United States Patent [19]

Debs

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[45] **Apr. 17, 1973**

[54] **BLIND HAVING LIFT CORDS AND A CORD LOCK**

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[52] **U.S. Cl.** ..... **160/178 C**, 160/168

[51] **Int. Cl.** **E06b 9/26**

[58] **Field of Search** ..... 160/166–178, 178 C

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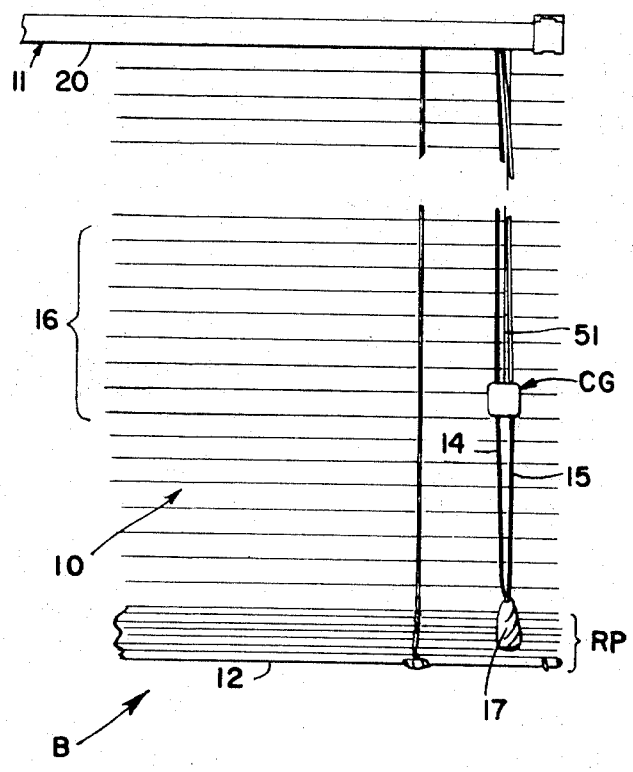
Primary Examiner—Peter M. Caun

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[57] **ABSTRACT**

A blind has lift cords which pass through a cord lock and hang down to be pulled downwardly and eased upwardly to raise and lower the blind. The down-hanging lift-cords are guided by a pendant cord-guide which is attached to and carried by an actuating cord that is connected to the locking dog of the cord lock. When the actuating cord is pulled it moves the locking dog into locking engagement with the lift cords, causing the cord lock to lock the cords.

15 Claims, 9 Drawing Figures



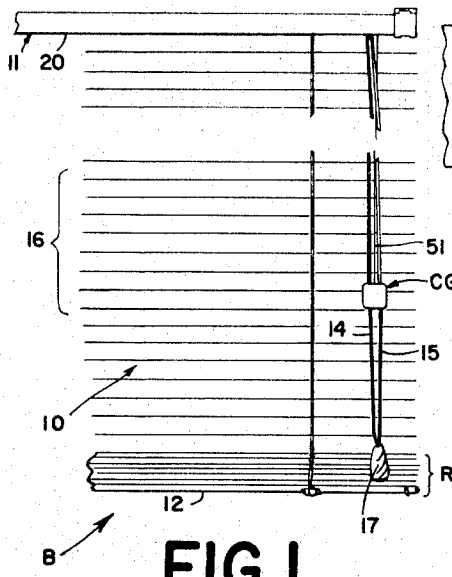
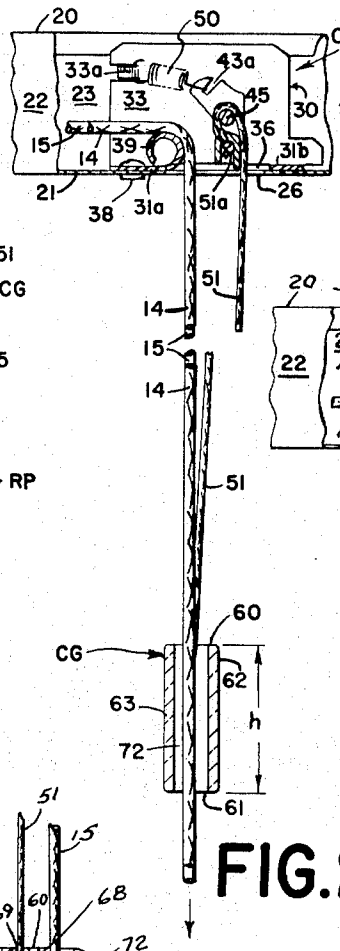


