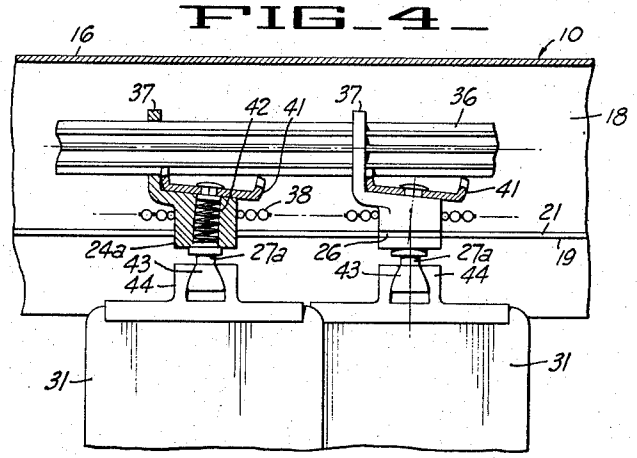


FIG_5_

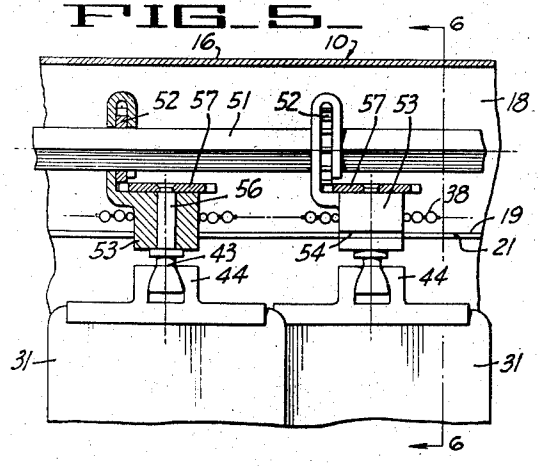


FIG_6_

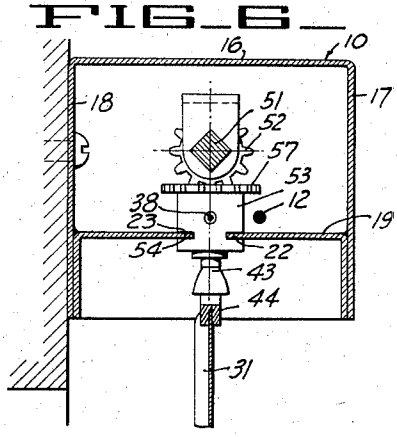


FIG_7_

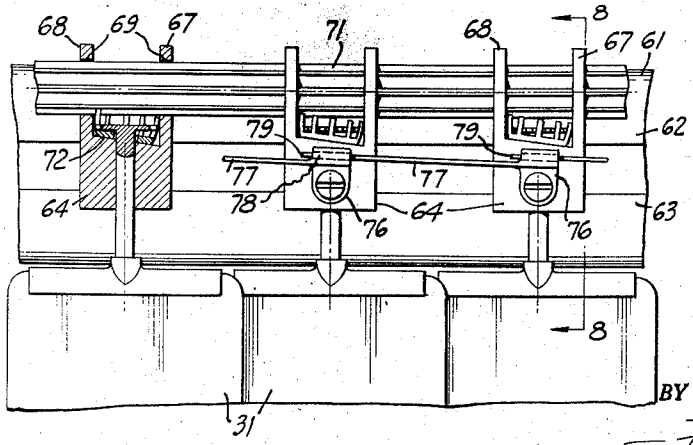
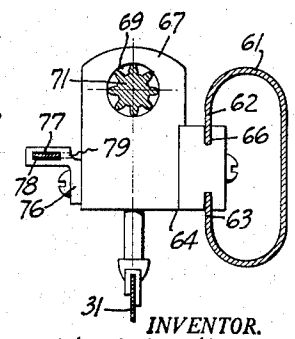


FIG_8_



INVENTOR.
Karl A. Klenz

BY

Fleckner & Swain

ATTORNEYS

United States Patent Office

2,869,636

Patented Jan. 20, 1959

2,869,636

VERTICAL VENETIAN BLIND

Karl A. Klenz, San Anselmo, Calif.

Application February 8, 1955, Serial No. 486,828

4 Claims. (Cl. 160—168)

This invention relates to Venetian blind construction and particularly to a so-called vertical Venetian blind in which the slats are held in a vertical rather than a horizontal position.

The conventional Venetian blind is one in which the slats are retained in a horizontal position and are supported by ladder tapes on whose rungs the slats rest. The slats are rotated about their longitudinal axes for the control of light and they may be raised or lowered by raising or lowering a bottom rail with the result that the slats pile up one above the other on the bottom rail.

