Sept. 26, 1967 R. J. CAYTON 3,343,588

TRANSVERSING VERTICAL VENETIAN BLIND

Filed Feb. 7, 1966 2 Sheets-Sheet 1

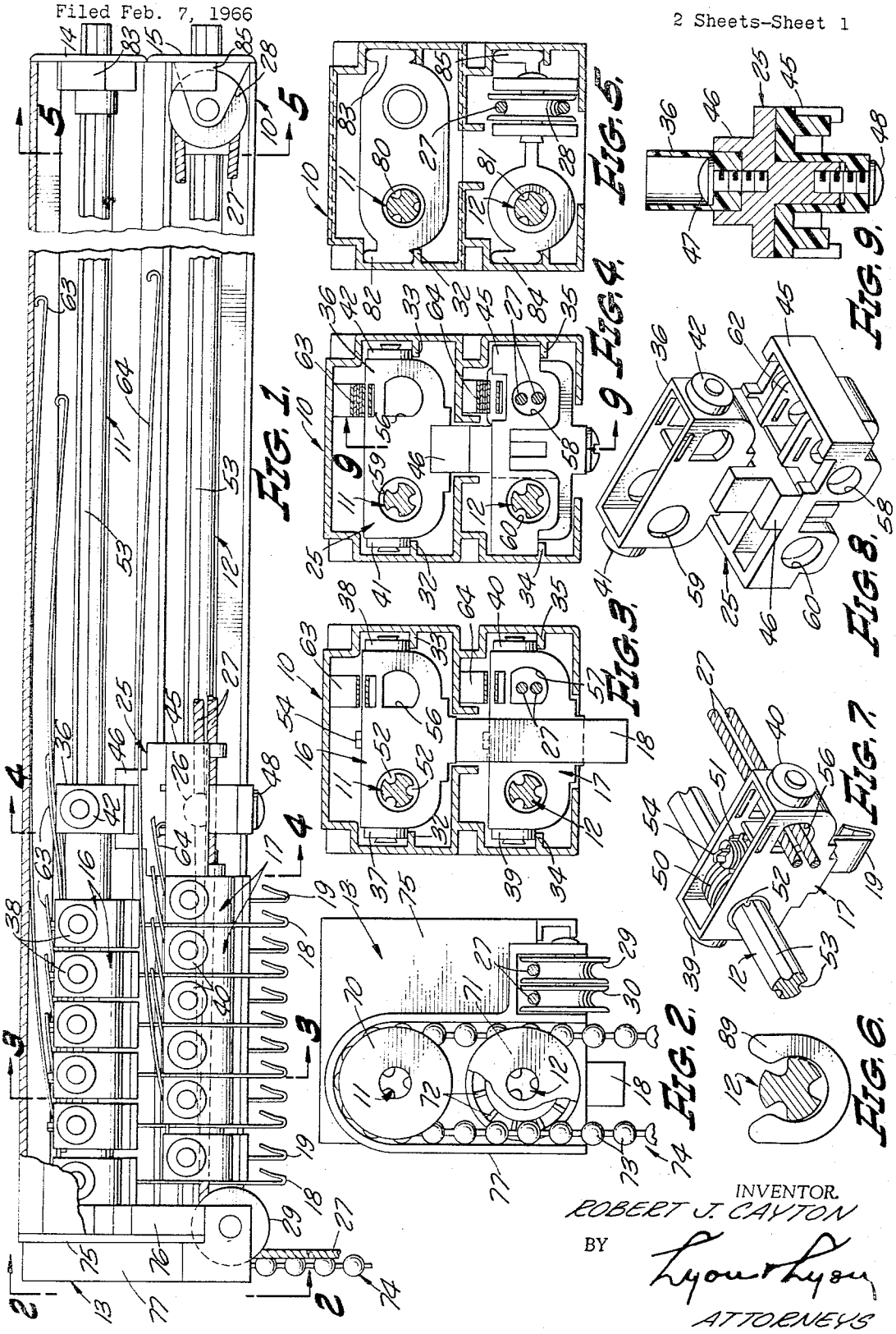

