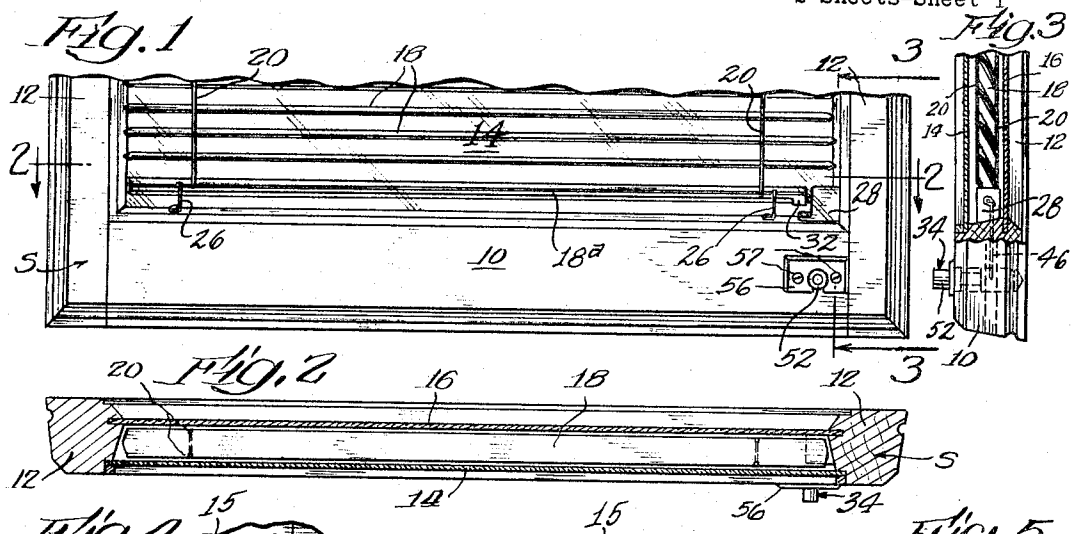
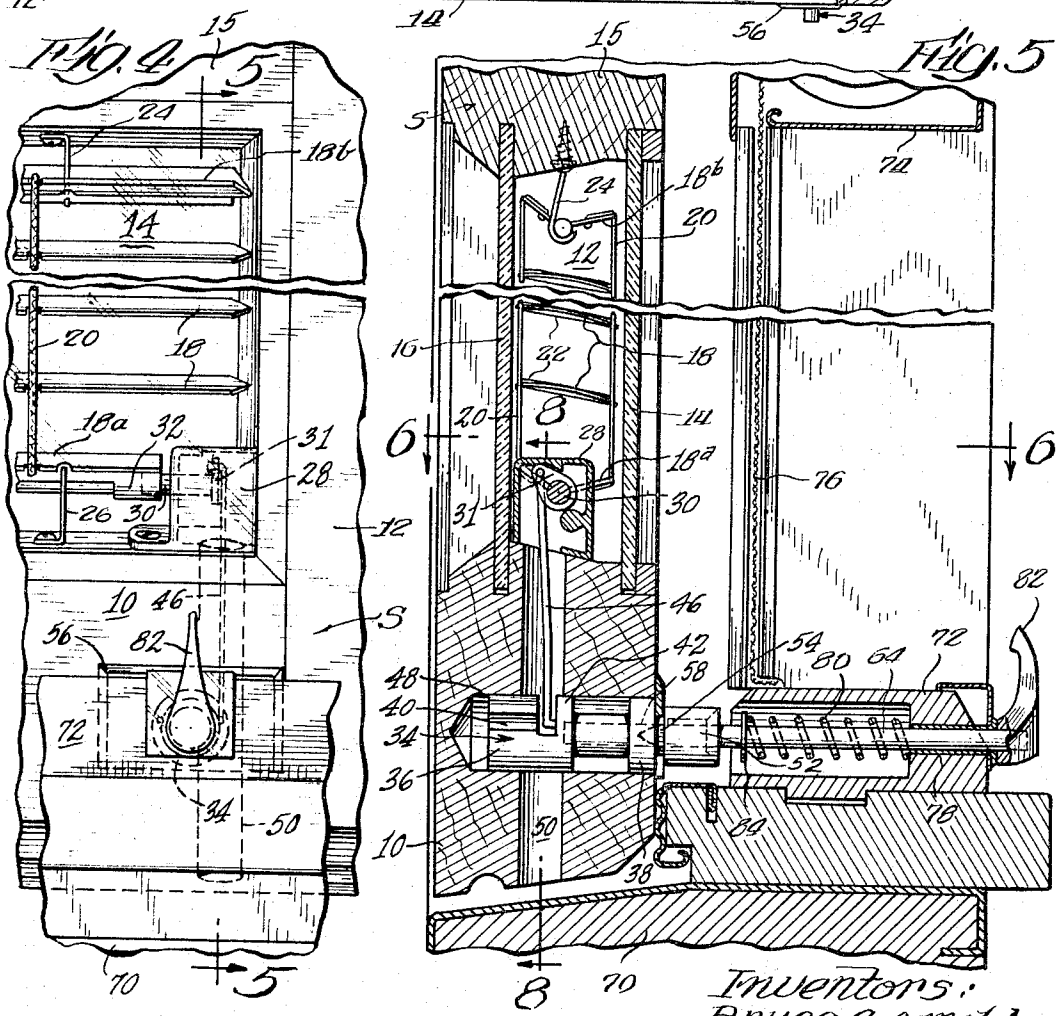
Jan. 30, 1968 B. C. ARNOLD ETAL 3,366,159

