

Aug. 1, 1939.

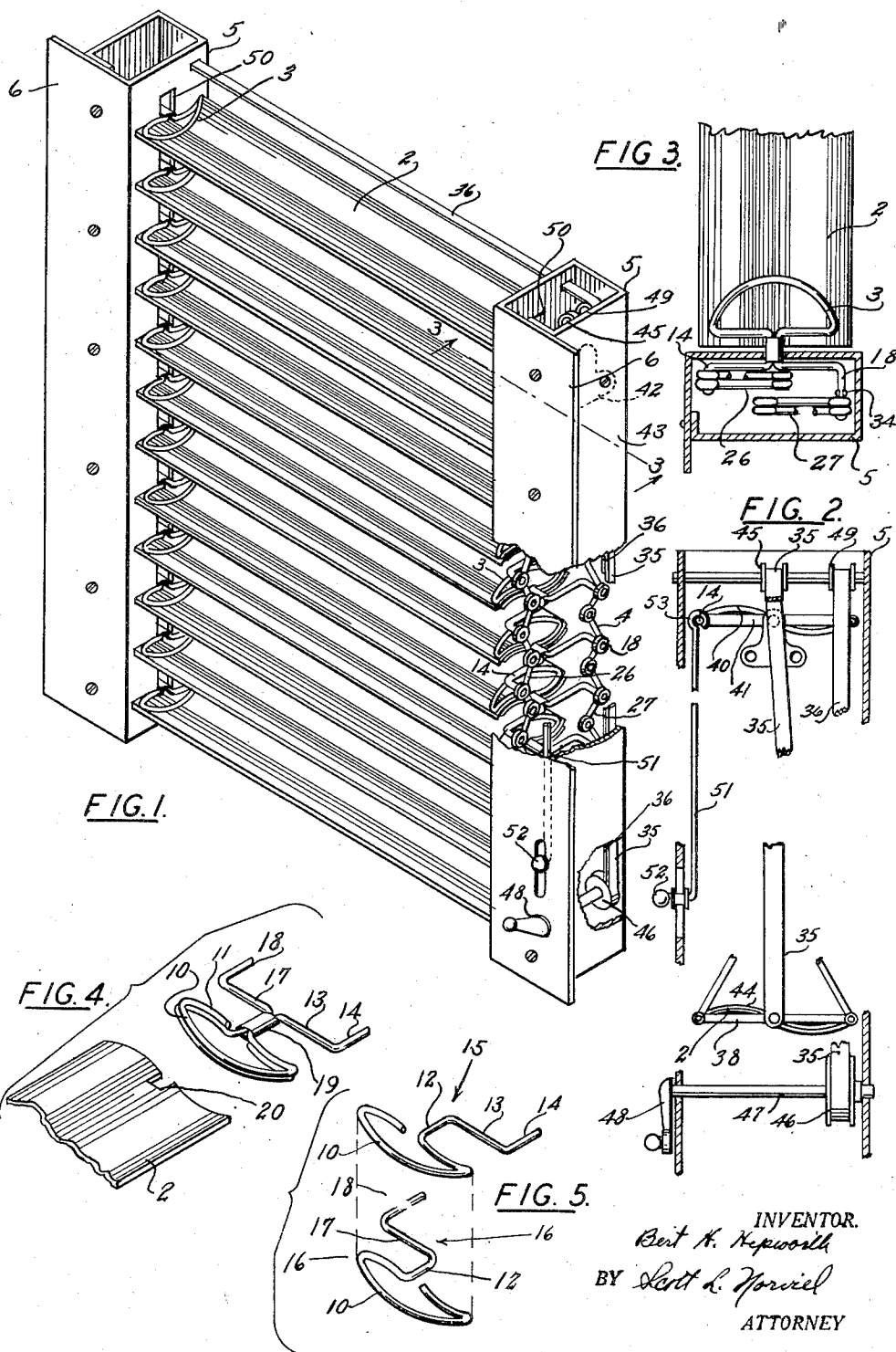
B. H. HEPWORTH

2,167,840

VENETIAN BLIND

Filed Oct. 17, 1938

2 Sheets-Sheet 1



Aug. 1, 1939.

