May 26, 1953 R. C. PRATT 2,639,766

CLOSURE STRUCTURE

Filed May 13, 1947 7 Sheets-Sheet 1

Fig. 1.

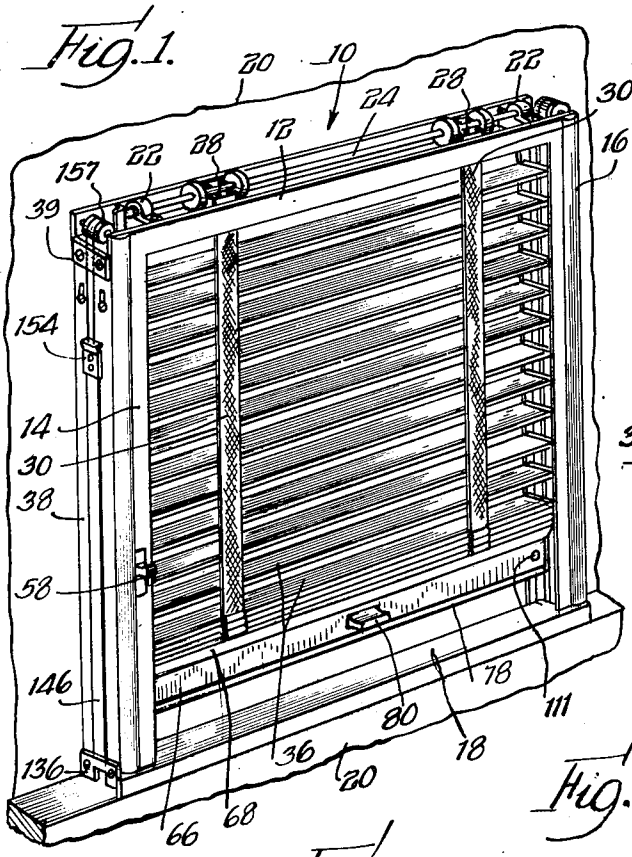


Fig. 2.

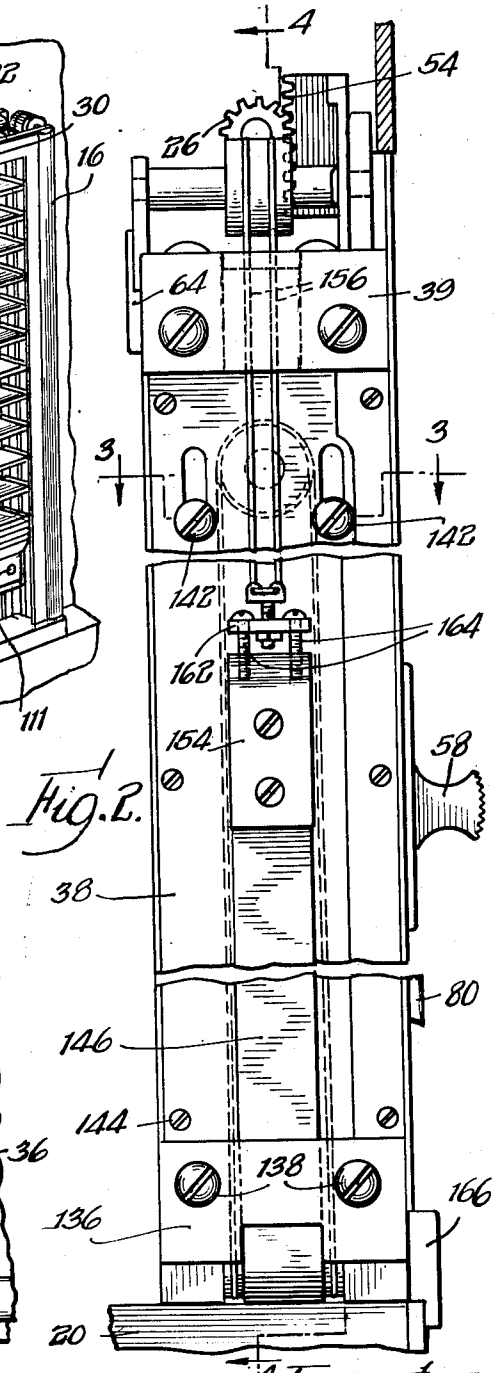
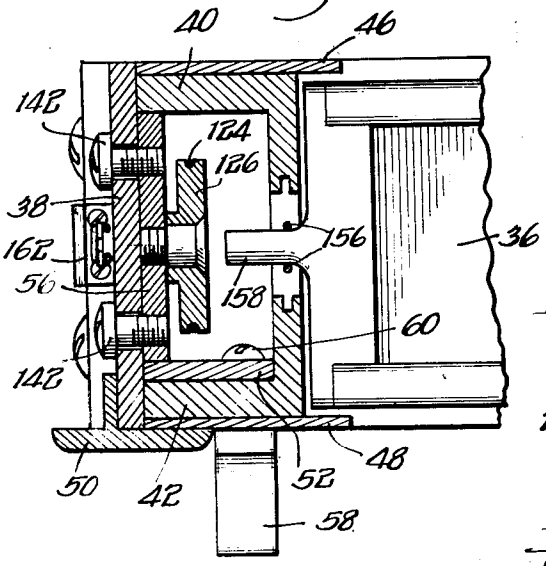


Fig. 3.



Inventor

Raymond C. Pratt

By:- Moon, Olson & Tredlew

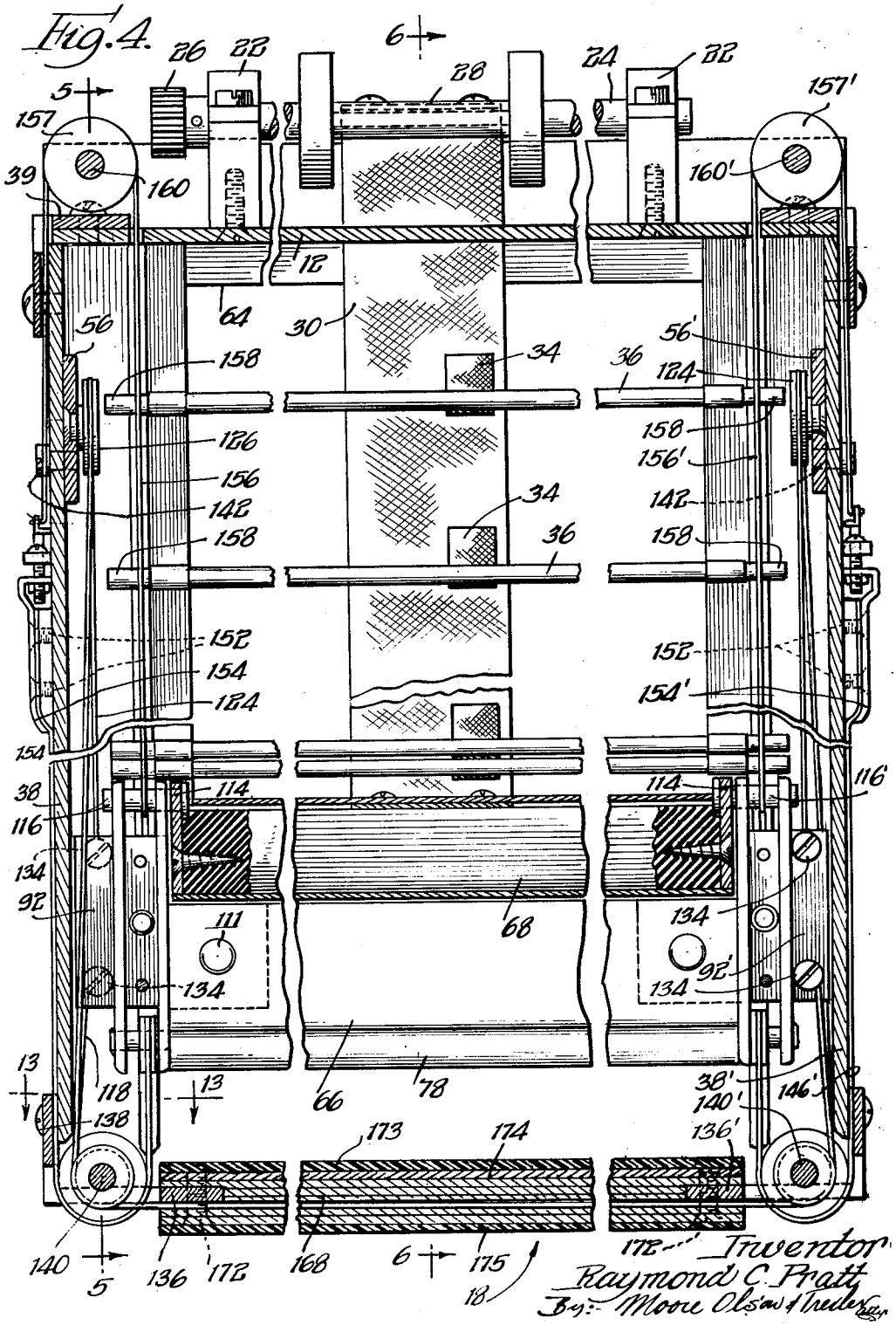
Attys.