VENETIAN BLIND OPERATING MEANS

Filed Dec. 7, 1965 2 Sheets-Sheet 1





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VENETIAN BLIND OPERATING MEANS

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Fig. 6

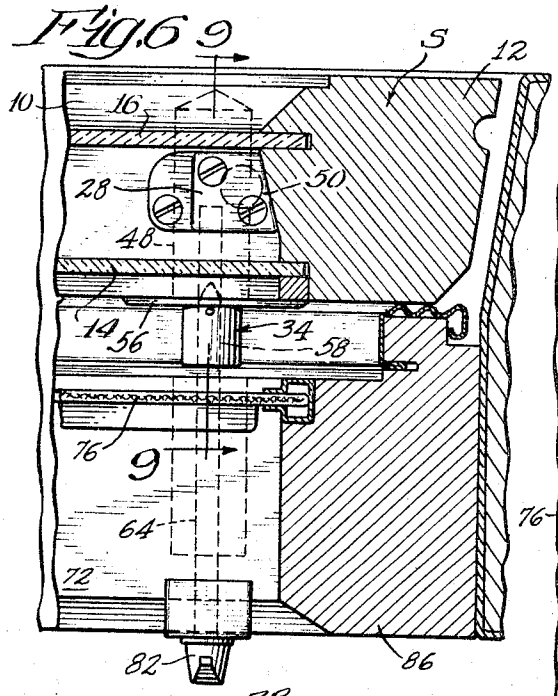
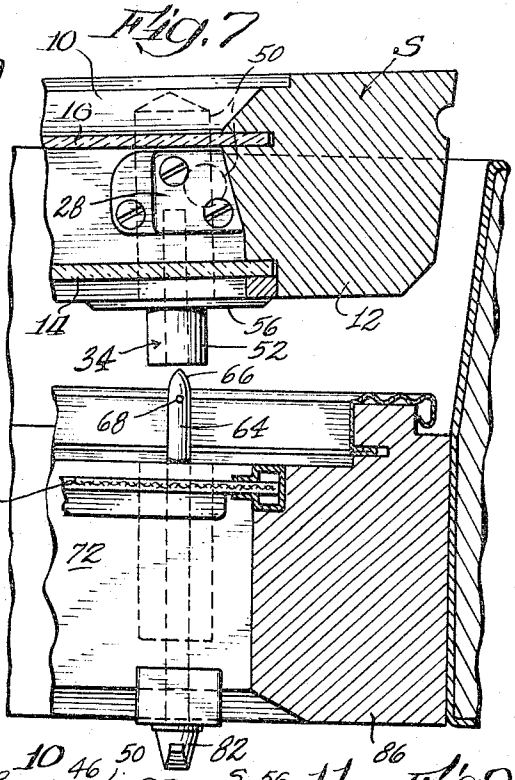


