

Sept. 29, 1942.

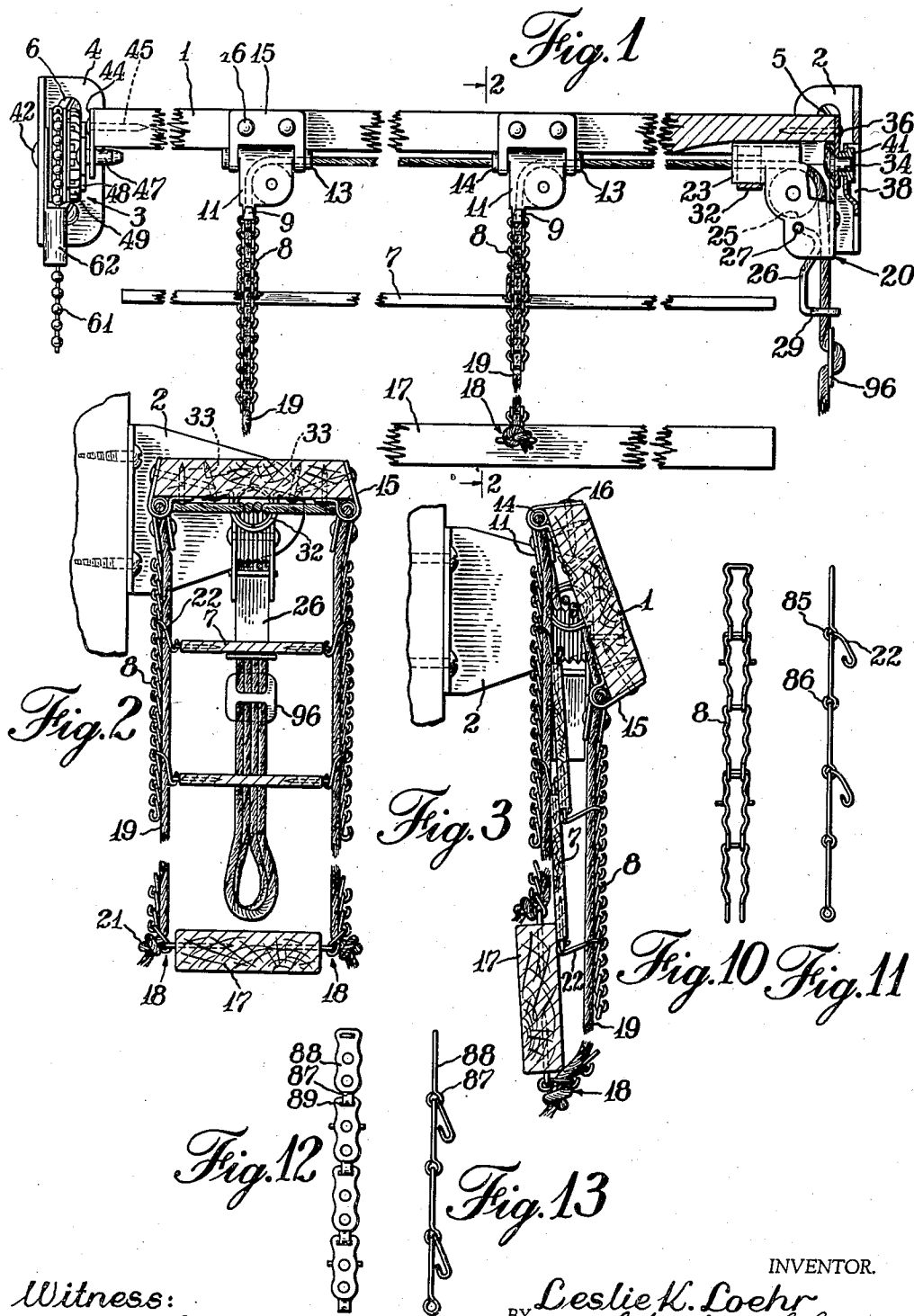
L. K. LOEHR

2,297,627

VENETIAN BLIND

Filed May 29, 1940

4 Sheets-Sheet 1



Witness:
Burr W. Jones

INVENTOR.
Leslie K. Loehr
BY Clinton S. Jones
ATTORNEY.

Sept. 29, 1942.

