

Jan. 20, 1948.

K. W. BROWNING

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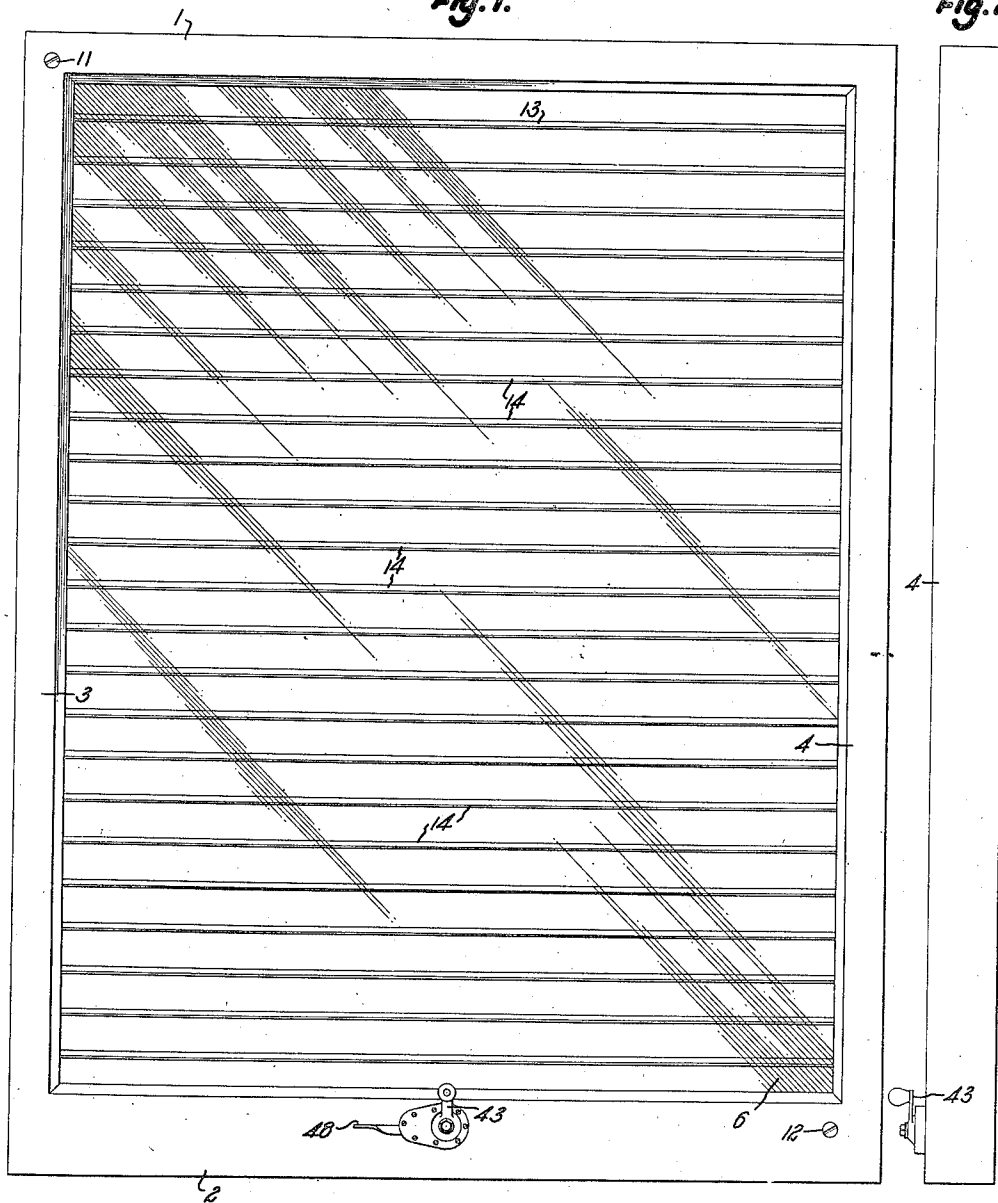
WINDOW AND BLIND CONSTRUCTION

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6 Sheets-Sheet 1

Fig. 1.

Fig. 2.