FIG.1



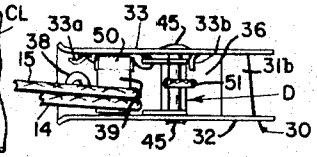


FIG.3

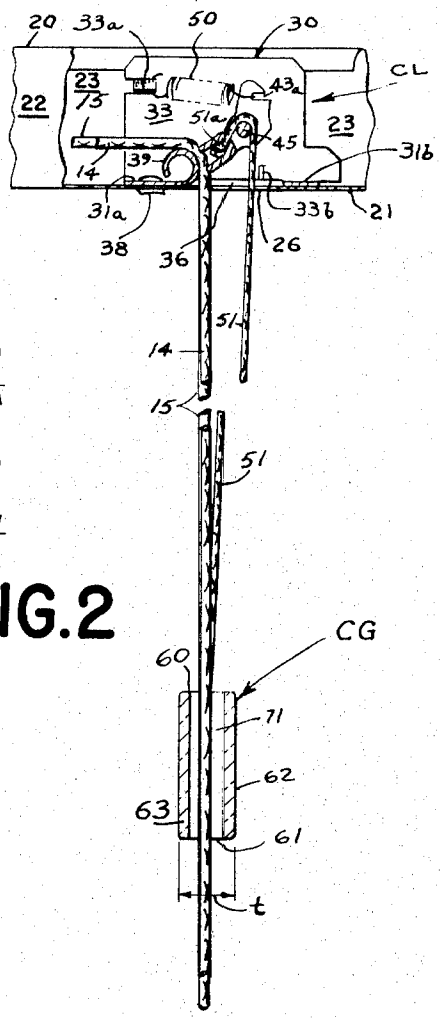


FIG.2

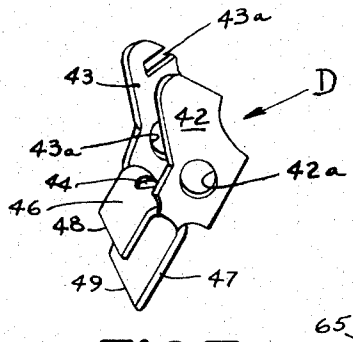


FIG.7

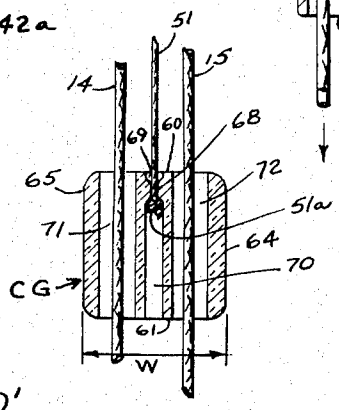


FIG.5

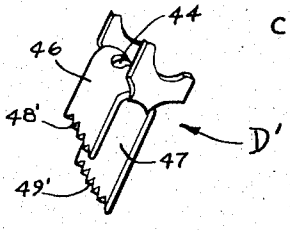


FIG.8

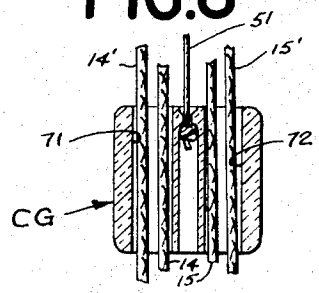


FIG.9

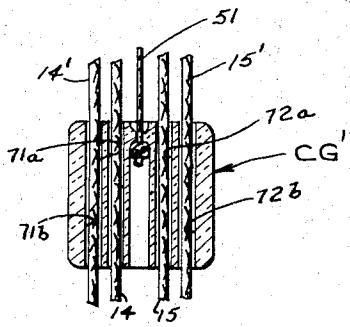


FIG.6

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BLIND HAVING LIFT CORDS AND A CORD LOCK

BACKGROUND OF THE INVENTION

The invention relates to Venetian blinds and other blinds, the term "blind" designating a device such as is used in connection with an opening to keep out light or hinder vision.