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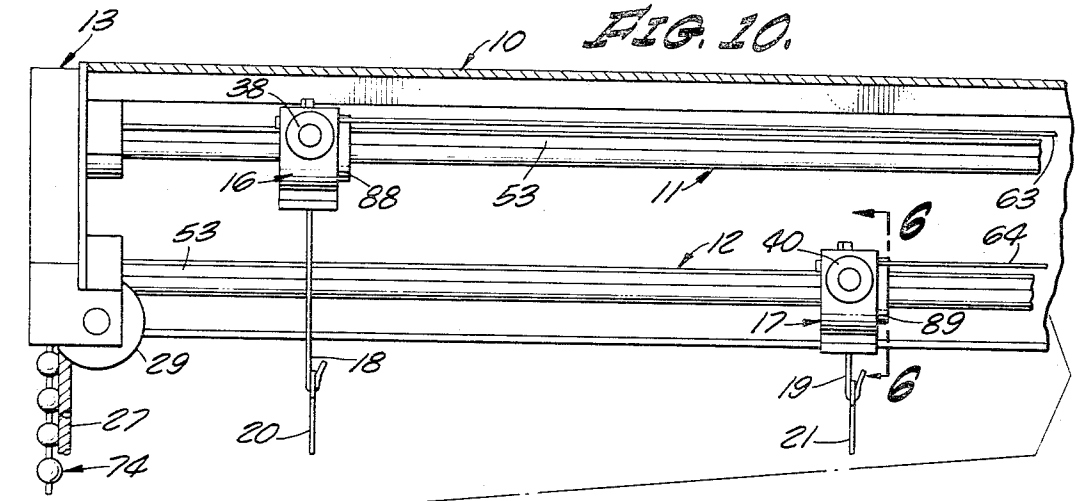
FIG. 10.



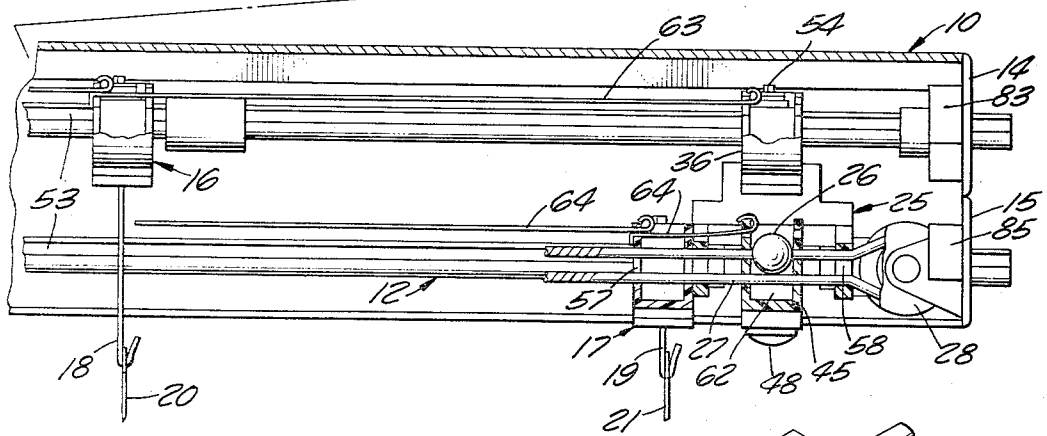
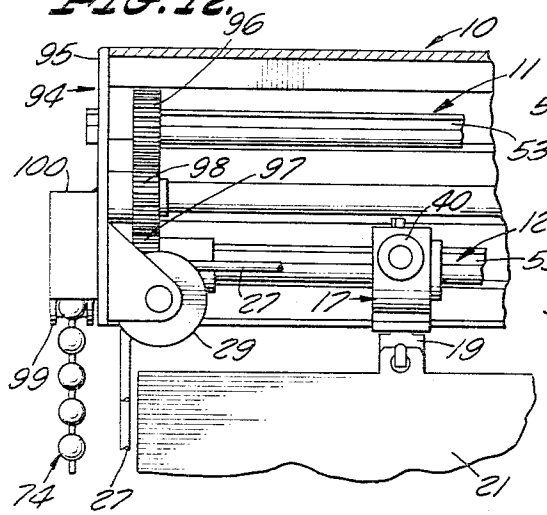


FIG. 12.