B. H. HEPWORTH

2,167,840

VENETIAN BLIND

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2 Sheets-Sheet 2

FIG. 7.

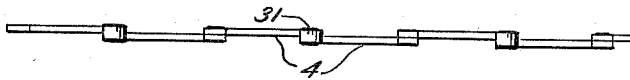


FIG. 8.

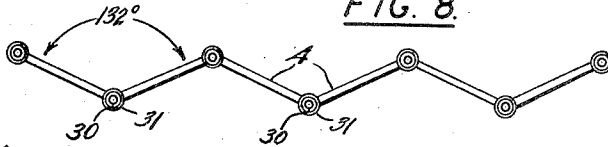


FIG. 9.

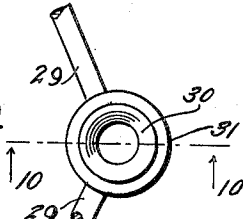
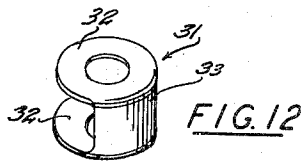


FIG. 17.

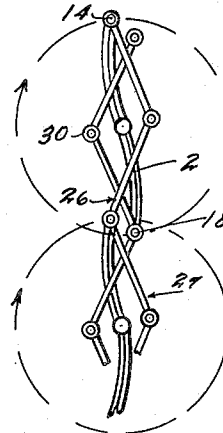


FIG. 10.

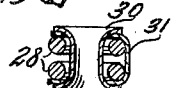
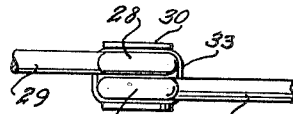


FIG. 11.

FIG. 6.

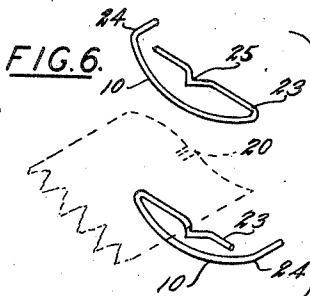


FIG. 13.

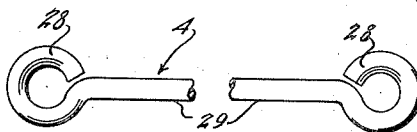


FIG. 16.

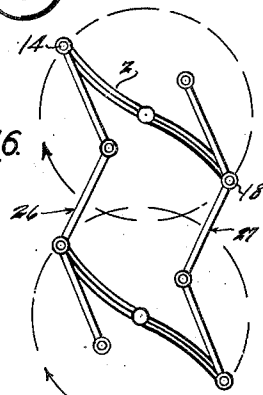
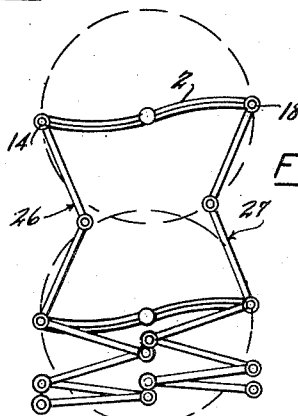
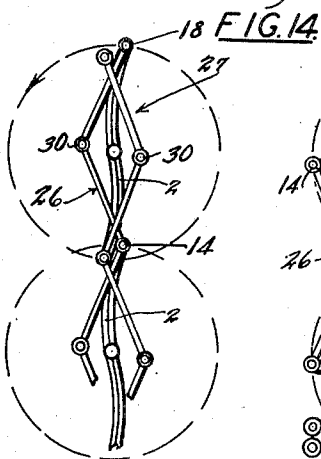


FIG. 15.



INVENTOR.
Bert H. Hepworth
BY Scott L. Yorvil
ATTORNEY

UNITED STATES PATENT OFFICE

2,167,840

VENETIAN BLIND

Bert H. Hepworth, Phoenix, Ariz.