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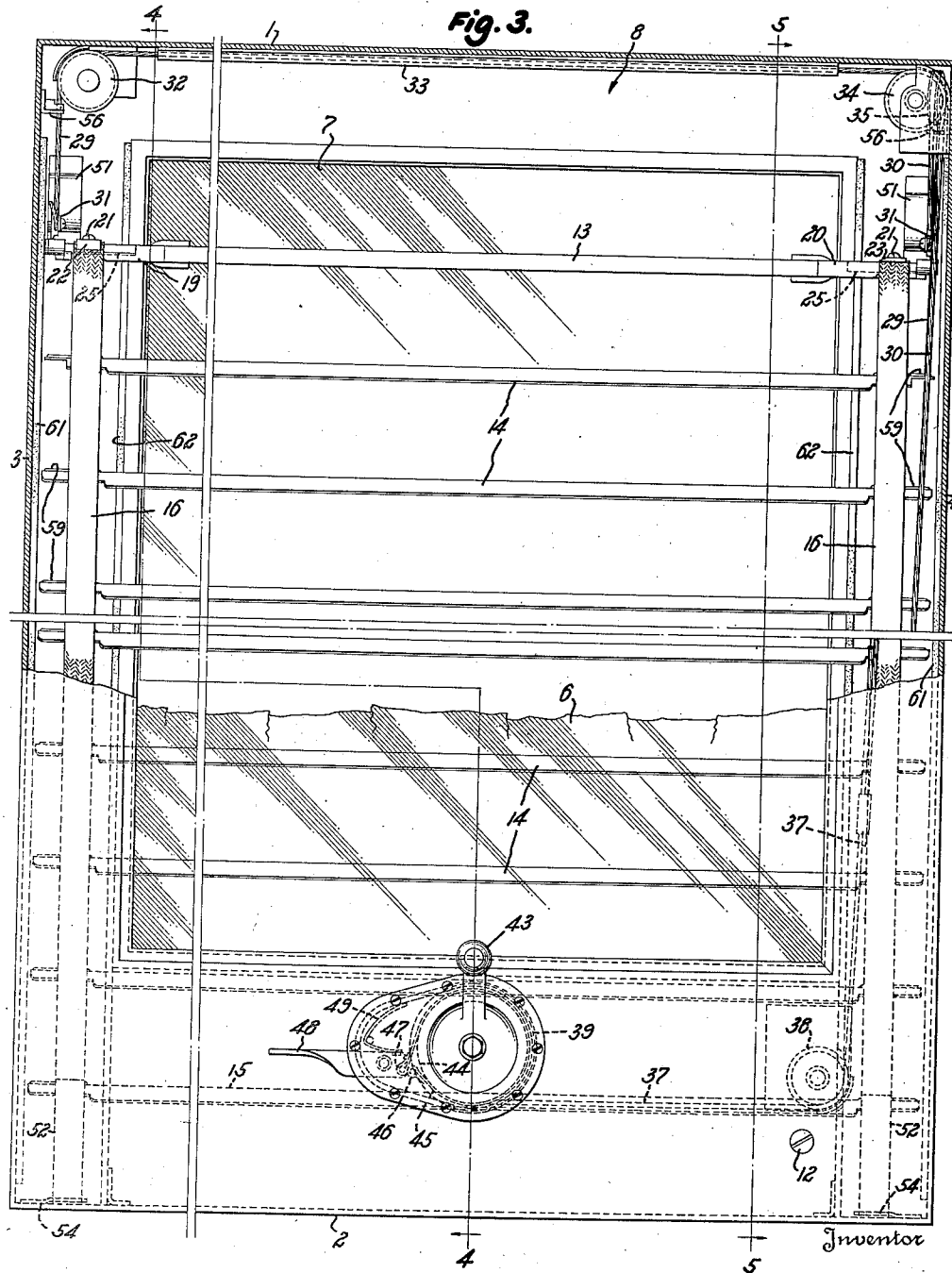
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6 Sheets-Sheet 2