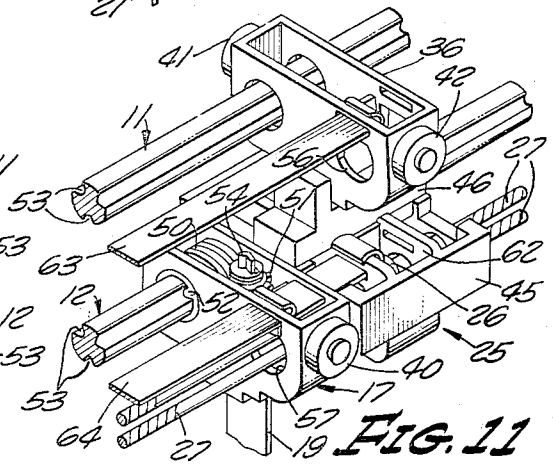


FIG. 11

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United States Patent Office 3,343,588 Patented Sept. 26, 1967

3,343,588

TRANSVERSING VERTICAL VENETIAN BLIND

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Filed Feb. 7, 1966, Ser. No. 525,705
6 Claims. (Cl. 160—176)

This invention relates to a blind and more particularly to a transversing vertical Venetian blind having an improved construction.

In numerous instances where vertical Venetian blinds are used, it is desirable that the slats be bunched compactly when the slats of the blind are moved to a retracted position to facilitate access to an adjacent window, such as vertically pivoted windows, for cleaning of the window, and the like. The usual traversing vertical Venetian blind includes a plurality of trolleys or trucks which ride upon one or more rails or rods, the trucks serving to carry vertically hand louvers or slats. Typically, the trucks are interconnected by spacing means which serve to position the trucks in a substantially equally spaced relationship when the blind is traversed across the window. These trucks, of necessity, have a finite width which, when the slats of the blind are moved to a retracted position determine the compactness of the bunched trucks and slats. These trucks carry suitable gearing means whereby rotation of the rod or rods upon which the trucks are supported cause the slats to be rotated in unison. Thus, when the slats are traversed across a window the slats may be rotated between closed and open positions to respectively restrict or admit light.

Accordingly, it is an object of this invention to provide an improved vertical Venetian blind mechanism and improved operating means therefor.

It is an additional object of the present invention to provide an improved vertical Venetian blind mechanism in which groups of trucks are vertically displaced from each other to enable compact bunching of slats when they are retracted, and having improved operating means for rotating all slats in unison.

It is a further object of this invention to provide an improved Venetian blind construction which enables the blind to be retracted with the slats thereof compact, and improved operating means for causing the slats to be rotated together.

Other objects and advantages of the invention will be readily apparent upon considering the following description in conjunction with the drawings in which:

FIGURE 1 is an elevational view partially cutaway illustrating a vertical Venetian blind mechanism according to the present invention;

FIGURE 2 is an end view taken along a line 2—2 of FIGURE 1;

FIGURE 3 is a sectional view taken along a line 3—3 of FIGURE 1;

FIGURE 4 is a sectional view taken along a line 4—4 of FIGURE 1;

FIGURE 5 is a sectional view taken along a line 5—5 of FIGURE 1;

FIGURE 6 is a partial sectional view taken along a line 6—6 of FIGURE 10;

FIGURE 7 is a perspective view of a truck used in the mechanism of FIGURE 1;

FIGURE 8 is a perspective view of a carriage used in the mechanism of FIGURE 1;

FIGURE 9 is a cross-sectional view of the carriage taken along a line 9—9 of FIGURE 4;

FIGURE 10 is an elevational view similar to FIGURE 1, but partially cutaway to illustrate further details thereof;

FIGURE 11 is a partial perspective view of a truck, a carriage and rods of the blind mechanism; and

FIGURE 12 is a partial elevational view of a modification of the mechanism illustrated in FIGURE 1.

Referring now to the drawings, an improved transversing vertical blind is provided including a channel 10 which may be made of extruded aluminum, or the like, and which may be positioned within a window frame. A pair of fluted tracks or rods 11 and 12 are supported in different planes, one above the other, within the channel 10. An operating member or means 13 is retained in one end of the channel and end caps 14 and 15 are retained in the other end of the channel. A plurality of trucks 16 and 17 are arranged on the respective rods 11 and 12. Hooks 18 and 19 carried by the respective trucks 16 and 17 in a manner which will be described subsequently for supporting vertically disposed louvers or slats 20 and 21 (note FIGURE 10). The hooks 18 extending from the trucks 16 are longer than the hooks 19 so that the ends of all hooks extend downwardly to a common level. Thus, a set of trucks 16 is positioned on the upper rod 11 and a set 17 poistioned on the lower rod 12 with the respective hooks 18 and 19 extending downwardly to carry slats 20 and 21.