Fig. 7



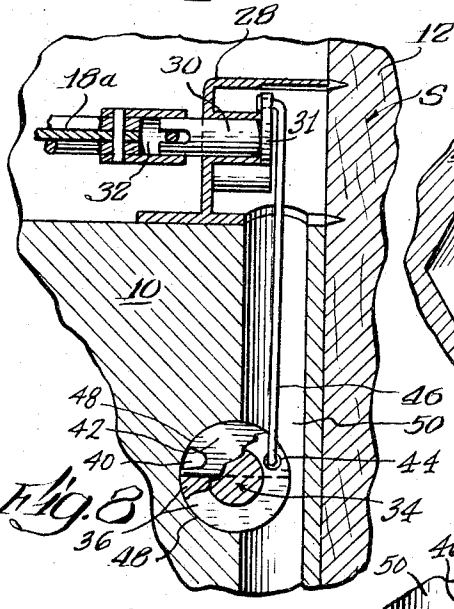
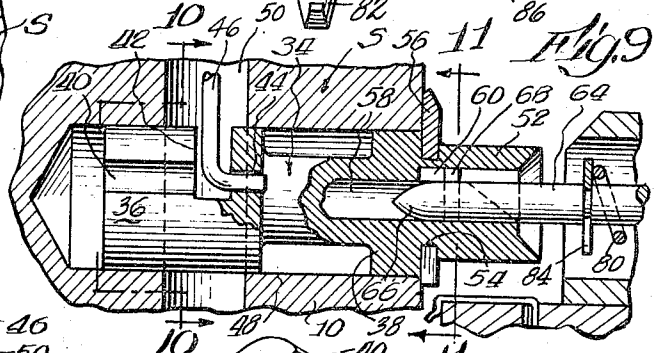


Fig. 8

Fig. 9



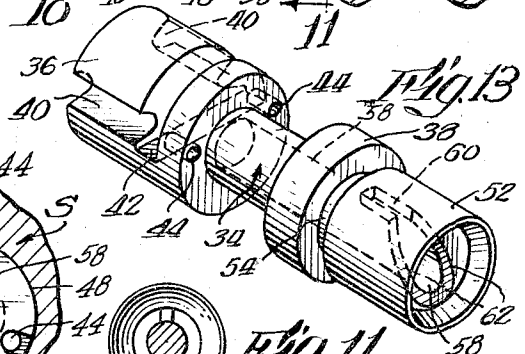
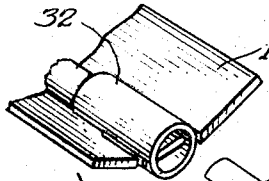


Fig. 13



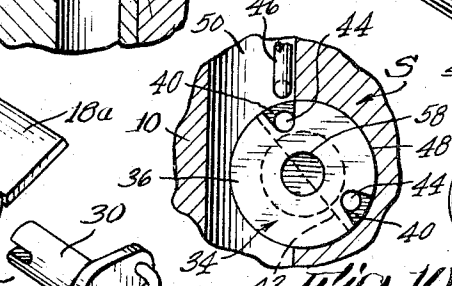


Fig. 10

Fig. 11

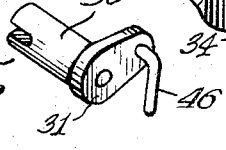


Fig. 12

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VENETIAN BLIND OPERATING MEANS

