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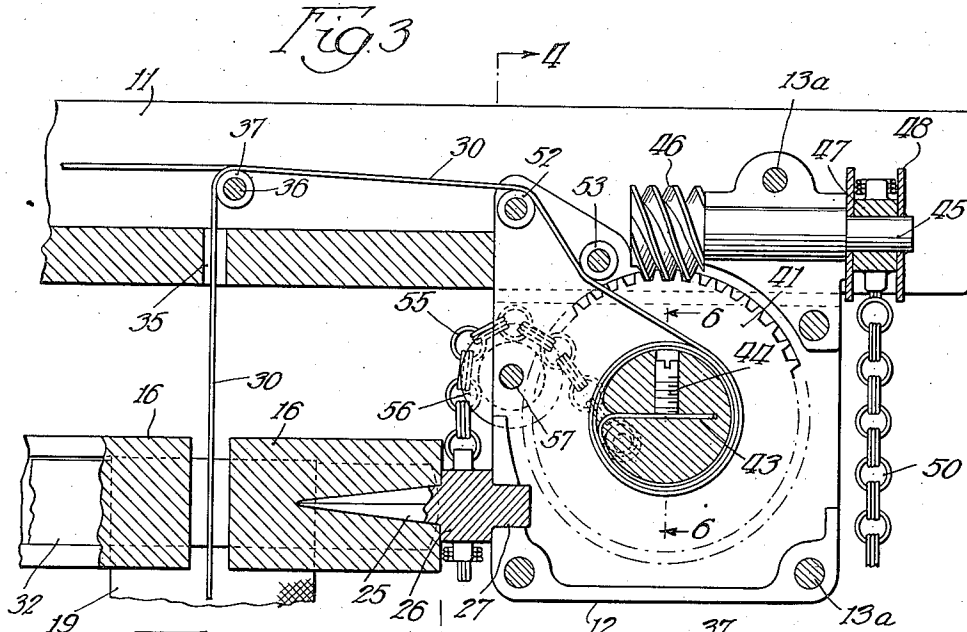
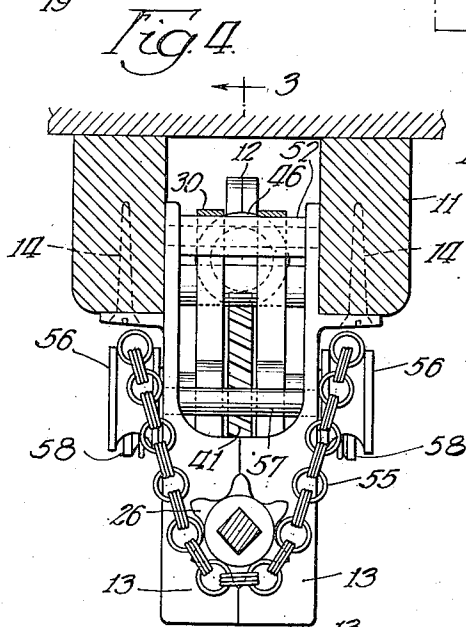
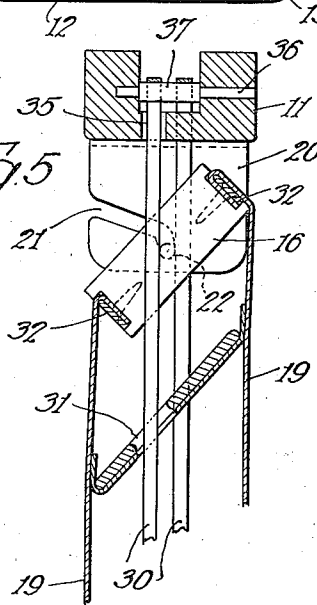
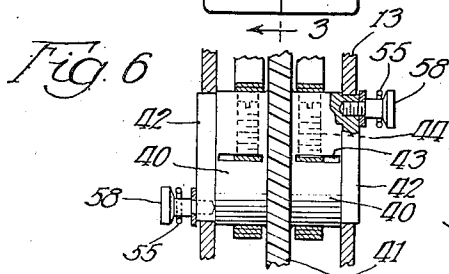
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2,264,609

VENETIAN BLIND OPERATING DEVICE

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VENETIAN BLIND OPERATING DEVICE

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18 Claims. (Cl. 156—17)

The present invention relates to Venetian blinds. It is particularly directed towards an improved device for operating blinds of this general character.

The usual Venetian blind is provided with two operating devices, one to raise and lower the blind, and the other to tilt the shutters. In its simplest form, the conventional means for raising and lowering the blind comprises two or more lifting ropes attached to the bottom shutter and extending upwardly through holes in the shutters to the top of the blind. The lifting ropes pass over pulleys to the side of the window and hang downwardly to within reach of the operator. Various locking means have been provided to retain the rope when the blinds have been adjusted to the desired height. Separate hanging ropes are ordinarily provided to rotate the top shutter so that the blind may be opened or closed.