As will appear subsequently, the trucks 16 and 17 may be moved along the rods 11 and 12 to a retracted or bunched position or to a traversed position with the trucks spaced across the blind, and the hooks 18 and 19 may be rotated about vertical axes to vary the coverage of an associated window by the slats 20 and 21 of the blind. FIGURE 1 illustrates the blind in a retracted position with the trucks 16 and 17 at one end thereof with the slats bunched in a substantially non-interfering position with respect to the associated window. FIGURE 10 illustrates the trucks in a traversed position with the slats appropriately spaced across the window, but with the slats rotated to an open position to emit light. It will be appreciated that if the trucks 16 and 17 were supported upon a common axis, they would take up substantially more room when in a bunched position as shown in FIGURE 1 and impair the operation of an associated window.

The trucks 16 and 17 are traversed by means of a carriage 25 (note FIGURES 1, 8 and 11) which is traversed or moved to and fro by means of a ball 26 affixed to a cord 27 which in turn is arranged over a pulley 28 in the end cap 15 and pulleys 29 and 30 (note FIGURE 2) in the member 13. The channel 10 includes upper internal lips 32 and 33 and lower internal lips 34 and 35 upon which the respective trucks 16 and 17 ride. A truck 36 may be used for the upper portion of the carriage 25, and each of the trucks 16, 17 and 36 may be provided with rollers or wheels 37 thru 42 to faclitate movement of the trucks along the lips 32 through 35. A lower member 45 of the carriage 25 is secured to the upper member 36 thereof by means of a spacer 46 and screws 47 and 48.

Each of the trucks 16 and 17 is provided with a worm drive arrangement (note FIGURE 7) including a worm 50 and a gear 51 for rotating a hook 18 or 19. The worm 50 includes a plurality of internal projections 52 which project or key into grooves 53 in each of the rods 11 and 12. The worm 50 is thus free to move longitudinally along the rod, but rotation of the rod rotates the worm 50 which in turn rotates the gear 51. The gear 51 includes a slot therethrough through which an end 54 of a hook 18 or 19 may be passed and bent to secure the hook to the gear. Upon rotation of the gear 51, the hook 19 and attached louver or slat likewise is rotated.

Each of the trucks 16 and 17 may be constructed alike to simplify manufacture thereof, and each includes apertures 56 and 57 (note FIGURE 3). The cord 27 passes through the aperture 57 in the lower trucks 17. Likewise, the carriage 25 includes an aperture 58 through

which the cord **27** may pass. The carriage **25** also includes apertures **59** and **60** for enabling the carriage to freely move back and forth along the respective rods **11** and **12**. The ball **26**, or any other suitable retaining means, is applied onto the cord **26** and secured thereto, and retained within a cavity **62** in the lower member **45** of the carriage **25** to move the carriage **25** back and forth as the cord **27** is moved. A plurality of spacers in the form of strips **63** and **64** (note FIGURES 1 and 11) are coupled with slots in the respective trucks **16** and **17** and in the carriage **25** for properly positioning the trucks along the blind mechanism when closed as shown in FIGURE 10. Preferably, the strips **63** and **64** are made of thin resilient metal, and the trucks **16** and **17** and the carriage **25** are formed of a suitable plastic, such as nylon.

The operating member **13** includes a pair of sprockets **70** and **71** coupled to the ends of respective rods **11** and **12**. These sprockets may be molded from plastic and each includes a plurality of spaced ribs **72** for engaging balls **73** of a chain **74**. The member **13** essentially includes a plate **75** having a flange **76** extending therefrom which may be press-fit into either end of the channel **10**. A substantially U-shaped guide wall serving as an elongated sprocket cover extends from the plate **75**, and the interior surface thereof is spaced from the periphery of the sprockets **70** and **71** to retain the chain **74** in engagement with the sprockets and to ensure that both of the sprockets **70** and **71** rotate in unison. It will be appreciated that rotation of the sprockets **70** and **71** rotates respective rods **11** and **12**, and that inasmuch as this action controls the rotation of the hooks and slats, the rods **11** and **21** rotate together. The end caps **14** and **15** include respective apertures **80** and **81** into which the other ends of the respective rods **11** and **12** extend and may freely rotate. The caps **14** and **15** also may include respective flanges **82**, **83** and **84**, **85** which may be press-fit into the end of the channel **10**. The member **13** and caps **14** and **15** may be made of plastic.

Clips **88** and **89** (note FIGURES 6 and 10) may be positioned on the respective rods **11** and **12** adjacent the trucks **16** and **17** which are adjacent an end of the blind mechanism to restrict the movement of these respective trucks when the trucks are traversed, that is, moved along the rods **11** and **12**. Thus, the clips **88** and **89** restrict the movement of the trucks nearest the end and allow the trucks nearest the center of the mechanism to be moved and spread apart in a sequential fashion beginning with the trucks in the middle of the blind, rather than beginning with the trucks at the edge of the blind to ensure proper spacing of the trucks and slats when they are traversed across the window.