However, Venetian blinds may also be manufactured in a form in which the slats are held in a vertical position and are supported from their tops by a suitable mechanism. It is essential that the blinds be mounted in such a manner that they may be turned about their vertical axes so that light may be controlled, and it is also desirable that the slats be mounted in such a way that they may be drawn to one or both sides of a window opening when desired.

Various means have heretofore been utilized in connection with the support of Venetian blind slats which are hung in a vertical position. However, it is my opinion that none of them have been completely satisfactory. Many of them have utilized a substantial number of working parts, any one or few of which might result in difficulty of operation, assembly, or use. Moreover, most of them have been noisy to operate and many of them have been so constructed that the blinds were rotatable about their axes only when in one position and have not been rotatable when in any other, as for example, fully or partially drawn position.

It is an object of this invention to provide a Venetian blind construction which is simple to manufacture and extremely simple to assemble. It is a further object of this invention to provide a Venetian blind of this character in which the slats may be rotatable at any position.

It is a further object of this invention to support the slats in such a manner that they are held rigidly with respect to their upper mounting and that they need not necessarily be jointed at their lower end.

Other objects and advantages of this invention will appear from the following specification taken in conjunction with the accompanying drawings in which:

Figure 1 represents a side view of a Venetian blind incorporating my invention.

Figure 2 represents a cross-sectional detail taken along the line 2—2 of Figure 1 illustrating the means of supporting and rotating the Venetian blind slat.

Figure 3 represents a cross-sectional detail taken along the line 3—3 of Figure 2.

Figure 4 represents a detail similar to that shown in Figure 3 showing a modification of the means for supporting the drive mechanism and also in which the drive mechanism itself has been varied.

Figure 5 represents a modification of my invention and represents a cross sectional detail thereof similar to Figure 3.

Figure 6 is a cross-sectional detail of the modification illustrated in Figure 5.

Figure 7 represents a modified type of support and represents a cross-sectional detail thereof similar to Figure 3.

Figure 8 represents a cross section taken along the line 8—8 of Figure 7.

As illustrated generally in Figure 1 my device consists of a head rail construction 10 and a plurality of slats 11 which are adapted to be suspended vertically therefrom. Suitable operating cords 12 and 13 extend from the head rail and their purpose and mode of operation will more fully hereinafter be described.

As illustrated particularly in Figure 2, the head rail 10 may be constructed in the form of an elongated channel. The web 16 forms the top and the two side portions 17 and 18 form the front and rear panels respectively. Formed integrally with the channel member 10 I have provided a pair of upwardly extending angle members 19 which provide an elongated slot 21 between their lips 22 and 23.

I have provided a plurality of mounting blocks 24 which are provided with grooves 26. The lips 22 and 23 are adapted to engage the grooves 26 so that the mounting blocks 24 may be slid longitudinally along the slot 21. The mounting blocks 24 are drilled to provide a suitable mounting for a shaft 27. The lower end of the shaft 27 may be recessed in the manner illustrated and provided with a tongue 28 which is adapted to cooperate with an opening 29 in the upper end of the slat 31. The slat 31 may be hung upon the shaft 27 simply by passing the tongue 28 through the opening 29 and then snapping the slat under the shoulders 30 and behind the tongue 28 of the recessed portion of the shaft 27. This will result in a relatively rigid construction so that as the shaft 27 is rotated about its vertical axis or is moved laterally along the longitudinal axis of the top rail 10, the slat 31 will likewise be moved and will be held relatively rigidly in a vertical position.

The means for rotating the shaft 27 about its longitudinal axis consists of a toothed gear 32 which is suitably secured to the upper end of the shaft. The gear 32 meshes with a gear 33 which lies upon the upper sloping surface of the block 24 and which is held in predetermined position for rotation with respect to the block 24 by means of a raised hub 34 formed integrally with the block 24. The toothed gears 32 and 33 are in constant mesh. However, one portion of the gear 32 is also in constant mesh with a toothed shaft 36 known as a pinion rod which, as viewed in Figure 2, is provided with radial teeth extending its full length with the result that regardless of the position of the gear 32 with respect to the ends of the shaft 36, some of its teeth will be in constant mesh with teeth on the member 33. It will be apparent therefore, that when the shaft 36 is rotated, it will also cause the member 33 to rotate. Rotation of member 33 causes rotation of the member 32 with the resultant rotation of the member 27 and slat 31.

The block 24 is provided with an upright lug 37 which is drilled and adapted to loosely fit around the member 36 in such a manner that it serves to keep the members 36 and 33 in constant mesh and yet does not bind the member 36. It will be appreciated that the member 36, being generally in the form of an elongated shaft, may sag between its end supports. The members 37 also serve to overcome this tendency to sag.

