Nov. 17, 1964 J. P. ARENA ETAL 3,157,223

VERTICAL BLINDS

Filed Dec. 21, 1962

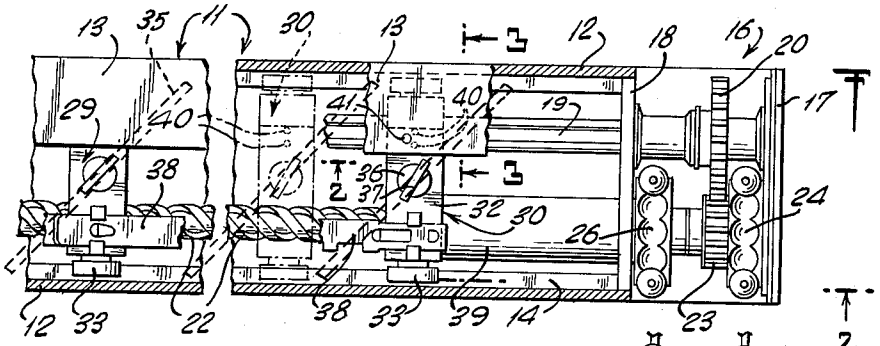


FIG. 1.

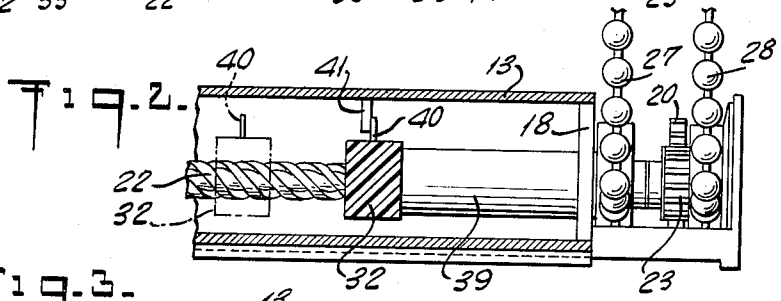


FIG. 2.

FIG. 3.

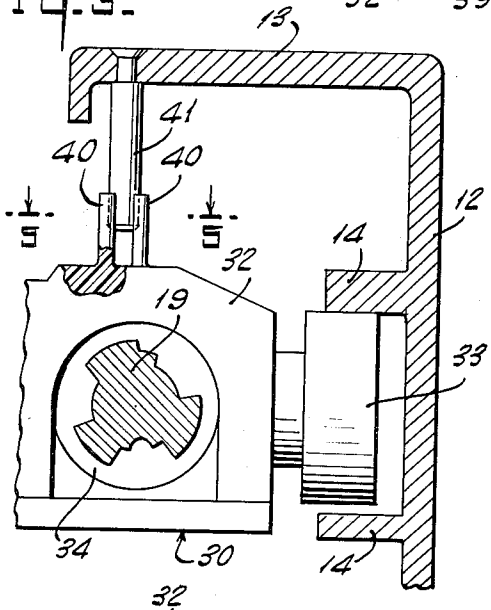


FIG. 4.

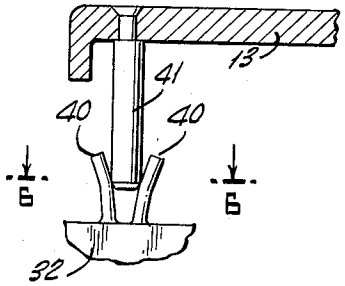


FIG. 6.

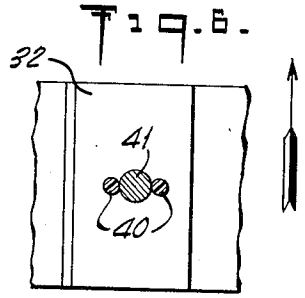
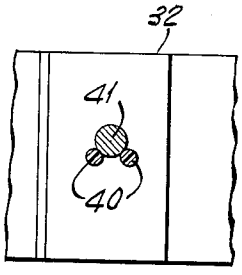


FIG. 5.