May 26, 1953 R. C. PRATT 2,639,766

CLOSURE STRUCTURE

Filed May 13, 1947 7 Sheets-Sheet 2

Fig. 4.



May 26, 1953 R. C. PRATT 2,639,766

CLOSURE STRUCTURE

Filed May 13, 1947 7 Sheets-Sheet 3

Fig. 5.

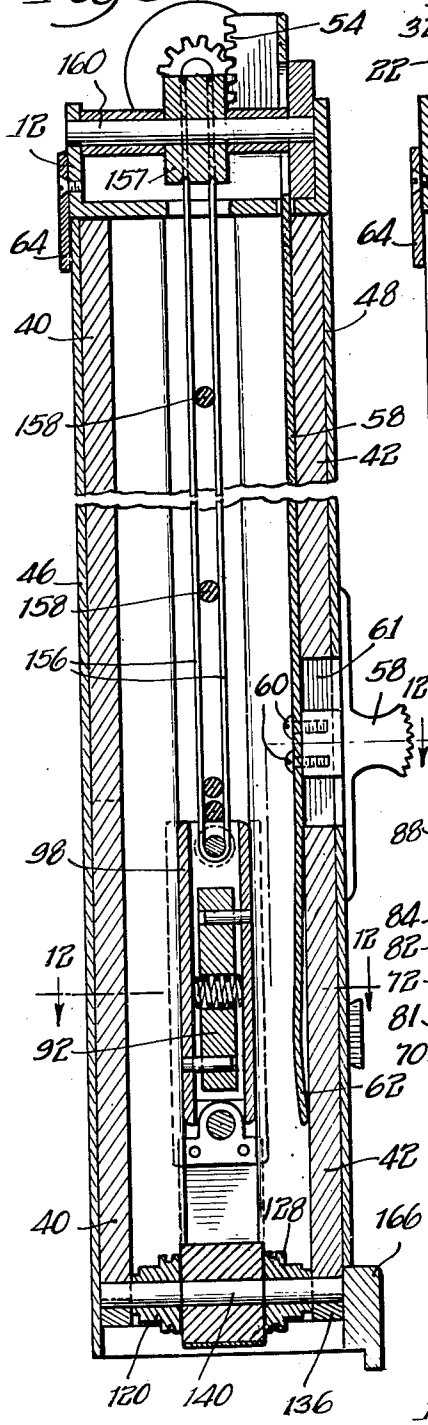


Fig. 6.

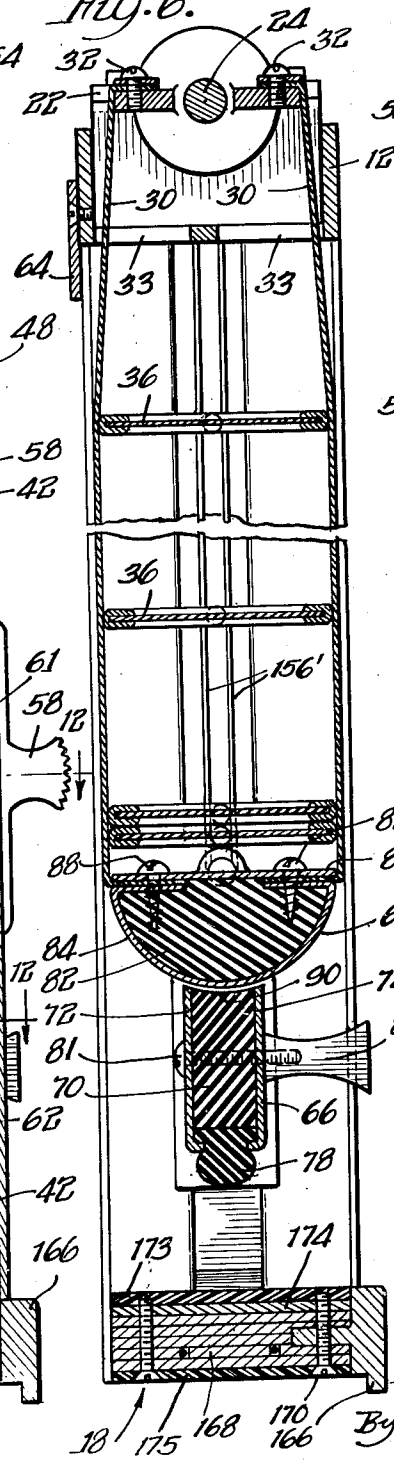


Fig. 7.

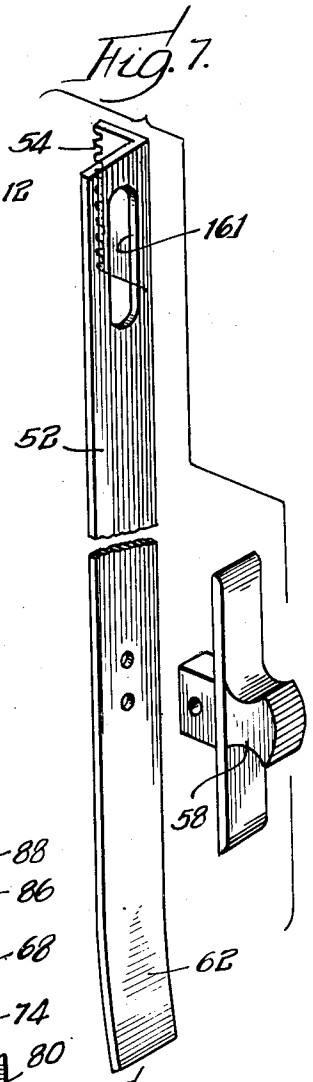
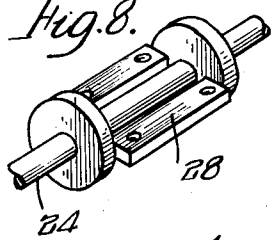


Fig. 8.



Inventor
Raymond C. Pratt
By:- Moore, Olson & Taylor
attys.

May 26, 1953 R. C. PRATT 2,639,766

CLOSURE STRUCTURE

Filed May 13, 1947 7 Sheets-Sheet 4

Fig. 9.

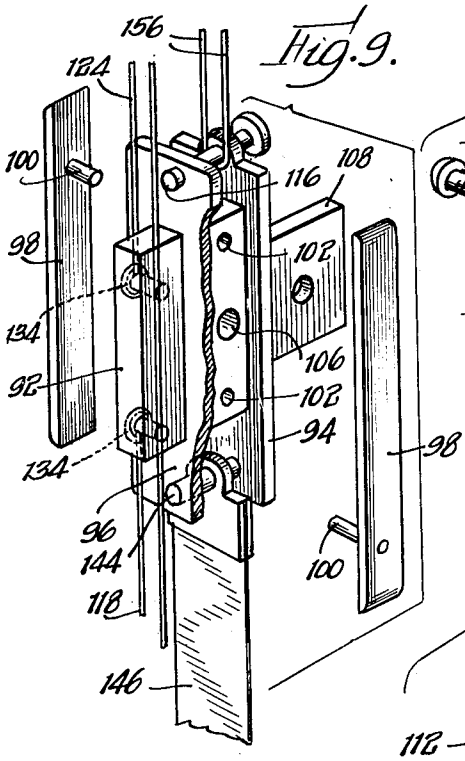


Fig. 10.