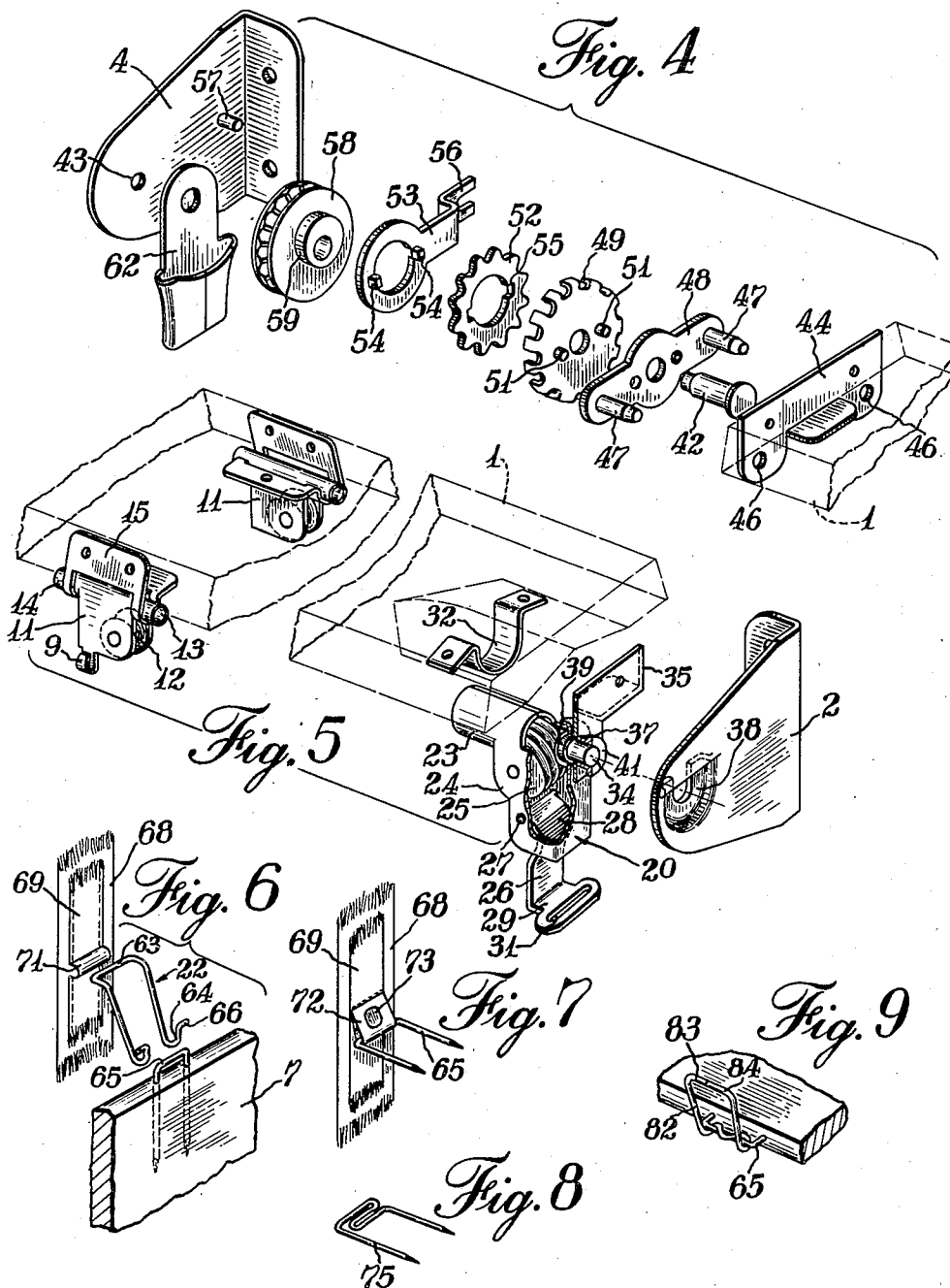
L. K. LOEHR

2,297,627

VENETIAN BLIND

Filed May 29, 1940

4 Sheets-Sheet 2



Witness:
Burr W. Jones

INVENTOR.
Leslie K. Loehr
BY Clinton S. Jones
ATTORNEY.

Sept. 29, 1942.

L. K. LOEHR

2,297,627

VENETIAN BLIND

Filed May 29, 1940

4 Sheets-Sheet 3

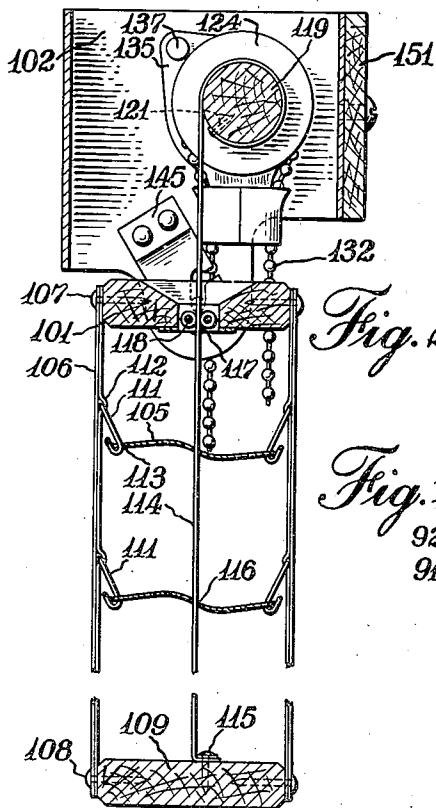


Fig. 21

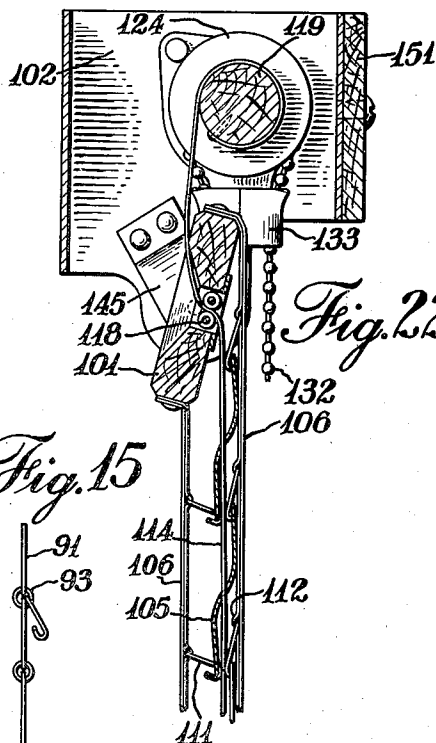


Fig. 22

Fig. 14 Fig. 15

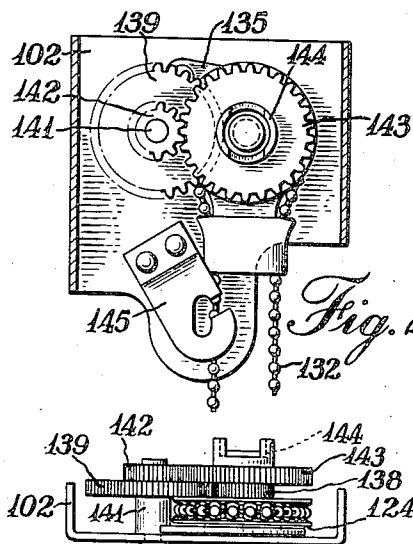
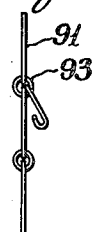
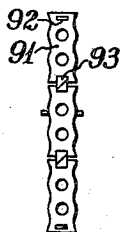