Application October 17, 1938, Serial No. 235,466

6 Claims. (Cl. 156—17)

My invention pertains to the shutters commonly known as Venetian blinds and has for its objects—

First to provide a Venetian blind of such design and construction that it is particularly adaptable to be fabricated entirely of metal;

Second, to provide a device of this kind in which the individual slats composing the shutter are suspended on metal linkage so that the assembly may be raised from the bottom whereby the lowermost slats are drawn together, and independently thereof the angle of said slats may be rotated from the horizontal to a substantially vertical position either clockwise or counterclockwise;

A third object is to provide a metal linkage for supporting and interconnecting slats of the Venetian blind whereby the several slats may be uniformly rotated on their central axis and the assembly may be drawn from the bottom upward by closing the distance between the lowermost slats;

A further object is to provide a device, as hereinabove described, wherein the link mechanism operatively suspending said shutters may be enclosed in channels adjacent the window casings;

A fifth object is to provide a device of the kind above described, wherein movement of the assembly of shutter slats may be controlled by mechanism at a predetermined desired distance from the shutter.

Other objects will appear hereinafter.

I attain the foregoing objects by means of the construction, device and means illustrated in the accompanying drawings, in which—

Figure 1 is a fragmentary perspective of an assembled shutter with a portion broken away to better illustrate the construction;

Figure 2, a fragmentary sectional end view of one of the channels illustrating the blind operating and adjusting mechanism;

Figure 3 is a section of one end of the shutter assembly taken substantially on line 3—3, Figure 1;

Figure 4 is a fragmentary view of one end of a slat with the supporting clip in position to be fitted thereto;

Figure 5 is an expanded view of the supporting clip before assemblage;

Figure 6 is a similar view of a modified form of clip;

Figure 7 is an edgewise view of the link assembly;

Figure 8, an end view thereof;

Figure 9 is an end view of a link joint drawn on an enlarged scale;

Figure 10 is a section thereof taken substantially on line 10—10 Fig. 9;

Figure 11, an edgewise view of said joint as viewed from the left of Figure 9;

Figure 12, a perspective on a somewhat larger scale, of a stop used in said joint;

Figure 13, a plan view of a link drawn on approximately the same scale;

Figures 14, 15, 16 and 17 are semi-diagrammatic end views of a shutter link assembly illustrating the various positions thereof after movements made for adjustment.

Similar numerals refer to the similar parts of the several views.

The general construction of my type of shutter is illustrated in Figure 1, comprises a series of vertically disposed slats 2 supported at their ends by removable clips 3, which are joined by a metal linkage 4. The clips and metal linkage are enclosed in rectangular channels 5 at each end and these are adapted to be fastened to window frames by flanges 6. The construction of the clips and links, as hereinafter described, permits this shutter to have all the adjustments possible with the present ordinary type of Venetian blind. That is, the slats may be turned from a horizontal to an angular position clockwise to exclude light coming from above the horizon, or they may be turned in a reverse position to permit light to enter but to shut off outside observation. At the same time the entire structure may be drawn up from the extended position as illustrated, to a compressed position where the slats lie closely together. This is done when the blind is not in use.

All parts are preferably made of metal. The slats are made of thin steel having a double curve or S-section to insure longitudinal stiffness. The clips are made of steel wire of a sufficient size to stand the load to which they are subjected without distortion.

The slat clips are composed of two sections, and as illustrated particularly in Figures 4 and 5, consist of a curved portion 10 conformable to the surface of the end of the slat; a straight portion 11 aligned with the end; a straight portion 12 at right angles thereto forming a neck; a crank portion 13 at right angles thereto and parallel to the end of the slat and an outwardly extending pintle 14. This upper clip portion 15, as illustrated in Figure 5, is matched to a lower portion 16 which is a converse counterpart thereof, with the crank arm 17 extending in the op-

posite direction to provide a pintle 18 at the opposite edge. These two portions are joined together by a metal ferrule 19, which surrounds and tightly clips the two neck portions 12 forming a composite clip with the two curved portions 10 adapted to closely fit over the ends of each shutter slat 2 and be retained thereon by their resilience and compression. Each slat is provided with a notch 20 to permit a portion of the ferrule 19 to be received therein and thus prevent lateral dislocation of the slat when in place.