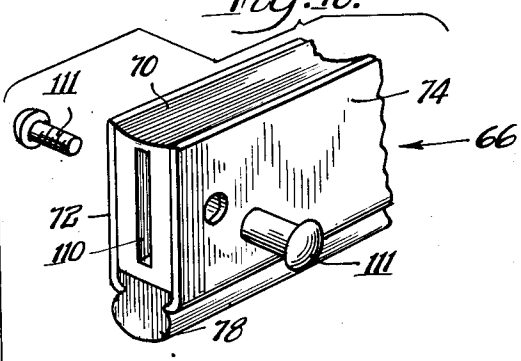


Fig. 11.

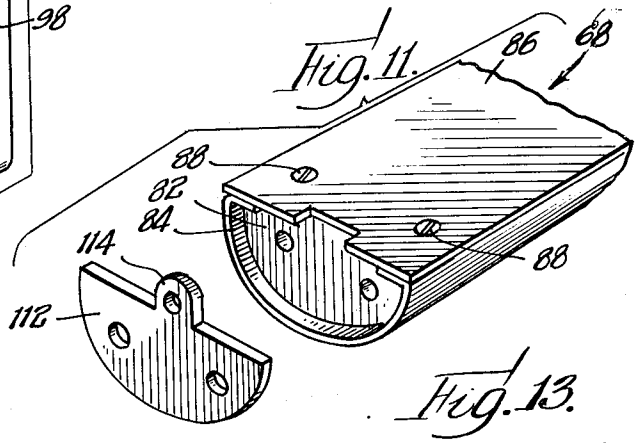


Fig. 12.

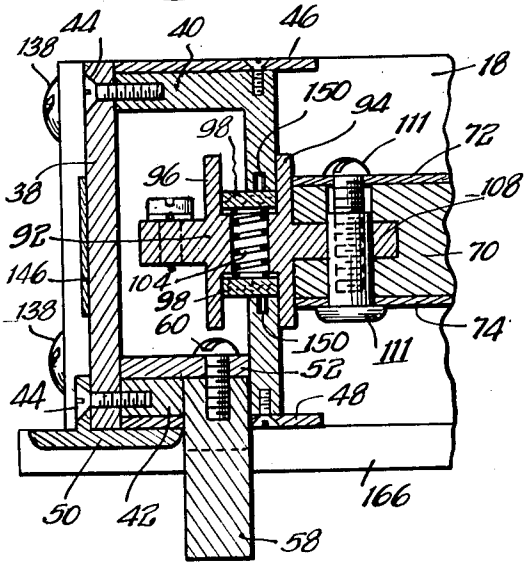
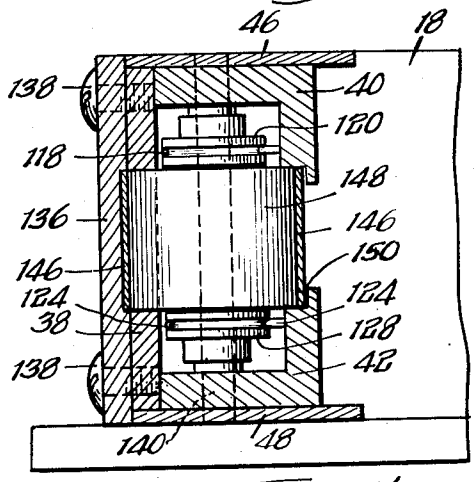


Fig. 13.



Inventor:
Raymond C. Pratt
By: Moore, Olson & Trexler
Attys

May 26, 1953 R. C. PRATT 2,639,766

CLOSURE STRUCTURE

Filed May 13, 1947 7 Sheets-Sheet 5

Fig. 14

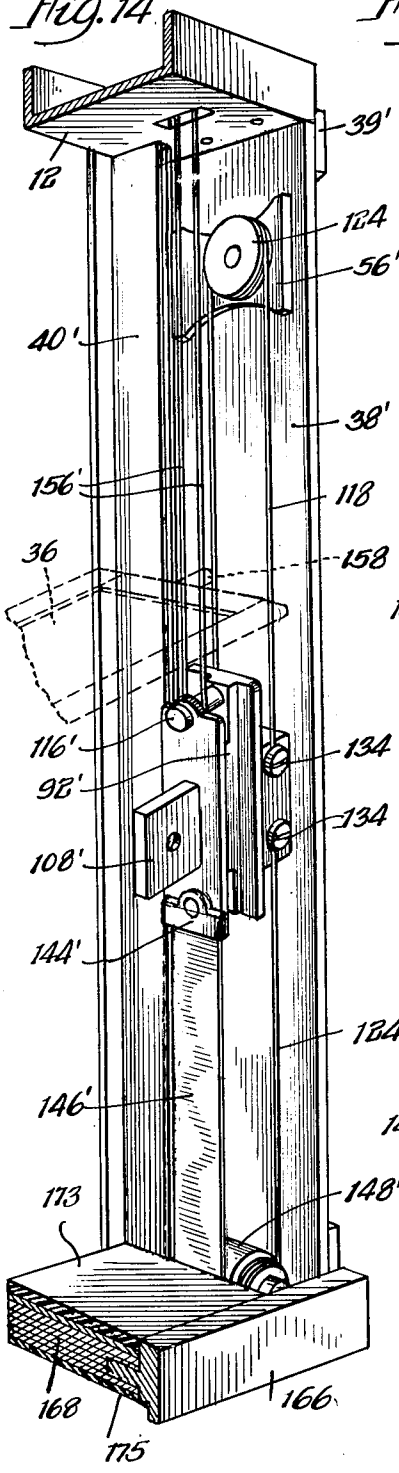


Fig. 15

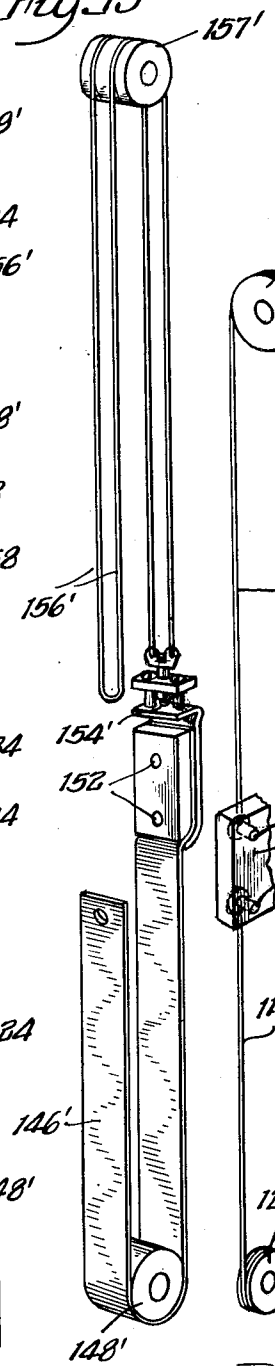
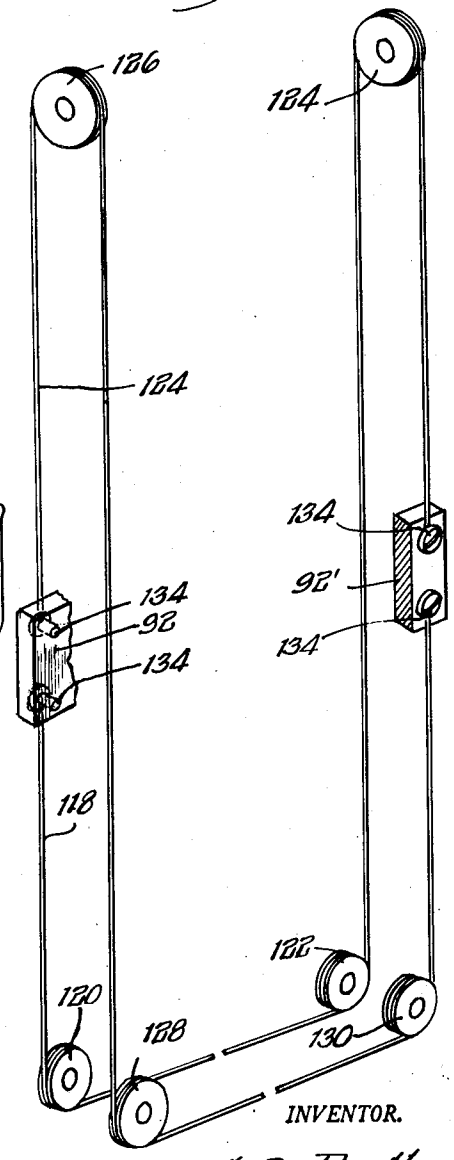


Fig. 16.