Venetian blinds and various other blinds are customarily provided with lift cords which pass through a cord lock and hang down to be pulled downwardly and eased upwardly to raise and lower the blind. In passing through the cord lock the lift cords ordinarily make a 90° bend around a cord guide that is included in the cord lock. In spaced relation to such cord guide there is locking means that is adapted to make locking engagement with the lift cords and clamp them against the aforesaid cord guide. Typically, the locking means is a locking dog which is so pivoted that it has unbalanced weight which biases the dog away from the lift cords.

The blind having been raised or lowered to the desired degree, the down-hanging lift-cords are swung sidewise against the locking dog (usually provided with teeth which the cords engage) and then the lift cords are eased upwardly for a short distance. The lift cords, by reason of their engagement with the locking dog, move the nose of the dog upwardly —thereby causing the dog to swing in the direction of the lift cords and clamp them against the cord guide around which the cords make the 90° bend. When the blind is to be raised or lowered to a different position, the down-hanging lift-cords are first pulled downwardly for a short distance; this releases the locking dog which, by reason of its unbalanced weight, swings away from the lift cords.

Because actuating the cord lock involves easing the lift cords upwardly for a short distance, it is likely to be troublesome to so manipulate the lift cords that the locking will be completed with the blind at the exact level that may be desired. Further, the weight of the raised portion of the blind is a factor in the locking action of the locking dog. This tends to make the locking action uncertain when the weight of the raised portion of the blind is quite small, as when the blind is quite light in weight or when only a small portion of the blind is raised.

United States patent to Kuyper U.S. Pat. No. 1,957,272 shows in its FIGS. **8**, **6**, **9** and **1** a Venetian blind in which a separate actuating cord is connected to the locking dog of the cord lock; when the actuating cord is pulled the locking dog is swung into engagement with the lift cords, clamping them against the top of the cord-lock housing. In the Kuyper blind there is wide separation between the down-hanging lift cords and the actuating cord for the cord lock, which separation Kuyper needs for protection against entanglement between the lift cords and the actuating cord. In various installations this wide separation is undesirable. Further, Kuyper's cord lock requires more space than is desirable in many instances. Still further, Kuyper's blind has difficulties in connection with the weight that is imposed upon the locking dog. To prevent false operation of his locking dog, the combined weight of Kuyper's actuating cord and pull tassel will have to be severely limited. Additionally, there is the problem of variations in the weight of the actuating cord, due to the varying length thereof in different installations.

SUMMARY OF THE INVENTION

The present invention provides a blind in which there is pendant cord-guide means for the lift cords, such cord-guide means being attached to and being carried by an actuating cord that is connected to the locking means of the cord lock.

In accordance with features afforded by the invention:

(a) the down-hanging lift-cords pass vertically through spaced lift-cord passages in the pendant cord-guide means; (b) collectively, the lift-cord passages are adapted to receive two or more lift cords; (c) the attachment of the cord-lock actuating-cord to the pendant cord-guide means is at a location that is between the spaced lift-cord passages, the lift-cord passages being symmetrically arranged in relation to such attachment; (d) the lift-cord passages extend vertically for a distance which is long as compared to the thickness of the lift cords; (e) the lift-cord passages afford unfettered movement of the lift cords through the passages; (f) the pendant cord-guide means is a unitary cord-guide which has it central vertical-axis passing through its center of gravity, and it is on such vertical axis and above the center of gravity that the pendant cord-guide is attached to the cord-lock actuating-cord; (g) the pendant cord-guide is a pendant block, and the central vertical-axis of the block is aligned at least approximately with the cord-lock actuating-cord; (h) the cord lock has a pivoted locking-dog which is spring biased away from the lift cords, the spring having sufficient strength to counteract the combined weight of the pendant cord-guide and the cord-lock actuating-cord; (i) the spring is a readily detachable and replaceable coil spring; and (j) the cord-lock actuating-cord, adjacent to the locking-dog-connected end thereof, is formed into a bight which embraces the pivot of the locking dog.

