July 9, 1957 C. W. RICE ET AL 2,798,546

VENETIAN BLIND

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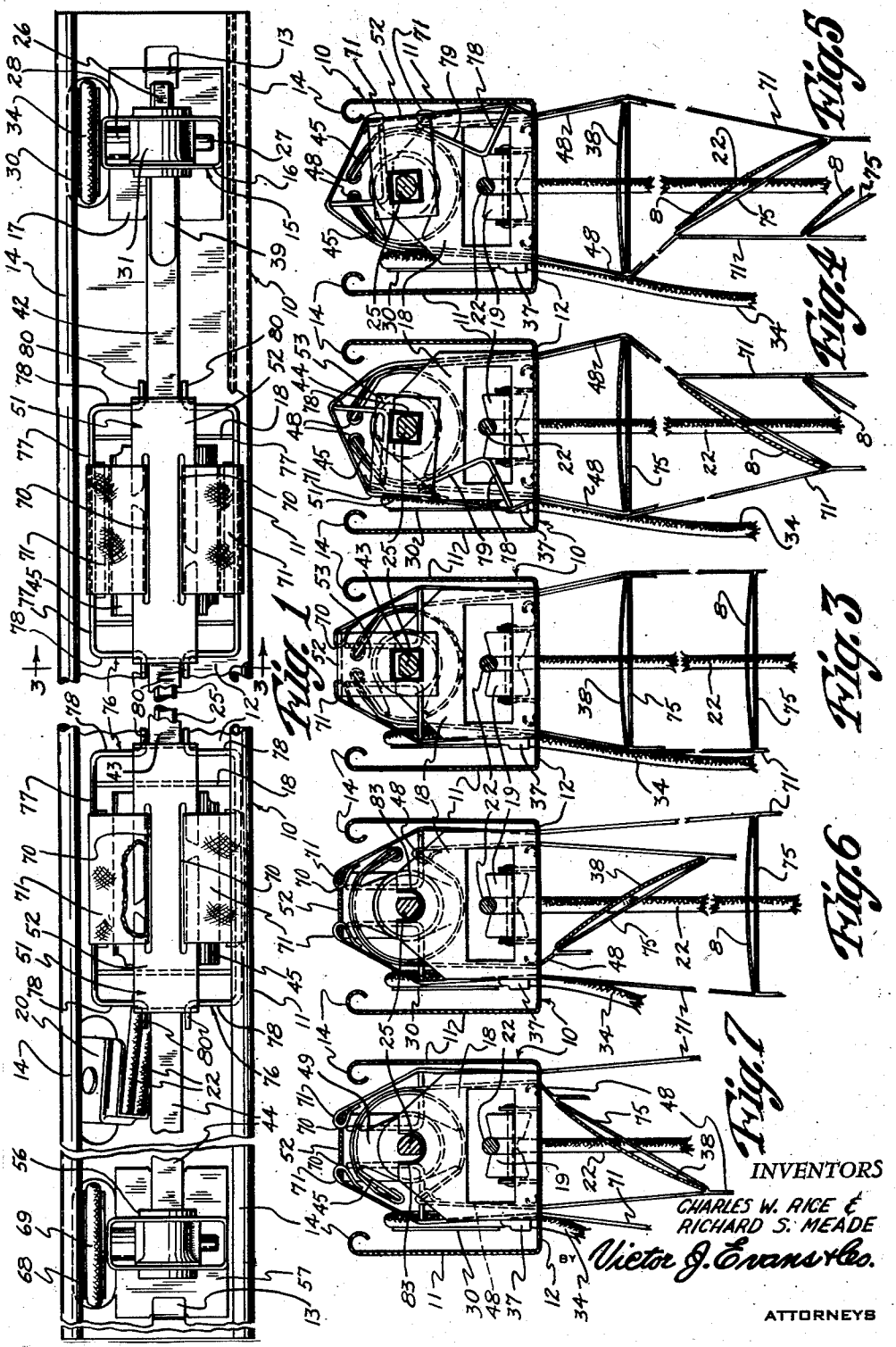