Fig. 23

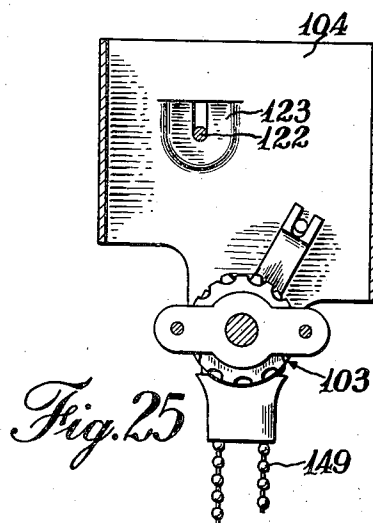


Fig. 25

Witness:
Burr W. Jones

Fig. 24

INVENTOR.
BY *Leslie K. Lochr*
Clinton S. Jones
ATTORNEY.

Sept. 29, 1942.

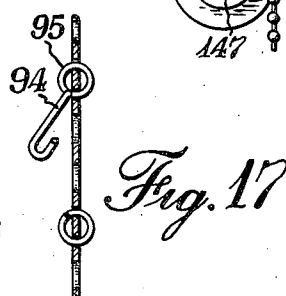
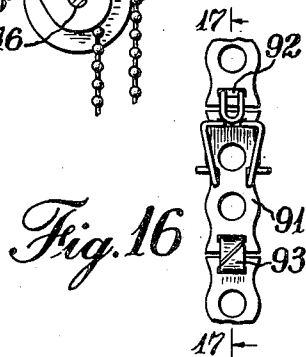
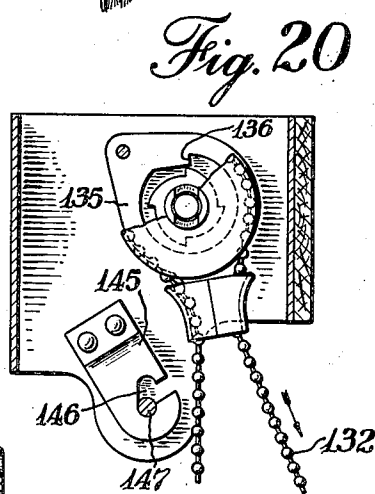
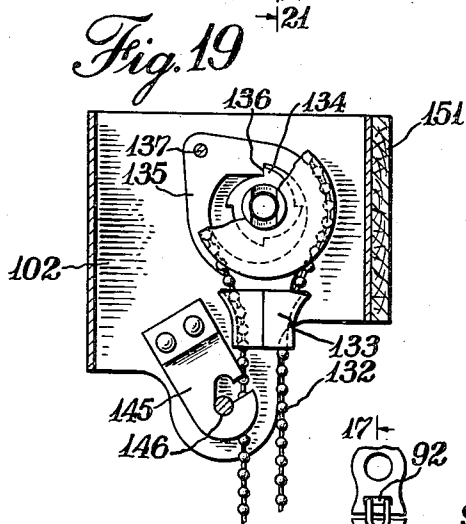
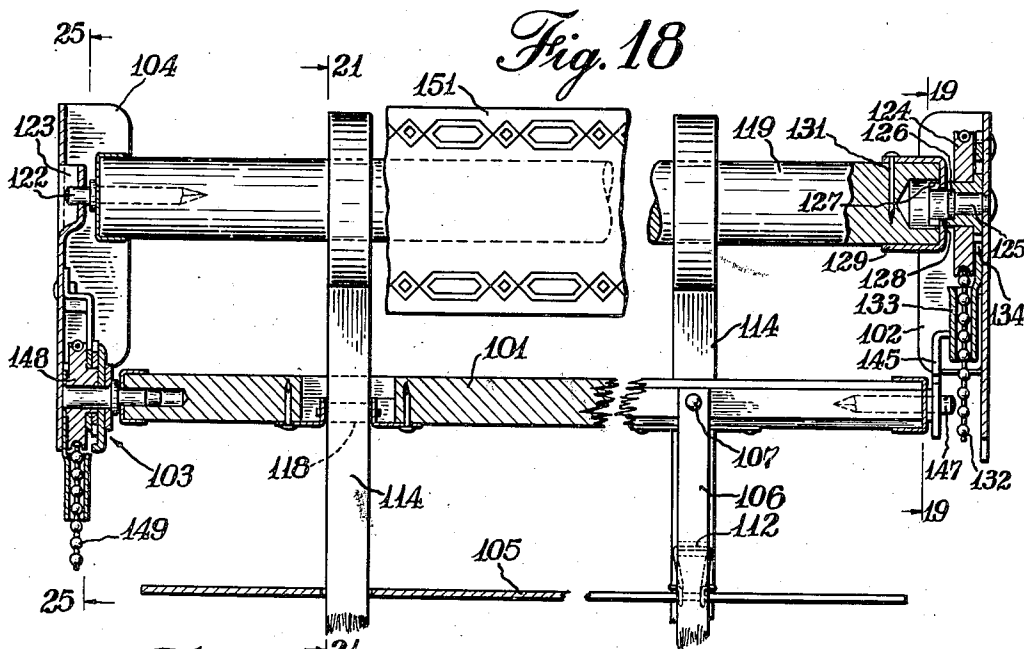
L. K. LOEHR

2,297,627

VENETIAN BLIND

Filed May 29, 1940

4 Sheets-Sheet 4



Witness:
Burr W. Jones

INVENTOR.
BY *Leslie K. Lochr*
Lehinton S. James
ATTORNEY.