The blocks 24 are adapted to be connected by means of a suitable chain 38 so that the distance between them will be limited. The two center blocks are connected to the cords 12. When the cords 12 are drawn the central blocks are likewise drawn, and as the blocks are drawn from the center toward the ends of the assembly, they

naturally engage successive blocks and urge the same to full drawn position. When the central blocks are drawn toward each other, the chains 38 tend to draw successive blocks into full closed position. The shaft 36 is adapted to be turned in any suitable manner and may preferably be turned by means of suitable gearing which may be of any type.

It is apparent from the foregoing therefore that I have provided a mechanism in which the means for turning the Venetian blind is in constant mesh with the operating mechanism so that regardless of the position of any block 24 along the slot 21, the slat 31 which that particular block 24 may support may be rotated about its vertical axis.

In the modification illustrated in Figure 4, I have provided a similar block 24*a* which is adapted to receive a short stud shaft 27*a*. The upper surface of the block is likewise slanted and is adapted to support a gear 41 which is secured to the stud shaft 27*a* by means of a pair of opposed springs 42. The teeth of the gear 41 are in constant mesh with the teeth of the shaft 36 so that upon rotation of the shaft 36, the gear 41 will be likewise rotated and rotation of the gear 41 will be imparted to the shaft 27*a* by the spring 42. In this manner it will be apparent that I have provided a slanted gear 41 which serves the purpose generally served by both of the gears 32 and 33 in the modification illustrated in Figures 1 to 3 inclusive. The method of hanging the Venetian blind from the stud shaft 27*a* differs from the method of hanging as viewed in Figures 1 to 3 inclusive. For example, the shaft 43 which extends downwardly from the stud 27 may be flared outwardly in the form of a truncated cone as generally indicated and may be engaged by a member 44, the upper portion of which is formed with a generally inverted conical surface which will cooperate with the similar conical surface on the member 43. The weight of the slat will cause the two conical surfaces to engage and the frictional engagement between the two surfaces will ordinarily be such that any motion imparted to the member 27*a* will be transmitted to the member 44 and the slat 31 which is suspended therefrom. The conical members might also be octagonal in cross-section and this modification could be successfully used when the gear 41 is provided with eight teeth. However should the slats 31 become set at varying angles with respect to each other, or more specifically, should they be displaced from their customary parallel positions for any reason, it is apparent that they may all be rotated about their vertical axes until they engage each other and become substantially coplanar. Further rotation of the shaft 36 and member 27*a* will cause those slats which are not parallel to come into engagement. Those slats which are in engagement will resist further movement and tend to overcome the frictional engagement between the members 27*a* and 43 even though the member 27*a* is continually rotated. In this manner it is apparent that devices which are constructed in accordance with this modification may be quickly and simply assembled and the great care with which the slats are now preliminarily set in parallel position need not be taken inasmuch as by a simple continued rotation of the shaft 36, all of the members 27*a* will continue to be rotated until all of the slats 31 are in engagement and are substantially coplanar.

In the modification illustrated in Figures 5 and 6 I have substituted a square shaft 51 for the toothed shaft 36. The square shaft 51 is adapted to cooperate with and serve as a mounting for a plurality of radially extending gears 52, which are provided with square holes which are slightly larger than the shaft 51, and by which they may be slid longitudinally along the shaft 51.

I provide a plurality of mounting blocks 53 which are provided with grooves 54 which engage the lips 22 and 23 of a head rail arrangement of the type described in connection with Figures 1 to 3 inclusive and to be slid longitudinally with respect thereto. The mounting block 53 is drilled to accommodate a vertical shaft 56 to which gear 57 is secured. Gear 57 occupies a generally horizontal position and is in constant mesh with the gear 52. Overhanging lip 58 which is formed integrally with the block 53 serves the same general purpose as the member 37 on the mounting block 24, to wit, support the shaft 51, and also serves to retain the gear 52 in constant mesh with the gear 57. The slat 31 may be supported from the shaft 56 in either of the manners specified in connection with the modifications illustrated in Figures 1 to 3 inclusive or Figure 4. At any rate it is apparent that upon rotation of the shaft 51, the gear 52 will be rotated as will the gear 57 and shaft 56 and slat 31. All of the mounting blocks 53 may be secured together by means of a simple tape or chain arrangement similar to the chain 38 as illustrated in Figure 2 so that the mounting blocks 53 may be moved horizontally along the member 10. However regardless of the position of the mounting blocks along their path of movement with respect to the member 10, the slats 31 may be rotated about their longitudinal axes.