The invention affords all of the foregoing features, among others. It is left to the user to select the features which are needed or desirable for his particular use.

BRIEF DESCRIPTION OF THE DRAWING

FIG. **1** is a largely diagrammatic front elevation, with parts broken away, showing a blind embodying the invention. In this instance the blind is a Venetian blind.

FIG. **2** is a largely diagrammatic detail view in sectional elevation with parts omitted and parts broken away, the view being to a larger scale than FIG. **1**. FIG. **2** shows the interior construction of the cord lock and shows two lift cords passing through the cord lock, the dog of the cord lock being in unlocked position. FIG. **2** also shows, in vertical front-to-rear section, the block which constitutes the pendant cord-guide; and to afford the front-to-rear section, the block in FIG. **2** is rotated 90° on its vertical axis from the position in which the block is shown in FIG. **1**.

FIG. **3** is a top plan view of the cord lock itself, to the same scale as FIG. **2**, the locking dog being in unlocked position. Fragments of the cords and an attaching eyelet for the cord lock are shown also.

FIG. **4** is the same as FIG. **2** but with the locking dog in locked position.

FIG. **5** is a central vertical-section of the block which constitutes the pendant cord-guide, the plane of the section being parallel to the expanse of the blind in

FIG. 1 and being perpendicular to the sectional plane of the block in FIGS. 2 and 4. Fragments of two lift cords and a fragment of the cord-lock actuating-cord are shown in elevation.

FIG. 6 is the same type of view as FIG. 5 but showing a pendant cord-guide block having four separate lift-cord passages. Fragments of four lift-cords and a fragment of the cord-lock actuating-cord are shown in elevation.

FIG. 7 is a perspective view, on an enlarged scale as compared to FIGS. 2–4, showing the locking dog that is shown in FIGS. 2–4

FIG. 8 is a perspective view, corresponding to FIG. 7, showing enough of the locking dog to illustrate how it may be modified to provide teeth which will engage the lift cords when the locking dog is in locked position.

FIG. 9 is the same as FIG. 5 but showing four lift cords, instead of two.

DESCRIPTION OF THE EMBODIMENTS THAT ARE PRESENTLY PREFERRED

The best modes thus far contemplated of carrying out the invention are herein disclosed. Nevertheless, the disclosed modes are by way of illustration and example, since other modes may be used; and the claims embrace other modes. Except as otherwise indicated the description hereinafter (prior to the claims) is of the particular forms of the invention that are shown in the drawing and does not necessarily refer to any other form. The above heading is not to be considered as applying to the claims, no matter what style and/or format is used in printing the patent.

In FIG. 1 the Venetian blind is designated as a whole by B. It has a conventional ladder-and-slat assembly **10**, which is conventionally suspended beneath a head **11** that is conventional except for the cord lock that is shown in FIGS. 2–4. A conventional bottom bar **12** acts as the lowermost slat of the ladder-and-slat assembly **10**. Two lift cords **14** and **15** are connected to the bottom bar **12**, from which they proceed as follows: upwardly through conventional openings (not shown) in the conventional slats **16**, into the head **11** in conventional manner, thence to the right within the head in conventional manner, through the cord lock in conventional manner, hanging down as shown in front of the slats and passing through a pendant cord-guide CG, and then being attached in conventional manner to a conventional tassel **17**. The two lift cords hang down as shown to be pulled downwardly and eased upwardly to raise and lower the slats of the blind, commonly referred to as raising and lowering the blind. In FIG. 1 the portion RP is in raised position. The two lift cords **14** and **15** may be two branches of a single length of cord which is folded back upon itself, having a bight within the tassel **17**.

