Oct. 15, 1957 W. F. SHARPE 2,809,693

VERTICAL BLIND CONSTRUCTION

Filed July 24, 1956

Fig. 1

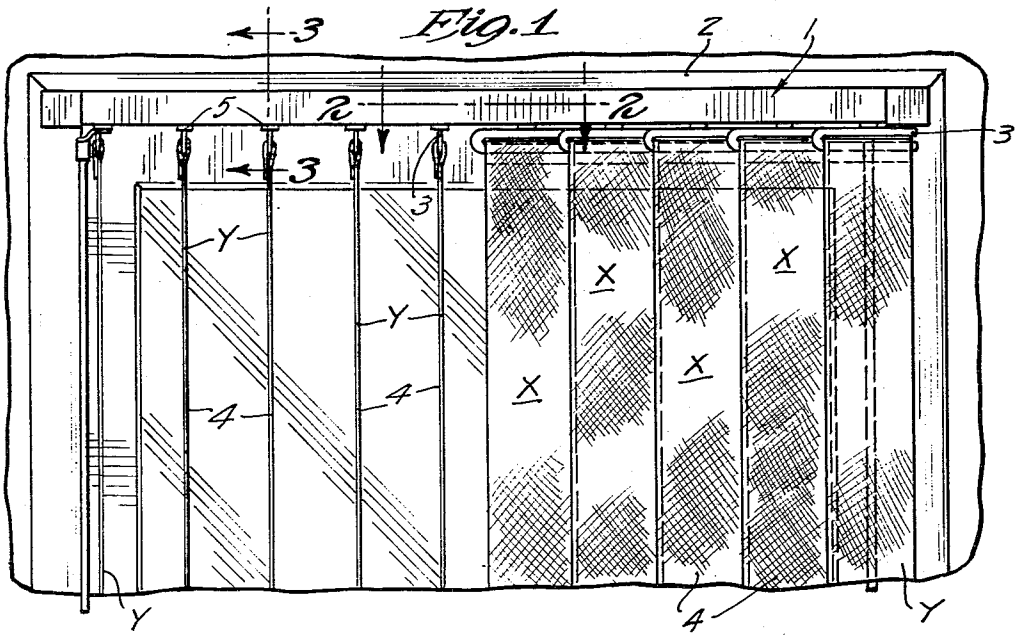


Fig. 2

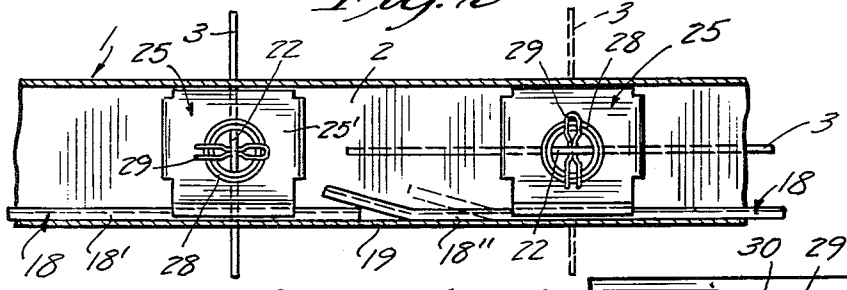


Fig. 3

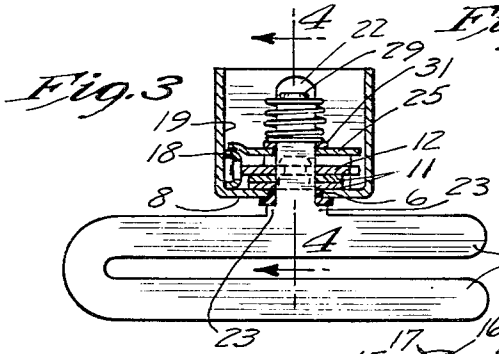


Fig. 4

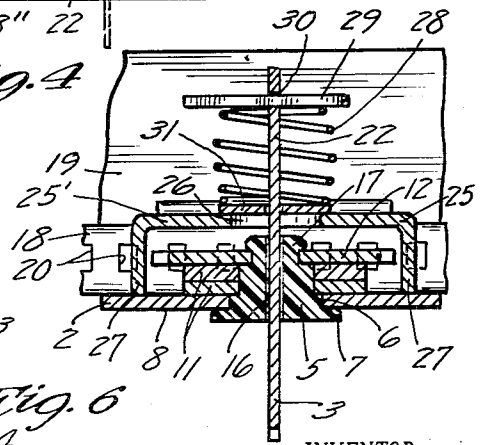


Fig. 5

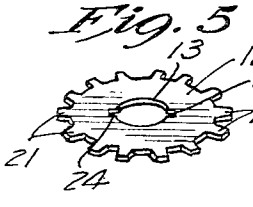
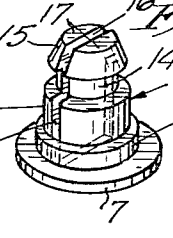