FIGURE 12 illustrates an alternative driving arrangement for the rods **11** and **13** and includes a driving member **94** which may be molded out of a plastic material. The member **94** has a plate **95** for supporting gears **96** and **97** which are keyed, or otherwise affixed, to respective rods **11** and **12**. An idler gear **98** couples the gears **96** and **97** to enable the shafts **11** and **12** to rotate together in the same direction. The gear **97** is coupled to a sprocket **90** having the chain **74** arranged thereon. A guide wall **100** projects from the plate **95** to retain the chain **74** in engagement with the sprocket **99**. The sprocket **99** may be similar to the sprockets **70** and **71**.

It will be appreciated that the blind mechanism shown and described herein may be mounted adjacent a window with the slats **20** and **21** hanging vertically. The carriage **25** is moved and engages the adjacent truck **17** and the hook **18** of the adjacent truck **16**, and so forth, thereby moving all of the trucks to the retracted position (FIGURE 1) in which the trucks and slats are bunched together. Upon movement of the carriage **25** in an opposite direction (to the right as shown in FIGURES 1 and 10), the trucks successively are moved to a traversed position across the window because they are interconnected by the spacer strips **63** and **64**.

If desired, a similar mechanism may be mounted at the lower portion of the window with the lower ends of the slats being hooked thereto in a similar manner. In this event, it is preferable to utilize spring biased hooks, which are well known to those skilled in the art, for retaining the slats under appropriate tension. Also, if a mechanism is employed at the lower portion of the window, the rods of both the upper and lower mechanisms may be geared together to insure that the slats rotate in unison.

Although preferred embodiments of the invention have been described, it will be readily apparent that alterations and modifications may be resorted to without departing from the scope of the invention and such alterations and modifications are intended to be included within the scope of the appended claims.

What is claimed is:

1. In a blind of the type having series of rotatable vertically extending louvers, the combination of

a single channel member,

a plurality of substantially parallel rod members positioned within said channel member, said rod members being spaced substantially one above the other,

a plurality of trunk means mounted on each of said rod members for supporting louvers, each of said trunk means having motion translating means for rotating said louvers in response to rotation of respective rod members, and

operating means coupled with an end of said channel member, said operating means including sprocket means coupled with said rod members to impart rotation to said rod members, said operating means including a substantially U-shaped guide means extending therefrom and having an interior wall for retaining flexible motion imparting means in engagement with said sprocket means to ensure rotation of all of said rod members in unison as said motion imparting means is moved.

2. Apparatus as in claim **1** wherein

two rod members are retained horizontally within said channel member, one vertically disposed above the other, and

first and second groups of said plurality of trunk means are respectively mounted on said two rod members.

3. Apparatus as in claim **2** wherein

said sprocket means includes first and second sprockets respectively coupled with said two rod members, and said guide means includes a wall extending from said driving means, the interior surface of said wall retaining said chain in engagement with both of said sprockets to ensure rotation of said sprockets in unison as said chain is moved.

4. Apparatus as in claim **3** wherein

hook means are coupled with the motion translating means of each of said truck means, the hook means coupled with the motion translating means of the upper group of truck means being longer than the hook means coupled with the lower group of truck means enabling an end of all of said hook means to extend to a common level.

5. Apparatus as in claim **2** wherein

said sprocket means includes first and second gears respectively coupled with said two rod members, an idler gear intercoupling said first and second gears, and a sprocket coupled with one of said first and second gears, said guide means including a wall extending from said driving means, the interior surface of said wall retaining said chain in engagement with said sprocket.

6. In a blind of the type having a series of rotatable vertically extending louvers, the combination of

a single channel member,

first and second grooved rod members positioned substantially horizontally one above the other in said channel member,

a plurality of truck means mounted on each of said

rod members for supporting louvers, each of said truck means having motion translating means for rotating said louvers in response to rotation of respective rod members,

means interconnecting said truck means for spacing said truck means along said rod members when said truck means are traversed,

operating means positioned at an end of said channel member, said operating means including a sprocket coupled with each of said rod members to impart rotation to said rod members, said operating means including an elongated and substantially U-shaped sprocket cover to retain a chain in engagement with said sprockets to ensure rotation of both of said rod members in unison as said chain is moved, and

hook members coupled with each of said truck means and extending therefrom to a common level.

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