UNITED STATES PATENT OFFICE

2,297,627

VENETIAN BLIND

Leslie K. Lochr, Los Angeles, Calif.

Application May 29, 1940, Serial No. 337,876

10 Claims. (Cl. 156—17)

The present invention relates to Venetian blinds and more particularly to a Venetian window blind which when closed is substantially light-tight.

Venetian blinds as heretofore constructed have generally been subject to certain disadvantages which have tended to restrict the popularity and usefulness of such devices. These disadvantages include expensiveness and complication of structure, and difficulty of installation, cleaning and repair. Moreover, in most types of Venetian blinds it is impossible to close the shutters sufficiently to substantially prevent the passage of light therethrough when desired, which limits the usefulness of such blinds for certain purposes.

It is an object of the present invention to provide a novel Venetian blind structure which is simple and economical in construction, reliable in operation, pleasing in appearance and easily installed and renovated.

It is another object to provide such a device which when in closed position is substantially impervious to light.

It is another object to provide such a device which is easily mounted and removed from its supporting brackets.

It is a further object to provide such a device in which the light obstructing elements or slats can be easily cleaned without removing them from their supporting means.

It is a further object to provide such a device in which any or all of the slats may be easily removed without disconnecting the raising and lowering means therefor.

It is a further object to provide such a device in which the entire mechanism for raising and lowering the slats is attached to and supported by a bar, the tilting of which effects the angular adjustment of the slats.

It is another object to provide such a device in which the cords for raising and lowering the slats pass through pulleys which are hinged to the tilt bar on axes parallel to the tilt bar axis.

It is another object to provide such a device in which the lifting cords do not pass through the slats.

It is a further object to provide such a device in which the slats when tilted into closed position are suspended from their upper edges.

It is another object to provide such a device in which the slats are suspended in spaced relation by means of pendulous elements of suitable material such as metal, fabric or paper attached

to chains or tapes extending downward from the tilt bar.

It is another object to provide such a device in which, when the blind is closed, the pendulous hangers permit the lower edges of the slats to swing free of any supporting or restraining relation with the chains or tapes to which said hangers are attached, while the upper edges of the slats are suspended from the tilting chains or tapes by the hangers or pendicles attached thereto.

Further objects and advantages will be apparent from the following description taken in connection with the accompanying drawings in which:

Fig. 1 is a front elevation, partly broken away and in section, of a preferred embodiment of the invention as mounted in brackets for attachment to a wall or window casing;

Fig. 2 is a cross section of the structure shown in Fig. 1 taken substantially on the line 2—2, showing the manner in which the slats are suspended from the tilting chains;

Fig. 3 is a view similar to Fig. 2 showing the slats in closed light-tight position suspended by the pendicles from their upper edges, their lower edges being free to overlap and engage the upper edge of the next slat;

Fig. 4 is an exploded detail view in perspective of the tilting mechanism shown at the left in Fig. 1;

Fig. 5 is a similar view with parts broken away and shown in phantom view, illustrating the automatic stop mechanism and the pulleys for the raising and lowering means pivoted to the tilt bar;

Fig. 6 is a detail in perspective showing one method of attaching hangers or pendicles to the tilting tapes and slats;

Fig. 7 is a similar detail of another form of hanger;

Fig. 8 is a detail in perspective of a staple for use in connection with the hanger of Fig. 7;

Fig. 9 is a similar detail of still another form of hanger;

Fig. 10 is a side elevation of one preferred form of chain construction with pendicles attached thereto;

Fig. 11 is an edge view of the structure shown in Fig. 10;

Fig. 12 is a view similar to Fig. 10 of another form of chain and pendicle construction;

Fig. 13 is an edge view of the structure shown in Fig. 12;

Fig. 14 is a view similar to Fig. 10 of a third form of chain and pendicle construction;

Fig. 15 is an edge view of the structure shown in Fig. 14;

Fig. 16 is a view similar to Fig. 10 of a fourth form of chain and pendicle construction;

Fig. 17 is a section taken on line 17—17 of the structure shown in Fig. 16;

Fig. 18 is a side elevation of the tilt bar, the raising and lowering mechanism and associated structure of a second embodiment of the invention, parts being broken away and shown in section for the sake of clarity;

Fig. 19 is a section taken substantially on the line 19—19 of Fig. 18, with parts broken away to show the automatic stop for the lifting mechanism;

Fig. 20 is a view similar to Fig. 19 showing the automatic stop in released position;

Fig. 21 is a section taken substantially on the line 21—21 of Fig. 18;

Fig. 22 is a view similar to Fig. 21 showing the slats tilted into closed position;

Fig. 23 is a view similar to Fig. 19 of an embodiment of the invention incorporating reduction gearing for the raising and lowering mechanism for use in connection with a heavy blind structure;

Fig. 24 is a top plan view of the gearing and associated elements illustrated in Fig. 23; and

Fig. 25 is a section taken substantially on the line 25—25 of Fig. 18, showing the tilting mechanism and bracket therefor.