The head **11** includes a conventional sheet-steel channel **20** (FIG. 1) which, as shown in FIGS. 2 and 4, has a bottom wall **21**, a front wall **22** and a rear wall **23**. Nested within the channel **20** and located toward the right-hand end of the channel there is a cord lock which is designated as a whole by CL. The cord lock has a body **30** which is stamped in one piece from sheet steel, the body having a two-part bottom wall **31***a*, **31***b*, a front wall **32** and a rear wall **33**. In the bottom wall **31***a*, **31***b* there is a rectangular opening **36** which extends from one bottom-wall part **31***a* to the other bottom wall part **31***b* and from the front wall **32** to the rear wall **33**. The bottom wall **31***a*, **31***b* of the cord-lock body is against the bottom wall **21** of the head channel **20**, and is suitably secured thereto as by one or more eyelets or rivets **38** (one shown). In the bottom wall **21** of the head channel **20** there is an opening **26** (FIGS. 2 and 4) which is the same size as, and registers with, the opening **36** in the bottom wall of the cord-lock body **30**.

In forming the cord-lock body **30**, metal taken from the opening **36** in the bottom of the body is formed into a hollow cylindrical cord-guide **39** which extends from the front wall **32** of the cord-lock body to the rear wall **33** of the cord-lock body, the axis of the cylindrical formation being horizontal and being perpendicular to the walls **32** and **33**. The cord guide **39** guides the lift cords **14** and **15** through a 90° bend, from horizontal to vertical. The lift cords pass through the openings **36** and **26** and hang down from the cord lock; see FIGS. 2–4.

The cord lock CL includes a movable locking-dog which is designated as a whole by D (FIG. 7), this dog being adapted to lock the lift cords **14** and **15**. The dog D is stamped in one piece from sheet steel; it includes front and rear cheeks **42** and **43**, front cheek **42** loosely engaging the front wall **32** of the cord-lock body and the rear cheek **43** loosely engaging the rear wall **33** of the cord-lock body. The dog D is pivotally mounted in the cord-lock body by means of a rivet **45**, which constitutes a pivot and is located as shown in FIGS. 2–4. The rivet **45** passes through the front and rear walls **32** and **33** of the cord-lock body. The rivet **45** also passes through and makes a loose bearing-fit with the locking-dog cheeks **42** and **43** at the openings **42***a* and **43***a* thereof. The cheeks **42** and **43** are connected together by a U-shaped formation which includes planar legs **46** and **47** that are in spaced parallel relation, the leg **46** being somewhat shorter than the leg **47**. The legs **46** and **47** lie on opposite sides of, and are equidistant from, a plane which includes the pivotal axis of the dog D and is parallel to the legs **46** and **47**. The legs **46** and **47**, which are connected together by an arc as shown, have free ends **48** and **49** that engage the lift cords **14** and **15** when the locking dog swings into locking engagement with the lift cords and clamps them against the cylindrical cord-guide **39**; see FIG. 4. In the modified locking dog D′ that is shown fragmentarily in FIG. 8 the legs **46** and **47** are provided with serrated free ends **48′** and **49′**, whereby the dog has teeth which engage the lift cords when the dog is in locked position.

The rear cheek **43** of the locking dog is notched at **43***a*, and one end of a coil spring **50** is connected to the notch as is seen in FIGS. 2–4. The other end of the coil spring **50** is connected to a finger **33***a* which is struck from the rear wall **33** of the cord-lock body. The spring **50** biases the locking dog away from the lift cords **14** and **15** and into the position shown in FIG. 2, counter-clockwise movement of the locking dog being arrested by finger **33***b* (FIGS. 3 and 4) which is struck from the rear wall **33** of the cord-lock body adjacent to the bottom of the rear wall. The locking dog (D or D′) is swung into locking position by means of an actuating cord **51** which is connected at its upper end to the locking dog and from which it hangs down through openings **36** and **26**. Adjacent to its upper end the ac-

tuating cord **51** is formed into a bight which embraces the pivot **45** of the locking dog, the cord being connected to the locking dog by passing through the hole **44** (FIGS. **7** and **8**) and being knotted at **51***a* as is shown in FIGS. **2** and **4**. When the actuating cord **51** is pulled it overcomes the bias of the spring **50**, swings the locking dog clockwise as viewed in FIGS. **2** and **4**, and brings the locking dog into locking engagement with the lift cords **14** and **15** as shown in FIG. **4**. The arrangement of the actuating cord in a bight which embraces the pivot of the locking dog is a very compact arrangement and, nevertheless, affords large angular movement of the locking dog when the actuating cord is pulled.