Fig. 1

Fig. 3

Fig. 4

Fig. 5

Fig. 6

Fig. 7

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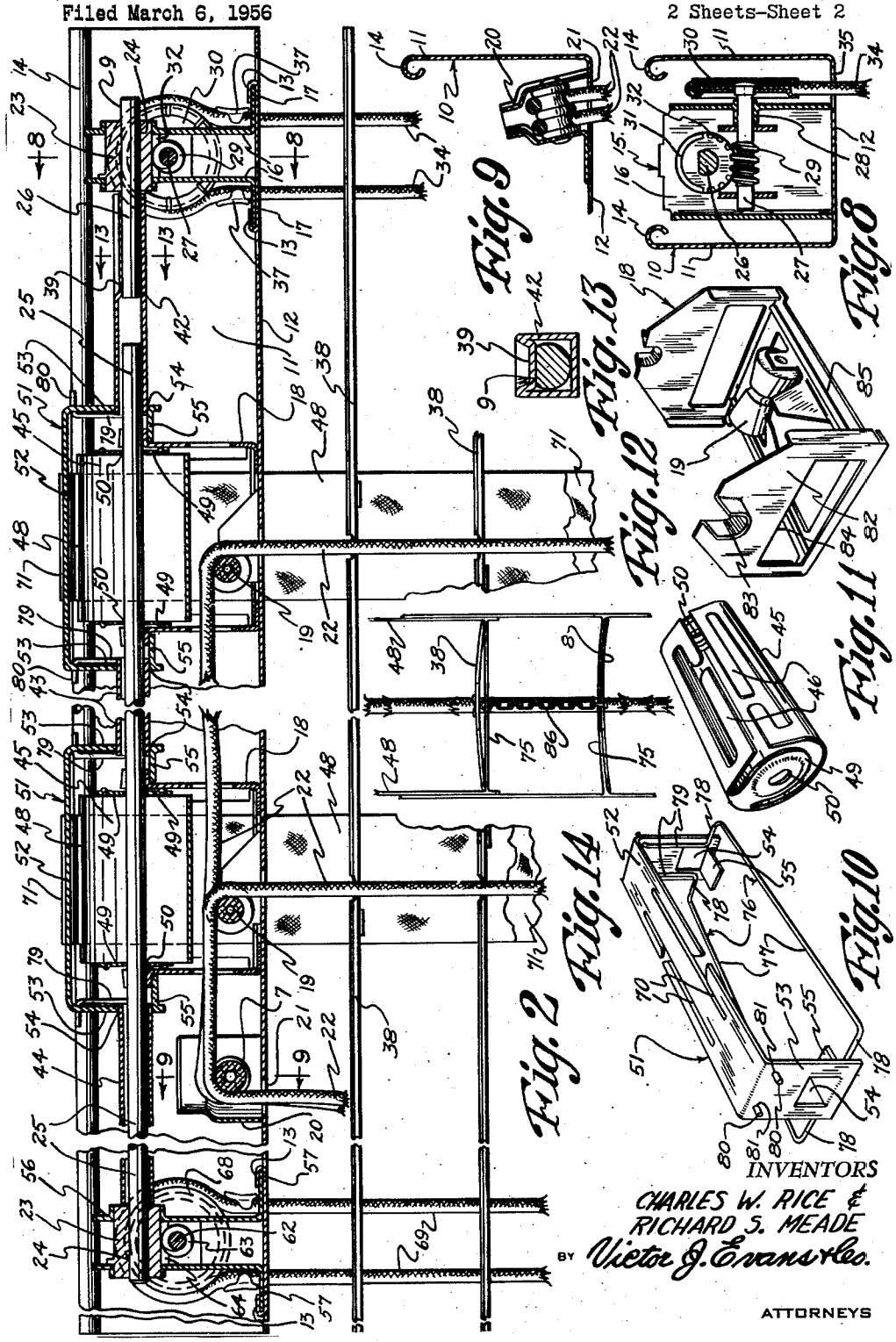

Fig. 2

Fig. 8

Fig. 9

Fig. 10

Fig. 11

Fig. 12

Fig. 13

Fig. 14

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VENETIAN BLIND

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4 Claims. (Cl. 160—115)

This invention relates to a Venetian blind construction.