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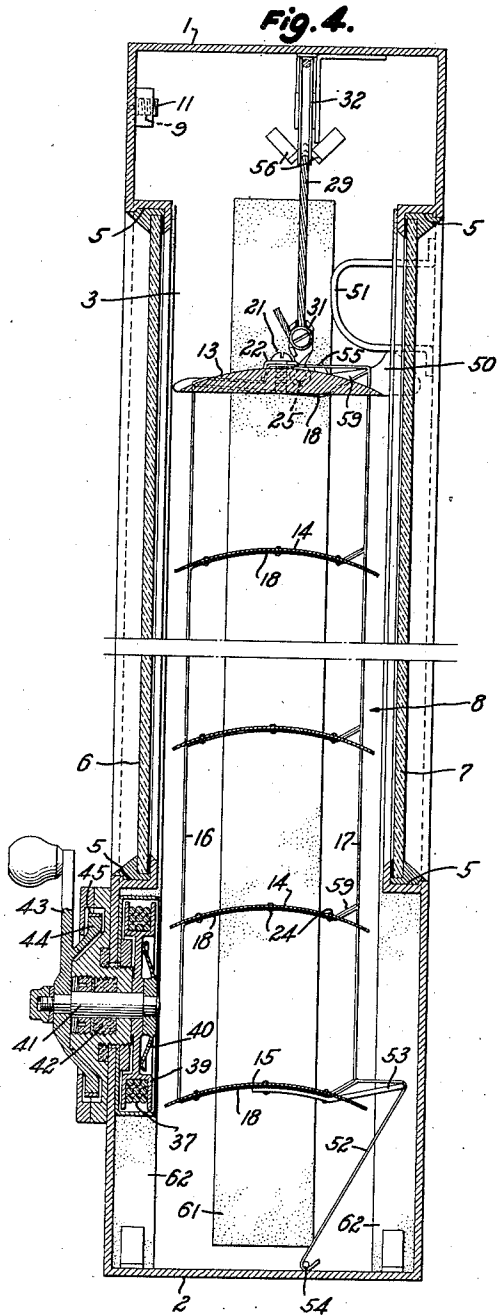
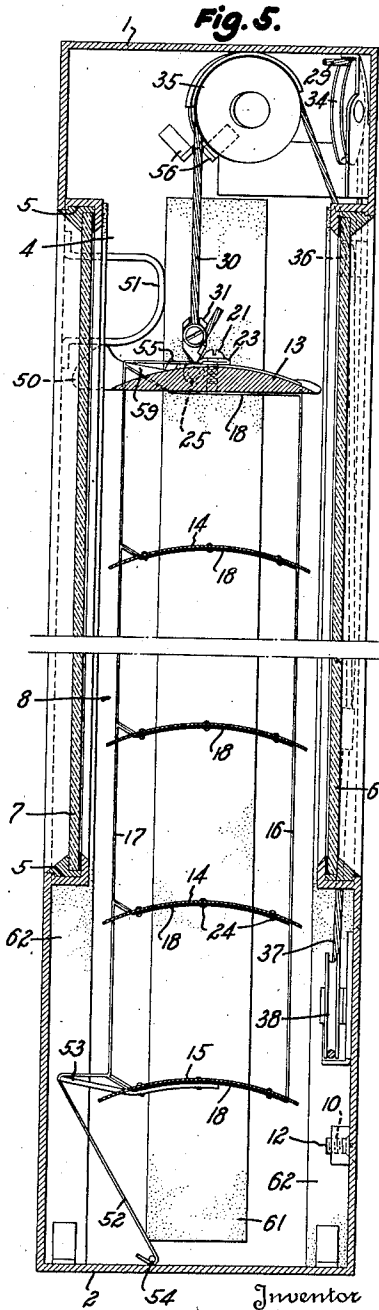
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WINDOW AND BLIND CONSTRUCTION

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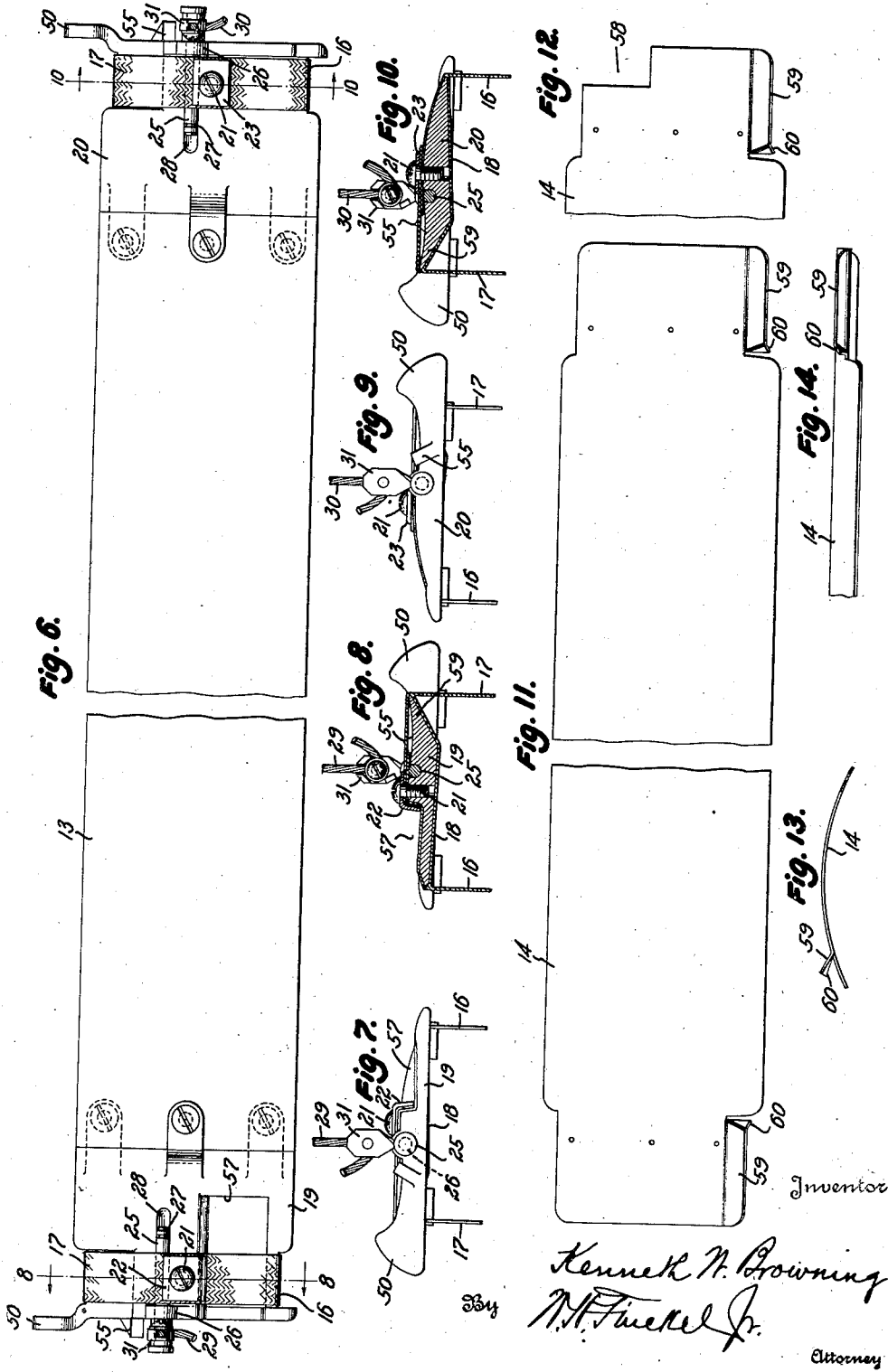
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WINDOW AND BLIND CONSTRUCTION