In the modification illustrated in Figures 7 and 8 I have provided a different support for the mounting blocks. As illustrated in Figure 7 I provide a channel member 61 which is provided with lips 62 and 63 which are positioned in a vertical plane. The mounting blocks 64 are provided with grooves 66 which cooperate with the lips 62 and 63 in such a manner that the blocks 64 may be moved longitudinally along the member 61. The blocks 64 are made as illustrated in Figures 7 and 8 and are provided with vertical ears 67 and 68 which are, in turn, provided with aligned orifices 69 through which a toothed shaft 71, of the same type as the shaft 36 previously described in connection with Figures 1 to 3 inclusive hereof, may be mounted. The block 64 is also provided with a sloping upper wall 72 which accommodates a gear assembly which may be of the type previously described in connection with Figures 1 to 3 inclusive and its operation need not herein be further described. It will be apparent that this modification is substantially the same as the device illustrated in Figures 1 to 3 inclusive with the exception, however, that the modification provides for a side mounting of the blocks 64, rather than the top or hanging mounting of the block 24 as illustrated in Figures 1 to 3 inclusive. The side mounting as illustrated in Figures 6 and 7 renders the controls more easily accessible and also permits a less expensive construction. It is apparent, for example, that the head rail 10, of the type illustrated in Figures 1 to 3 inclusive, is more expensive than the rail construction 61 of the type illustrated in Figures 7 and 8. The method of moving the blocks 64 horizontally along the channel 61 is generally that which has previously been described herein. However as specifically illustrated in Figures 7 and 8 I have eliminated the chain attachment between the blocks 64 and have provided a different type of linkage as illustrated. Each link is provided with a body 76 which is pivotally mounted on the member 64. The body 76 is provided with an extending arm 77 and a recess 78 which is adapted to accommodate the arm 77 on the adjacent body 76. The arm 77 is provided with an enlarged portion 79 which will engage the walls of the recess 78 when the members 64 are separated. The engagement between the portions 79 and the walls of the recess 78 limits the separation of the members 64. However when the members 64 are urged toward each other the arm 77 will slide within the recess 78 until the members 64 are in engagement. It is apparent, therefore, that this simplified mechanism will permit adjacent members 64 to be drawn closely together and yet will limit their separation to the exact degree desired. The members 76 are pivoted with respect to the members 64 so that, as the members 64 approach each other, they

may pivot upwardly and serve to nest with respect to each other.

It is apparent from the foregoing that I have provided a vertical Venetian blind construction, with several modifications, in which slats may be rotated about their vertical axes at any position, either open, closed, or partially opened or closed. It is further apparent that these modifications illustrate a simplified form of support whereby the slats are always held in a truly vertical plane.

I claim:

1. In a vertical Venetian blind, an elongated horizontal support member, a plurality of mounting blocks slidably carried by said support member for longitudinal movement relative to said support member, a horizontal toothed shaft rotatably carried by said support member, means slidably connecting said blocks to said shaft for movement longitudinally of the shaft, a vertical shaft rotatably mounted in each of said blocks and rotatable about an axis at right angles to the axis of rotation of said toothed shaft, a vertical slat carried by each of said vertical shafts, a bevel gear connected to each of said vertical shafts and underlying the toothed shaft, each of said bevel gears being inclined from the horizontal so that only a predetermined number of teeth engage the toothed shaft whereby upon rotation of said toothed shaft said bevel gears and the vertical slats connected thereto will be rotated.

2. A vertical Venetian blind as in claim 1 together with means interconnecting said mounting blocks and serving to limit the spacing between the mounting blocks, said last named means including a plurality of interconnected relatively flexible links, and means for connecting each of said links to said mounting blocks, each of said links having an L-shaped arm and an opening in one end of said arm, the L-shaped arm of each of the links

being detachably connected to another link and being slidably accommodated within the opening of the link to which it is connected to permit relative sliding movement between the links.

3. In a vertical Venetian blind, an elongated horizontal support member, a plurality of mounting blocks slidably mounted in said support member for longitudinal movement relative to said support member, a horizontal toothed shaft rotatably carried by said support member, means slidably connecting said blocks to said shaft to permit movement longitudinally of the shaft, a vertical shaft rotatably mounted in each of said blocks and rotatable about an axis at right angles to the axis of rotation of said toothed shaft, a plurality of vertical slats, means connecting the upper ends of said slats to said vertical shafts, and gearing means connected to each of said vertical shafts and engaging said horizontal toothed shaft whereby upon rotation of said toothed shaft said gearing means will be rotated, said gearing means including bevel gears inclined from the horizontal.

4. A vertical Venetian blind as in claim 3 wherein the means for connecting said inclined bevel gears to said vertical shafts comprises additional gears fixed to said vertical shafts, said additional gears lying in a horizontal plane and having their teeth engaging the teeth of said inclined gears.

References Cited in the file of this patent

UNITED STATES PATENTS

2,591,775	Bopp et al.	Apr. 8, 1952
2,625,219	Peck	Jan. 13, 1953
2,635,686	King	Apr. 21, 1953
2,756,817	Toti	July 31, 1956