This invention is an improvement over the Venetian blind construction shown and described in our copending applications, Serial No. 432,208, now U. S. Patent No. 2,757,726 and Serial No. 488,319, filed February 15, 1955.

The object of the invention is to provide a Venetian blind which is constructed so that there will be a minimum of friction between the parts and thereby the operation of the Venetian blind can be effected more smoothly and easily.

Another object of the invention is to provide a Venetian blind construction which includes wire separators for reducing friction between the tapes, and wherein the wire separators are used in lieu of the saddles of my copending application, Serial No. 488,319, and the present invention also including a novel operating mechanism, which permits independent adjustment or tilting of the upper slats or lower slats independently of each other.

Another object of the invention is to provide an improved operating mechanism for permitting upper and lower slats to be independently adjusted or tilted relative to each other, and whereby either the upper or lower groups of slats can be opened or closed regardless of the position of the other group of slats, there being a flexible equalizer between the upper and lower groups of slats, the present construction permitting a more compact unit which will not readily get out of order.

A further object of the invention is to provide a Venetian blind which is extremely simple and inexpensive to manufacture.

Other objects and advantages will be apparent during the course of the following description.

In the accompanying drawings, forming a part of this application, and in which like numerals are used to designate like parts throughout the same:

Figure 1 is a top plan view of the operating mechanism for the Venetian blind of the present invention.

Figure 2 is a longitudinal vertical sectional view taken through the operating mechanism of the Venetian blind.

Figure 3 is a sectional view taken on the line 3—3 of Figure 1.

Figures 4, 5, 6 and 7 are sectional views similar to Figure 3, but showing alternate positions of operation.

Figure 8 is a sectional view taken on the line 8—8 of Figure 2.

Figure 9 is a sectional view taken on the line 9—9 of Figure 2.

Figure 10 is a perspective view of one of the bases.

Figure 11 is a perspective view of one of the support members.

Figure 12 is a perspective view of a bracket.

Figure 13 is a sectional view taken on the line 13—13 of Figure 2.

Figure 14 is a fragmentary sectional view illustrating the flexible connecting member between the upper and lower groups of slats.

Referring in detail to the drawings, there is shown a

Venetian blind which includes a U-shaped housing 10 that embodies a pair of vertically disposed spaced parallel side walls 11 and a bottom wall 12. A lip 14 may be arranged on the upper edge of each of the side walls 11.

Arranged adjacent one end of the housing 10 is a first body member 15 which includes vertical portions 16 and a lower horizontal portion 17. The portion 17 of the body member 15 may be secured to the bottom wall 12 of the housing 10 as for example by means of struck-out portions 13, Figure 2.

There is further provided a pair of brackets 18, Figure 12, and the brackets 18 may be secured to the upper surface of the bottom wall 12 of the housing 10. A guide roller 19 is rotatably supported by each bracket 18.

Extending upwardly from the bottom wall of the housing and secured thereto is a support piece 20, and an opening 21 is arranged in the bottom wall 12 below the support piece 20. A cable 22 is trained over the guide rollers 19, and the cable 22 extends through the opening 21 in the bottom wall of the housing.

A second body member 56 is mounted in the housing adjacent one end thereof, and the body member 56 includes lower horizontal portions 57 which may be secured to the wall 12 of the housing 10. Bearings 23 are supported by each of the body members, and the bearings 23 may be provided with apertures 24. A first shaft 25 has one of its ends engaging one of the bearings, and there is further provided a second shaft 26 which is arranged in alignment with the first shaft 25, and the shaft 26 engages the apertures 24 in the other bearing 23. The second shaft 26 is provided with a flattened portion 9 for a purpose to be later described.