INVENTOR.

Raymond C. Pratt

By: Moore, Olsen & Treyler
attys.

May 26, 1953 R. C. PRATT 2,639,766

CLOSURE STRUCTURE

Filed May 13, 1947 7 Sheets-Sheet 6

Fig. 17.

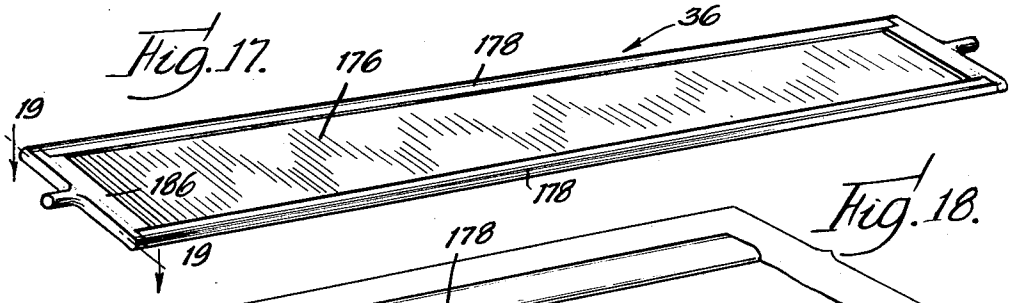


Fig. 18.

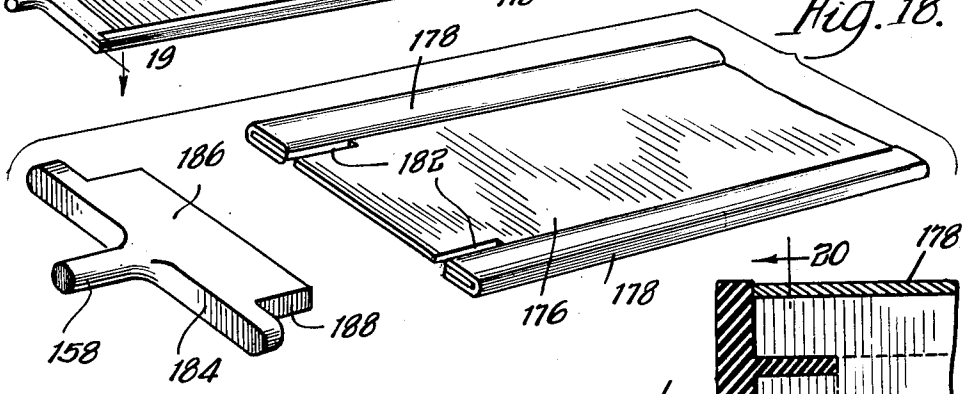


Fig. 21

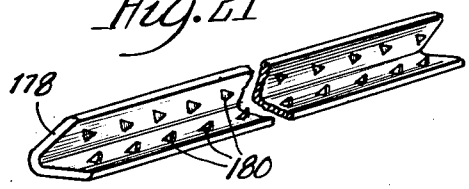


Fig. 19.

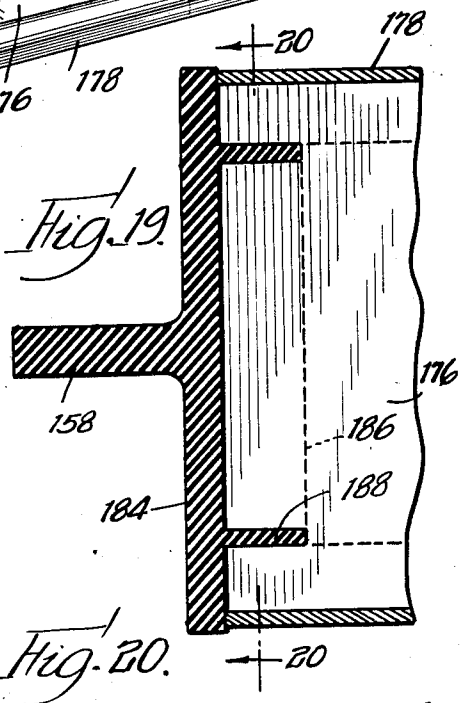


Fig. 22.

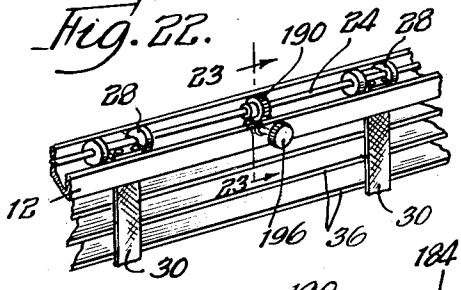


Fig. 20.

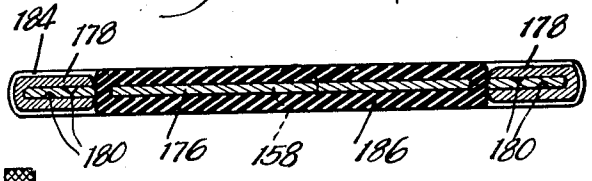
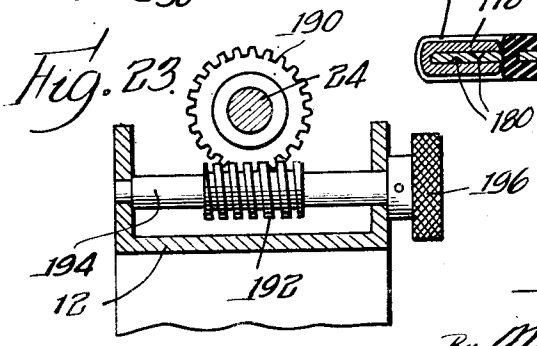


Fig. 23.



Inventor

Raymond C. Pratt

By Moore Olson & Trexler Attys.

May 26, 1953 R. C. PRATT 2,639,766

CLOSURE STRUCTURE

Filed May 13, 1947 7 Sheets-Sheet 7

Fig. 24.

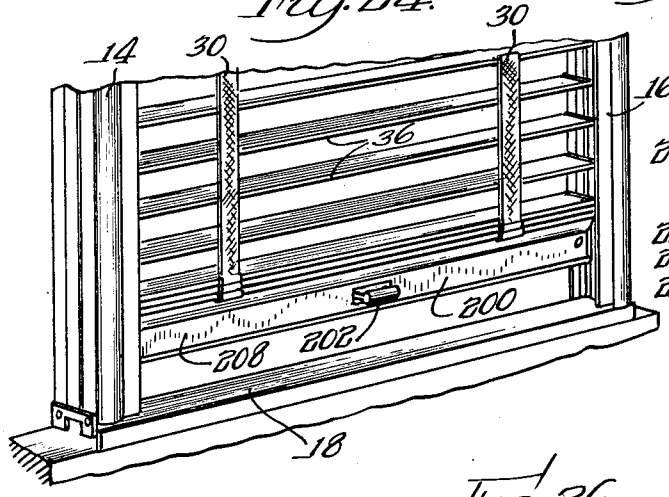


Fig. 25.

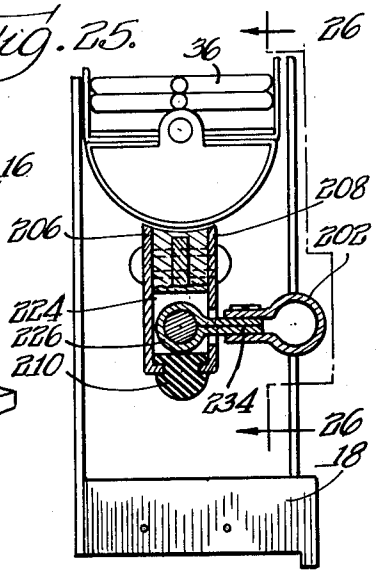


Fig. 26.