The inherent objections to this type of operating device are that the lifting ropes are often displaced with respect to each other with the result that the blind does not hang evenly; that the rope locking means sometimes fails of its purpose with the result that the blind unexpectedly drops; and that the rope locking device tends to excessively wear the ropes with the result that the ropes frequently must be replaced. Also, there is considerably unsightly rope hanging on either side of the blind, the length of which varies with the position of the blind. It is obvious that in the case of large blinds, considerable effort is required to actuate the operating ropes.

The principal object of my invention is to provide a Venetian blind operating mechanism of simple and economical construction, but which is highly efficient in operation. It effectively eliminates the objections inherent in the above described conventional operating means. A further object is to combine into a single mechanism the means for raising and lowering the blinds and the opening and closing means.

The present invention comprises a small housing containing two rotatable drums designed to be driven by means of a worm and gear combination. The worm carrying shaft is rotated by an endless chain which hangs downwardly to within easy reach of the operator. Metal tapes are provided to raise and lower the blind, said tapes being directed into the housing by properly positioned guides. Each drum receives one of the tapes, and by rotation of the drums, the blind is raised or lowered. A sprocket chain, having its ends eccentrically associated with the drum carrying shaft so that the chain oscillates back and forth as the shaft is rotated, cooperates with a sprocket rigidly mounted on the head slat of the blind, thereby successively opening and closing the blind as the operator raises or lowers the blind.

As will be understood, the blind may be raised or lowered to the desired height by actuating the endless chain, and finally by a slight further movement of the chain, the blind may be adjusted to the desired open or closed position. The worm and gear means of raising and lowering the blind will, of course, hold the blind at any point without the necessity of an additional lock.

The features and advantages of the present invention will appear more fully as the description proceeds, reference being had to the accompanying drawings wherein a preferred form of the invention is shown. It is to be understood, however, that the drawings and description are illustrative only and are not to be taken as limiting the invention except insofar as it is limited by the claims.

In the drawings, Fig. 1 is an inside elevation view of a window showing a Venetian blind provided with my improved operating means;

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

Fig. 3 is a sectional view on line 3—3 of Fig. 4;

Fig. 4 is a sectional view on the line 4—4 of Fig. 3;

Fig. 5 is a sectional view on the line 5—5 of Fig. 1, and

Fig. 6 is a sectional view on the line 6—6 of Fig. 3.

Referring now to the drawings, and particularly to Fig. 1, a window frame in which my Venetian blind and operating device are mounted is generally designated by the numeral 10. Beneath the top member of the frame is mounted an inverted wooden channel 11 which serves as the support for the blind and operating device. At one end of the channel 11, a portion thereof is cut away to permit the mounting of a small housing 12 which contains the operating mechanism. The housing 12 is cast in two symmetrical portions 13 which fit together and enclose the mechanism. One of the castings is provided with integral pins 13a which pass through holes in the other casting and are riveted down to hold the parts together. As shown in Fig. 4, the housing is fixed to the webs of the channel 11 by means of ordinary wood screws 14.

The Venetian blind herein contemplated is of a conventional type comprising a relatively heavy head slat 16, spaced thin intermediate slats 17 and a heavier bottom slat 18, the weight of which tends to maintain the blind in a vertical plane despite drafts of air through the window. Spaced from the ends of the slats are oppositely disposed vertical straps 19 which extend from the head slat 16 to the bottom slat 18. The straps 19 are anchored to the head and bottom slats and intermediate thereof support the spaced intermediate slats 17. As will be understood,

partial rotation of the head slat 16 opens or closes the blinds.

To support the blind, a bracket 20 is provided near the end of the channel 11 opposite the housing 12. The vertical leg of the bracket 20 is provided with a bayonet slot 21 to receive a shaft 22 mounted in the end of the head slat 16. The other end of the head slat 16 is provided with a rigidly mounted axial shaft 25 having a sprocket wheel 26 intermediate its ends. The round outer end of the shaft 25 is rotatably mounted in a socket 27 in the housing 12. Rotation of the sprocket wheel 26, therefore, rotates the head slat 16, thereby opening or closing the blind.

Thin flexible metallic tapes 30 are provided to raise and lower the blind. Holes 31 are provided in the intermediate slats 17 and bottom slat 18 through which the tapes 30 pass. The holes 31 are preferably located in the slats between the pairs of supporting straps 19 so they will not be visible when the blind is in closed position. Also, the series of holes at one end of the slats have their centers offset to one side of the center line of the slats, while the series at the other end are offset to the opposite side of said center line. The reason for this offsetting is to permit the raising and lowering tapes 30 to occupy different vertical planes that they may extend side by side through the channel 11 as herein-after explained.

