FULL-CLOSURE TYPE VENETIAN BLINDS


This invention relates to Venetian blinds, and more particularly to Venetian blinds which allow the over-lapped slats to move substantially into contact. This gives the blind greater light-excluding capacity, and such blinds have been referred to in the trade as "black-out" blinds and "full-closure" blinds.

The present application is a continuation of our application Serial Number 507,782, filed May 12, 1955, now abandoned.

A Venetian blind, of the class to which the present invention is applicable, is essentially an assembly of superimposed articulated slats suspended from a head bar or "head" extending across the top of the blind and on or in which is mounted mechanism which comes into play in raising and tilting the slats of the blind. Such a blind is usually raised by two lift cords which begin at a top loop that hangs on a front or room side of the blind, extend upwardly into the head, partially across the head to respective pulleys or other cord-guiding and direction-changing means at locations spaced along the width of the blind, and then downwardly (ordinarily through holes in the slats) to the bottom bar. The slats and bottom bar are conventionally tiltable through approximately 180° from one "blind-closed" position, through the "blind-open" position in which the slats lie horizontally, to a second "blind-closed" position.

In the "blind-closed" positions of many Venetian blinds the overlapped edge portions of adjacent slats cannot approach each other any more closely than is permitted by the diameter of the lift cord, which extends between the overlapped edges. In "full-closure" blinds this limitation on the approach of the overlapped edge portions to each other is reduced or eliminated, at least as regards the tilting of the slats in one direction, so that the overlapped edge portions of adjacent slats can move closer together or even into contact.

Blind constructions and arrangements have been proposed from time to time to render Venetian blinds "full-closing" to various degrees. However, the full-closing type blinds of the prior art have disadvantages of various sorts, among which are lack of simplicity in structure, manufacture and assembly, extra parts, weakening of certain parts, sharp corners which tend to snag dust cloths and brushes, openings which admit light despite substantial contact of the overlapped slats, etc.

Among the objects of the present invention are to render a Venetian blind substantially full-closing without complicating the structure of the blind or employing additional parts, to render a Venetian blind substantially full-closing without unduly weakening any of its parts, to provide a full-closing type Venetian blind which is free of sharp corners that are likely to snag dust cloths or the like, to provide a full-closing type Venetian blind in which openings that are in the slats are well shielded from the transmission of light, to provide for a full-closure type Venetian blind parts which can be rapidly and economically manufactured on a quantity-production basis, and to provide a full-closure type Venetian blind which can be rapidly and economically assembled.

Other objects and advantages, and objects and advantages relating to details of construction, assembly, operation, and use, will be apparent from the detailed description which follows.

FIGURE I is a fragmentary, somewhat diagrammatic front elevation of a Venetian blind embodying the present invention, the room side of the blind being considered as the "front" of the blind, and a portion of one of the ladders being broken away.

FIGURE 2 is a fragmentary end view looking from the right of FIGURE 1, the blind being in open position and portions of the lift cords being broken away.

FIGURE 3 is a view similar to FIGURE 2, the blind being fully closed.

FIGURE 4 is a fragmentary plan view of one of the slats, on a larger scale than FIGURES 1-3.

FIGURE 5 is a fragmentary isometric view of one of the ladders of the blind illustrated in FIGURES 1-3 and 6-9.

FIGURE 6 is a fragmentary sectional view on the line 6-6 of FIGURE 1.

FIGURE 7 is a fragmentary perspective view showing one slot of the blind tilted for substantial full closure, the relation thereto of the ladder shown in FIGURE 1.

FIGURE 8 is a fragmentary end view, looking from the right of FIGURE 1, showing the position of the slats as they approach full closure.

FIGURE 9 is a view similar to FIGURE 8 but showing the slats fully closed.

FIGURE 10 is a fragmentary side elevation showing a modification of the ladder shown in FIGURE 1.

FIGURE 11 is a fragmentary isometric view showing a further form of ladder in accordance with the present invention.

FIGURE 12 is a fragmentary side elevation showing a modification of the ladder shown in FIGURE 11.

Reference will first be had to FIGURES 1, 2 and 3. The blind, designated as a whole by 14, includes a head 15, a series of slats 16, ladders 17 (one shown), and a bottom bar 19. The blind is adapted to be counted as a unit in conventional manner by means of a pair of installation brackets 20 of known form (one shown), the brackets being attached to the jamb of a window, for example, and receiving the ends of the head 15.