In Fig. 1 of the drawings there is illustrated a horizontal tilt bar 1 which is arranged to form the entire support for a Venetian blind structure including the raising and lowering mechanism for the slats. The right hand end of the tilt bar 1 is pivoted in a bracket 2, and the left hand end of the tilt bar is pivoted in a tilting mechanism indicated generally by numeral 3, which tilting mechanism is mounted on a bracket 4. Brackets 2 and 4 are adapted to be mounted on a wall or in a window frame by any suitable means such as screws 5 and 6.

Slats 7 are suspended from the tilt bar by flexible means such as chains 8 which are attached to the tilt bar by means of hooks 9 preferably formed as integral projections on the lower edges of pulley blocks 11. These pulley blocks are preferably formed as best shown in Fig. 5 as an integral metal frame bent into a U-shape to form supports for pulley wheels 12. On the axis of the bend, and extending beyond the edges of the block, hollow cylindrical trunnions 13 and 14 are formed and adapted to be freely journaled in brackets 15 fixed in any suitable way as indicated at 16 to the tilt bar 1. The pulley blocks 11 are thus hinged to the edges of the tilt bar.

A bottom rail 17 is supported from the chains 8, the lower ends of which are fastened to the bottom rail in any suitable manner as indicated at 18 (Figs. 1 and 2). Lifting cords 19 are fixed at their lower ends to the bottom rail 17 as indicated at 21 and extend upward beside the chains 8 over the pulley wheels 12 and through the trunnions 13. Pendulous hangers or pendicles 22 are provided for supporting the slats 7 from the chains 8, and the lifting cords 19 are arranged to pass through the hangers 22 and are thus located between the chains 8 and the edges of slats 7.

Lifting cords 19 extend along the tilt rail 1 to the right (Fig. 1) and are brought together in order to pass into a hollow trunnion 23 (Fig. 75

5) formed on a pulley block 24 supporting a multi-grooved pulley wheel 25. The cords 19 pass over the pulley wheel 25 and down past an automatic locking device indicated generally by numeral 20. The locking device comprises a wedging member 26 pivoted at its upper end as indicated at 27 in the pulley block 24 and provided with a roughened surface 28 arranged to engage and wedge the cords against the inner surface of the pulley block when suitably manipulated. The wedging device 26 is provided with an angularly bent portion 29 having a slot 31 through which the cords 19 are threaded, whereby lateral forces applied to the cords are caused to swing the wedging device 26 into or out of locking position.

The trunnion 23 of pulley block 24 is pivotally connected to the end of tilt bar 1 along the axis thereof by means of a U-shaped clamp 32 (Fig. 5) surrounding the trunnion and fixed to the tilt bar as indicated at 33 (Fig. 2).

A shouldered rivet 34 (Fig. 5) is mounted in the pulley block 24 with its axis in alignment with the axis of hollow trunnion 23. Rivet 34 is held tightly against an end plate 35 fixed as indicated at 36 (Fig. 1) to the end of the tilt bar 1. As here shown, this function is performed by a sleeve 37 pressed on the rivet 34 and arranged to engage in an offset U-shaped seat 38 formed in bracket 2. Shoulder 39 on rivet 34 is made wider than the thickness of the wall of pulley block 24 whereby the pulley block is free to swing on the shoulder of rivet 34, while the sleeve 37 forms a pivotal support for the entire assembly on the bracket 2. Sleeve 37 is provided with a terminal flange 41 adapted to be received by the bracket seat 38 to prevent axial movement of the tilt bar assembly.

The supporting and tilting mechanism 3 for the tilt bar is best shown in Fig. 4. A pin 42 is fixedly mounted in an opening 43 in bracket 4 and serves as a pivotal support for the tilting mechanism. An end plate 44 is fixed to the end of tilt bar 1 as indicated at 45 (Fig. 1) and is provided with a pair of openings 46 adapted to receive pins 47 fixedly mounted in a yoke 48 pivoted on the end of pin 42. A crown gear 49 is fixed to yoke 48 as by means of extrusions 51 riveted therein. A spur gear 52 having one or more less teeth than the crown gear 49 is arranged to mesh therewith and is prevented from rotation by means of a fork 53 having lugs 54 adapted to engage in notches 55 in the bore of gear 52 and having tines 56 arranged to straddle a pin 57 fixed in the bracket 4. An actuating pulley 58 is journaled on the pin 42 and has an eccentric bearing portion 59 adapted to form a seat for the fork 53 and the gear 52 whereby rotation of the pulley 58 causes oscillation of the gear 52 within the crown gear 49. Inasmuch as the spur gear 52 is prevented by the fork 53 from rotation, it is obvious that oscillation of the spur gear will, due to the differential number of teeth, cause the crown gear 49 to advance one or more teeth in the direction of rotation of the pulley wheel 58 for every revolution of said pulley wheel. The rotation of crown gear 49 is transmitted through yoke 48 and pins 47 to the tilt bar 1.

Pulley 58 is preferably operated by a suitable flexible operating means such as a chain 61 (Fig. 1), and a guide 62 for said chain is pivoted on pin 42 so as to be free to swing about said pin when the assembly is mounted on the bracket 4.

In Figs. 1, 2 and 3 the pendulous hangers or

pendicles 22 are of the construction shown in Fig. 6. The straight portion 63 of the hanger is hooked into a link of the chain 8, while the hooks 64 engage in a staple 65 fixedly mounted in the edge of the slat 7. The outturned ends 66 of the hook 64 prevent the hooks from disengaging the staples 65 while the blind is being operated. However, the hanger can be disengaged from the slat by moving the hooks 64 toward each other until the projections 66 will clear the opening between the staple 65 and the slat 7.

