June 4, 1957 C. B. WHITE 2,794,499

VENETIAN BLIND AND MECHANISMS USEFUL THEREIN

Filed Nov. 8, 1954 2 Sheets-Sheet 1

FIG. 3

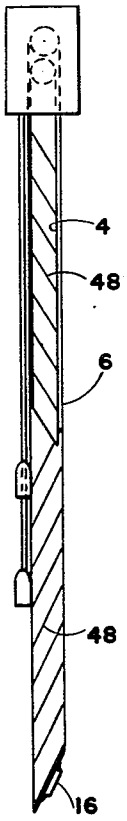


FIG. 2

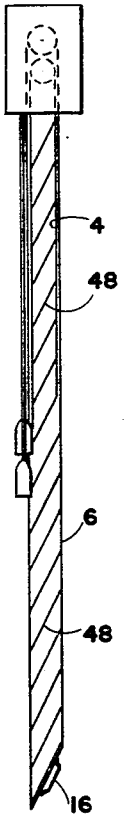


FIG. 1

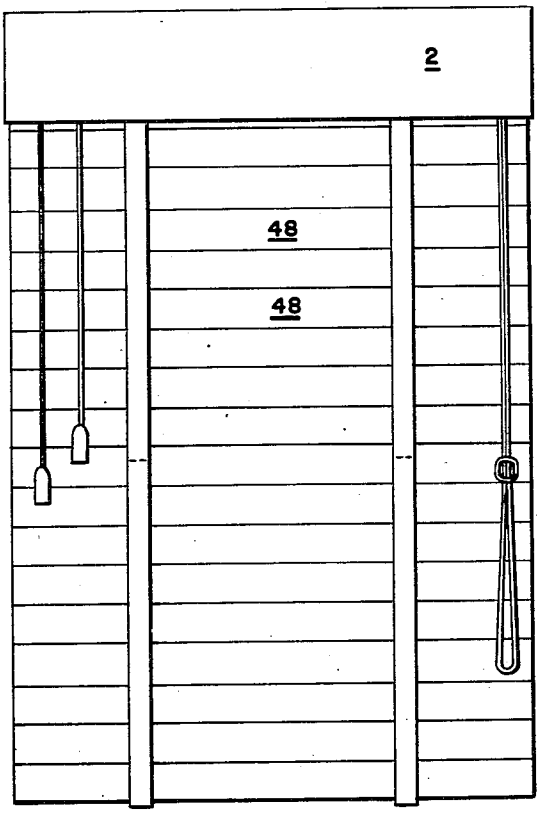
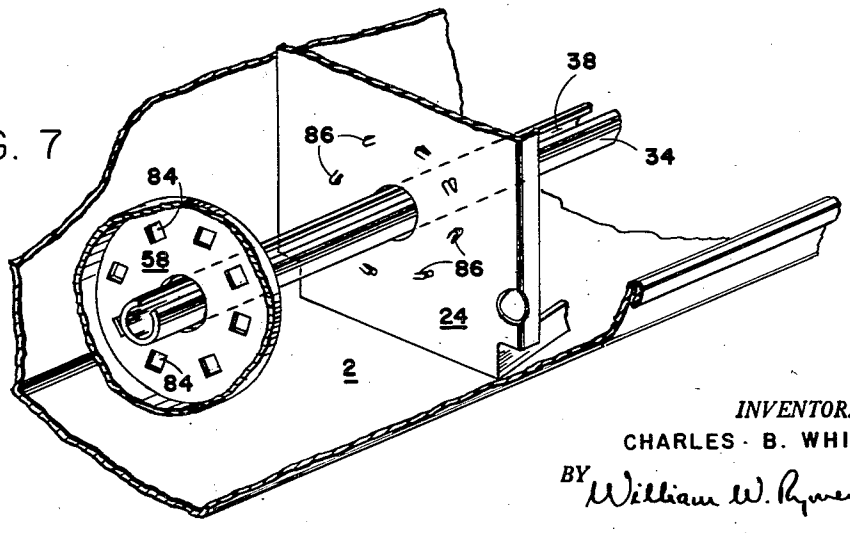