Fig. 6



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VERTICAL BLIND CONSTRUCTION

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5 Claims. (Cl. 160—176)

My invention relates generally to window shutters or blinds and, more particularly, to improvements in vertical blinds which include a plurality of parallel slats formed from fabric strips.

Still more specifically my invention relates to improvements in vertical blind construction of the type disclosed in my Patent No. 2,717,034.

The primary object of my invention is the provision of novel support and operating mechanism for the vertical slats which reduces friction between the several relatively movable parts to a minimum and thus enables the operator to manually simultaneously adjust the slats on their vertical axes with a minimum of effort and with a maximum of smoothness of operation.

A further object of my invention is the provision of a device of the class above described wherein the components may be assembled into operative working relationship with a minimum of skill and in a minimum of time.

A still further object of my invention is the provision of a device of the class immediately above described which is relatively inexpensive to produce, which is fool proof in its operation and which is extremely durable.

The above and still further objects of my invention will become apparent from the following detailed specification, appended claims, and attached drawings.

Referring to the drawings, wherein like parts are indicated by like characters throughout the several views:

Fig. 1 is a fragmentary view in front elevation of a vertical adjustable window blind, built in accordance with my invention;

Fig. 2 is an enlarged fragmentary view partly in top plan and partly in section as seen substantially from the line 2—2 of Fig. 1;

Fig. 3 is an enlarged view partly in vertical section and partly in side elevation as seen substantially from the line 3—3 of Fig. 1;

Fig. 4 is an enlarged fragmentary view in section as seen substantially from the line 4—4 of Fig. 3;

Fig. 5 is a perspective view of the gear utilized in my novel construction; and

Fig. 6 is a perspective view of the grommet-like bearing element of my invention.

Referring with greater particularity to the drawings, the numeral 1 indicates in its entirety an elongated U-shaped channel adapted to be secured horizontally to a window adjacent its upper or lower frame section, by any suitable means. In Fig. 1 only the channel 1 secured to the upper window frame section 2 is shown. It follows that the channel 1 secured to the lower frame section of the window would be inverted so as to cause the bottoms 2 of the channels 1 to be in opposed relationship, as shown in my earlier Patent No. 2,717,034. It is the bottoms 2 of the channels 1 which become mounting plates for the longitudinally spaced hooks 3 for the reception of the opposite ends of the flexible slats 4.

Supporting and operating structure for the hooks 3 comprises grommet-like bearing elements 5 receivable in and projecting one each through longitudinally spaced

transversely centered apertures 6 in the bottoms 2 of the channels 1. Bearing elements 5 are preferably formed from nylon or other like material which is not only resilient, for a purpose which will hereinafter become apparent, but also which offers a minimum of frictional resistance as it is rotated in its cooperating aperture 6. As shown, the bearing elements 5 are provided with enlarged annular head acting flange portions 7 which are adapted to rest upon the outer surface 8 of the bottom 2 of the channel 1 radially of its cooperating opening 6. Immediately axially inwardly of the enlarged head acting flange portion 7, the bearing elements 5 are provided with cylindrical bearings 9 which are of a diameter only slightly less than the diameter of the apertures 6 and of an axial depth corresponding approximately to the thickness of the material from which the bottoms 2 of the channels 1 are formed. Axially inwardly of the cylindrical bearing 9 is a reduced cylindrical portion 10 for the mounting of a pair of combination spacer and antifriction washers 11 which are interposed between the bottoms 2 of the channel 1 and gears 12. As shown particularly in Figs. 3 and 4, gears 12 are provided with central apertures 13 which snugly receive the still further reduced cylindrical portions 14 of the bearing elements 5. The enlarged axially inwardly tapering radially enlarged heads 15 on the extreme inner ends of the bearing elements 5 retain the gears 12 in operative position thereon.