To permit passage of the tapes 30 through the head slat 16, said slat is divided into three sections, the middle and two end sections. The respective sections are joined together with a slight gap between their ends by means of elongated metal plates 32 which bridge the gap and are screwed to the opposite sides of the slat. The straps 19 are wrapped around the plates 32 which fit snugly in grooves in the sides of the slat. This construction is necessary in the thicker head slat to provide clearance for the tapes 30 when the slat is rotated towards the vertical.

The lower ends of the tapes 30 which pass through the holes 31 in the bottom slat 18 are provided with holes through which are passed staples 33. The staples 33, bridging the openings through the slat, are countersunk and driven into the underside of the slat, as shown in Fig. 1.

The tapes 30 pass upwardly through the holes in the successive slats 17, the gaps separating the adjacent ends of the head slat sections and then pass into the channel 11 through openings 35 cut therein.

Disposed within the channel 11 above the openings 35 are guide members comprising pins 36 on which are mounted rotatable sleeves 37. The tapes 30 pass over these guides and extend towards the mechanism housing 12. Because the tapes are not in the same vertical plane, they extend side by side through the channel 11.

Within the housing 12 are mounted two tape receiving drums 40 having a gear 41 co-axially mounted between them. The unit comprising shaft 42, drums 40 and gear 41 conveniently may be a single casting as the gear and drums are necessarily rigidly mounted on the shaft. Each drum has a tape receiving slot 43 therein and is provided with a screw means 44 to secure the tape within the slot. The shaft 42 is rotatably journaled in the sides 13 of the housing 12. Journaled in the housing above the gear is a shaft 45. Rigidly mounted on the shaft 45, and engaging gear 41, is a worm 46. A sprocket wheel

47 having side washers 48 is mounted rigidly on the end of the shaft 45 outside the housing 12. An endless chain 50 engages the sprocket wheel 47 and extends downwardly to a position where an operator may readily actuate the device.

The lifting tapes 30 enter the housing 12 by passing over guide roller 52 and under guide roller 53. The tape from one end of the blind engages one of the drums 40, while the other tape engages the second drum. The entrances to the tape receiving slots 43 in the drums 40 are rounded to avoid bending the tape at sharp angles. As will be understood, rotation of the worm 46 by means of the chain causes rotation of the gear and drums, thereby winding or unwinding the tape 30 on the drums 40, and, consequently, raising and lowering the blind.

To provide means for opening and closing the blind operable in conjunction with the means for raising and lowering the blind, I have provided a length of sprocket chain 55 which co-operates with the sprocket 26 on the shaft 25 extending from the head slat 16. The chain 55 passes over pulleys 56 mounted on shaft 57 and has its ends rotatably mounted on pins 58 eccentrically projecting from the ends of the shaft 42 (Fig. 6). The pins 58 are located on opposite sides of the shaft center so, as the shaft rotates, the length of chain 55 oscillates back and forth, thereby successively opening and closing the blind.

As has been described, the blind is raised or lowered by actuating the endless chain 50. In moving the blind upwardly or downwardly, the blind is consequently successively opened and closed. When the operator has the blind at the desired height, he may, by slight additional movement of the chain, obtain the desired open or closed adjustment of the blind.

From the above description it is believed that the features and advantages of the present invention will be readily apparent to those skilled in this art. Having thus described my invention, what I claim as new and desire to secure by Letters Patent is:

1. A Venetian blind operating device comprising blind lifting tapes, rotatable tape receiving drums, means operatively associated with said drums whereby rotation of said drums successively opens and closes the blind, and means for rotating said drums.

2. A Venetian blind operating device comprising blind lifting tapes, a housing, a rotatable shaft through said housing, tape receiving drums and a gear rigidly mounted on said shaft, a worm cooperating with said gear, means operatively associated with said shaft whereby rotation of said shaft successively opens and closes the blind, and means for rotating said worm.

3. In combination with a Venetian blind having a head slat, rotation of which tilts the shutters, a shaft having a sprocket thereon extending from one end of said head slat, a mechanism enclosing housing into which the end of said shaft is journaled, a rotatable shaft extending transversely through said housing, blind lifting tape receiving drums rigidly mounted on said second named shaft within said housing, a sprocket chain passing around said sprocket and having its ends eccentrically mounted to the ends of said second named shaft, and means for rotating said second named shaft.

4. A Venetian blind operating device comprising blind lifting tapes, a housing, a rotatable shaft through said housing, tape receiving drums

rigidly mounted on said shaft, a sprocket chain having its ends eccentrically mounted to the ends of said shaft, a sprocket cooperating with said chain rigidly mounted on the head slat of the Venetian blind, and means for rotating said shaft.