Connected to the body member 15 is a collar 28, and a stub shaft 27 is rotatably supported by the collar 28. A worm 29 is arranged on the stub shaft 27, and a pulley 30 is secured to one end of the stub shaft 27. A gear 31 is secured to the bearings 23, as shown at the right hand side of Figure 2, and the gear 31 is provided with teeth which engage the worm 29, Figure 8. A manually operable cable 34 is trained over the pulley 30, and the cable 34 extends down through an opening 35 in the bottom wall 12 of the housing 10. Guide portions 37 are arranged adjacent the pulley 30 for maintaining the cable 34 in proper position on the pulley.

The numeral 38 designates the slats of the upper group of slats, which are actuated by the cable 34. The numeral 8 designates the slats of the lower group of slats.

There is also provided a first, second and third hollow rectangular sleeve 42, 43 and 44, and these sleeves 42, 43 and 44 are mounted on the shafts 25 and 26, Figure 2. The first sleeve 42 has an indented portion 39 which engages the flat portion 9 of the shaft 26, Figure 13.

The operating mechanism of the present invention further includes a pair of support members 45 which are of generally cylindrical shape, Figure 11. Each of the support members 45 includes tongues 46, and a pair of flexible tapes 48 have their upper ends connected to the tongues 46. Each of the support members 45 further includes a pair of spaced parallel legs 49 which have openings 50 therein for projection therethrough of the shaft 25. One of the support members 45 may be arranged between the pair of sleeves 42 and 43, while the other support member is arranged between the pair of sleeves 43 and 44.

The bases 51 each includes a web 52 and a pair of spaced parallel bars 53, and each bar 53 has a rectangular opening 54 through which extends the corresponding end of one of the sleeves 42, 43 or 44. Ears 55 extend inwardly from each of the bars 53.

The second body member 56 serves to support a stub shaft 62 which has a worm 63 thereon, and gear teeth

64 on the adjacent bearing mesh with the worm 63. A pulley 68 is secured to one end of the stub shaft 62, and a cable 69 is trained over the pulley 68. The web 52 of each base 51 is provided with a pair of spaced parallel slots 70, and a pair of flexible tapes 71 are arranged in engagement with the slots 70. The lower group of slats 8 are connected to the tapes 71.

Flexible strips 75 extend between the tapes for supporting the slats, and the construction of these flexible strips is shown more in detail in my copending applications.

The present invention further includes a novel means for reducing or eliminating friction between the tapes, and this means comprises a pair of wire separators 76, and a pair of the wire separators 76 are pivotally connected to each base 51. Each separator 76 includes a first section 77, and extending at right angles from the ends of the first section 77 are second sections 78. The second sections 78 terminate in right angularly arranged sections 79, and the sections 79 terminate in right angularly arranged sections 80. The sections 80 are pivotally mounted in apertures 81 which are arranged in the bars 53 of the base 51.

Each of the brackets 18 may include a bottom wall 85 and spaced parallel side members 82, and the side members 82 may be provided with curved bearing portions 83. The side members 82 of the brackets 18 are further provided with cut-outs 84 to which portions of the cable 22 may extend.

The sections 77 and the separators 76 are interposed between the inner and outer tapes 48 and 71, and these separators serve to maintain adjacent portions of the inner and outer tapes spaced from each other, so that friction between the tapes will be eliminated or reduced.

From the foregoing it is apparent that there has been provided a Venetian blind regulating mechanism which is an improvement over the Venetian blind regulating mechanisms shown and described in my copending applications Serial No. 432,208 and Serial No. 488,319. The regulating mechanism of the present invention is adapted to be used with Venetian blinds of the type which include upper slats 38 and lower slats 8, and these slats 38 and 8 are adapted to be adjusted independently of each other. Thus, with the present invention the upper slats or lower slats can either be opened or closed so that light can be selectively blocked off or permitted to enter a room either through the top or bottom of the window, as desired.