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VERTICAL BLINDS

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The present invention relates generally to improvements in blind structures and it relates more particularly to an improved vertical blind structure provided with means for controlling the position of the trailing slat.

A conventional type of vertical blind now in widespread use includes a pair of upper and lower longitudinally extending track members which slidably engage vertically aligned pairs of longitudinally spaced carriages. The carriages are provided with vertical spindles for engaging the ends and controlling the angles of the slats and the spindles are coupled to a common control mechanism so that the slat angles are uniformly and simultaneously adjustable. The traverse mechanism includes collapsable spacer members connecting successive carriages and means for advancing and retracting the leading carriage whereby to expand and contract the blind by moving the carriages to their respective extended and retracted positions. The positioning of the trailing slat and carriages present a problem. Under normal operating conditions the trailing slat should not be advanced since such movement opens and exposes the sides of the window and is thus unsightly and contrary to the proper and desirable operation of the blind. On the other hand it is frequently desirable to advance the trailing slat from its normal end position to afford access to the corresponding area for cleaning, servicing or other purposes. Arrangements have been proposed for solving this problem but these arrangements possess many disadvantages and drawbacks. They are unreliable and subject to malfunctioning, they may interfere with the normal operation of the vertical blind and otherwise leave much to be desired.

It is thus a principal object of the present invention to provide an improved blind structure.

Another object of the present invention is to provide a vertical blind structure having an improved slat control mechanism.

Still another object of the present invention is to provide an improved vertical blind structure having means for controlling the advance movement of the trailing slats whereby to selectively provide access to the side areas of the blind.

A further object of the present invention is to provide an improved vertical blind structure of the above nature characterized by its simplicity, ruggedness, reliability and versatility.

The above and other objects of the present invention will become apparent from a reading of the following description taken in conjunction with the accompanying drawing, wherein:

FIGURE 1 is a fragmentary bottom plan view, partially in section, of a vertical blind traverse mechanism embodying the present invention, the trailing and leading carriages being shown by full line in their retracted and advanced positions respectively, and the trailing carriage being shown by broken line in an advanced position;

FIGURE 2 is a sectional view taken along line 2—2 in FIGURE 1;

FIGURE 3 is an enlarged detailed fragmentary sectional view taken along line 3–3 in FIGURE 1;

FIGURE 4 is a fragmentary view similar to FIGURE 3, the trailing carriage being shown in an advancing position;

FIGURE 5 is a sectional view taken along line 5—5 in FIGURE 3; and

FIGURE 6 is a sectional view taken along line 6—6 in FIGURE 4.

In a sense the present invention contemplates the provision of a vertical blind structure comprising a longitudinally extending guide member, a plurality of longitudinally spaced carriages longitudinally movable along said guide member and engaging respective vertical slats and including a leading carriage and a trailing carriage, spacer elements connecting successive of said carriages to limit the relative longitudinal movement thereof, means for selectively advancing and retracting said leading carriage whereby to expand and contract said carriages, and relatively stationary means located on said guide member and releasably restricting the longitudinal movement of said trailing carriage.

According to a preferred form of the present structure a track is defined by ribs directed inwardly from the side legs of a longitudinally extending guide member defining channel including a flange directed inwardly from the end of one of said side legs. The trailing carriage includes a housing formed of a synthetic organic thermosplastic resin and the first abutment member is defined by a pair of laterally spaced resilient fingers formed integrally with the carriage housing and projecting therefrom toward said channel flange. The second abutment member is defined by a stationary pin projecting from the channel flange toward the trailing carriage and in longitudinal alignment with the space between the fingers. The stationary pin is wider than the space between the fingers to prevent the movement of the carriage and the fingers past the stationary pin unless sufficient pressure is applied to the carriage to effect the spreading of the fingers by the pin bearing thereon and the passage of the fingers past the pin. It should be noted that any pull applied to the trailing carriage by the leading carriage attendant to the expansion of the blind is normally insufficient to effect the spread of the resilient fingers and the advance of the trailing carriage. However, the trailing carriage may be moved past the abutment pin in either direction merely by manually grasping the trailing slot and pulling it and the associated carriages in the desired direction.