The down-hanging lift-cords **14** and **15** are guided by the pendant cord-guide CG, which may be a pendant block of suitable size and shape and which is made of suitable material. The block CG that is shown has a height *h*, a width *w*, a thickness *t*, a top **60**, a bottom **61**, a generally planar front-face **62**, a generally planar rear-face **63**, a generally planar right edge-face **64**, and a generally planar left edge-face **65**. The various corners of the block are rounded off somewhat. The block CG that is shown is molded in one piece of suitable plastic —plastic which is hard, impact resistant and light in weight being presently preferred. If desired, the plastic may be translucent or transparent.

The block CG is symmetrical about its vertical axis, which is midway between the front and rear faces **62** and **63** and also midway between the right and left edge-faces **64** and **65**. The center of gravity of the block CG is on its vertical axis, being a trifle above the level that is midway between the top **60** and the bottom **61**. Near the top of the block CG, and coaxial with the vertical axis of the block, there is a short vertical bore **68** of relatively small diameter. Above the bore **68** there is a short counterbore **69** leading to the top of the block, and below the bore **68** there is a long counterbore **70** leading to the bottom of the block. As shown in FIG. **5**, there are vertical bores **71** and **72** which are equally spaced in opposite directions from the bore **68** and its companion counterbores **69** and **70**. The bores **71** and **72** extend for the entire height of the block CG, the axes of these two bores being parallel to the vertical axis of the block and being midway between the front and rear faces **62** and **63** of the block.

The pendant block CG is attached to and carried by the actuating cord **51** that is connected to the locking dog of the cord lock CL. The vertical axis of the block CG is in at least approximate alignment with the actuating cord **51**, the offset between the lower and upper fragments of the cord **51** in FIGS. **2** and **3** being due to the break out between these two fragments. The attachment of the block, CG to the cord **51** is by virtue of the lower end of the cord **51** being threaded through the bore **68** and being knotted as shown in FIG. **5**, the knot **51***a* being drawn into the counterbore **70** and to the top of the counterbore as is shown in FIG. **5**. It will be seen that the block CG is not only attached to the cord **51** at a location that is on the vertical axis of the block CG but the attachment is located at a level which is substantially above the center of gravity of the block CG —whereby the weight of the block biases it into untilted position.

The down-hanging lift-cords **14** and **15** pass vertically and individually through the bores **71** and **72**, whereby the lift cords are guided by the pendant block CG. The bores **71** and **72** are cylindrical and have equal diameters. The bore diameter is substantially in excess of the lift-cord diameter, the relative diameters of the bores **71** and **72** and the lift cords **14** and **15** being as shown in FIG. **5**. Thus, the bores **71** and **72** afford unfettered longitudinal (vertical) movement of the lift cords through the bores. The bores **71** and **72** have the same length, each of these bores extending vertically for a distance which is long as compared to the thickness of the lift cord, whereby the block CG affords effective guiding of the lift cords **14** and **15** and inhibits entanglement between the lift cords and the actuating cord **51**. The bores **71** and **72**, while being long compared to the thickness of the lift cords, are long as compared to the diameter of the bores, the relative dimensions being as shown in FIGS. **2**, **4** and **5**.

The pendant cord-guide block CG doubles as a tassel for pulling the cord **51** to actuate the cord lock. The coil spring **50** of the cord lock may be an initially-set spring, i.e., a spring that is so coiled in known manner that the convolutions are biased against one another, so that the spring doesn't start to extend until a predetermined tensioning force has been applied to the spring. Such a spring, with appropriate initial set, will completely counteract the weight of the actuating cord **51** plus the weight of the pendant block CG, thereby insuring against false operation of the locking dog of the cord lock. The length, and consequent weight, of the actuating cord **51** will be greater in some blinds than in others. Also, some pendant cord-guides will be heavier than others, due to being made of different material or due to being of different size, or both. For example, the pendant cord-guide CG′ of FIG. **6** (to be described presemtly) is heavier than the pendant cord-guide CG. Thus, in different installations, the spring **50** will be called upon to compensate for different total weights of actuating cord and pendant cord-guide. The spring **50** has hook ends which are hooked to the finger **33***a* and the notch **43***a*. These spring ends are easily unhooked and rehooked, thereby rendering the spring **50** readily detachable and replaceable. Thus, a suitable spring **50** can be selected and used for any particular installation.