The blind includes a pair of ladders, such as ladder 17, though additional ladders may be used in the case of a wide blind. A lift-cord loop 21 hangs on the front (room side) of the blind. From this loop lift cords 24 and 25 extend upwardly through a cord equalizer 26 of known type and thence into the head, where these cords are arranged in known manner in connection with known means for guiding and changing the direction of the lift cords and for locking the lift cords to secure the blind in fully or partially raised positions. One lift cord, for example cord 24, extends from the head downwardly at the ladder 17 and is attached to the bottom bar. The lift cord 25 is arranged in similar manner, extending downwardly at the other ladder of the aforesaid pair of ladders. When the loop 21 is pulled downwardly, the blind is raised in conventional manner.

The ladder 17 has front and rear vertical tabs 29 and 30 connected by cross tabs 31 on each of which one of the slats 16 rests. The entire ladder 17 may be made of suitable plastic material. Each cross tab 31 has at each end oppositely disposed integral tabs 32 and 34 (FIGURE 5) which are fixedly secured to the vertical tabs 29 and 30 as by heat and pressure. Near both spaced from each end of the cross tab is a pair of oppositely positioned notches 35, 35 the two pairs of notches being symmetrically positioned with respect to the transverse central axis of the cross tab. The cross tabs 31 are arranged in a single line as shown in FIGURE 2.

The slats 16 are all alike and all of them cooperate in the same manner with the ladders and with the lift cords. The slats are made of suitable sheet material, preferably metal, and they are upwardly crowded as shown in FIGURE 2.
Referring to FIGURE 4, which shows a fragment of one of the slats 16 including the ladder zone, the slat has an elongated transverse opening 36 which is somewhat wider than the thickness of the lift cord, the transverse central axis of the opening lying closer to the front edge of the slat than does to the rear edge of the slat. Aligned with the transverse opening 36 is a notch 37 in the rear edge of the slat. Spaced inwardly as shown from the rear edge of the slat is an elongated longitudinal hole 39 which is longitudinally offset with respect to the edge notch 37. An entrance slot 40 leads from the rear edge of the slat to the hole 39.

Referring to FIGURES 2 and 6, the front edge of the slat 16 is in a straight line directly on the cross tape 21 in abutting relation to the front vertical tape 29 of the ladder. As the cross tape 31 approaches the rear vertical tape 30 of the ladder, it passes upwardly through the hole 39. As shown, the cross tape is wider than the length of hole 39 and the notches 35, 35 interlock with the slat at the ends of the hole 39, one side of each notch 35 constituting a shoulder 38 which engages the top of the slat. Preferably, the notches 35, 35 are wide enough, and the neck portion 41 of the cross tape narrow enough, to avoid chafing engagement between the cross tape and the slat at hole 39.

The entrance slot 40 affords convenient assembly of the cross tape with the slat, the cross tape being inserted sidewise through the slot and pushed into the hole 39. As far as operation of the blind is concerned, the cross tape need have only one pair of notches 35, 35. However, we prefer to provide such notches near both ends of the cross tape, and to make the cross tape symmetrical about its central transverse axis, so that in assembling a blind either one of the vertical tapes of the ladder may be used as the rear tape.

The upper ends of front and rear vertical tapes 29 and 30 are attached in known manner to a suitable tape rock- er 44, indicated in dotted lines in FIGURES 2 and 3. In tilting the blind, the rocker is shifted in known manner so that it raises one of the vertical tapes of the ladder and simultaneously lowers the other vertical tape of the ladder, as is well understood in the art. With the blind of the present invention, the greatest light exclusion is obtained by turning the tape rocker 44 in such direction that it raises the front tape 29 and lowers the rear tape 30, bringing the blind to the condition shown in FIGURE 3.

Reference will now be had to FIGURES 7, 8, and 9. In FIGURE 8 the slats are approaching fully closed position and in FIGURE 9 they have reached fully closed position. Since the upper ends of the vertical tapes 29 and 30 are held apart by the tape rocker 44, the effect of such spacing must be overcome to a considerable extent if the overlapping portions of the slats are to be brought into contact. As may be seen in FIGURE 8, the upward pull on front vertical tape 29 is transmitted to the now depending cross tape 31 and brought to bear upon slat 16 at the location of hole 39 which is interlocked with the notches 35, 35. This hole 39 is removed from (i.e., spaced from) the now lower edge of the slat, and hence the cross tape acts to pull this edge-engaged slot of the slat directly toward the overlapped slat beneath. Thus, the bottom zone of the slat is drawn directly toward the overlapped portion of the slat beneath, leaving rear vertical tape 30 spaced from the slats.