In using the present invention, by manually pulling on the cable 34, the regulating mechanism will cause pivotal movement of the lower group of slats 8. Similarly, by pulling on the other cable 69, the upper group of slats 38 can be pivoted or tilted. By pulling on the cable 22, the entire set of upper and lower slats can be raised or lowered. A flexible chain or connecting member 86 extends between the lowermost slat 38 of the upper group of slats, and the upper slat 8 of the lower group of slats, Figure 14, and this connecting member 86 serves to maintain the parts in their proper relative positions.

The previously described operation takes place as follows: When the cable 34 is manually actuated, the pulley 30 is rotated and this rotates the stub shaft 27 which in turn rotates the shaft 26 through the medium of the gear teeth 29. Since the sleeve 42 has the flattened portion 39 engaging the flattened portion 9 of the shaft 26, this rotation of the shaft 26 causes rotation of the sleeve 42. The sleeve 42 has an end snugly seated in one of the openings 54 of the adjacent base 51, so that rotation of the sleeve 42 causes rotation of the base 51. The intermediate sleeve 43 interconnects the pair of bases 51 together so that the bases 51 rotate in unison. As the bases 51 rotate, they move the outer tapes 71, since the tapes 71 have their upper ends arranged in engagement with the slots 70 of the bases 51. Thus, since the outer tapes 71 are connected to the lower group of slats 8, then this manual movement of the cable 34 will result in tilting or pivotal movement of the lower slats 8 only.

The tilting or independent pivotal movement of the upper slats 38 results from manual movement of the cable 69 as follows: When the cable 69 is manually actuated, the pulley 68 is rotated and this rotates the stub shaft 62. As the stub shaft 62 rotates, it causes rotation of the shaft 25 through the medium of the gear teeth 63 which mesh with the gear teeth 64. The shaft 25 is free to rotate within the sleeves 44, 43 and 42. However, the shaft 25 has secured thereto the pair of support members 45. Thus, the support members 45 each are provided with a pair of apertures or openings 50 which have the same configuration as the outside of the shaft 25, so that as the shaft 25 rotates, it causes similar rotation or movement of the pair of support members 45. The inner tapes 48 have their upper ends connected to the tongues 46 of the support members 45, so that as the shaft 25 and support members 45 rotate, the inner tapes 48 are moved. The tapes 48 have the upper group of slats 38 connected thereto, so that this movement of the tapes 48 causes tilting or pivotal movement of the upper slats independent of the lower slats.

The flexible chain 86 serves to keep the upper and lower slats in their proper aligned positions regardless of the position of the parts.

The separators 76 include the straight sections 77 which are interposed between the inner and outer tapes, whereby the tapes will not rub against each other, so that friction will be eliminated or minimized. The ends 80 of the separators 76 are pivotally connected to the bars 53, so that the separators 76 are free to move as the tapes move, whereby there will be no interference with operation of the device. The chain 86 acts as a flexible equalizer between adjacent slats of the upper and lower groups of slats. The use of the wire separators 76 insure a smoother operation and permits the parts to be ruggedly constructed in a compact unit. A guide roller 7 is journaled in the support housing 20, and the guide roller 7 is engaged by the cable 22, and in the support housing 20 a cord lock is assembled and this cord lock enables or permits stopping of the cable 22 at any desired location. Furthermore, it is to be understood that more than three of the sleeves 42, 43 and 44 can be used, as when wider widths of blinds are being used. The ears 55 which extend inwardly from each of the bars 53 serve to lock the shaft assembly in the bearings of the member shown in Figure 12 and also act as spacers to hold the member shown in Figure 10 in the center of the member shown in Figure 12.