As shown, the bearing elements 5 have relatively narrow axial openings 16 therethrough which are of a width corresponding approximately to the reduced cylindrical portion 10. Therefore, as shown in Fig. 6, the entire reduced inner ends of the bearing elements 5, from the cylindrical bearing portions 9 to the tapered heads 15 are bifurcated to define flexible resilient normally spaced jaws 17, for a purpose which will hereinafter become apparent.

In assembling my novel construction a bearing element 5 is caused to assume the position shown in Fig. 4 with the enlarged head acting flange portion 7 in engagement with the outer surface 8 of the bottom 2 of the channel 1, whereby the reduced inner end portions 10, 14 and 15, which together define the resilient jaws 17, project inwardly of the channels 1 beyond the bottoms 2 thereof. Thereafter the spacing washers 11 are placed about the reduced cylindrical portion 10. Note that the axial depth of the cylindrical portion 10 corresponds approximately to the combined thickness of the washers 11. Next, longitudinally extended racks 18 are placed in position on the bottom 2 of the channel 1, in engagement with one of the side walls 19 thereof with the spaced gear teeth receiving openings 20 facing the transverse center of the channel. Next, a gear 12 is positioned so that the teeth 21 thereof are received in the cooperating openings 20 in the rack 18, immediately opposite the bearing element 5. Pressure is now exerted upon diametrically opposite sides of the gear 12 to cause contraction of the resilient jaws 17, whereby to cause the tapered head acting end 15 to pass through the opening 13 in said gear 12. When the gear 12 becomes seated on the reduced cylindrical portion 14, the resilient jaws 17 will snap back so as to cause the tapering heads 15 to lock the gear 12 against axial movements, see Fig. 4.

The next step in assembly comprises the passage of the flat shaft 22 inwardly through the relatively narrow axial openings 16 in the bearing elements 5. Note that the spacing shoulders 23 engage the head acting flange portion 7 so as to space the hooks 3 therefrom and from the bottoms 2 of the channels 1. Note also that the shafts 22 are snugly receivable in the opening 16, and hence are of a width approximating the diameter of the cylindrical portion 10 of the bearing elements 5 but greater than

the diameter of the cylindrical portion 14 thereof and diameter of the central openings 13 in the gears 12. Hence, the openings 13, at diametrically opposed points, define keyways 24 for the snug reception of the opposite, key-acting sides of the shaft 22. Obviously, insertion of the shaft 22 between the resilient jaws 17 positively locks the gears 12 on the cylindrical portions 14. Plate-like saddle members 25, preferably and as shown being generally rectangular in form and of a width to be snugly received between the opposite walls 19 of the channel 1, are next placed in position over the gears 12 and rack 18. Note that the saddles 25 have central apertures 26 which are of a diameter slightly greater than the width of the shafts 22 so as to permit rotation of the latter with respect to the former. Also, the saddles 25 have depending legs 27 which space the horizontal plate-like portions thereof 25' in spaced relation to said gear 12 and rack 18. A coil compression spring 28 is finally interposed between the saddles 25 and a cotter key or the like 29 passing through an opening 30 in the extreme inner end of the shaft 22. Preferably and as shown, an antifriction washer 31 is interposed between one end of the spring 28 and the plate-like portion 25' of the saddle 25.

When a plurality of hooks 3 and their cooperating shafts 22 are mounted within a given channel 1, as above described, all thereof which are operatively connected to a given rack 18 will be caused to rotate simultaneously, for the purpose of controlling the light to a desired extent, between the extremes illustrated at the left of Fig. 1, wherein the slats 4 are spaced in parallel relationship at right angles to the channels 1, to the position illustrated at the right of Fig. 1, wherein the slats 4 are in substantially the same vertical plane, with the edges of one slat 4 overlapping the edges of the adjacent slat 4. Obviously rotation of the several hooks 3 causes rotation of the shafts 22, the bearing elements 5, the gears 12, and the cotter keys 29 associated with each thereof, the coil springs 28, the saddles 25 and the antifriction washers 31 and 11 reducing friction to a minimum and creating a maximum of smoothness of operation. Obviously, the turning of any one of the hooks 3 or shafts 22 associated therewith, will impart identical movements to all hooks 3, the associated gears 12 of which are connected to a common rack 18. Any suitable means, such as the shaft 31 of my Patent No. 2,717,034 suffices for this purpose.