Referring now to the drawing which illustrates a preferred embodiment of the present invention, the reference numeral **10** generally designates a vertical blind upper traversing mechanism affixed in a suitable manner to the head of a window or other area, a complementing counterpart thereof being disposed along the bottom of the area, if so desired. The traversing mechanism **10** is described in detail in the copending patent applicant of Joseph P. Arena and Robert J. Smith, Serial No. 239,204, filed November 21, 1962, and comprises a longitudinally extending horizontal channel member **11** including a cross web and depending side legs **12** which terminate in inwardly directed flanges **13** the confronting edges of which are turned upwardly and delineate a longitudinally ex-

tending medial slot. Also directed inwardly from each of the legs 12 are a track defining pair of vertically spaced longitudinally extending ribs 14.

A gear bearing bracket 16 is mounted at one end of the channel member 11 and is provided with a remote end wall 17 and is partitioned from the channel member 11 by a transverse panel 18. A splined rod 19 extends longitudinally along the length of the channel member 11 at the level of the tracks 14 and is transversely offset relative to the medial axis of the channel member. An end of the splined rod 19 projects through and is journalled to the panel 18 and has affixed thereto a first gear 20. A threaded rod 22 also extends longitudinally along the channel member 11 at the level of and transversely opposite to the splined rod 19 and has an end journalled to and projecting through the panel 18. A pinion 23 engaging the gear 20 is rotatable on the end of the rod 22 and has affixed thereto a sprocket wheel 24. A second sprocket wheel 26 is affixed to the threaded rod 22. Ball chains 27 and 28 engage the sprocket wheels 24 and 26 respectively to facilitate the rotation thereof and the rods 19 and 22 therewith.

A plurality of longitudinally spaced carriages including a leading carriage 29 and a trailing carriage 30 are associated with the channel member 11. Each of the carriages includes a transversely extending housing 32 formed of a synthetic thermoplastic resin and provided with integrally formed transversely projecting axles which carry corresponding rollers 33 riding along the respective tracks 14. A worm gear 34 is journalled in each of the housings 32 and has an axial bore corresponding in cross section to that of the rod 19 and slidably engages the splined rod 19 and is rotatable therewith. Engaging each of the worm gears 34 is a vertical gear medially journalled in the housings 32 and provided with an axial spindle 36 carrying a spring loaded coupling element 37 engaging the end of a respective vertically tensioned slat 35, shown by broken line in FIG. 1.

The leading carriage 29 is provided with a follower member which engages the threaded rod 22 and the other carriages have axial bores formed therein which slidably register with the threaded rod 22. Successive of the carriages are interconnected by spacer links 38 each having a trailing end anchored to each of the carriages and slidably related to the spacer link anchored to the next successive carriage and urged into releasably locked engagement therewith when the carriages are spread to their extended positions. The carriages and associated linkage are described in detail in the above identified Arena et al. application. The angle of the blind slats are simultaneously adjusted by manipulation of the chain 24 which rotates the splined rod 19 which concurrently rotates the spindles 36 by way of the worm gears 34. The rotation of the threaded rod 22 by manipulation of the chain 26 effects the advance and retraction of the leading carriage 29 which in turn extends the plurality of carriages into regularly spaced relationship as determined by the links 38 and compactly contracts the carriages respectively.