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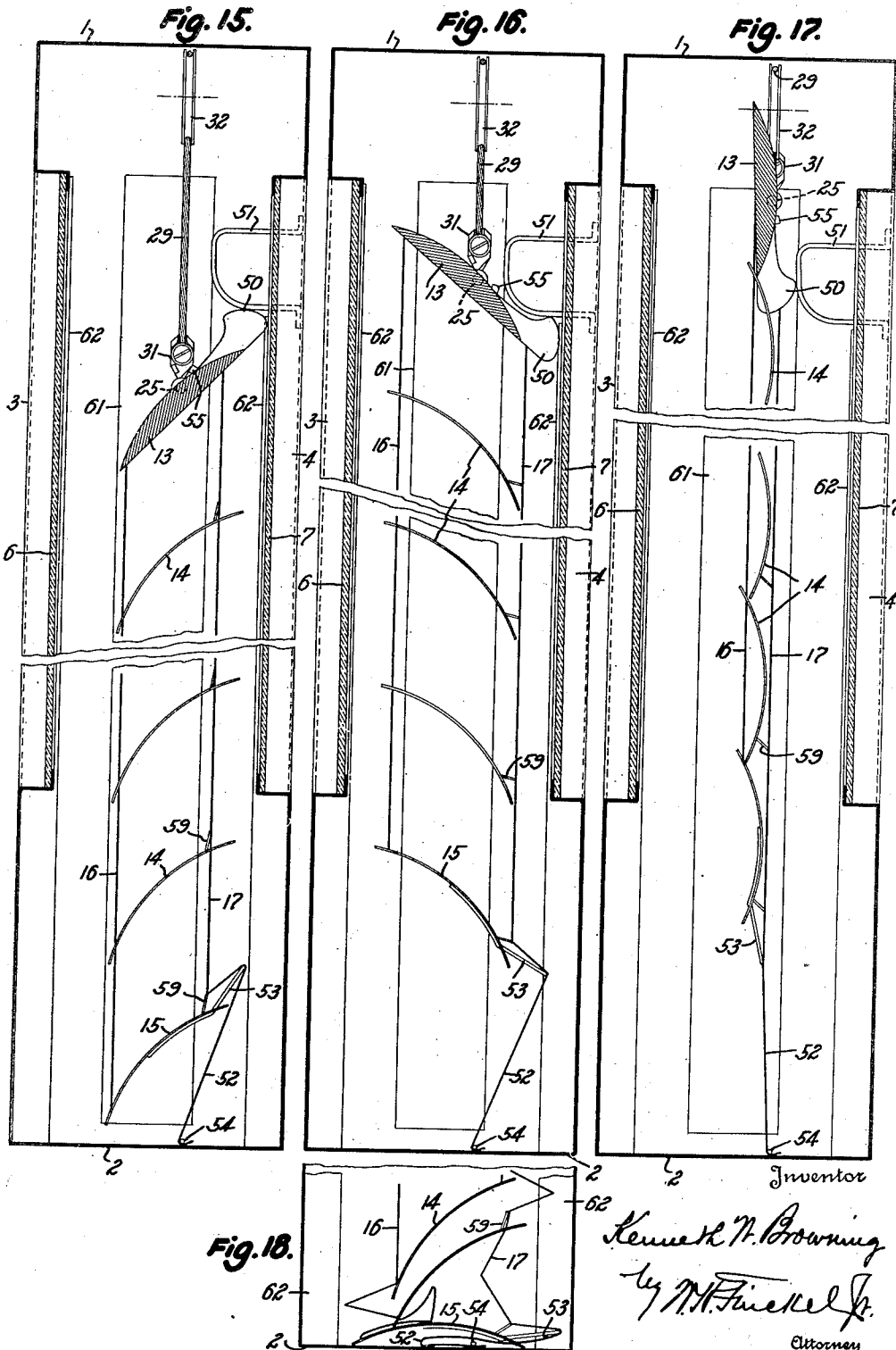
K. W. BROWNING

2,434,786

WINDOW AND BLIND CONSTRUCTION

Filed Dec. 4, 1944

6 Sheets-Sheet 5



Jan. 20, 1948.