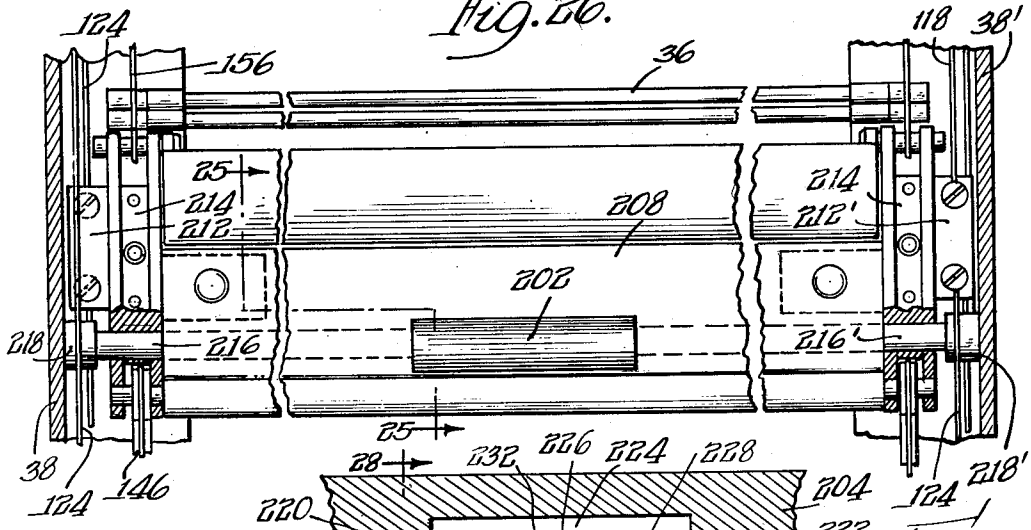


Fig. 27.

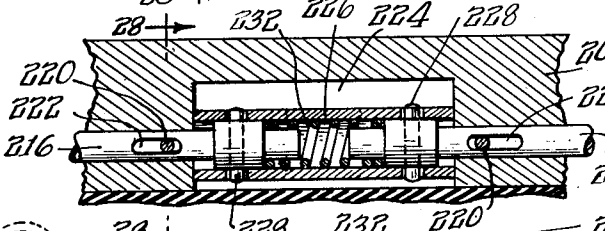


Fig. 28.

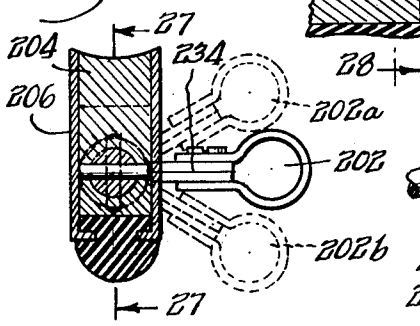
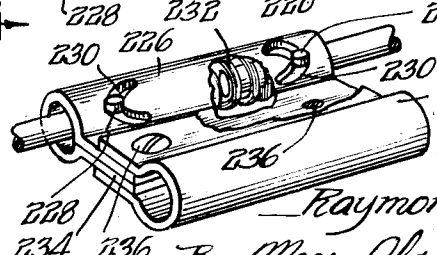


Fig. 29.



INVENTOR.

Raymond C. Pratt

By: Moore, Olson & Trudeau attys.

Patented May 26, 1953 2,639,766

UNITED STATES PATENT OFFICE

2,639,766

CLOSURE STRUCTURE

Raymond C. Pratt, Chicago, Ill.

Application May 13, 1947, Serial No. 747,813

11 Claims. (Cl. 160—40)

1

This invention relates to closures, and more particularly to that class of closures commonly referred to as Venetian blinds.

While the invention, in various of its features and aspects, has reference to closures generally, and Venetian blinds for various purposes and installations, it has particular reference to Venetian blinds for vehicle use, and like installations, wherein simplicity of operation, resistance to tampering, durability, quietness, and resistance to vibration are matters of particular importance and present problems in the production of a satisfactory blind structure.

It is an object of the invention to provide a closure of the foregoing type, of improved construction and improved operating characteristics.

More specifically stated, it is an object of the invention to provide a closure of the Venetian blind type wherein the bottom bar will be more properly held in parallel position, free from jamming, at all times and regardless of the manner of its manipulation; and wherein improved means are provided for guiding the bottom bar and the slats in their movements, in and to any adjusted position, and for maintaining the parts in such position of adjustment notwithstanding vibration or the like to which the blind structure may be subjected.

A further object of the invention is to provide a closure structure, of the type defined, which will be smoother and more quiet in operation.

A further object of the invention is to provide a closure structure wherein the operating parts of the mechanism are more effectively sealed against tampering or the like, in various positions of adjustment.

Still further objects of the invention are to provide a closure structure, of the type defined, which can be more readily mounted into position for use, and which incorporates an improved bottom bar, bottom sill, and slat structures.

Various other objects, advantages and features of the invention will be apparent from the following specification when taken in connection with the accompanying drawings, wherein certain preferred embodiments are set forth for purposes of illustration.

In the drawings, wherein like reference numerals refer to like parts throughout:

Fig. 1 is a perspective assembly view of a Venetian blind constructed in accordance with and embodying the principles of the invention, in accordance with one selected embodiment thereof;

Fig. 2 is an enlarged side view of the structure illustrated in Fig. 1, looking from the left side thereof;

2

Fig. 3 is a partial horizontal section through the left guide column and associated parts, taken substantially as indicated by the line 3—3 of Fig. 2;

Fig. 4 is a longitudinal vertical section through the blind, taken substantially as indicated by the line 4—4 of Fig. 2;

Figs. 5 and 6 are transverse vertical sections of the blind structure, taken substantially along the lines 5—5 and 6—6, respectively, of Fig. 4;

Fig. 7 is a composite or exploded perspective view of a part of the slat tilting mechanism;

Fig. 8 is a detail perspective of one of the slat tilting brackets;

Figs. 9 and 10 are exploded detail perspective views of one of the bottom bar guide brackets, and associated bottom bar parts;

Fig. 11 is an exploded detail perspective of a portion of the bottom bar structure;

Figs. 12 and 13 are partial horizontal sections, on the scale of Fig. 3, and taken, respectively, as indicated by the lines 12—12 of Fig. 5 and 13—13 of Fig. 4;

Fig. 14 is an illustrative perspective view of one of the guide columns, illustrating the control mechanism for the bottom bar guide bracket;

Figs. 15 and 16 are illustrative views, diagrammatic in form, further showing the guide bracket control mechanism;

Fig. 17 is a perspective view of one of the blind slats;

Fig. 18 is an enlarged exploded perspective, showing the slat end, and its associated end cap and guide member;

Figs. 19 and 20 are enlarged sectional views of the slat structure, taken as indicated respectively by the lines 19—19 of Fig. 17 and 20—20 of Fig. 19;

Fig. 21 is a detail perspective of one of the slat binding members;

Fig. 22 is a partial view, similar to Fig. 1, but showing a modified form of slat tilting arrangement;

Fig. 23 is an enlarged detail section of the tilting mechanism of Fig. 22, taken substantially as indicated by the line 23—23 thereof; and

Figs. 24–29 are views illustrating a modified form of bottom bar incorporating holding mechanism selectively releasable upon the shifting of the bottom bar by its handle means, Fig. 24 being an assembly perspective view thereof, Fig. 25 being a transverse sectional view on the line 25—25 of Fig. 26, Fig. 26 being a front sectional view on the line 26—26 of Fig. 25, Figs. 27 and 28 being detail sections, Fig. 27 being taken on the line 27—27 of Fig. 28 and Fig. 28 being taken

on the line 28—28 of Fig. 27, and Fig. 29 being a detail perspective view of the lock releasing mechanism.

The closure structure herein set forth is of the general type disclosed in my prior Patent No. 2,324,536, dated July 20, 1943.

Referring specifically to the drawings, and first to the embodiment illustrated in Figs. 1–21, the structure illustrated comprises a Venetian blind, generally indicated by the numeral 10, Fig. 1, mounted within a self-contained frame structure adapted to be applied as a unit to the structure with which the blind is to be associated. More specifically, the frame comprises a top cross frame 12, a pair of side columns 14 and 16, and a bottom sill member 18. As stated, the frame is adapted for preassembling, and for application as a unit to the wall structure 20 of the vehicle or other device with which the blind is to be used. While the sill 18 is herein, for convenience, referred to as a bottom sill, due to the upright positioning of the particular blind structure illustrated, it is to be understood that in view of the positive guiding structures provided, and hereinafter to be described, the blind may be inverted, horizontally disposed, or otherwise mounted in the desired operating position.