We claim:

1. In a Venetian blind, a housing including a bottom wall, first and second body members arranged in said housing adjacent the ends thereof, a pair of brackets secured to the upper surface of the bottom wall of the housing, guide rollers supported by said brackets, a support piece extending upwardly from the bottom wall of said housing and secured thereto, there being an opening in said bottom wall below said support piece, a guide roller journaled in said support piece, a cable trained over said guide roller and extending through the opening in said bottom wall below said support piece, a bearing supported by each of said body members and provided with an aperture, a first shaft having an end seated in an aperture of one of said bearings, a second shaft arranged in alignment with said first shaft and having an end engaging the aperture in the other bearing, said second shaft being provided with a flattened portion, a collar connected to each of said body members, a stub shaft rotatably supported by each of said collars and having a worm thereon, a pulley secured to an end of each of said stub shafts, a gear secured to each of said bearings and provided with a plurality of teeth engaging said worm, a manually operable cable trained over each of said pulleys, an upper group of slats actuated by one of said last named cables, a lower group of slats actuated by the other of said last

named cables, first, second and third hollow rectangular sleeves mounted on said shafts, said first sleeve having an indented portion engaging the flat portion of said second shaft, a pair of support members of generally cylindrical shape each including tongues, a pair of inner flexible tapes having their upper ends connected to said tongues, each of said support members further including a pair of spaced parallel legs each having an opening for the projection therethrough of said first shaft, a pair of U-shaped bases engaging said sleeves, a pair of outer flexible tapes arranged in engagement with each of said bases, and said lower group of slats being connected to said last named tapes, the upper group of slats being connected to the tapes which engage the tongues of the support members, and means for reducing friction between the inner and outer tapes.

2. In a Venetian blind, a housing including a bottom wall, first and second body members arranged in said housing adjacent the ends thereof, a pair of brackets secured to the upper surface of the bottom wall of the housing, guide rollers supported by said brackets, a support piece extending upwardly from the bottom wall of said housing and secured thereto, there being an opening in said bottom wall below said support piece, a guide roller journaled in said support piece, a cable trained over said guide roller and extending through the opening in said bottom wall below said support piece, a bearing supported by each of said body members and provided with an aperture, a first shaft having an end seated in an aperture of one of said bearings, a second shaft arranged in alignment with said first shaft and having an end engaging the aperture in the other bearing, said second shaft being provided with a flattened portion, a collar connected to each of said body members, a stub shaft rotatably supported by each of said collars and having a worm thereon, a pulley secured to an end of each of said stub shafts, a gear secured to each of said bearings and provided with a plurality of teeth engaging said worm, a manually operable cable trained over each of said pulleys, an upper group of slats actuated by one of said last named cables, a lower group of slats actuated by the other of said last named cables, first, second and third hollow rectangular sleeves mounted on said shafts, said first sleeve having an indented portion engaging the flat portion of said second shaft, a pair of support members of generally cylindrical shape each including tongues, a pair of inner flexible tapes having their upper ends connected to said tongues, each of said support members further including a pair of spaced parallel legs each having an opening for the projection therethrough of said first shaft, a pair of U-shaped bases engaging said sleeves, a pair of outer flexible tapes arranged in engagement with each of said bases, said lower group of slats being connected to said last named tapes, the upper group of slats being connected to the tapes which engage the tongues of the support members, and means for reducing friction between the inner and outer tapes, said means comprising a pair of separators pivotally connected to each of said bases, each of said separators including a first section, second sections extending at right angles from said first sections, third sections extending at right angles from said second sections, and fourth sections extending at right angles from said third sections, said fourth sections being pivotally connected to said bases.