The lift cord depends vertically between the front and rear vertical tapes 29 and 30, passing through the transverse opening 36 in the slat. As the slat moves into fully tilted position, the notch 37 in the slat receives the lift cord, e.g., cord 24, and permits the lower edge of the slat to move into contact with the overlapped slat beneath without limitation imposed by the thickness of the lift cord. This fully closed condition of the blind is shown in FIGURE 9 and the corresponding position of a single slat is shown in FIGURE 7.

FIGURE 10 illustrates a modification of the ladder shown in FIGURES 1 through 9. This has cross tapes 31' each provided with pairs of notches 35', 35' (one notch of each pair shown) arranged in the same manner as the notches of the cross tape shown in FIGURE 5. To compensate for the weakening of the cross tape by the notches, the cross tape in FIGURE 10 is thickened in zones 45, 44, with the length of each zone extending throughout the entire width of the cross tape.

The form of ladder shown in FIGURE 11 is the same as that shown in FIGURE 5 except that the neck portion 41a of the cross tape 31a extends across the central portion of the cross tape, leaving a pair of notches 47, 47 near each end of the cross tape. These shoulders corresponding to the outward sides of the notches 35, 35. When this form of cross tape is used, these shoulders act to pull the lower zone of the tilted slat into contact with the slat beneath, as was explained in connection with FIGURE 8.

The ladder shown in FIGURE 12 is the same as that shown in FIGURE 11 except that the cross tape is thick- ened in the zone 50 to compensate for the weakening caused by the long neck 41a shown in FIGURE 11. This thickening extends throughout the width of the neck and width of the tape in zones adjacent to the ends of the cross tape.

The blind described may, of course, be tilted in the direction opposite to that shown in FIGURE 3, in which case the rear vertical tapes of the ladders are raised and the front vertical tapes of the ladders are lowered. When the blind is tilted in this direction, the lift cords limit the degree of closure; also the slats are in a less favorable position to block light coming downwardly at an angle from the sky.

Under breezy conditions the slats of Venetian blinds are subject to flutter and chatter, particularly when the blinds are closed. This tendency to flutter and chatter is aggravated when the slats are "fully closed" because there is little space between the slats through which to vent the pressure imposed by the breeze striking the blind. With the blind of the present invention, such flutter and chatter are effectively opposed even with the blind "fully closed" as shown in FIGURES 3 and 9. Referring to FIGURE 9, it will be seen that when the wind tends to blow the lower edge of a tilted slat toward the rear vertical tape 30, such movement is opposed by the shoulders 38, 38 (FIGURE 5) of the cross tape which is interlocked with the slat. Also, if the wind tends to blow the lower edge of the tilted slat toward the front vertical tape 29, the movement is opposed by the slat with the slat beneath, the slat beneath having its upper edge against the stump portion of the cross tape. Like- wise, if the wind tends to blow the upper edge of the slat in either direction, the movement is opposed—movement toward the front vertical tape 29 being opposed by the stump of the cross tape and movement toward the rear vertical tape 30 being opposed by the lower edge of the slat above. The result is that the fully tilted slat is effect- ively held against flutter to a marked extent, despite the fact that the blind does not have openings between slats which will permit vent wind pressure that builds up against the blind.

We claim:
1. In a Venetian blind of the full-closure type in which
(a) a plurality of ladders have front and rear vertical tapes that are interconnected by vertically-spaced cross tapes, (b) the cross tapes extend transversely between all the slats, and (c) lift cords depend between the front and rear vertical tapes and pass through elongated transverse openings in the slats, and (d) the rear edges of the slats are formed to move astride of the lift cords when the blind is closed; the improvement which comprises: the slats having openings through which the cross tapes pass close to but spaced from the rear edges of the slats, the cross tapes having shoulders which, when the slats are horizontal, engage the
tops of the slats at points close to but spaced from the rear edges of the slats whereby, when the blind is closed with the rear edges of the slats depressed, the cross tapes pull the lower edges of the slats away from the rear vertical edges and against the faces of the subjacent slats.