As best shown in Figs. 1, 5 and 6, the top cross frame member 12 is of channel shape, and carries a pair of bearing pedestals 22, Figs. 4 and 6, adjacent its opposite ends. A cross shaft 24 is journalled in the bearing blocks, the shaft having at one end thereof a gear wheel 26 by means of which the shaft may be rotated. Between the bearing blocks the shaft carries a pair of tape support brackets 28, one of which is illustrated in detail in Fig. 8. The oppositely disposed wings of the brackets form supports for the slat tapes 30, Fig. 6, the tape ends being secured thereto by suitable means such as screws 32 and passing downwardly through openings 33 in the frame member 12. The two sets of tapes carry cross bands 34, Fig. 4, in the usual manner, by which the slats 36 are supported in uniform spaced relation. It will be noted that the slats lie loosely upon the cross bands so that they may be removed from the blind structure for cleaning or the like without removal of the tapes or other operating structures.

Each of the side columns 14 and 16 is similarly formed, the column 14 being illustrated in section in Figs. 3, 12 and 13. As shown, it comprises an outer plate member 38, secured to the end of the channel 12 by a bracket 39, Fig. 2, and to which a pair of angle bars 40 and 42 are secured by suitable means such as screws 44, Fig. 12. Trim plates 46 and 48 are secured to the angle bars to provide a channel for the movement of the slat bodies. A trim plate 50 overlies the front trim plate 48, to provide a suitable finishing piece cooperable with the wall structure 20.

To effect the oscillation of the slat tilting shaft 24, a vertically reciprocable slide plate 52 is provided, the detailed shaping of which is best shown in Fig. 7. This slide plate has rack teeth 54 formed at its upper end for cooperation with the gear 26. It lies against one wall of the angle bar 42, being held thereagainst by a pulley bracket plate 56, Fig. 3, the principal function of which will be later described. A handle 58 is secured to the slide plate adjacent its lower end by screws 60, Fig. 5, the handle projecting forwardly through a vertical slot 61 in the angle bar 42 and trim plate 48 so as to be operable from the front of the structure. The lower end of the slide plate 52 is bent slightly as indicated at 62 so as to apply a predetermined frictional resistance to movement.

It will be seen that as the handle 58 is raised and lowered, the shaft 24 wil be oscillated to tilt the tapes and slats. The length of the slot 61 is such that a 180° arc of movement may be applied to the tape brackets 28, so as to effect a full degree of movement to the slats for light-tightness. A trim plate 64, Fig. 5, is secured to the rear wall of the top frame channel 12 so as to provide a light block between the uppermost slat and the lower surface of the frame channel.

The bottom bar of the blind is of composite construction and consists of a vertically reciprocable lower rectangular portion 66 and a pivotally mounted semicylindrical portion 68, Fig. 1, associated and movable therewith. More specifically, the rectangular bar portion comprises a block 70, Fig. 6, of wood or hard rubber faced with sheet metal plates 72 and 74. The block 70 is provided at its lower portion with a bumper 78 of soft rubber, interlocked with the plates 72 and 74, and adapted to be brought into engagement with the sill 18 when the bottom bar is in its lowermost position. The block or bottom bar 70 is provided at its intermediate portion with a handle 80, Figs. 1 and 6, held in place by screws 81, by which the bottom bar structure may be conveniently manipulated upwardly or downwardly along the side columns, as desired.

The upper pivotally mounted portion of the bottom bar structure more specifically comprises a semicylindrical body 82 also preferably of wood or hard rubber, faced with sheet metal plates as indicated at 84 and 86, Fig. 6. The plate 86, and its associated holding screws 88 serve to connect the lower ends of the tapes 30 to the body 82, so that the body will be oscillated along with the tapes and slats. The lower bottom bar 70 is provided with a concave surface as indicated at 90, Fig. 6, so as to insure light-tightness in any adjusted position of the upper bar or body 82.

To guide the bottom bar structure along the side columns, a pair of duplicate guide brackets is provided, one of which is illustrated in detail in Fig. 9. As shown, the guide bracket comprises a generally elongated metal body 92 having a pair of plate-like portions 94 and 96 adapted to lie on opposite sides of the inturned flanges of the angle bars 40 and 42, and be guided thereby, as indicated in Fig. 12. A pair of fiber brake shoes 98 is provided, carried by the guide bracket body and movable therewith, and frictionally engageable with the inturned flanges of the angle bars 40 and 42, whereby to provide a smooth sliding action for the bottom bar structure, and also to impart a predetermined frictional resistance to movement of the bottom bar so as to hold it in any adjusted position against vibration or the like. More specifically, and as shown in Fig. 9, each brake shoe carries a pin 100 engageable within an opening 102 in the guide bracket body. A compression spring 104, Fig. 12, is mounted within an opening 106 in the bracket body, the arrangement being such that the spring resiliently presses the shoes outwardly or away from each other into predetermined frictional engagement with the inturned flanges of the angle bars. By reason of the engagement of the bracket flange 94 and the brake shoes 98 against the angle bar flanges, a positive guide structure for the slide brackets is provided, coupled with a predetermined frictional resistance to movement, for the purpose set forth.

To secure the guide brackets to the lower bot-

tom bar 70, the brackets are provided with a lug or ear 108, Figs. 9 and 10, adapted to be received within an opening 110 in the end of the bar and held therein by screws 111. These screws, and the handle screws 81, serve to hold the metal plates 72 and 74 firmly against the bottom bar body 70, thus also firmly locking the bumper bar 78 in position.

As best shown in Fig. 11, the upper semicylindrical body 82 of the bottom bar structure is provided at each end with an end plate 112 secured thereto, the end plate having an upstanding portion or lug 114 adapted to pivotal connection with its associated guide bracket. For this purpose each guide bracket carries a fixed pin 116, the end of which is adapted for pivotal connection with the lug 114, as shown in Fig. 4. By reason of the connections provided it will be seen that both the upper and the lower portions of the bottom bar structures are carried by the guide brackets, the upper portion comprising the body 82 being pivotally connected thereto, and the lower portion comprising the body 70 being fixed thereto, as pointed out.

Positively operable means is provided for insuring that the guide brackets at the opposite ends of the bottom bar structure will move together and be maintained in proper parallel relationship. This means comprises an elongated cord or the like, specifically a wire cable in the particular embodiment disclosed, interconnecting the guide brackets and so arranged as to cause them to move as a unit and in predetermined relationship at all times. The arrangement is best shown in Fig. 16, wherein it will be seen that one reach of the cable, designated by the numeral 118 is anchored to the guide bracket 92, and thence passes around a pair of lower idler pulleys 120 and 122 associated with the bottom sill structure, and thence around an upper idler pulley 124 associated with the righthand guide column, the other end of the cable being secured to the companion guide bracket 92' associated with the opposite end of the bottom bar. The other reach 124 of the cable is anchored at one end to the guide bracket 92, and thence passes upwardly around an idler pulley 126 associated with the lefthand frame column, around a pair of lower pulleys 128 and 130 associated with the bottom sill, being anchored at its opposite end to the companion guide bracket 92', as in the case of the cable reach 118. Obviously the cable may be formed in two reaches, as shown, or into a single endless reach anchored to the guide brackets 92 and 92' at appropriate points intermediate its length. The cable may be anchored to the guide brackets by any suitable means, for example by means of screws 134 as indicated in Figs. 9 and 16.

The mounting for the sill idler pulleys 120—122 and 128—130 is best shown in Figs. 2, 4, 5, 13 and 14. An angle bracket 136 Fig. 2, is secured to the outer face plate of each of the side columns at the lower end thereof by screws 138. A shaft 140 outer face thereof by screws 138. A shaft 140 lies in a suitable groove in this bracket, being held therein by notches cut in the lower ends of the angle bars 40 and 42, Fig. 5. The pulleys 120 and 128 are loosely mounted on the shaft 140 at the lower end of the left guide column, whereas the pulleys 122 and 130 are loosely mounted on the companion shaft 140', Fig. 4, at the lower end of the righthand guide column.

The mounting for the upper idler pulleys 124 and 126 is best shown in Figs. 2, 3, 4 and 14. The pulleys are rotatably carried by studs anchored to and extending from companion brackets 56 and 56' associated, respectively, with the oppositely facing guide columns, the bracket 56 having been previously referred to as a part of the guide means for the tape tilting side plate 52. The brackets are adjustably mounted on the columns by means of screws 142 so that the brackets may be vertically adjusted to tension the cable 118, 124, and to properly align the bottom bar guide brackets 92—92'.