While two is probably the most-frequently-used number of lift cords, there is no particular limit to the number of lift cords that a blind may have. Four lift cords are not uncommon, six have been used, and any number larger than six is rare. An odd number of lift cords has been used, but only rarely.

The lift cords are circular in cross section, as are the lift-cord passages in the pendant cord-guide. As shown in FIGS. **2**, **4**, **5** and **9** the lift-cord passages **71** and **72** each have a diameter that is approximately three times the lift-cord diameter, whereby these passages have a cross-sectional area that is approximately nine times the lift-cord cross-sectional area. Accordingly, the guide block CG is suitable for any likely number of lift cords. With an eight-lift-cord blind four lift cords can be placed in each of the passages **71** and **72**, with unfettered longitudinal movement of the lift cords through the passages. In the case of an odd number of lift cords, one of the passages **71** and **72** would have one more lift cord than the other. But with an even number of lift

cords, which is the usual case, an equal number of lift cords is in each of the passages **71** and **72**, these two passages being on opposite sides of the actuating cord **51** and equidistant therefrom. FIG. **9** shows the guide block CG used with a blind having four lift cords **14**, **14'**, **15** and **15'** —a group of two of the lift cords being placed in each of the passages **71** and **72**.

FIG. **6** shows a modified guide block CG' used with a blind having the four lift cords **14**, **14'**, **15** and **15'**. The block CG' has four lift-cord passages **71***a*, **71***b*, **72***a* and **72***b* that are individual to the four lift cords. Each of the four lift-cord passages is cylindrical and has a diameter which is only a little larger than the lift-cord diameter, but enough larger to afford unfettered longitudinal movement of the lift cord through the passage. The amount of material that is elimiated from the guide block in forming one of the cylindrical cord-guide passages is proportional to the square of the diameter of the passage. Hence, less material is eliminated in forming the four cylindrical lift-cord passages of FIG. **6** than in forming the two cylindrical lift-cord passages of FIGS. **5** and **9**; and guide block CG', which has the same over-all dimensions as guide block CG and is made of the same material, weighs somewhat more than guide block CG.

As will be apparent from FIG. **3**, four lift cords may be used with the cord lock CL. The space between the front and rear walls **32** and **33** of the cord lock body, and the front-to-rear dimensions of the locking dog D and the cylindrical cord-guide **39**, are sufficient to enable the cord lock to take care of two more lift cords. The two additional lift cords are placed between the rear wall **33** and the lift cord **15** that is shown in FIG. **3**. Where the blind has more than four lift cords, but not over eight, two cord locks CL may be used. The two cord locks are placed one immediately behind the other in the head channel **20** and secured in like manner to the bottom **21** of the head channel. The lift cords are suitably divided between the two cord locks.

Regardless of the number of lift cords, the down-hanging ends of the cords are united at a tassel **17** or the like. The tassel **17** may be replaced by a duplicate of the pendant cord-guide block CG, the lift cords being passed through the passages **71** and **72** thereof and being united immediately beneath the duplicate block CG. If desired, the duplicate block CG may have the walls of the counterbore **70** removed for a distance up from the bottom of the block, thereby providing the block with an internal space to receive the fastened-together lift-cord ends.

What is claimed is:

1. A blind in which (a) lift cords pass through a cord lock and, when the blind has been installed, hang down to be pulled downwardly and be eased upwardly to raise and lower the blind, (b) the cord lock has locking means that is biased away from the lift cords but is movable into locking engagement with the lift cords, and (c) an actuating cord is connected to the locking means and, upon being pulled, moves the locking means into locking engagement with the lift cords — wherein the improvement comprises:

pendant cord-guide means for the lift cords, said pendant cord-guide means being attached to and carried by the actuating cord that is connected to the locking means of the cord lock.