FIG. 7



INVENTOR.
CHARLES · B. WHITE
BY William W. Rymer, Jr

June 4, 1957 C. B. WHITE 2,794,499

VENETIAN BLIND AND MECHANISMS USEFUL THEREIN

Filed Nov. 8, 1954 2 Sheets-Sheet 2

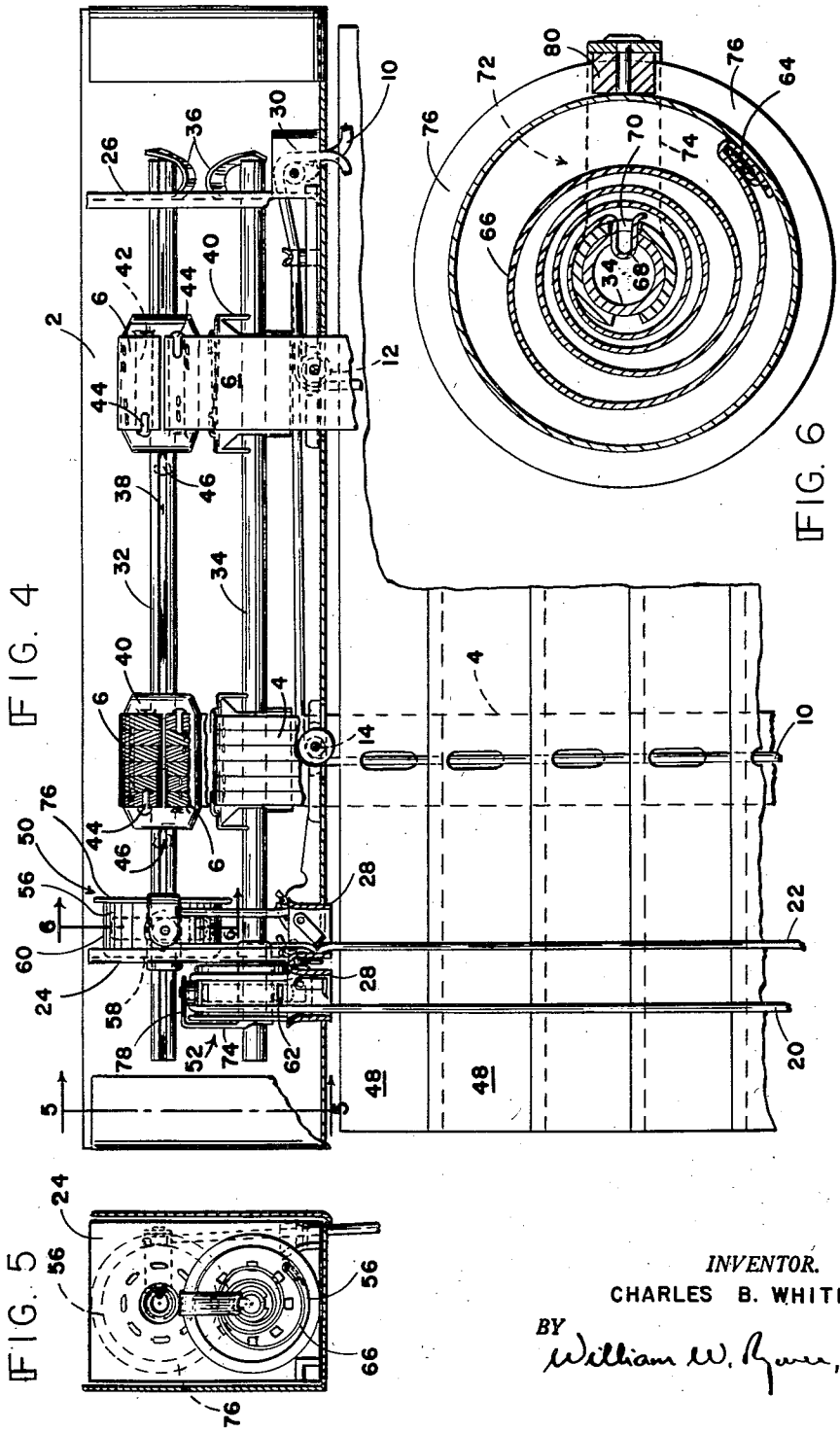


FIG. 4

FIG. 6

FIG. 5

INVENTOR.
CHARLES B. WHITE
BY William W. Ryan, Jr.

United States Patent Office

2,794,499

Patented June 4, 1957

2,794,499

VENETIAN BLIND AND MECHANISMS USEFUL THEREIN

Charles B. White, Waban, Mass.

Application November 8, 1954, Serial No. 467,298

7 Claims. (Cl. 160—115)

This invention relates to Venetian blinds. More particularly, it is concerned with improvements in Venetian blinds of the type in which only one cord is required for rotation of a multiplicity of slats in unison, a pull on the cord rotating said slats in one direction, and tensioning means in the head causing rotation in the opposite direction.

The amount of force required to properly urge rotation of a set of slats in a Venetian blind varies with the width and weight and number of slats involved. Obviously there is great variation from one window size and shape to another. Further, it may be desired to have two sections (or more) of independently rotatable slats for a single window, and one section may include more slats and so be heavier than another.

It is one object of my invention to provide an improved Venetian blind head in which the amount of force exercised on a particular group of slats by the tensioning means therefor may be adjusted easily to the optimum.

A further object of the invention is to provide a new and improved organization of parts for interrelating the tensioning means and the cord used to produce rotation in the opposite direction, and which facilitates easy adjustment of the force exerted by the tensioning means or spring.

Still another object is to provide improved spring tensioning means and mounting therefor.

A further object is to provide a Venetian blind of the class described having two or more sections of slats, each with its own set of tape ladders providing full 180° rotation, but having at the same time the appearance of being a Venetian blind with only a single set of tape ladders.