In the structure of Figs. 1 and 2, I have shown two independent rack sections 18' and 18" respectively which are longitudinally aligned, with the adjacent end of the latter being bent laterally toward the center of the channel 1 to permit the adjacent end of the other section 18' to pass thereby without direct abutment. This novel arrangement permits separate groups of independently controllable slats 4 to be mounted in a given channel 1. Thus, in Fig. 1 the group of slats 4 at the right, is designated by the letter X, all thereof being directly associated with and controlled by movements of the rack 18" or any hook 3 associated therewith. On the other hand, all of the slats 4 on the left side of Fig. 1 make up a group identified by the letter Y. All of these hooks are associated with and controlled by the movements of the rack 18'. This novel arrangement makes possible any desired arrangement of a given group of slats 4 according to the desires of those affected by any given group. Note, by reference to Fig. 2, the overlapping of the adjacent ends of the rack sections 18', 18" which the varied positions of the slats 4 making up groups X and Y effects.

My novel invention has been thoroughly tested and found to be completely satisfactory for the accomplishment of the above objects; and while I have disclosed a preferred embodiment thereof, it should be obvious that same is capable of modification without departure from the scope of the appended claims.

What I claim is:

1. A support and operating structure for a window blind having vertically disposed parallel slats, said support and operating structure comprising an elongated U-shaped channel adapted to be secured horizontally to a window adjacent its upper or lower frame section, the bottom of said channel being provided with aligned longitudinally spaced circular openings, grommet-like bearing elements extending through and journaled for rotation in each of said openings, said bearing elements having flange portions which are adapted to rest upon the outer surface of said channel bottom radially of said openings and having diametrically reduced inner end portions receivable within said channel, said bearing elements having relatively narrow axial openings therethrough which bifurcate the reduced inner ends thereof and define therewith flexible resilient normally spaced jaws, said jaws having diametrically enlarged head portions at their extreme inner ends, a gear for each of said bearing elements, said gears having central apertures adapted to receive the enlarged head portions of said jaws when the same are moved radially toward each other, said gears being locked on said bearing elements against axially inward movement when said jaws are permitted to return to their normal spaced relationship, the central apertures of said gears defining keyways, shafts snugly slidably receivable one each in each of said bearings and each thereof having slat receiving hooks at their outer ends, said shafts defining keys receivable in said keyways, an elongated rack within said channel having meshing engagement with said gears to impart common rotation thereto, and means yieldingly biasing said shafts in a direction to cause the hooks carried thereby to move toward the bottom of said channel.

2. The structure defined in claim 1 in which the reduced bifurcated inner end portions of said bearing elements define circumferentially extended shoulders which are axially spaced from the bottom of the channel and which limit axial movements of the gears toward the bottom of the channel, and in further combination with antifriction spacer means interposed between each of said gears and the bottom of said channel.

3. The structure defined in claim 2 in further combination with saddle members having central openings rotatably receiving one of each one of said shafts axially inwardly of one of said gears, said saddle members having feet which engage the bottoms of said channels and space same from said gears and from said rack.

4. The structure defined in claim 3 in which said yielding means is in the nature of coil compression springs one each encompasing one of said shafts and interposed between a cooperating one of said saddle members and a pin removably received in the extreme outer ends of said shafts.

5. A support and operating structure for a window blind having vertically disposed parallel slats, said support and operating structure comprising an elongated mounting member adapted to be secured horizontally to a window adjacent its upper or lower frame section, said mounting member being provided with aligned longitudinally spaced circular openings, grommet-like bearing elements extending through and journaled for rotation in each of said openings, said bearing elements having flange portions which are adapted to rest upon one surface of said mounting member radially of said openings and having diametrically reduced inner end portions adapted to project through said openings, said bearing elements having relatively narrow axial openings therethrough which bifurcate the reduced inner ends thereof and define therewith flexible resilient normally spaced jaws, said jaws having diametrically enlarged head portions at their extreme inner ends, a gear for each of said bearing elements, said gears having central apertures adapted to receive the enlarged head portions of said jaws when the same are moved radially toward each other, said gears being locked on said bearing elements against axially inward move-

ment when said jaws are permitted to return to their normal spaced relationship, the central apertures of said gears defining keyways, shafts snugly slidably receivable one each in each of said bearings and each thereof having slat receiving hooks at their outer ends, said shafts defining keys receivable in said keyways, an elongated rack in closely spaced parallel relation to said mounting member and having meshing engagement with said gears to impart common rotation thereto, and means yieldingly biasing said shafts in a direction to cause the hooks carried thereby to move toward said mounting member.

No references cited.