In Figure 6 a modified form of clip is illustrated. This is used when it is not desirable to enclose the linkage in channels 5, and the clips are made without the necks 12. In this modified form the loops 10 are similar to the first form. One side of each loop, however, is bent to extend directly longitudinally from the slat to form the two respective pintles 24. The other end is bent to form the compression bar 23 conformable to the end of the slat and provided with the V-shaped bend 25 to fit into notch 20 in the end of the slat. In this form the upper and lower parts of the clip are converse counterparts of each other so that there are two longitudinally extending pintles aligned with the edges of the slat adapted to receive the connecting links. These two parts are held together by spot welding along the contact portions of the lateral bars 23.

In either form, the clips thus constructed may be slipped onto and off from the ends of the respective slats composing the shutter. Their construction, being uniform for the type desired, all parts are replaceable.

The pintles 14 and 18 are connected by a series of metallic links forming two chain-like constructions. At the forward edge of the slats connecting all pintles corresponding to that designated 14 in Fig. 4, is a chain indicated by numeral 26; at the rear edge, connecting all pintles designated by numeral 18, is a chain 27. This same structure is duplicated at both ends of the slats.

These chains are composed of individual links, as illustrated in Figure 13; preferably these are made of steel wire of approximately number 12 gauge, bent to form eyes 28 at each end of a shank 29. Pairs of these links are joined by hollow rivets 30 (see Figs. 9, 10 and 11) peaned over as shown to hold them together forming joints with an easy working fit. To prevent the links, when extended, from assuming a straight line position, thus forming a dead center, I provide the stop 31, consisting of two washer-like tabs 32 joined in spaced relation by a semi-cylindrical spacer 33 attached to a portion of their outer peripheries. These stops are formed from blanks stamped from one piece of metal and shaped as above described. When the link joint is being made, a stop is first fitted over the link eyes, with the holes in the washer-like ends registering with those in the link eyes; the grommet is then inserted and peaned to a set. When thus constructed the joints are prevented from opening a greater distance than desired by spacer 33 contacting the link shanks. As indicated in Figure 8, this is preferably limited to an angle of 132 degrees. Constructed in this way the links are never open a sufficient distance to be on dead center and will always fold inwardly.

To form a complete chain, as indicated in Figures 7 and 8, the eyes of the links at the end of the link pairs are placed on the clip pintles one above the other and pintle ends riveted and peaned over to hold them in place. Except for

the top and bottom clips, there are two link eyes on each pintle. The vertical assembly of these link pairs, when attached to the front and rear pintles respectively, form the link chains 26 and 27 above referred to.

In order to prevent interference between the inwardly folding link joints, each row is set to operate in a separate longitudinal plane as illustrated in Figure 3. The link chain 26 operates in a plane within link chain 27. Since the link eyes operate with a comparative loose working fit on the pintles, stop beading 34 or a tubular sleeve, is necessary to keep the link eyes of the outer chain in proper alignment.

While I have illustrated the links as being preferably fabricated from steel wire, it is sometimes possible and even preferable to make them from stampings of sheet metal; all connecting parts, however, would be substantially the same.

A shutter, assembled as above described, is suspended in a window opening; the clip 40 on the topmost slat is provided with a cross bar 41, as shown in Figure 2. The center of this cross bar is pinioned on a support 42 attached by screws to the inside of the window frame or, if channels 5 are used, to the outer face thereof. This suspension permits axial turning movement of the top slat and all lower slats depending from it.

The lowermost slat clip 44 is provided with a cross bar 38. The center of this is pinioned to the lower end of a flexible steel tape 35. This tape passes upward, outside of all interference with the link chains, over a spool pulley 45, and down over a drum 46. This drum is supported on shaft 47 and operated by crank 48 on the outside of channel case 5. A second tape 36, also wound on drum 46, passes up, over pulley 49 across to the left channel, and down over a similar pulley near its top to a cross bar on the left end of the bottom slat clip. Operation of crank 48 will wind both tapes on pulley 46 simultaneously and draw the bottommost slat upward. The links suspending this slat will fold inwardly, as shown in Figure 15, and as the operation is continued, the slats next above will be drawn to this compressed position and so on, until the entire shutter assembly is compressed just below the top slat. To accommodate this movement slots 50 are cut in the inner faces of channels 5.