Other objects, advantages, and features will appear from the following description of a preferred embodiment, taken together with the drawings thereof, in which:

Fig. 1 is a front elevation of a Venetian blind embodying the present invention;

Fig. 2 is a diagrammatic end elevation of said Venetian blind, showing both groups of slats rotated to the same extent;

Fig. 3 is a similar end elevation but showing the two groups of slats rotated to different degrees;

Fig. 4 is a broken-away, partially sectional side elevation showing the head embodying my invention;

Fig. 5 is a sectional view taken at 5—5 of Figure 4;

Fig. 6 is a sectional view at 6—6 of Figure 4; and

Fig. 7 is an exploded, partially broken-away view of a detail of the embodiment of Fig. 4.

Referring now to the drawings, there is shown in Fig. 1 a Venetian blind embodying my new invention. Novel details in the head construction are clearly shown in Fig. 4, which discloses a housing 2 in which is mounted my novel Venetian blind head.

Dependent from the head, and extending through two pairs of holes in the bottom of the housing 2, are tape ladders 4 supporting slats of an upper section and tape ladders 6 supporting slats of a lower section, all slats in each section or group being rotatable in unison. Each

of the four holes, referred to, in the bottom of the housing has two tapes passing therethrough, the outer of said tapes being in each case a tape of tape ladder 6 and the inner of said tapes being a tape of tape ladder 4, the outer thus overlying the inner to give the impression of a single tape.

At the right, depending from the housing 2, is the usual cord 10 for raising and lowering all the slats in a vertical direction. As shown in Fig. 4, this cord extends over the pulleys 12 and 14 in the usual manner and is secured (not shown) beneath holes in the bottom slat 16 by knots in the ends thereof.

At the left are shown pull cords 20 and 22, which control the angles to which, respectively, the slats supported by the upper tape ladder 4 and slats supported by the lower tape ladder 6 are turned.