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Filed Dec. 7, 1965, Ser. No. 512,134

8 Claims. (Cl. 160—107)

ABSTRACT OF THE DISCLOSURE

Operating means for a Venetian blind enclosed between two panes of glass in a sash frame. A rock shaft is connected to the blind and another one extends from the lower rail of the sash, the two being operatively connected together by a link connection. The sash may be hinged for opening, and an operator is provided for manually adjusting the rock shafts which has a disconnectable connection with one of them to permit opening of the sash. Thus, the tilt of the Venetian blind can be adjusted only when the connection is made.

This invention relates to Venetian blind operating means for that type of Venetian blind enclosed in a sash frame between two panes of glass in the frame.

One object of the invention is to provide operating means so designed that the tilt of the slats of the Venetian blind may be adjusted from outside the frame of the sash and inside of a room that is provided with the sash.

Another object is to provide manually operable means for the Venetian blind having a separable connection with the Venetian blind so that the Venetian blind can be carried by a casement sash and the tilt of its slats adjusted when the sash is closed whereupon the sash may be opened to any desired degree, and again closed if it is desirable to change the adjustment of the slats.

A further object is to provide a double rock shaft and connecting link structure carried by the casement sash, and a stem and socket connection between the manually operable means and one of the rock shafts of the mechanism wherein an operative disconnectible connection is provided as by a pin-and-slot connection between the stem and socket.

Still a further object is to provide the pin-and-slot connection with means in the form of a double spiral groove for guiding the pin to the slot, and a means to bias the pin along the groove and into the slot to assure proper cooperation of the manually operable means and the blind slat tilting means carried by the casement sash.

An additional object is to provide a rock shaft and link connection so designed as to facilitate assembly wherein the rock shaft is entered into one bore of the sash frame while the link is threaded through another bore thereof, the rock shaft having an axially extending groove to facilitate such assembly and a lateral groove in which the link may subsequently operate during the rocking motions of the rock shaft.

Brief summary of the invention

A simple operating means is provided for the Venetian blind and involves the connection of a rock shaft to the blind and another rock shaft exposed for operation at the face of the sash. The two rock shafts are operatively connected together by a link extending through a vertical bore in the lower sash rail, a housing being provided for journalling one of the rock shafts and enclosing the upper end of the link connection. An operating stem is oscillatably mounted on the window frame and has a disconnectable connection with the rock shaft projecting from the lower rail of the sash.

With these and other objects in view, our invention consists in the construction, arrangement and combination of the various parts of our Venetian blind operating means, whereby the objects above contemplated are attained, as hereinafter more fully set forth, pointed out in our claims and illustrated in detail on the accompanying drawings, wherein:

FIG. 1 is an inside elevation of the lower portion of a casement sash and an associated Venetian blind, with our Venetian blind operating means applied thereto;

FIG. 2 is a horizontal sectional view on the line 2—2 of FIG. 1;

FIG. 3 is a vertical sectional view on the line 3—3 of FIG. 1;

FIG. 4 is an enlarged view similar in part to the lower right hand corner of FIG. 1 showing also a portion of a window frame and a manually engageable and operable lever means for adjusting the tilt of the blind slats positioned in front of the casement sash;

FIG. 5 is a vertical sectional view on the line 5—5 of FIG. 4 showing details of our Venetian blind operating means;

FIG. 6 is a sectional view on the line 6—6 of FIG. 5 showing the casement sash fully closed;

FIG. 7 is a similar sectional view showing the casement sash partially opened;

FIG. 8 is a vertical sectional view on the line 8—8 of FIG. 5 showing how a pair of rock shafts are operatively connected;

FIG. 9 is an enlargement of a portion of FIG. 5 showing parts of our operating means in section;

FIG. 10 is a vertical sectional view on the line 10—10 of FIG. 9;

FIG. 11 is a vertical sectional view on the line 11—11 of FIG. 9;

FIG. 12 is a perspective view showing an operative connection between a rock shaft and a slat of the Venetian blind, and

FIG. 13 is a perspective view of a main rock shaft which is shown partly in section in FIG. 9.