2. The improvement as in claim 1 in which the front edges of the slats are continuous straight edges.

3. The improvement as in claim 1 in which the openings through which the cross tapes pass are elongated ones extending longitudinally of the slats, and the portions of the cross tapes that lie between the openings and the rear vertical tapes are wider than the lengths of the openings.

4. The improvement as in claim 1 in which the openings through which the cross tapes pass are elongated ones extending longitudinally of the slats, and the portions of the cross tapes that lie between the openings and the rear vertical tapes are wider than the lengths of the openings.

5. The improvement as in claim 1 in which the front edges of the slats are continuous straight edges, the openings through which the cross tapes pass are elongated ones extending longitudinally of the slats, and the portions of the cross tapes that lie between the openings and the rear vertical tapes are wider than the lengths of the openings.

6. A full-closure Venetian blind comprising: a plurality of ladders having front and rear vertical tapes that are interconnected by vertically-spaced cross tapes, crowned slats supported by the cross tapes, the slats having openings adjacent to their rear edges through which the cross tapes pass at points that are in space relation to the rear edges of the slats, and the cross tapes having shoulders which bear against the tops of the slats when the slats are horizontal and which when the blind is closed with the rear edges of the slats depressed cause the lower edges of the slats to contact the faces of the subjacent slats.

7. A Venetian blind comprising: a plurality of crowned slats having openings adjacent to one edge thereof, said one edge being normally at the bottom when said slats are closed, and ladders supporting said slats in vertically-spaced arrangement, each of said ladders comprising front and rear vertical tapes of soft pliable material and a plurality of vertically-spaced cross tapes of soft pliable material extending between said vertical tapes, the width of said slats from the innermost sides of said openings to the opposite edges of the slats being less than the length of said cross tapes, cross tapes passing under said slats and through said openings and engaging the slats at the innermost sides of said openings, and said cross tapes being shaped to provide shoulder means thereon engageable with the slats toward the bottom edges thereof to hold the slats against sliding down into the openings of said cross tapes with said rear vertical tapes when said slats are tilted closed.

8. A Venetian blind comprising: a plurality of crowned slats having openings adjacent to one edge thereof, said one edge being normally at the bottom when said slats are tilted closed, ladders supporting said slats in vertically-spaced arrangement, each of said ladders comprising front and rear vertical tapes of soft pliable material and a plurality of vertically-spaced cross tapes of soft pliable material extending between said vertical tapes, the width of said slats from the innermost sides of said openings to the opposite edges of the slats being less than the length of said cross tapes, each of said cross tapes including end portions adjoining said vertical tapes, the intermediate portions of said cross tapes between said end portions being narrower in width than the end portions, there being shoulders at the junctions of said intermediate portions with those end portions which adjoin the rear vertical tapes, said cross tapes passing under said slats and through said openings and engaging the slats at the innermost sides of said openings, said shoulders on said cross tapes being spaced inwardly from the rear vertical tapes and engaging said slats at the ends of said openings to hold the slats against sliding down into the junctions of the cross tapes with the rear vertical tapes when the slats are tilted closed.

9. A Venetian blind as in claim 7 in which said shoulder means includes two shoulders, one shoulder being at one end of the cross tape and being engageable with the slat at one end of the cross opening through which the cross tape passes, and the other shoulder being at the opposite edge of the cross tape and being engageable with the slat at the opposite end of the cross opening through which the cross tape passes.

10. A Venetian blind as in claim 8 in which each cross tape has two of said shoulders, one at each end of the cross tape, and the shoulder distance across the edge of the cross tape.

11. A Venetian blind comprising: a plurality of crowned slats having openings for the passage of cross tapes therethrough at locations close to the rear edges thereof, the rear edges of the slats being normally at the bottom when said slats are tilted closed; and ladders supporting said slats in vertically-spaced arrangement, each of said ladders comprising front and rear vertical tapes of soft pliable material and a plurality of vertically-spaced cross tapes of soft pliable material extending between said vertical tapes, the length of the cross tapes being greater than the width of said slats from the front edges of the slats to the nearest edges of said openings in the slats, said cross tapes passing under said slats when the slats are horizontal and through said openings to positions above the tops of the slats and thence to the rear vertical tapes, and said cross tapes having means which engage the slats toward the bottom edge thereof when the slats are tilted closed and hold the tilted slats against sliding down into the junctions of the cross tapes with the rear vertical tapes.

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