2. A blind as in claim **1** wherein the improvement further comprises:

the pendant cord-guide means has spaced lift-cord passages through which the down-hanging lift-cords pass vertically.

3. A blind as in claim **2** wherein the improvement further comprises:

one or more lift cords pass through each of the lift-cord passages of the pendant cord-guide means.

4. A blind as in claim **1** wherein the improvement further comprises:

the pendant cord-guide means has apaced lift-cord passages through which the down-hanging lift-cords pass vertically,

and the attachment of the pendant cord-guide means to the actuating cord is at a location that is between said spaced lift-cord passages.

5. A blind as in claim **2** wherein the improvement further comprises:

the lift-cord passages of the pendant cord-guide means extend vertically for a distance which is long as compared to the thickness of the lift cords.

6. A blind as in claim **3** wherein the improvement further comprises:

the lift-cord passages afford unfettered movement of the lift cords through the passages.

7. A blind as in claim **1** wherein the improvement further comprises:

the pendant cord-guide means is a unitary cord-guide having is center of gravity on its central vertical-axis,

and the attachment of the unitary cord-guide to the actuating cord is at a location which is approximately on such vertical axis and substantially above the center of gravity.

8. A blind as in claim **1** wherein the improvement further comprises:

the pendant cord-guide means is a pendant block, and the central vertical-axis of the block is aligned approximately with the actuating cord that is connected to the locking means of the cord lock.

9. A blind as in claim **8** wherein the improvement further comprises:

the pendant block has lift-cord passages which are spaced in opposite directions from the central vertical-axis of the block, the down-hanging lift-cords passing vertically through such passages.

10. A blind as in claim **9** wherein the improvement further comprises:

one or more lift cords pass through each of the lift-cord passages of the pendant block.

11. A blind as in claim **9** wherein the for further comprises:

the lift-cord passages of the pendant block extend vertically for a distance which is long as compared to the thickness of the lift cords.

12. A blind as in claim **9** wherein the improvement further comprises:

one or more lift cords pass through each of the lift-cord passages of the pendant block,

the lift-cord passages of the pendant block extend vertically for a distance which is long as compared to the thickness of the lift cords,

and the lift-cord passages afford unfettered movement of the lift cords through the passages.

13. A blind as in claim 1 in which (d) the cord lock has a cord guide that guides the lift cords through a 90° bend, and (e) the locking means of the cord lock is a pivoted locking dog which, when it is in locking engagement with the lift cords, clamps the lift cords against said cord guide of the cord lock —wherein the improvement further comprises:

a spring which biases the locking dog away from the lift cords, the spring having sufficient strength to counteract the combined weight of the pendant cord-guide and the actuating cord to which the pendant cord-guide is attached.

14. A blind as in claim 13 wherein the improvement further comprises:

the spring which biases the locking dog away from the lift cords is a readily detachable and replaceable coil spring.

15. A blind as in claim 13 wherein the improvement further comprises:

one end of the actuating cord is connected to the pendant cord-guide and the other end is connected to the locking dog,

and the actuating cord, adjacent to the locking-dog-connected end thereof, is formed into a bight which embraces the pivot of the locking dog.

* * * * *

UNITED STATES PATENT OFFICE
CERTIFICATE OF CORRECTION

Patent No. 3,727,665 Dated April 17, 1973

Inventor(s) VICTOR DEBS

It is certified that error appears in the above-identified patent and that said Letters Patent are hereby corrected as shown below:

On the cover sheet [22], "1871" should read -- 1971 -- .

Column 1, line 47, "U.S. Pat. No." should be cancelled.

Claim 4, line 3, "apaced" should read -- spaced -- . Claim 7, line 4, "is" should read -- its -- . Claim 11, line 1, "for" should read -- improvement -- .

Signed and sealed this 22nd day of January 1974.

(SEAL)
Attest:

EDWARD M.FLETCHER,JR.
Attesting Officer

RENE D. TEGTMEYER
Acting Commissioner of Patents

50