It will be seen that by reason of the cable interconnection between the bottom bar guide brackets, the bottom bar will be properly held in parallel disposition at all times, and will be maintained parallel to the bottom sill, and against jamming or tilting, regardless of where the operating forces are applied thereto as the bottom bar is raised or lowered in the lifting or lowering of the blind. By adjustment of the brackets 56—56', each reach of the cable may be individually tensioned to the proper desired degree, and the ends of the bottom bar brought into proper alignment.

Means is provided for closing the space between the angle bars of the side columns, so as to minimize tampering with the structure, said means also forming part of the structures for guiding the ends of the slats in their movements. These means are the same for each of the guide columns, and are best shown in Figs. 2, 4, 9, 13, 14 and 15. The bottom bar guide brackets carry fixed pins 144 and 144', Figs. 9 and 14, to which elongated metal tapes 146 and 146' are respectively secured. These metal tapes, which may for example be of stainless steel or the like, pass downwardly between the angle bars of the respective side columns, around rollers 148 and 148' loosely mounted upon the shafts 140 and 140', respectively, and thence upwardly along the outer face plates 38 and 38' of the side columns. To receive and co-mate with the tapes, the facing flanges of the side column angle bars are preferably provided with elongated notches as best shown at 150, Fig. 12.

The opposite ends of the tapes are connected by means of screws 152 to brackets 154 and 154', respectively, these brackets being adjustably connected to the ends of wire cables 156 and 156' which pass over idler pulleys 157 and 157' and have their opposite ends looped around the pivot pins 116 and 116' of the bottom bar guide bracket structures, previously described. Each of the cables 156—156' is comprised of two parallel reaches in predetermined spaced relation, the cable thus forming guide means for the end tips 158 of the slats, as perhaps best shown in Fig. 5.

The pulleys 157—157' are mounted upon shafts 160—160' carried at the opposite ends of the upper channel frame 12, as best shown in Figs. 4 and 5. The slat tilting slide plate 52 is provided with a cutout or slot 161, Fig. 7, so as to accommodate the shaft 160.

The adjustable connection between the cables and the brackets 154—154', by which the cables and tapes are properly tensioned, is shown in detail in Fig. 2. It will be seen that the cable ends are anchored to a plate 162 adjustably mounted in respect to its associated bracket by means of a pair of adjustment screws 164. By tightening these screws the tapes and connected slat guide cables 156—156' are properly tensioned to perform their respective functions.

It will be seen that by reason of the tapes, the spaces between the angle bars of the guide columns are closed as the bottom bar is raised, so as to provide an improvement in appearance and

also to discourage tampering with the structure. The tapes are drawn between the angle bars automatically as the bottom bar is adjusted, and as an incident to its movement. The connected guide cables 156—156' provide a somewhat yieldable yet effective guide means for the end tips 158 of the slats, the guide cables being in effect extended or drawn downwardly with the bottom bar so as to cooperate with the slat ends in all positions of adjustment.

The frame parts heretofore described such for example as the side columns and top frame channel 12 are preferably of light-weight metal construction, such for example as of aluminum or the like. The lower sill structure, however, is preferably of composite construction, and as best shown in Figs. 4, 6 and 14, comprises a metal face plate 166 and a body portion 168 formed primarily of laminated wood and through which the cables 118—124 are extended. The face plate is held to the body by suitable means such as screws 170, Fig. 6, the body in turn being anchored to the inturned flanges of the brackets 136—136' by screws or the like 172, Fig. 4. The upper surface of the sill body is faced with a sheet 173 of alcohol resistant and heat blister-proof plastic. Underlying the plastic sheet 173 is a metal sheet 174, in contact therewith, to aid in the dissipation of heat in the event cigarettes or the like should be laid upon the upper plastic surface. The sill body is preferably faced on its lower surface with a second plastic sheet, as indicated at 175, Fig. 6. The various laminated sheets are held together by glue, or other suitable adhesive, and also by the screws 170.

The foregoing construction provides a sill structure which is of light-weight, and yet resistant to warping. The top facing sheet 173 of plastic, which may be colored as desired, not only improves the appearance of the structure, but also provides a sill surface which is resistant to alcohol, cigarettes, and the like, so as to maintain the appearance of the sill and increase the durability of the structure.

The preferred form of slat structure is illustrated in Figs. 17–21. The slat preferably comprises a body portion 176 which may be of aluminum or suitably colored plastic, as desired. The body portion is faced on its opposite edges with a pair of binding strips 178, preferably of aluminum, which, if the body is formed of plastic, provide a contrasting color combination therewith. As best shown in Figs. 20 and 21, the binding strips are provided with barbs 180 which grip the surfaces of the body member as the binding strips are crimped into position thereon.

The slat bodies are provided with a pair of notches or slits 182, Fig. 18, at each end thereof forming an anchorage for the end caps 184, preferably of rubber, and which are fixed to each of the slat ends. The end caps are provided with a hollow skirt portion 186, the opposite sides 188 of which are received within the body slots 182. The skirt portion 186 is preferably proportioned so that it is stretched slightly as the end cap is mounted into position, so as to provide a firm anchorage and connection between the parts. The thickness of the skirt is also preferably such that when mounted in position it provides a slightly greater thickness than the binding strips, as shown in Fig. 20, so as to insure rubber to rubber contact when the slats are brought into superposed position. As will be understood, the end caps carry the tips 156, previously described, which fit between the wires or cables 156—156', to be guided thereby at all times and in all positions of slat adjustment.

It will be seen that by reason of the construction described a strong slat structure is provided, of improved appearance, and which is silent in operation. The end tips 158, being circular, are effectively guided by wires 156—156' in all positions of slat adjustment, slight yieldability of the wires insuring a snug guide surface of maintained tightness even when the blind structure is subjected to vibration.

The structure disclosed thus comprises a closure, specifically of the Venetian blind type, which is light-tight, of improved appearance, and of durable construction. The guiding arrangement for the bottom bar brackets 92—92', and the positive cable interconnection therebetween, insures ease of manipulation and the proper maintenance of the bottom bar in position regardless of the manner in which operating forces are applied thereto. The brake shoes 98 associated with the guide brackets insure that the bottom bar will be maintained in adjusted position, regardless of vibration or the like to which the blind structure may be subjected. By means of the handle 58 the slats may be conveniently and readily tilted to and maintained in any desired adjusted angularity. The cooperative engagement between the slats and the guide cables 156—156' insures noiseless operation as the blind is raised or lowered, or when subjected to vibration in use. The steel tapes 146—146' effectively close the side columns and provide a substantially imperforate inner wall structure thereon automatically and as the bottom bar is raised, so as to discourage any tampering with the mechanism of the unit.

In Figs. 22 and 23 a modified arrangement is illustrated for effecting the operation of the slat tilting shaft 24. As shown, the shaft in this instance has a worm gear 190 secured thereto, at approximately the center of the blind structure, cooperable with the worm 192 fixed to shaft 194 journalled in the cross channel frame 12. This latter shaft is provided with a knurled operating knob 196, the arrangement thus being such that as the knob is turned corresponding rotation is imparted to the tilting shaft 24. In certain instances the slower operating micrometer adjustment means thus provided may be preferred.

In Figs. 24–29 means is provided in association with the bottom bar structure normally operative to aid in holding the bottom bar in adjusted position, and automatically releasable as the bottom bar is manipulated by its associated handle structure in either direction of movement.

In Fig. 24 structures are shown generally similar to Fig. 1, and corresponding reference numerals have been applied.

In this instance the bottom bar 200, corresponding to the bottom bar structure 66 previously described, is provided with a handle 202 operable to manually raise and lower the bottom bar, and also tiltable through a predetermined arc of travel in connection with its operation, as indicated in Fig. 23, whereby to effect the control of locking mechanism associated therewith.

The bottom bar may be constructed and arranged for sliding movement in a manner generally similar to that previously described and, as shown, the bar comprises a main body block 204 faced with opposite sheet metal plates 206 and 208, and carrying a rubber bumper strip 210 along its lower edge.