It will be noted by reference to Figs. 2 and 3 that the hangers 22 support slats 7 considerably below the points of attachment of the hangers to the supporting chains 8, and the slats are materially narrower than the tilt bar so that the hangers are inclined downwardly and are considerably longer than the horizontal distance between the edges of the slats and the supporting chains. By this arrangement, when the slats are tilted as shown in Fig. 3, they are suspended pendulously from the upwardly moving hangers, while the downwardly moving hangers on the opposite side assume a substantially horizontal position and allow the lower edges of the slats to hang free of supporting or restraining relation with the chains 8.

In Fig. 6 the flexible supporting element 68 is in the form of a tape to which a narrower tape 69 is suitably attached as by sewing, tape 69 being arranged to form loops 71 to receive the straight portions 63 of hangers 22. In Fig. 7 there is illustrated a modification of the structure of Fig. 6 in which the tape 69 is formed with longer loops 72 arranged to form the hangers and engage directly with the staples 65. Hanger loops 72 are provided with openings 73 to permit passage of the lifting cords 19.

Fig. 8 illustrates an alternative form of staple 75 so formed as to be readily attached to or detached from the loop 72 so as to permit the slats to be easily removable.

Fig. 9 shows a hanger 82 which is arranged to be permanently attached to the staple 65 and is made detachable from the chain 8 or tape 68 by separating the free ends 83 and 84 of the hanger.

In Figs. 10 and 11 there is illustrated a wire construction of chain 8 in which hangers 22 are attached to alternate links. When the slats are raised, the hinge action is inward at the joints 85 where the hangers 22 are attached and outward at the alternate joints 86.

Chains constructed of links punched from strip stock are illustrated in Figs. 12 to 17 inclusive. In Figs. 12 and 13 the hinge for the links is formed by a reduced portion 87 on each link 88 bent to form a loop engaging a transverse slot 89 in the opposite end of the adjacent link. The hinge action is the same as with the wire link construction illustrated in Figs. 10 and 11. The pendicles 22 can be of the form shown in Figs. 6 or 9 or any other form capable of giving the results above set forth.

In Figs. 14 and 15 the links 91 are provided with slots 92 at both ends, and the links are joined by small rings or thimbles 93 engaging in said slots. Pendicles 22 are mounted in alternate thimbles 93.

In Figs. 16 and 17 links 91 and hinge thimbles 93 are formed the same as in Figs. 14 and 15. However, alternate thimbles 93 are omitted and pendicles 94 are provided with central ring portions 95 adapted to be received in the slots 92 of adjacent links and form the hinge joint therebetween.

In operating a blind constructed as above set forth, the bottom rail 17 and slats 7 can be raised to full height by pulling on the dependent portions of cords 19 which are preferably maintained in bunched relation by means such as a buckle 96 (Fig. 1). The slats may be stopped and locked in any intermediate position by exerting a pull to the right on the cords 19 so as to cause engagement of the wedging element 26 with the cords. A pull downward or a pull to the left on the cords will release the wedging element 26 and permit the slats 7 to fall to their extended position. Tilting of the slats to any desired angle is accomplished by pulling on the wall side or on the room side of the tilt chain 61 whereby the tilt bar 1 is moved about the axis of the pin 42 and rivet 34, and the chains 8, dependent from the edges thereof, are caused to tilt the slats accordingly by means of the pendulous hangers 22 as previously described. As shown in Fig. 3, when the tilt bar approaches the vertical position, the slats hang with their edges overlapping and in engagement, and since the arrangement of the lifting cords 19 and of the pendicle attachments are such as to permit close surface engagement of such overlapping edges, the blind is substantially light-tight under such conditions.

It will be understood that when the slats are supported in conventional ladder tapes or by clips fastened over the edges of the slats, the slats cannot be made to close light-tight because they are held apart where they overlap by the cross tapes or by the clips or other supporting means which extend from one tape to the other upon which the slats are supposed to rest. Lifting cords which pass through the slats also serve to keep the slats separated by a distance equal to the diameter of the cord.

When it is desired to remove the Venetian blind as above constructed, it is merely necessary to lift the right end of the tilt bar so as to disengage the sleeve 37 from the seat 38 in bracket 2. The tilt bar and associated parts are then drawn to the right off the pins 47 of the tilting mechanism, whereupon the entire mechanism is dismounted. When it is desired to remove one or more of the slats from the blind for cleaning or replacement, it is merely necessary to detach the pendicles from their staples, whereupon the slats are free to be removed endwise from the blind.

In Figs. 18 to 25 inclusive of the drawings there is illustrated an embodiment of the invention in which the lifting means for the slats passes through the tilt bar and slats instead of around the slats through the pendicles.

In Fig. 18 of the drawings there is illustrated a tilt bar 101 pivotally supported at the right in a bracket 102 and at the left by a tilting mechanism indicated generally at 103 in a bracket 104. Slats 105 are provided, the edges of which are preferably offset slightly as shown in Figs. 21 and 22 in order to promote tightness of the blind when the slats are tilted to their fullest extent. These slats are preferably formed of sheet metal but may be made of paper or cloth stiffened along the two edges by steel wire or other means. It is not necessary to resort to the use of any means for stiffening the slat transversely when it is suspended from slat supporting means by any one of the types of pendicles illustrated in the drawings. Flat wooden slats of the type shown in Figs. 1, 2 and 3 may also be used, but it is more difficult to approach complete closure in that

case because of the thickness of the slat and the difficulty of getting the proper opening for the lifting tape.