K. W. BROWNING
WINDOW AND BLIND CONSTRUCTION

2,434,786

Filed Dec. 4, 1944

6 Sheets-Sheet 6

Fig. 19.

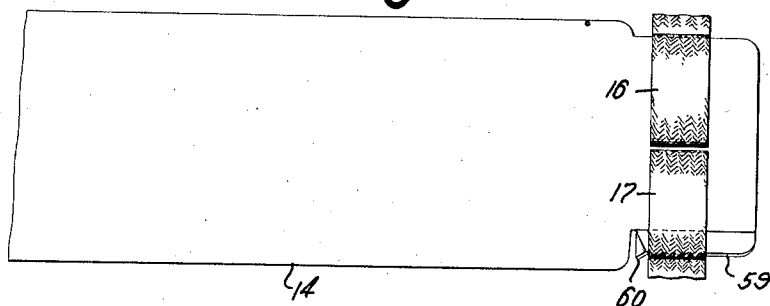
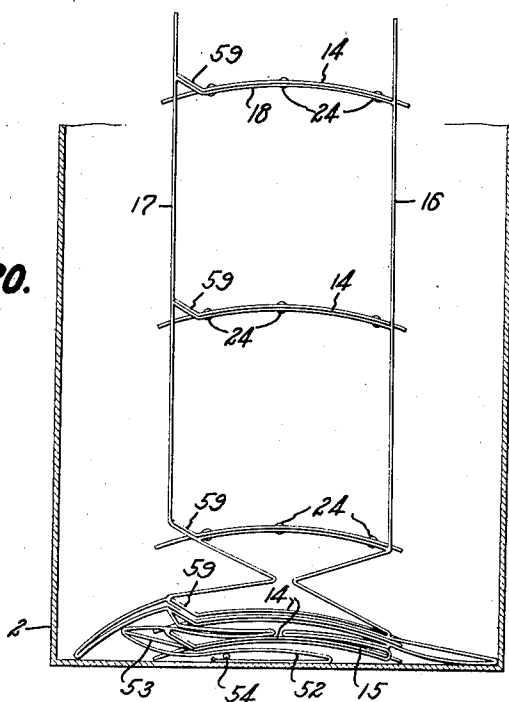


Fig. 20.



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UNITED STATES PATENT OFFICE

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WINDOW AND BLIND CONSTRUCTION

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15 Claims. (Cl. 160—34)

1

This invention relates to a window and blind construction, and it has reference particularly to a blind generally of the Venetian blind type.

One object of the invention is to provide a window and blind construction in which the blind is sealed within a space provided in the window sash or frame between two parallel panes of translucent and preferably transparent material, operating means for raising and lowering the blind and for adjusting the angular position of the louvers or slats thereof extending without the frame or sash for manual actuation.

Another object is to provide a blind generally of the Venetian blind type in which a single control means is provided for raising and lowering the blind and for adjusting the louvers or slats thereof to desired angular position.

A further object is to provide a blind of the Venetian blind type which is of relatively simple and cheap construction but capable of long and efficient service, and one which, when installed within the space of a double-paned window frame or sash, may be easily and cheaply repaired in the event any of its louvers or slats become damaged or carried away by a missile or the like hurled through the window.

A still further object is to provide a blind of the Venetian blind type in which the louvers will nest at the bottom of the window opening instead of at the top thereof, thus especially adapting the blind of the invention to installation in the space of a double-paned window, the bottom rail of which is usually deeper than the top rail and thus more commodious.

The invention comprises a window and blind construction preferably including a frame or sash of double-paned type providing a space within which is mounted a Venetian blind, this blind, regardless of its preferred mounting, having structural and operating characteristics of a form modified from the conventional, all as will be explained more fully hereinafter and finally claimed.

In the accompanying drawings illustrating the invention, in the several figures of which like parts are similarly designated,

Fig. 1 is an inside front elevation of a window and blind construction in accordance with the invention,

Fig. 2 is an edge view thereof,

Fig. 3 is an enlarged fragmentary sectional elevation of the window and blind viewed as in Fig. 1,

Fig. 4 is a section taken on line 4—4 of Fig. 3, looking in the direction of the arrows,

2

Fig. 5 is a section taken on line 5—5 of Fig. 3, looking in the direction of the arrows,

Fig. 6 is a top plan view showing the details of the top louver or slat of the blind,

Fig. 7 is an elevational view of the left end of the louver or slat of Fig. 6,

Fig. 8 is a section taken on line 8—8 of Fig. 6, looking in the direction of the arrows,