On the accompanying drawings we have used the reference character S to indicate, in general, a casement sash. The sash S has a bottom rail **10**, a top rail **15** and a pair of stiles **12**. The sash is provided with an inside pane **14** and an outside pane **16** spaced from each other to provide a dual-glazed window for insulating purposes, the spacing being in the range of about ¾" to 1". A narrow-slat Venetian blind is illustrated mounted in this space and may be one of the type shown in our copending application, Ser. No. 512,098, filed Dec. 7, 1965. The Venetian blind is shown as comprising a number of slats **18**, the bottom one being indicated **18a**. Tape ladders are illustrated, the tapes thereof being shown at **20** and the rungs at **22**. The Venetian blind (comprising the slats and the tape ladders in the form of assembly) are supported by upper supporting hooks **24** and lower supporting hooks **26** as shown in greater detail in our copending application. The tape ladders are under some tension to hold the slat **18a** upwardly in the supporting hooks **26** (which are identical to the hooks **24** except inverted) and the upper slat of the Venetian blind shown at **18b** in FIG. 4 as well as the lower slat **18a** are so designed as to pivot with respect to the hooks as also shown in our copending application.

A problem is presented in providing for the manual actuation of the Venetian blind from outside the frame of the casement sash S. Our Venetian blind operating means solves that problem by providing a secondary rock shaft **30** journaled in a rock shaft housing **28** and connected by a coupling sleeve **32** with the blind slat **18a**. A main rock shaft **34** is operatively connected by a link **46** to the secondary rock shaft **30** and is of special character, being provided with an inner enlargement **36** and an outer enlargement **38** to rotate in a horizontal bore

48 of the sash rail 10. The enlargement 36 has a pair of axial grooves 40 in its periphery which communicate with a cross groove 42. A pair of perforations 44 open into the cross groove 42 all as shown in FIG. 13.

A vertical bore 50 intersects one side of the horizontal bore 48 and the link 46 extends through this bore from the main rock shaft 34 to the secondary rock shaft 30. The upper and lower ends of the link 46 are provided with right angle bends to cooperate with a lever 31 on the rock shaft 30 and one of the perforations 44 of the enlargement 36 for transferring rocking motion of the rock shaft 34 to the rock shaft 30.

The arrangement is such that the parts can be assembled by entering the link 46 downwardly through the bore 50 and then inserting the rock shaft 34 into the bore 48, one of the grooves 40 receiving the lower end of the link 46 in such manner as to permit such insertion until the lower end of the link enters the corresponding perforation 44. Thereafter, the cross groove 42 permits rocking of the rock shaft 34 and at the same time retains the lower end of the link 46 in the perforation 44. Two grooves 40 and two perforations 44 are provided so that the rock shaft 34 is adaptable for either right hand or left hand mounting, that is, at the right hand end of the casement sash when it is hinged at the left as in FIG. 1, or at the left hand end when hinged at the right.

The main rock shaft 34 is also provided with a hub 52 spaced from the enlargement 38 by an annular groove 54. A retainer plate 56 has a downwardly opening slot to fit in the groove 54 and is then secured in position by screws 57 (see FIG. 1) and subsequently prevents axial movement of the rock shaft 34 relative to the bottom rail 10 of the sash S.

The rock shaft 34 is provided with a socket 58 having a pin-receiving slot 60 and a double spiral guide surface 62 leading thereto. The socket 58 is adapted to receive an actuating stem 64 having a pointed end 66 to facilitate entry of the stem into the hub 52 as will hereinafter appear. The stem is provided with a lateral pin 68 to be received in the slot 60, and the actuating stem is journaled in a bearing sleeve 78 located in a bottom rail 72 of the window frame, the sill of which is indicated at 70. FIG. 5 also illustrates a rolling window screen housing 74, the screen thereof being shown at 76 in order to illustrate how a handle 82 on the actuating stem 64 may be utilized to manually rock the actuating stem 64 from inside the room without having to elevate the screen 76.