In accordance with the present invention, means are provided for releasably locking the trailing carriage 30 in its predetermined fully retracted position substantially abutting the inner end of a tubular bumper element 39 registering with the rod 22 adjacent the panel 18 and formed of polyethylene or the like. Formed integrally with the housing 32 are a pair of transversely spaced parallel resilient cylindrical fingers 40 projecting from the trailing carriage housing 32 toward the confronting flange 13 adjacent to its free end. Projecting from the inner face of the flange 13 toward the confronting face of the housing 32 is an abutment defining cylindrical pin 41 suitably affixed to the flange 13. The pin 41 is of a diameter slightly less than the center to center distance of the fingers 40 and greater than the space between the pins 40 and it extends to a point substantially above the bases of the pins 40. Further, the pin 41 is in longitudinal medial alignment with the space between the fingers 40, being disposed in abutment with or shortly forward of the front faces of the fingers 40.

In operation, the blind may be closed by advancing the leading carriage 29 to expand the carriages in the manner described above, the pin 41 engaging the fingers 40 to restrain the trailing carriage 30 from advancing forward of its retracted position. However, if access to the side of the blind covered area is desired, the trailing vertical slat is grasped and advanced longitudinally to impart a corresponding longitudinal force to the trailing carriages 30. The resultant force should be sufficient to effect the spreading of the fingers 40 as they bear on the pin 41, as seen in FIGS. 4 and 6 and thereby permit the passage of the fingers 40 past the pin 41 and the release of the trailing carriage 30 and further manual advance movement. The carriage 30 may be returned to its retracted position in an opposite manner.

It should be noted that the cooperating releasable locking members, as exemplified by the pin 41 and fingers 40, may be otherwise positioned on the channel member 11 and trailing carriage 30. In addition the resilient abutment element may be mounted on the channel member 11 instead of on the carriage 30 and the carriage abutment member may be rigid, or both abutment members may be resilient.

While there has been described and illustrated a preferred embodiment of the present invention, it is apparent that numerous alterations, omissions and additions may be made without departing from the spirit thereof.

What is claimed is:

1. A vertical blind structure comprising a longitudinally extending guide member, a plurality of longitudinally spaced carriages longitudinally movable along said guide member and engaging respective vertical slats and including a leading carriage and a trailing carriage, spacer elements connecting successive of said carriages to limit the relative longitudinal movement thereof, means for selectively advancing and retracting said leading carriage whereby to expand and contract said carriages, a first abutment member located on said trailing carriage and a second stationary abutment member located on said guide member and disposed in the path of said first abutment member and just forward thereof when said trailing carriage is in its fully retracted position, at least one of said abutment members being resilient to releasably restrict the mutual bypassing of said abutment members.

2. The vertical blind structure of claim 1 wherein said resilient abutment member comprises a resilient arm.

3. The vertical blind structure of claim 1 wherein said resilient abutment member is located on said trailing carriages and comprises a pair of laterally spaced resilient first fingers and said other abutment member comprises a second finger in alignment with the space between said first fingers and of greater width than said space.

4. The vertical blind structure of claim 3 wherein said trailing carriage is formed of a synethetic organic resin and said first fingers are integrally formed therewith.

5. The vertical blind structure of claim 3 wherein said second finger comprises a relatively rigid pin.

6. A vertical blind structure comprising a longitudinally extending channel including a cross web and side legs and a flange directly inwardly from said side legs and track defining ribs directed inwardly from said side legs, a plurality of longitudinally spaced carriages slidable along said track and including a leading carriage and a trailing carriage, spacer elements connecting successive of said carriages to limit the relative longitudinal movement thereof, means for selectively advancing and retracting said leading carriage whereby to expand and contract said carriages, a first abutment member located on said trailing carriage and directed toward said flange, and a second abutment member mounted on said flange and disposed in the path of said first abutment member and just forward thereof when said trailing carriage is in its fully retracted position, at least one of said abutment members

being resilient to releasably restrict the mutual by-passing of said abutment members.

7. The vertical blind structure of claim 6 wherein said resilient abutment member is located on said trailing carriage and comprises a pair of laterally spaced resilient first fingers and said other abutment member comprises

a second finger in alignment with the space between said first fingers and of greater width than said space.

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