Fig. 9 is an elevational view of the right end of the louver or slat of Fig. 6,

Fig. 10 is a section taken on line 10—10 of Fig. 6, looking in the direction of the arrows,

Fig. 11 is a top plan view of one of the intermediate louvers or slats of the blind,

Fig. 12 is a fragmentary top plan view of the right-hand end of the louver next to the top louver of Fig. 6, showing a portion cut away to accommodate the cam-contacting lug of the top louver when the louvers of the blind are angularly adjusted to closed position,

Fig. 13 is an end view of the louver or slat of Fig. 11,

Fig. 14 is a fragmentary edge view of the right-hand end portion of the louver or slat of Fig. 11,

Figs. 15, 16, 17 and 18 are fragmentary schematic views illustrating the operation of the blind.

Fig. 19 is a fragmentary top plan view of one of the slats or louvers 14 similar to Fig. 11 but showing the tapes infolded thereupon as when the blind is collapsed, and

Fig. 20 is a fragmentary end view of the blind partially collapsed and showing the housing of the channel in section.

The device comprises a window sash or frame having a top rail 1, a bottom rail 2 and stiles 3 and 4 respectively, preferably formed from sheet metal appropriately shaped and furnished with rabbets 5 to removably and replaceably receive spaced inner and outer panes 6 and 7 of translucent, and preferably transparent, material, such as glass.

The space 8 thus formed within the frame or sash is preferably hermetically sealed, and may be filled with a dehydrated gas through openings 9 and 10 closed and sealed by screws 11 and 12, respectively, and the provision of the two openings 9 and 10 makes possible replenishment of the gas in the space without exhausting such space by reason of the fact that as clean, dry gas is introduced through one opening, contaminated gas may be emitted through the other.

The blind which, as hereinbefore stated, is of modified Venetian blind type, is mounted within this space which is sealed and preferably gas

3

filled, and the hollow construction of the rails and stiles 1, 2, 3 and 4, respectively, provides ample room to accommodate the operating mechanism associated with the louvers or slats of the blind and conceal it from view.

Moreover, the capacious interior of the bottom rail 2 provides a space for housing and concealing the nested louvers or slats of the blind when in open condition, as will be referred to hereinafter.

The blind proper comprises a top or actuating louver or slat 13, intermediate louvers or slats 14 and a bottom louver or slat 15, and all of the louvers or slats are connected by substantially conventional ladder tapes including the inside and outside longitudinal tapes 16 and 17, respectively, and the cross tapes 18. The longitudinal tapes 16 and 17 are joined, preferably by overlapping, upon the upper surfaces of the left-hand and right-hand terminal members 19 and 20, respectively, of the top or actuating louver 13 and securely fastened thereto by clamping means including the screws 21 and clamping plates 22 and 23, and are thus relatively adjustable to properly align the several suspended louvers or slats. The cross tapes 18 are secured to the intermediate and bottom louvers or slats 14 and 15 by rivets 24 the heads of which will disengage from the tapes without injury thereto in case any of the louvers or slats are broken and carried away. But other fastening means than rivets may be used so long as the same function is served.

Preferably the longitudinal tapes are creased intermediate the several louvers or slats so that when and as the blind is lowered they will fold flat alternately inwardly between the louvers or slats, and outwardly therefrom into the hollow space in the frame, as indicated schematically in Fig. 18.

Attached to the terminal members 19 and 20 by pins 25 which pass through eyes 26 and are provided with latching grooves 27 engaging latch means (not shown) in recesses 28 to prevent their withdrawal, and which are held fixed by the tape clamping means 21, 22, 23 are blind operating cords or cables 29 and 30, respectively, secured in cable clamps 31 pivoted on the outer ends of the pins 25.

The cord or cable 29 passes upwardly over a pulley 32 at the stile 3 and through a guide 33 to a pulley 34 at the opposite stile 4 of the sash or frame. The cord or cable 30 passes upwardly over a pulley 35 at the adjacent stile 4. The cords or cables 29 and 30 are led downwardly from their respective pulleys 34 and 35 over a guide 36 (Fig. 5) and their ends are jointly connected with an actuating cord or cable 37 passed beneath a guide pulley 38 and led therefrom to a winding drum 39 (Figs. 3 and 4) operatively connected by a resident friction clutch 40, or the like, through a shaft 41 packed by a gland 42 with an operating crank 43 arranged exteriorly of the window frame or sash. The crank 43 is provided with a brake drum 44 engaged by a brake band 45 having a fixed end 46 and an adjustable end 47 secured to a lever 48 normally biased by a hairpin or other spring 49 to position to hold the brake band 45 in braking engagement with the drum (see Fig. 3).

By this arrangement the blind may be held at any desired height and with its louvers or slats in any appropriate angular adjustment by a single operating means afforded by the crank 43, as will be explained hereinafter, and the blind may be lowered quickly by downward pressure applied

4

to the outer end of the lever 48 to release the brake 44—45.