As shown in Figs. 18, 21 and 22 slats 105 are supported from tilt rail 101 by means of tapes 106 fixed to the edges of the tilt rail as indicated at 107 and attached as shown at 108 to a bottom rail 109. Pendulous hangers 111 of any of the types previously described are pivotally attached at suitable intervals to the tapes 106 as shown at 112, and are arranged to engage at their lower ends in slots 113 formed for that purpose in the edges of the slats 105.

Lifting means for the slats is provided in the form of thin but strong and flexible tapes 114 which are attached at 115 to the bottom rail 109 and traverse slots 116 in slats 105 and a slotted opening 117 in the tilt rail 101. Anti-friction rollers 118 may be mounted in the tilt rail 101 to reduce friction in the passage of the tapes 114 therethrough if so desired.

The upper ends of tapes 114 are wound on a roller 119 and attached thereto as indicated at 121. The left end of roller 119 is detachably pivoted in bracket 104 by means of a trunnion 122 engaging in an offset U-shaped seat 123 formed in said bracket. The right hand end of roller 119 is connected by means of a dog clutch with a pulley 124 journaled on a pin 125 riveted in the bracket 102. As here shown, the clutch connection between the pulley and roller comprises a hub 126 extending laterally from the pulley and provided with slots 127 for the reception of lugs 128 formed on a sleeve or thimble 129 fixed as indicated at 131 on the end of roller 119.

Means for rotating the pulley 124 is provided in the form of a chain 132 arranged to traverse a guide 133 and extend into position for convenient manual operation. Means for locking the pulley 124 in adjusted position are provided comprising a series of ratchet teeth 134 (Figs. 19 and 20) formed on the hub 126 of pulley 124 and an annular pawl member 135 having a shoulder 136 adapted to engage said ratchet teeth 134. Pawl 135 is pivoted at 137 to the bracket 102 and is formed integrally with the chain guide 133 whereby lateral forces applied to the chain guide by manipulating the chain cause the pawl 135 to swing about the pivot 137 to bring the shoulder 136 into or out of engagement with the ratchet teeth. This arrangement is such that a pull downward or away from the wall on said chain will move the guide 133 and consequently the pawl member 135 into the position shown in Fig. 20. In this position the shoulder 136 of the pawl is released from the ratchet teeth and the blind will be free to lower of its own weight as long as the chain is held in a manner to prevent the pawl from engaging the ratchet teeth. Moving the chain 132 toward the wall will permit the shoulder 136 of pawl 135 to engage one of the ratchet teeth 134 and thereby lock the blind in adjusted position.

Where the blind is made of heavy construction, it may be desirable to introduce reduction gearing between the pulley 124 and the roller. Figs. 23 and 24 show one form of such gearing comprising a pinion 138 fixedly mounted on the hub of pulley 124 meshing with a gear 139 which is rotatably mounted on a bearing 141 fixed in the bracket 102. A pinion 142 rigidly connected in any suitable way to rotate with the gear 139 is arranged to mesh with a gear 143 which is journaled freely on an extension of the pulley hub and is provided with a clutch member 144 ar-

ranged to engage and drive a corresponding clutch member fixed on the end of the roller 119.

The right hand end of the tilt bar 101 as shown in Fig. 18 is pivoted on the bracket 102 by means of an offset hanger 145 providing a hook-shaped bearing 146 (Fig. 19) adapted to receive a trunnion 147 fixed axially in the end of the tilt bar. The tilting mechanism 103 for the tilt bar may be of the type above described and illustrated particularly in Fig. 4, or may be of any other suitable type actuated by a pulley 148 controlled by a chain 149.

In order to present a more pleasing appearance, the front of the roller and its operating mechanism may, if desired, be concealed behind a decorative fascia board 151 of any preferred construction which may be attached at its ends to the brackets 102 and 104.

When it is desired to take down this blind, it is merely necessary to raise the left hand end of the roller 119 so as to disengage the trunnion 122 from its bearing 123. The roller 119 may then be drawn to the left to disengage the clutch 127, 128. The tilt bar is similarly demountable by disengaging the trunnion 147 at the right hand end thereof from the hanger 145, after which the tilt bar may be drawn to the right to disengage it from the tilting mechanism 103. The blind is then free for removal as a unit.

In this embodiment of the invention, the bottom rail 109 (Fig. 21) is raised or lowered by suitably rotating the roller 119 by means of the chain 132, the adjusted position thereof being maintained by means of the pawl 135 and ratchet 134. Tilting of the slats is accomplished by rotating the tilt bar 101 by means of the tilting mechanism 103 controlled by the chain 149.

As in the previously described embodiment of the invention, the slats 105 are narrower than the tilt bar 101, and the pendulous hangers 111 are attached to the supporting tapes 106 substantially above the slats. When, therefore, the tilt bar is rotated toward the vertical position, the slats are entirely supported at their upper edges as shown in Fig. 22, the hangers for the lower edges becoming substantially horizontal so as not to interfere with the overlapping engagement of the slats. A substantially light-tight blind is thus secured in spite of the fact that the lifting tape 114 traverses the slats.

Although certain embodiments of the invention have been shown and described in detail, it will be understood that the invention is not limited to the precise structure illustrated and described and that various changes may be made in the construction and arrangement of the parts without departing from the spirit of the invention as defined in the claims appended hereto.