The actuating stem 64 is also slidable in the bearing sleeve 78 and is provided with a shoulder in the form of a washer 84 against which a spring 80 is positioned in order to normally bias the stem toward the left in FIG. 5 with the handle 82 serving as a stop against the right hand end of the bearing sleeve 78.

From the foregoing specification we believe it is obvious how, when the parts are associated as in FIG. 5, manual oscillation of the handle 82 will result in the rock shaft 34 rocking the rock shaft 30 and thereby the lower slat 18^a of the Venetian blind which, through the ladder tapes 20, 22, tilts the slats 18 and 18^b. They may be tilted from the level position shown in FIG. 1 to the position shown in FIG. 4 or the extreme position shown in FIG. 3 as well as in the extreme opposite position in an obvious manner.

As disclosed and claimed in our copending application, once the Venetian blind is adjusted to any desired angle, it will remain in that position even though the casement sash is open relative to the window frame, a side stile of which is shown at 86 in FIGS. 6 and 7. In FIG. 6 the sash is closed whereas in FIG. 7 it is being opened and it will be noted that the rock shaft 34 has just been disconnected from the actuating stem 64. The casement sash may now be opened to any desired degree.

When the sash S is reclosed, the hub 52 will receive the pointed end 66 of the stem 64 and its pin-receiving slot 60 will receive the pin 68 in an obvious manner if the lever 82 is still in the same position as when the sash

was opened. If it has been changed to some other position, there will still be proper coaction between the stem and the rock shaft as the lateral pin 68 will engage one or the other side of the double spiral guide surface 62 and this will rotate the stem to the proper position for coaction of the lateral pin 68 with the slot 60. In some instances the stem 64 may be pushed toward the right in FIG. 5 against the bias of the spring 80 as the sash is closed, but the action of the spring will eventually project the actuating stem toward the left and propel its lateral pin 68 along the spiral guide surface and into the slot 60. Thus we are assured of proper operative coaction of the actuating stem with the main rock shaft 34 without undesirable jamming of the coacting parts.

From the foregoing specification it will be obvious that we have provided a relatively simple Venetian blind operating means which has the advantage of being capable of adjustment outside the space between the two panes of a dual glazed sash in which space the Venetian blind is mounted. A double rock shaft and link arrangement of simple construction capable of easy and quick assembly is provided and also a disconnectible connection between a manually operable adjusting means mounted on a window frame and a casement sash which can be opened after the Venetian blind has been adjusted, and returned to a position of operative coaction between the parts 64 and 52 when the sash is closed. Thus, a simple actuating mechanism involving few parts and a special assembly technique are provided to produce a low cost Venetian blind operating means. Additionally, the desing illustrated provides a simple structure which has the advantage of a separable connecting means as between the manually operated portion of the mechanism and the Venetian blind tilting mechanism carried by the sash of a casement window.

Some changes may be made in the construction and arrangement of the parts of Venetian blind operating means without departing from the real spirit and purpose of our invention, and it is our intention to cover by our claims any modified forms of structure or use of mechanical equivalents which may reasonably be included within their scope.

We claim as our invention:

1. Venetian blind operating means for that type of Venetian blind enclosed in the frame of a sash between two panes of glass in the sash; comprising a secondary rock shaft operatively connected to one end of one slat of the Venetian blind with its axis parallel to the plane of the sash, a main rock shaft journaled in the lower rail of the sash frame with its axis normal to said plane of the sash and one of its ends exposed at the inner face of said lower rail, a link connection between the two rock shafts, said lower rail having a vertical bore connecting said rock shafts through which said link connection extends, and manually operable means adjacent said inner face of said lower rail for rocking said main rock shaft and thereby said secondary rock shaft, the slats of said Venetian blind being thereby tilted as desired.