Moreover, due to the provision of the friction drive means for the winding drum 39, afforded by the clutch 40, any damage to the blind and its operating mechanism which might be occasioned by excessive winding or unwinding of the actuating cable 37 will be avoided.

Two types of means for accomplishing tilting movement for angular adjustment of the louvers or slats are provided. These means may be employed for conjoint operation, as shown in the drawings, or either may be used separately, as desired.

One of the means just referred to comprises actuating lugs 50 laterally offstanding from the terminal members 19 and 20 adapted to engage cam members 51 fixed upon the window frame or sash.

The other means comprises extensions 52 of the outer longitudinal tapes 17 attached to the outwardly projecting ends of lever arms 53 carried by the bottom louver or slat 15 and anchored to the frame or sash by clips 54 or other appropriate fastening means.

It is to be noted that the pivot pins 25 have their common axis offset from the gravitational center of the top louver or slat 13, and hence when the lugs 50 are not in contact with the cam members 51 and no tension is on the extensions 52 of the tapes 17, or either where these means are separately used, the louvers or slats will assume an angular adjustment of approximately 45°, as shown in Fig. 15, such adjustment being limited by means of the stops 55 of the terminal members abutting against the cord or cable clamps 31.

When the lugs 50 engage the cam members 51 and/or the extensions 52 of the tapes 17 are put under tension during raising of the blind, the louvers or slats will gradually be adjusted from the angular 45° position shown in Fig. 15 to the full open position shown in Figs. 1 to 5, and as raising of the blind continues the cooperation of the lugs 50 with the surfaces of the cam members 51 will adjust the angular position of the louvers or slats from the full open position to some angular position between full open and completely closed, as shown in Figs. 16 and 17.

It will be seen that raising of the blind is limited by abutment of the cord or cable clamps 31 against fixed stop members 56 (Figs. 3, 4 and 5), and that when the blind is in fully closed condition the pulley 32 is received within a recess 57 (Figs. 6, 7 and 8) formed in the terminal member 19. Also, the louver or slat 14 adjacent to the top or actuating louver or slat 13 is cut away at its ends as shown at 58, Fig. 12, to permit it to clear the lugs 50.

All of the louvers or slats 13, 14 and 15 have the tapes set in portions of reduced width adjacent to their ends. Ordinarily, the vertical distance between the louvers of blinds of this general type is less than the width of the individual louvers in order to provide the necessary overlap of the louvers when the blind is closed. This results in folding of the tapes between the louvers and outside of their edges in such a manner that the lateral space between the louvers is not utilized to the fullest extent to accommodate the in-folded tapes, and the outfolded tapes extend unduly laterally of the louvers. By providing the louvers with the portions of reduced width for attachment of the tapes, which narrows the louvers at these portions to a width substantially

5

equal to the normal vertical separation of the louvers, substantially the full lateral width of the louvers may be utilized to accommodate the in-folded tapes, and the outfolded tapes will not extend outwardly as far as is now customary, thus making for a more compact arrangement of the blind when collapsed, and better accommodating it for reception within the confines of the window frame. This will be better understood by reference to Figs. 19 and 20.

All of the louvers or slats are provided also with angularly offset lip members 59, and these lip members on the louvers or slats 14 and 15 have stops 60, whereby the tapes 16 and 17 are not only caused to extend out of contact with the louvers or slats when in closed position, as shown in Fig. 17, but are prevented from being pinched between the louvers or slats when in collapsed or lowered nested condition. Moreover, the lip members 59 provide for more accurate control of the angular adjustment of the louvers or slats than would be possible were they omitted.

Also, it will be noted that, due to the provision of the lip members 59, when the louvers are in fully closed condition (Fig. 17), the then lower edge of each louver is in contact with the surface of the next lower adjacent louver, thus eliminating the gaps between adjacent louvers ordinarily occurring in conventional Venetian blinds and providing for more adequate exclusion of light.

Regardless of whether the means 50-51 or 52-53 are employed separately, or are combined as illustrated in the drawings, it will be apparent that, in combination with the actuating mechanism including the cords or cables 29, 30 and 37, and the pulleys and winding drums 32, 34, 35, 38 and 39, they make possible full operation of the blind, not only in raising and lowering, but in angular adjustment of its louvers or slats, by means of a single actuating member, the crank 43, thus materially simplifying the construction, installation and operation of the blind.

In order to prevent rattling of the blind, and to guard against wear or defacement of the louvers during operation and use, end guides 61 and edge guides 62, made of any suitable resilient, durable material, are provided upon the sash or frame, as shown.

The louvers or slats may be made of any appropriate material, and their surfaces may be treated to enhance their light and heat reflective characteristics, or otherwise, as desired.

When the blind is open, that is to say when it is lowered, all of the louvers or slats except the upper surface of the top or actuating louver 13 are nested in and concealed by the bottom rail 2 of the frame or sash.