Mounted within the housing 2 spaced from the ends thereof are the shaft support plates 24 and 26. Integral with the shaft support 26 may suitably be the housing portion 30 of the lock for cord 10, this lock being of the type familiar to the art, and similar to the locks 28 engageable with the cords 20 and 22 to prevent undesired movement thereof, and therefore slat rotation, as hereinafter described.

Each of the shaft supports 24 and 26 is provided with two holes through which the shafts 32 and 34 extend for rotation therein. Ears 36 struck out from the support 26 prevent transverse movement of the shafts toward said support. Each of said shafts is tubular in cross-section, with a slot 38 extending the entire length thereof.

Mounted on each of said shafts 32 and 34 are two spools 40. Each spool carries one front tape and one back tape for a particular tape ladder, the two spools on the upper shaft 32 carrying the two pairs of tapes supporting the lower tape ladder 6, and the two spools on the lower shaft 34 carrying the tapes of the two upper tape ladders 4. Each spool includes two struck-out fingers 42 having near the ends thereof smaller struck-out, oppositely directed fingers 44. Each tape is mounted on a spool by forming a loop in the end thereof, as by folding the tape back on itself and stapling the same in place, sliding the loop over the finger 42, and hooking the edge of the tape within the finger 44. The spools are locked against rotational movement with respect to the shafts by being keyed thereto, a lug 46 of said spools extending into the slot 38. Rotation of a shaft thus rotates the spools mounted thereon to wind up thereupon one pair of front or rear tapes and simultaneously unwind the corresponding opposing pair of tapes of the same pair of tape ladders, to rotate the slats 48 supported by the said pair of tape ladders to any desired degree throughout a 180° range. As is apparent, tape ladders of each group of slats may be rotated freely without regard to the rotational position of the tape ladders for the other group of slats, there being no interference whatsoever therebetween.

Turning of the shafts 32 and 34 is regulated through a pair of units indicated generally at 50 and 52, respectively.

Each of said units 50 and 52 includes a generally cup-shaped housing 56, with an open end and an opposed closed end 58, and a generally cylindrical body portion 60. Struck inwardly from a portion 62 of the body portion 60 is an eye defined by the struck-in portion 64 and the body portion 60 therearound. A coiled spring 66 is mounted in said housing 56, with its outer end bent back on itself and the extremity thereof seated within the above-referred-to eye. Near the inner extremity of said spring is formed a U-shaped projection 68, which is mounted in and extends through a slot 70 in the bearing support member 72. Said projection 68 then extends into the slot 38 in a shaft 32 or 34, for preventing relative rotation.

The bearing support member **72** includes a tubular portion within which the outer diameter of said shaft **32** or **34** slidably fits, said tubular portion being slotted as described to receive and grip the projection **68**. Extending generally perpendicular to the axis of said tubular portion, outside the open end of the housing **56**, is an arm **74**, which is bent (just past the flange **76** on said housing) back in a direction generally paralleling the axis of the cylindrical body portion **60** to form a bearing support extremity **78**. Mounted, preferably rotatably, on said extremity **78** is a bearing **80**, generally cylindrical with its axis normal to the surface of the extremity **78**, and with the surface thereof toward the cup housing body portion **60** in close juxtaposition thereto for free movement thereover.

The cords **20** and **22** each have an end secured near the base of the housing **2**, and extend upwardly therefrom, around the bearings **80**, and down through the locks **28**.

Spaced around circumference on the closed end **58** of the cup-shaped housing **56** are holes **84**. Said closed end **58** on its outer surface abuts against the vertical support **24**, and etxending toward said closed end **58** are lugs **86** struck out from the support **24** in a circular relationship to cooperate with the holes **84**. Engagement between said lugs **86** and holes **84** prevents relative rotation between the housing **56** and the support **24**.