What is claimed is:

1. In a Venetian blind, a horizontal tilt bar, a plurality of slats maintained in parallel relation thereto, flexible means hingedly attached to the tilt bar for supporting the slats therefrom, flexible means hingedly supported entirely by the tilt bar for raising and lowering the slats, mounting brackets for the ends of the tilt bar providing pivotal seats enabling the assembled blind with its raising and lowering means to be removed from and replaced in operative position as a unit, one of said brackets comprising a yoke slidably but non-rotatably connected to the tilt bar, a pivotal support for the yoke, irreversible gearing for rotating said yoke, and flexible means for manually operating the gearing.

2. In a Venetian blind, a tilt bar, a plurality of

slats supported therefrom in parallel relation thereto, brackets for pivotally supporting the ends of the tilt bar detachably connected thereto, one of said brackets having a pivot pin fixed thereon, a yoke member swiveled on the pivot pin non-rotatably connected to the tilt bar, a control wheel journaled on the pivot pin, and reduction gearing rotatably mounted on said pin connecting the control wheel to the yoke member.

3. In a light-tight Venetian blind a plurality of imperforate slats having smooth unobstructed upper and lower surfaces, staples fixed in both edges thereof intermediate the upper and lower surfaces, a pair of vertically arranged flexible supporting members, pendulous links pivotally connected at their ends to the staples and supporting members, said links being substantially longer than the distance between the edges of the slats and the supporting members, and means for raising one supporting member and lowering the other member to move the slats into overlapping surface contact.

4. In a light-tight Venetian blind a plurality of horizontal imperforate slats having smooth unobstructed upper and lower surfaces, vertically arranged flexible supporting means, links hinged to the supporting means and detachably pivoted to the edges of the slats intermediate the upper and lower surfaces thereof, said links being substantially longer than the distance between the edges of the slats and the supporting means, the points of attachment of the links to the supporting means being substantially above the slats supported thereby, and means for raising the supporting means at one edge of the slats until the slats hang freely therefrom with their edges in overlapping surface contact.

5. In a Venetian blind a tilt bar, brackets pivotally supporting the ends of the tilt bar, a plurality of slats formed with parallel off-set portions adjacent their edges connected by an intermediate inclined portion, means supporting the slats in parallel relation to the tilt bar including a plurality of flexible supports and downwardly inclined hangers dependent therefrom hinged to the edges of the slats, means for swinging the tilt bar in a direction to move the inclined portions of the slats through the horizontal portion until the slats hang with their off-set portions in overlapping substantially parallel relation, a roller rotatably mounted in said brackets above the tilt bar, and flexible lifting tapes attached to the roller traversing the intermediate portions of said slats.

6. In a Venetian blind a tilt bar, brackets detachably supporting the tilt bar in horizontal position, a plurality of slats and a bottom rail suspended in parallel relation to the tilt bar, said slats being formed with parallel off-set portions adjacent their edges connected by an intermediate inclined portion, a roller detachably journaled in said brackets above the tilt bar, flexible slat raising means traversing the tilt bar and the intermediate portions of the slats and attached to the bottom rail and the roller, manually operable means for rotating and locking the roller, and manually operable means for swinging the tilt bar until the slats hang with their off-set por-

tions in overlapping substantially parallel relation with the raising means passing between the off-set portions of the slats.

7. In a Venetian blind a tilt bar, brackets detachably supporting the tilt bar in horizontal position, a plurality of slats and a bottom rail, means for supporting the slats and bottom rail from the tilt bar including a flexible tension element attached to the edges of the tilt bar and bottom rail, and pendulous hangers hinged at their upper ends to the tension element and at their lower ends detachably pivoted to the edges of the slats, a roller detachably journaled in said brackets above the tilt bar, flexible tension means traversing the tilt bar and slats and attached to the bottom rail and to the roller, a ratchet for locking the roller, manually operable means for controlling said ratchet and rotating the roller, and manually operable means for rotating the tilt bar, said slats being formed with laterally off-set portions adjacent their edges arranged to assume substantially vertical overlapping position when the tilt bar is rotated to close the blind.

8. In a Venetian blind a tilt bar, a plurality of imperforate slats having plane unobstructed upper and lower surfaces, pendulous supporting means for the slats hinged to the edges of the tilt bar, and links hinged to the edges of the slats intermediate the upper and lower surfaces thereof, for swinging the slats from the supporting means, said links being substantially longer than the spaces between the slats and the supporting means and so arranged that when the bar is tilted the slats hang from the upper links, and the lower links approach a horizontal position and thus push the overlapping edges of the slats into surface contact.

9. In a Venetian blind a tilt bar, a plurality of imperforate slats having plane unobstructed upper and lower surfaces, pendulous supporting means for the slats attached to the edges of the tilt bar intermediate the upper and lower surfaces thereof, and links swinging the slats from the supporting means, said links being inclined downwardly toward the slats when the slats are horizontal, whereby when the bar is tilted the lower links approach horizontal position and push the slats into surface engagement, said links being readily detachable from the slats to permit easy removal and replacement of the slats.

10. In a light-tight Venetian blind a tilt bar, a bottom rail, flexible supporting means hinged to the edges of said bar and rail, a plurality of pendulous hangers hinged in spaced relation to the supporting means, a plurality of slats pivotally supported by the hangers in parallel relation, said hangers having openings arranged in vertical alignment, flexible lifting means attached to the edges of the bottom rail extending up through the openings in the hangers, pulleys for the lifting means hinged to the edges of the tilt bar for directing said means toward one end of the tilt bar, and means including a pulley at said end of the tilt bar, for grouping the lifting means and maintaining manual adjustment thereof.

LESLIE K. LOEHR.