It will be appreciated, also, that the entire window is of simple and practical design, and that it occupies less space and is more efficient than the combination of a conventional Venetian blind and a double glazed window.

Various changes and modifications are considered to be within the principle of the invention and the scope of the following claims.

What I claim is:

1. In a window blind of the Venetian blind type, a plurality of substantially similar louvers, means for raising and lowering said blind, means for angularly adjusting said louvers, and an operating member, both of said means being responsive to actuation of said operating member.

2. In a window blind of the Venetian blind type, a plurality of substantially similar louvers,

6

and means for raising and lowering the blind and for angularly adjusting the louvers thereof, including separate cable means connected with the uppermost of said louvers adjacent to its opposite ends and serving through appropriate ladder tapes to suspend said blind with its louvers in spaced relation and in similar angular adjustment, means associated with one of the louvers and operable adjacent to one limit of movement of said blind to progressively alter the angular adjustment of the louvers, and means for imparting similar longitudinal movement simultaneously to said separate cable means.

3. In a window blind as claimed in claim 2, a winding drum included in the means for imparting similar longitudinal movement simultaneously to said cable means, an operating shaft for said drum, and a friction clutch between said drum and shaft, said clutch serving to prevent rotation of said drum by said shaft in excess of that requisite to fully raise and angularly adjust said blind, whereby injury of said blind by over-actuation of said shaft will be prevented.

4. In a window blind of the Venetian blind type, a plurality of substantially similar louvers, means for raising and lowering said blind, and means carried by one of said louvers, fixed means overlappable by and engaging with said carried means whereby, upon movement of the blind during raising and lowering, the louvers thereof will be angularly adjusted.

5. A window blind as claimed in claim 4, in which the means carried by said louver include an offstanding lug and the fixed means is a cam member with which said lug engages and over the surface of which it may be moved as the blind is raised and lowered.

6. A window blind as claimed in claim 4, in which the means for angularly adjusting the louvers includes means fixed to one of said louvers and to the window frame, said means adapted as said blind is raised and lowered to be alternately tautened and slacked to exert a varied pull upon said louver.

7. A window blind as claimed in claim 4, in which the means for angularly adjusting the louvers includes lever means fixed to one of said louvers and flexible link means fixed to said lever and to the window frame, said link means adapted as said blind is raised and lowered to be alternately tautened and slacked to exert a varied pull upon said louver.

8. A window blind as claimed in claim 4, in which the means for angularly adjusting the louvers includes lever means fixed to and laterally offstanding from one of said louvers and flexible link means fixed to said lever and to the window frame, said link means adapted as said blind is raised and lowered to be alternately tautened and slacked to exert a varied pull upon said louver.

9. In a window blind of the Venetian blind type, a plurality of substantially similar louvers, ladder tapes for relatively suspending said louvers in predetermined relation, and means laterally offstanding from the edges of said louvers and engaging said tapes for holding the tapes in predetermined relation to said louvers.

10. In a window blind of the Venetian blind type, a plurality of substantially similar louvers including an actuating louver arranged at the top of said blind, operating means connected with said actuating louver and functioning to raise and lower the same and to angularly adjust it upon its longitudinal axis, and ladder tapes car-

ried by said actuating louver and by which the other louvers are carried and suspended therefrom and angularly adjusted in parallelism therewith.

11. In a combined window and blind of the Venetian blind type, a window frame having a chamber in its bottom rail, a plurality of substantially similar louvers constituting said blind and suspended within said frame for raising and lowering movement, said blind when lowered having its louvers confined within the chamber of said bottom rail.

12. In a combined window and blind construction, a window frame having hollow rails and stiles, a blind arranged within the confines of said frame and including a plurality of substantially similar louvers and operating means for suspending and raising and lowering said blind and for angularly adjusting the louvers thereof, said operating means being confined within said hollow rails and stiles and thereby concealed from view.

13. In a window blind of Venetian blind type, a plurality of louvers interconnected by ladder tapes including longitudinal tapes applied to the louvers adjacent to their ends, the louvers being of less width at those portions where the tapes are connected to them than throughout the major portion of their length, whereby compact folding of the tapes with respect to the width of the louvers is made possible.

14. A window and blind construction, including a window frame providing a space for receiving and confining a blind of Venetian blind type, said

blind including a plurality of louvers interconnected by ladder tapes including longitudinal tapes applied to the louvers adjacent to their ends and located within channels in the stiles of the frame, the louvers being of less width at those portions where the tapes are connected to them than throughout the major portion of their length and furnishing a space between the slats and channels, thereby providing for compact folding of the tapes with respect to the louvers and accommodating the ends of the louvers and their folded tapes to the channels of said stiles.

15. A window and blind construction, including a window frame providing a space for receiving and confining a blind of Venetian blind type, said blind including a plurality of louvers and means for suspending same in adjustable arrangement, the window frame being provided with means for guiding and cushioning the end portions of said louvers to prevent rattling and wear thereof while at rest and during their adjustment relatively to said frame.

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