5. In a blind having a plurality of spaced slats and flexible members cooperating therewith to raise and lower said slats and also to tilt said slats about their respective axes, an operating device comprising rotatable drums upon which are wound the blind raising flexible members, means operatively associated with said drums whereby rotation of said drums successively tilts said slats first in one direction and then the other, and means for rotating said drums.

6. In a blind having a plurality of spaced slats and flexible members cooperating therewith to raise and lower said slats and also to tilt said slats about their respective axes, an operating device comprising a housing, a rotatable shaft through said housing, drums, upon which are wound the blind raising flexible members, rigidly mounted on said shaft within said housing, means operatively associated with said shaft whereby rotation of said shaft successively tilts said slats first in one direction and then the other, and means for rotating said shaft.

7. In a blind having a plurality of spaced slats and flexible members cooperating therewith to raise and lower said slats and also to tilt said slats about their respective axes, an operating device comprising a housing, a rotatable shaft through said housing, drums, upon which are wound the blind raising flexible members, rigidly mounted on said shaft within said housing, a sprocket chain having its ends eccentrically mounted on the ends of said shaft, a sprocket cooperating with said chain rigidly mounted on a slat of the blind, and means for rotating said shaft.

8. In a blind having a plurality of spaced slats and flexible members cooperating therewith to raise and lower said slats and also to tilt said slats about their respective axes, an operating device comprising a housing, a rotatable shaft through said housing, drums, upon which are wound the blind raising flexible members, rigidly mounted on said shaft within said housing, means operatively associated with said shaft whereby rotation of said shaft successively tilts said slats first in one direction and then the other, and a worm and gear means for rotating said shaft.

9. In a Venetian blind having a head slat, intermediate slats and a bottom slat, an operating device including spaced blind lifting tapes which pass through perforations in said slats and are oppositely offset from the axis of said slats, guide means for directing said tapes side by side and laterally above said head slat, a housing into which said tapes are directed, spaced rotatable tape receiving drums within said housing, and worm and gear means for rotating said drums.

10. In a Venetian blind, staggered lifting tapes and means for directing said tapes in spaced relationship into an operating device, said operating device including a housing, spaced rotatable tape receiving drums within said housing, tape receiving means on said drums and means for rotating said drums.

11. In a Venetian blind, staggered lifting tapes and means for directing said tapes in spaced relationship into an operating device, said operating

device including a housing, spaced rotatable tape receiving drums within said housing, tape securing slots and set screws on said drums, and means for rotating said drums.

12. In a Venetian blind, staggered lifting tapes and means for directing said tapes in spaced relationship into an operating device, said operating device including a housing, spaced rotatable tape receiving drums within said housing, tape securing slots and set screws on said drums, said slots having rounded edges to avoid sharply bending the tape, and means for rotating said drums.

13. In a Venetian blind, staggered lifting tapes and means for directing said tapes in spaced relationship into an operating device, said operating device including a housing, rotatable tape receiving drums and a gear rigidly mounted therebetween within said housing, tape receiving means on said drums, a worm cooperating with said gear whereby rotation of said worm rotates said gear and drums, and means for rotating said worm.

14. In combination with a Venetian blind, an inverted channel extending across the top of the window opening, spaced and staggered lifting tapes extending into the channel through openings in the web thereof, guide means for directing said tapes side by side to one end of said channel, and a tape actuating device disposed at said end of said channel.

15. In combination with a Venetian blind, an inverted channel extending across the top of the window opening, spaced and staggered lifting tapes extending into the channel through openings in the web thereof, guide means for directing said tapes side by side to one end of said channel, a housing mounted at said end into which said tapes are directed, spaced rotatable drums within said housing, and worm and gear means for rotating said drums.

16. In combination with a Venetian blind, an inverted channel extending across the top of the window opening, spaced and staggered lifting tapes extending into the channel through openings in the web thereof, guide means for directing said tapes side by side to one end of said channel, a housing mounted at said end into which said tapes are directed, spaced rotatable drums within said housing, tape receiving means on said drums, and worm and gear means for rotating said drums.

17. In combination with a Venetian blind, an inverted channel extending across the top of the window opening, spaced and staggered lifting tapes extending into the channel through openings in the web thereof, guide means for directing said tapes side by side to one end of said channel, a housing mounted at said end into which said tapes are directed, rotatable drums within said housing, a gear rigidly mounted between said drums, and worm means for rotating said gear and drums.

18. In combination with a Venetian blind, an inverted channel extending across the top of the window opening, spaced and staggered lifting tapes extending into the channel through openings in the web thereof, guide means for directing said tapes side by side to one end of said channel, a housing mounted at said end into which said tapes are directed, spaced rotatable drums within said housing, guide rollers within said housing directing said tapes to said drums, and worm and gear means for rotating said drums.

JOSEPH H. BAN.