Guide brackets as indicated at 212 and 212' are

secured to the opposite ends of the bottom bar, functioning as previously described in reference to the brackets 92 and 92', and having associated therewith spring pressed friction guide shoes as indicated at 214 engageable with the angle bars of the side columns as in the case of the previously mentioned brake shoes 98. However, in this instance the guide shoes 214 are resiliently urged into engagement with the side column angle bars with a very light compression, sufficient only to provide a guiding action between the parts.

To provide means for holding the bottom bar in adjusted position, the bottom bar structure includes a pair of oppositely extending rods or shafts 216 and 216', these rods being mounted in the body member 204 and being projected through the guide brackets 212 and 212' and carrying on their outer ends friction shoes or blocks as indicated at 218 and 218a, which are engageable with the plate members 38 and 38' of the side columns when the rods 216 and 216' are in outwardly thrust position. The friction shoes 218 and 218' lie between the cable reaches 118 and 124 so as not to interfere therewith.

The two rods 216 and 216' are mounted for reciprocatory movements relative to the bottom bar body 204, through a limited range of travel, and are maintained against rotation by pins 220, Fig. 27, press fitted into the body 204 and operable within slots 222 provided in the rods.

The inner ends of the rods terminate within a recess or chamber 224 provided in the bottom bar body. A sleeve member 226 having a shape as best shown in Fig. 29 lies within this recess in embracing relation to the ends of the rods. More particularly, the rods 216 and 216' project into the opposite ends of the sleeve member 226, the rods being provided with pins 228 operable within cam shaped slots 230 in the member 226, as shown. A compression spring 232 bears between collars fixed to the rods, so as to normally urge the rod ends away from each other. The cam slots 230 are so shaped that upon rotation of the sleeve member 226 in either direction from its central position shown, the rod ends are drawn toward each other against the action of the compression spring.

To effect the controlled movement of the sleeve member 226, the forwardly projecting flange portion 234 thereof is secured by means of screws 236 to the manually operable handle member 202. The opening in the plate member 208 through which the handle 202 projects limits the rotatable movements of the sleeve 226 to the range indicated by the dotted lines in Fig. 28.

In operation, normally the compression spring 232 holds the friction shoes 218 and 218' firmly in engagement with the plates 38 and 38' respectively of the guide columns, whereby to maintain the bottom bar in adjusted position, resistant to vibration or other inadvertent forces tending to move the bottom bar from adjusted position. To raise the bottom bar the operator pushes upwardly on the handle 202 causing it to move to the dotted line position indicated at 202a in Fig. 28. This initial movement of the handle draws the friction shoes 218—218' inwardly against the action of the compression spring, and as the bottom bar is thus released for movement, the continued application of upward force on the handle causes the bottom bar to move upwardly as long as the force is applied. Immediately as the handle is released it moves to its central full line position, as shown in Fig. 28, whereby to hold the bottom bar firmly in the new position of adjustment. Similar operation takes place in effecting the lowering of the bottom bar, the operator merely being required to press downwardly upon the handle which first moves to the dotted line position 202b, Fig. 28, releasing the bottom bar so that continued downward pressure upon the handle moves the bar to the desired lowered position.

As will be understood, in the event it is desired to positively lock the operating bar in predetermined positions, the plates 38 and 38' may be provided with depressions or holes for receiving the shoes 218—218' at such predetermined stations along the path of travel of the bar.

It is obvious that various changes may be made in the specific embodiments set forth without departing from the spirit of the invention. The invention is accordingly not to be limited to the specific embodiments shown and described, but only as indicated in the following claims.

The invention is hereby claimed as follows:

1. A closure structure comprising an operating member adapted to be drawn across an opening to be closed, said operating member being shiftable in opposite directions along a predetermined path of travel, a frame structure, said frame structure including a guide column having a channel for guiding the operating member in its movements, and closure means for the channel comprising an elongated metal tape, said channel and tape having interengaging portions for precluding lateral movement of the tape when within the channel.

2. A closure structure comprising a plurality of aligned closure members adapted to be shifted across an opening to be closed, an operating bar for controlling the shifting of said closure members, said operating bar being shiftable in opposite directions along a predetermined path of travel, a frame structure, said frame structure including a guide column having a channel for guiding the operating bar in its movements, a closure tape for the channel, and guide means including a pair of elongated flexible members in parallel spaced relation for guiding the aligned closure members, said tape and elongated flexible members being connected to and operable with the operating bar.

3. A closure structure comprising an operating member adapted to be drawn across an opening to be closed, said operating member being shiftable in opposite directions along a predetermined path of travel, a frame structure, said frame structure including a pair of guide columns provided with channels for guiding the operating member in its movements, means comprising an elongated filament interconnecting the opposite ends of the operating member for concomitant movement, and means comprising a widened tape member connected to the operating member for closing said channels as the operating member is shifted.

4. A closure structure comprising an operating member adapted to be drawn across an opening to be closed, said operating member being shiftable in opposite directions along a predetermined path of travel, a frame structure, said frame structure including a pair of guide columns provided with channels for guiding the operating member in its movements, means comprising an elongated flexible member interconnecting the opposite ends of said operating member for concomitant movement, and means comprising a second elongated flexible member for closing said channels as the operating member is shifted.

5. A closure structure comprising a plurality of aligned closure members adapted to be shifted across an opening to be closed, an operating bar for controlling the shifting of said closure members, said operating bar being shiftable in opposite directions along a predetermined path of travel, means interconnecting the opposite ends of said operating bar for concomitant movement, and means comprising a pair of parallel spaced filaments connected to and operable with the operating bar for guiding the ends of said closure members.

6. A closure structure comprising a plurality of aligned closure members adapted to be shifted across an opening to be closed, said closure members being provided with end guide portions, an operating bar for controlling the shifting of said closure members, said operating bar being shiftable in opposite directions along a predetermined path of travel, and guide means for the guide portions of the closure members and comprising a pair of elongated flexible members arranged in predetermined spaced relation for slidably engaging said guide portions and connected to and shifted as a unit by movement of the operating bar.

7. A closure structure comprising a plurality of aligned closure members adapted to be shifted across an opening to be closed, an operating bar for controlling the shifting of said closure members, said operating bar being shiftable in opposite directions along a predetermined path of travel, a frame structure, said frame structure including a guide column having a channel for guiding the operating bar in its movements, closure means for the channel including a tape traversing the channel opening, and guide means for the aligned closure members, said closure means and guide means being connected to and actuated by the operating bar.

8. A closure structure comprising an operating member shiftable in opposite directions along a predetermined path of travel, a frame structure including a guide column with an open channel for guiding the operating member, an operated closure device connected to said operating member and adapted to be drawn thereby across an opening to be closed, channel closing means connected to and terminating at said operating member and adapted to traverse the channel opening to close the same, said operated closure device and said channel closing means extending in opposite directions from said operating member to effect progressively increased closing of the channel opening as the operated closure device is shifted toward open position, and vice versa.

9. A closure structure as claimed in claim 8, wherein the operated closure device includes multiple closure members and wherein guide means including flexible elements for the ends of said closure members are connected to said operating member and project therefrom in a direction opposite to that of the channel closing means.

10. A closure structure as claimed in claim 8, wherein the channel closing means includes a flexible tape traversing the channel opening.

11. A closure structure as claimed in claim 8, wherein there is provided flexible means interconnecting the ends of said operating member for concomitant movement.

RAYMOND C. PRATT.

References Cited in the file of this patent

UNITED STATES PATENTS

Number	Name	Date
Re. 21,518	Lawson et al.	July 30, 1940
279,835	Smith	June 19, 1883
444,302	Niss	Jan. 6, 1891
1,013,417	McIntosh	Jan. 2, 1912
1,787,158	McNulty	Dec. 30, 1930
1,914,050	Smith	June 13, 1933
2,059,134	Metcalf	Oct. 27, 1936
2,090,145	Pierce	Aug. 17, 1937
2,128,163	Pratt	Aug. 23, 1938
2,164,556	Udstad	July 4, 1939
2,187,242	Kesner	Jan. 16, 1940
2,209,276	Lawson	July 23, 1940
2,212,718	Pratt	Aug. 27, 1940
2,229,221	Pratt	Jan. 21, 1941
2,248,775	Nottingham	July 8, 1941
2,255,311	Butler et al.	Sept. 9, 1941
2,268,858	Dodge	Jan. 6, 1942
2,428,197	Bretz et al.	Sept. 30, 1947