Rotary or tilting movement is communicated to the shutter through rod 51 manually operated by the slider and knob 52, and attached at its upper end 53 to the uppermost pintle 14 on the top slat clip. Upward motion of knob 52 will turn the top slat and all depending slats counterclockwise from the horizontal position shown in Figure 15, through the angular position shown in Figure 16 to the extreme limit of motion shown in Figure 17. Downward motion rotates the slats counterclockwise to the extreme position shown in Figure 14. In making these motions it will be noted that the link joints 30 on the respective chains cross each other laterally. This further illustrates the necessity of separating the longitudinal planes of each link chain.

While I have illustrated the preferred form of my device, it will be readily apparent to those familiar with the art that this form is subject to numerous changes and modifications, all of which will, nevertheless, remain within the spirit of the invention. Thus, for example, it is apparent that the tapes 35 and 36 might be joined

near the top of the right hand channel 5 and only a single tape continued downwardly over drum 46; also, the position, shape and location of the controls 48 and 52 may be changed and altered. Therefore, I wish to be limited only by the following claims.

I claim:

1. A Venetian blind comprising, in combination, a plurality of shutter slats, slat clips removably attached to the ends of each of said slats, linkage interconnecting said slat clips whereby said slats are adjustably held in uniformly spaced superposed position, means for suspending said shutter within a window area, and means for adjusting the position of said slats, including a rod mechanism for regulating the angle of the slats, and a draw tab for closing the space between said slats.
2. A Venetian blind comprising, in combination, a plurality of shutter slats, slat clips attached to the ends of said slats, having means for removably retaining the ends of said slats by compression, and outwardly extending pintles substantially aligned with the edges of said slats, linkage interconnecting the vertical rows of pintles aligned with each of the edges respectively of said slats, whereby said slats are held in superposed, uniformly spaced position to permit annular rotary movement relative to the longitudinal axis of each slat and adjustment of the distance between each slat by folding of the link joints, means of suspension of said shutter assembly within a window opening to permit axial movement of the topmost slat and means for operative adjustment of said slat assembly, including a manually operated rod attached to one of the pintles of the topmost slat clip, and flexible tapes attached to the lowermost slat clip to permit longitudinal axial motion and adapted to draw said slat assembly upwardly, whereby the distance between said slats is adjusted.
3. A Venetian blind comprising, in combination, a plurality of shutter slats, slat clips removably attached to the ends of said slats having projecting pintles, supporting chains composed of pairs of links joined with a link joint having stops adapted to prevent said joints opening to form a dead center, with the open ends of said pairs bear-

ing on pintles on said slat clips, said chains interconnecting the pintles aligned with the inner and outer edges of said slats, respectively, and relatively positioned thereon to hang and operate in separate longitudinal planes; channels adjacent the slat ends and encasing the supporting chains, a cross bar attached to the topmost slat to provide support and permit longitudinal axial movement, a control rod intermediate one of the pintles on the topmost slat clip and a knob slidably operative on one of said channels, and flexible tapes centrally and rotatably attached to the lowermost slat clips adapted, together with pulleys and drum mechanism, to raise said lowermost slat to effect a folding of said blind.

4. In a Venetian blind of the kind disclosed, slat clips adapted to form means for supporting said slats upon chain links to form said blind, comprising two superposed portions, each having a curved inner part adapted to grip the slat and by compression against the other, a straight portion connected thereto to extend across the end of the slat having a central bend adapted to fit within a notch in the slot end to prevent lateral displacement, each part having an outwardly protruding pintle aligned with the respective edges of the slat.

5. In a Venetian blind of the type disclosed, link chains, adapted to support the ends of said blinds, comprising pairs of links interconnecting pintles on the ends of said blind slats, and means for stopping the angular opening of said link pairs to prevent the formation of dead center therebetween.

6. In a Venetian blind of the kind disclosed, a link chain adapted to adjustably support the blind slats, comprising pairs of links, having shanks terminating in eyes, formed by a hollow rivet peened through two superposed eyes to form a joint having an easy working fit, and a stop having a semi-cylindrical cross portion partially encasing said joint to prevent same from opening beyond a predetermined angle, and the open ends of said link pairs adapted to journal on pintles protruding from slat clips on said blind slats to form a continuous chain.

BERT H. HEPWORTH.