3. In a Venetian blind, a housing including a bottom wall, first and second body members arranged in said housing adjacent the ends thereof, a pair of brackets secured to the upper surface of the bottom wall of the housing, guide rollers supported by said brackets, a support piece extending upwardly from the bottom wall of said housing and secured thereto, there being an opening in said bottom wall below said support piece, a guide roller journaled in said support piece, a cable trained over said guide roller and extending through the opening in said bottom wall below said support piece, a bearing supported by each of said body members and provided with an aperture, a first shaft having an end seated in an aperture of one of said bearings, a second shaft arranged in alignment with said first shaft and having an end engaging the aperture in the other bearing, said second shaft being provided with a flattened portion, a collar connected to each of said body members, a stub shaft rotatably supported by each of said collars and having a worm thereon, a pulley secured to an end of each of said stub shafts, a gear secured to each of said bearings and provided with a plurality of teeth engaging said worm, a manually operable cable trained over each of said pulleys, an upper group of slats actuated by one of said last named cables, a lower group of slats actuated by the other of said last named cables, first, second and third hollow rectangular sleeves mounted on said shafts, said first sleeve having an indented portion engaging the flat portion of said second shaft, a pair of support members of generally cylindrical shape each including tongues, a pair of inner flexible tapes having their upper ends connected to said tongues, each of said support members further including a pair of spaced parallel legs each having an opening for the projection therethrough of said first shaft, a pair of U-shaped bases engaging said sleeves, a pair of outer flexible tapes arranged in engagement with each of said bases, said lower group of slats being connected to said last named tapes, the upper group of slats being connected to the tapes which engage the tongues of the support members, and means for reducing friction between the inner and outer tapes, said means comprising a pair of separators pivotally connected to each of said bases, each of said separators including a first section, second sections extending at right angles from said first sections, third sections extending at right angles from said second sections, and fourth sections extending at right angles from said third sections, said fourth sections being pivotally connected to said bases, and a flexible equalizer extending between the upper and lower groups of slats.

4. In a Venetian blind, a housing including a bottom wall, first and second body members arranged in said housing adjacent the ends thereof, a pair of brackets secured to the upper surface of the bottom wall of the housing adjacent the ends thereof, a pair of brackets secured to the upper surface of the bottom wall of the housing, guide rollers supported by said brackets, a support piece extending upwardly from the bottom wall of said housing and secured thereto, there being an opening in said bottom wall below said support piece, a guide roller journaled in said support piece, a cable trained over said guide roller and extending through the opening in said bottom wall below said support piece, a bearing supported by each of said body members and provided with an aperture, a first shaft having an end seated in an aperture of one of said bearings, a second shaft arranged in alignment with said first shaft and having an end engaging the aperture in the other bearing, said second shaft being provided with a flattened portion, a collar connected to each of said body members, a stub shaft rotatably supported by each of said collars and having a worm thereon, a pulley secured to an end of each of said stub shafts, a gear secured to each of said bearings and provided with a plurality of teeth engaging said worm, a manually operable cable trained over each of said pulleys, an upper group of slats actuated by one of said last named cables, a lower group of slats actuated by the other of said last named cables, first, second and third hollow rectangular sleeves mounted on said shafts, said first sleeve having an indented portion engaging the flat portion of said second shaft, a pair of support members of generally cylindrical shape and each including tongues, a pair of inner flexible tapes having their upper ends connected to said tongues, each of said support members further including a pair of spaced parallel legs for the projection therethrough said first shaft, a pair

of U-shaped bases engaging said sleeves, a pair of outer flexible tapes arranged in engagement with each of said bases, said lower group being connected to said last named tapes, the upper group of slats being connected to the tapes of the support members, and means for reducing friction between the inner and outer tapes, said means comprising a pair of separators pivotally connected to each of said bases, each of said separators including a first section, second sections extending at right angles from said first sections, third sections extending at right angles from said sections, and fourth sections being pivotally connected to said bases, and a flexible equalizer extending between the upper and lower group of slats, each of said bases including a web and a pair of spaced parallel bars, each of said bars being provided with a rectangular aperture for the projection therethrough of the corresponding end of one of the sleeves.

No references cited.