2. Venetian blind operating means according to claim 1 wherein a rock shaft housing is provided in which said secondary rock shaft is journaled and in which the upper end of said link connection is housed, and a bore is provided in said lower rail in which said main rock shaft is journaled.

3. Venetian blind operating means according to claim 1 wherein a separable connection is provided between said main rock shaft and said manually operable means to permit opening of said sash frame, and comprises a coactable stem and socket wherein the stem has a pin-and-slot connection with the socket, and the socket has a double spiral guide surface for guiding the pin to the slot of said pin-and-slot connection when said stem enters said socket.

4. Venetian blind operating means according to claim 3 wherein said manually operable means is mounted to slide axially relative to the axis of said main rock shaft,

and means is provided to bias said manually operable means axially toward said main rock shaft and thereby said pin along one of said spiral guide surface and into said slot when said sash frame is closed.

5. Venetian blind operating means for that type of Venetian blind enclosed in the frame of a sash between two panes of glass in the sash; comprising a secondary rock shaft operatively connected to one end of one slat of the Venetian blind, a main rock shaft journaled in the sash frame, a link connection between the two rock shafts, manually operable means adjacent the inner face of said sash frame for rocking said main rock shaft and thereby said secondary rock shaft, the slats of said Venetian blind being thereby tilted as desired, said main rock shaft having an axially extending groove and a lateral groove adjacent the connection of said link to said main rock shaft, said axially extending groove opening into said lateral groove and said main rock shaft having a perforation opening into said lateral groove to receive a pivot end of said link, said axially extending groove facilitating the assembly of said main rock shaft relative to said link by permitting the pivot portion of the link to pass therethrough into said lateral groove, and said lateral groove providing space in which said link travels during the rocking motion of said main rock shaft for adjusting the tilt of the Venetian blind.

6. Venetian blind operating means according to claim 5 wherein two intersecting bores at substantially right angles to each other are provided in said sash frame, one of which journals said main rock shaft and said link connection extends through the other bore.

7. Venetian blind operating means for that type of Venetian blind enclosed in a casement sash frame between two panes of glass in the sash; comprising a secondary rock shaft operatively connected to one end of one of the slats of the Venetian blind, a main rock shaft journaled in said casement sash frame, a link connection between the two rock shafts, a manually operable means journaled in the window frame for the casement sash for rocking said main rock shaft, a separable connection between said main rock shaft and said manually operable means, said separable connection comprising a stem and socket having a pin-and-slot connection with each other, said socket having a double spiral guide surface for guiding the pin to the slot of said pin-and-slot connection when said stem enters said socket, said manually operable means being axially slidable in said window frame, and means to bias said manually operable means toward said main rock shaft to cause said pin to traverse said double spiral guide surface if said pin is out of alignment with said slot upon the casement window being closed relative to its window frame.

8. Venetian blind operating means for that type of Venetian blind enclosed in a casement sash frame between two panes of glass in the sash; comprising a secondary rock shaft operatively connected to one end of one of the slats of the Venetian blind, a main rock shaft journaled in said casement sash frame, a link connection between the two rock shafts, a manually operable means journaled in the window frame for the casement sash for rocking said main rock shaft, a separable connection between said main rock shaft and said manually operable means, said main rock shaft having an axially extending groove and a lateral groove adjacent the connection of said link to said main rock shaft, said axially extending groove opening into said lateral groove and said main rock shaft having a perforation opening into said lateral groove to receive a pivot end of said link, said axially extending groove facilitating the assembly of said main rock shaft relative to said link by permitting the pivot portion of the link to pass therethrough into said lateral groove, and said lateral groove providing space in which said link may function during the rocking motion of said main rock shaft for adjusting the tilt of the Venetian blind.

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