The support **24** includes two sets of lugs **86**, struck-out in opposite directions, to cooperate respectively with the holes **84** in the closed ends **58** of the units **50** and **52**, which abut the support **24** on opposite faces thereof.

Tension on the spring **66** may be varied to give the correct force for the particular section of slats being controlled, easily, by hand and without requiring any tools, by simply sliding a unit **50** or **52** along its respective shaft in a direction away from the support **24** until the lugs **86** and holes **84** are disengaged, rotating the unit **50** or **52** to increase or decrease the tension of the respective spring, and sliding the unit back to re-engage lugs and holes in the new position.

A pull on the cord **20** or **22** causes it to move over its bearing **80** and at the same time pull down thereby the bearing support member **72** on which said bearing is mounted. This member in turn rotates the respective shaft into which it is keyed to correspondingly produce rotation of the slat group concerned. The proper lock **28** operates on its cord to keep the slats in the particular rotational position desired. To rotate the slats in the opposite direction the lock is released and the spring **66** allowed to draw the cord, bearing, support member **72**, and shaft in said opposite direction to the extent desired.

It will be apparent that my new bearing arrangement for carrying the cord to turn the shaft in one direction facilitates adjustment and sliding the units **50** and **52** back and forth to engage and disengage the same, the cord in my new mounting not in any way impeding this movement.

It will be apparent also that by positioning the axes of the shafts in the same vertical plane and parallel, mounting both tapes of each tape ladder on a single spool, mounting spools for one tape ladder directly above spools for other tape ladders, and eliminating cross-tapes in tape ladders for lower groups of slats in the upper portions thereof to permit clearance of upper groups of slats, I have been able to give a multiplicity of tape ladders the appearance of being a single tape ladder, thus producing additional functions without marring appearance or full rotation of all slats. The spools of an upper shaft are positioned vertically over the spools of a lower shaft, with tapes supporting a lower group of slats depending from spools of an upper shaft, and vice versa. Only the tapes supporting the lower group of slats are visible thus, tapes supporting any upper group of slats being hidden therebehind. It will be apparent that more than two groups of slats can be similarly handled by adding a shaft, with

spools, for each added group of slats. The highest shaft would in each case support the lowest group of slats, and in fact the height of each shaft would be inversely related to the relative height of the group of slats dependent therefrom.

Other embodiments within the spirit of my invention and the appended claims may of course occur to those skilled in the art.

I claim:

1. A subcombination useful in Venetian blind heads which comprises a housing adapted to be mounted in such a head, a spring within said housing and having an outer end anchored therein and an inner end anchored within a bearing support member, said bearing support member having an extremity extending over the outer surface of said housing, and a bearing mounted on said extremity between the same and said surface for free movement along the latter.

2. A subcombination as in claim 1 in which said housing includes latches adapted for engagement with mating latches on a support to prevent rotation of said housing and for disengagement therewith to permit rotation of said housing to a new position relative thereto and reengagement in said new position, whereby the degree of tension exerted by said spring may be adjusted.

3. A Venetian blind including an upper group of slats rotatable in unison and supported by a multiplicity of first tape ladders, a lower group of slats rotatable in unison and supported by a multiplicity of second tape ladders formed without cross-tapes in the vicinity of said upper groups and overlying said first tape ladders, each of said tape ladders including a front tape and a back tape each mounted in a common spool for being wound in opposite directions responsive to the rotation of said spool, an upper shaft and a lower shaft for carrying thereon respectively spools for said tape ladders of said lower group and spools for said tape ladders of said upper group, said shafts being longitudinally slotted, a first and a second support plate within which said shafts are journaled for rotation therein, said first support plate being provided with two sets of circularly oriented lugs, one said set being directed to engage a set of mating circularly oriented holes in a housing mounted on one of said shafts on one side of said first support plate, and the other said set being directed to engage a set of mating circularly oriented holes in a second housing mounted on the other of said shafts on the opposite side of said first support plate, said two housings, each being generally cup-shaped with its open end opposed to a closed end carrying said circularly oriented holes and having a generally cylindrical body portion flanged adjacent said open end, a coil spring mounted within each of said housings, for urging one said shaft in one rotational direction, each said spring having an outer end anchored in its said housing and a U-shaped projection near the inner end thereof, a bearing support member slidably mounted on each said shaft and slotted to grip therein said U-shaped projection of one of said springs, said spring extending therethrough and into said longitudinally slotted shaft, each said bearing support member having an arm bent out along said open end of one said housing, and bent back around said flanged portion thereof in a bearing support extremity carrying rotatably mounted therein for free movement relative to said cylindrical body portion a bearing, a pair of cords, one of said cords passing over each said bearing for urging one said shaft in a direction opposite to the urging of the respective said coil spring, and a pair of locks operable in cooperation with said cords to prevent movement thereof.

4. Mechanism useful in Venetian blinds which comprises: a shaft rotatable in either direction, and responsive to opposite rotation of which tapes for supporting a group of slats are moved in opposite directions; a plate rigidly mounted to permit free rotation of said shaft relative thereto; a spring unit mounted on said shaft for engagement with said plate, said spring unit comprising a

spring housing secured to said plate, a spring having one end secured in said spring housing and the other end secured in said shaft, and a bearing secured in said shaft and having a cord receiving arm extending from said shaft, a cord secured at one end against movement and with its other end free, and intermediate said ends passing over said cord receiving arm; and a lock operable to secure said shaft against movement; whereby said spring urges rotation of said shaft in one direction and a pull on the free end of said cord pulls down said cord receiving arm to urge rotation of said shaft in the opposite direction.

5. Mechanism useful in Venetian blinds which comprises: a shaft rotatable in either direction, and responsive to opposite rotation of which tapes for supporting slats are moved in opposite directions; a plate rigidly mounted to permit free rotation of said shaft relative thereto and carrying latches thereon; a spring unit slidably mounted on said shaft for engagement with said plate, said spring unit comprising a spring housing provided with latches cooperating with said latches on said plate to secure said spring housing against movement in normal operation, a spring having one end secured in said spring housing and the other end slidably secured in said shaft, and a bearing slidably secured in said shaft and having a cord receiving arm extending from said shaft; a cord secured at one end against movement and with its other end free, and intermediate said ends passing over said cord receiving arm; and a lock operable to secure said cord and shaft against movement; whereby said spring urges rotation of said shaft in one direction and a pull on the free end of said cord pulls down said cord receiving arm to urge rotation of said shaft in the opposite direction, and whereby said spring unit may be unlatched from said plate, moved slidably along said shaft, rotated relative to said plate to increase or decrease tension on said spring, and moved slidably back along said shaft and relatched with said plate in its new rotated position relative to said plate.

6. Mechanism as in claim 5 which includes a pair of said shafts, a pair of said spring units, a pair of said cords, and a pair of said locks, said plate being provided with two sets of latches, one for cooperation with each of said spring units, whereby two groups of independently rotatable slats may be controlled using only two cords.

7. Mechanism useful in Venetian blinds which comprises: a shaft rotatable in either direction, and responsive to opposite rotation of which tapes for supporting a group of slats can be moved in opposite directions; a plate rigidly mounted to permit free rotation of said shaft relative thereto; a cord-supporting cylindrical surface at least partially surrounding said shaft; a round cord bearing with axis normal to said cylindrical surface and operably connected with said shaft for rotation therewith about the axis of the latter; and a spring having a first end operably secured to said shaft to prevent rotation of the shaft relative to said first end and having a second end latched against movement relative to said plate; said plate carrying a multiplicity of latches disposed around said shaft to provide for adjusting said spring to varying degrees of tension and operably securing said second end thereof against movement relative to said plate.

References Cited in the file of this patent

UNITED STATES PATENTS

2,388,000	Larson	Oct. 30, 1945
2,706,522	White	Apr. 19, 1955