

Oct. 25, 1949.

K. W. BROWNING

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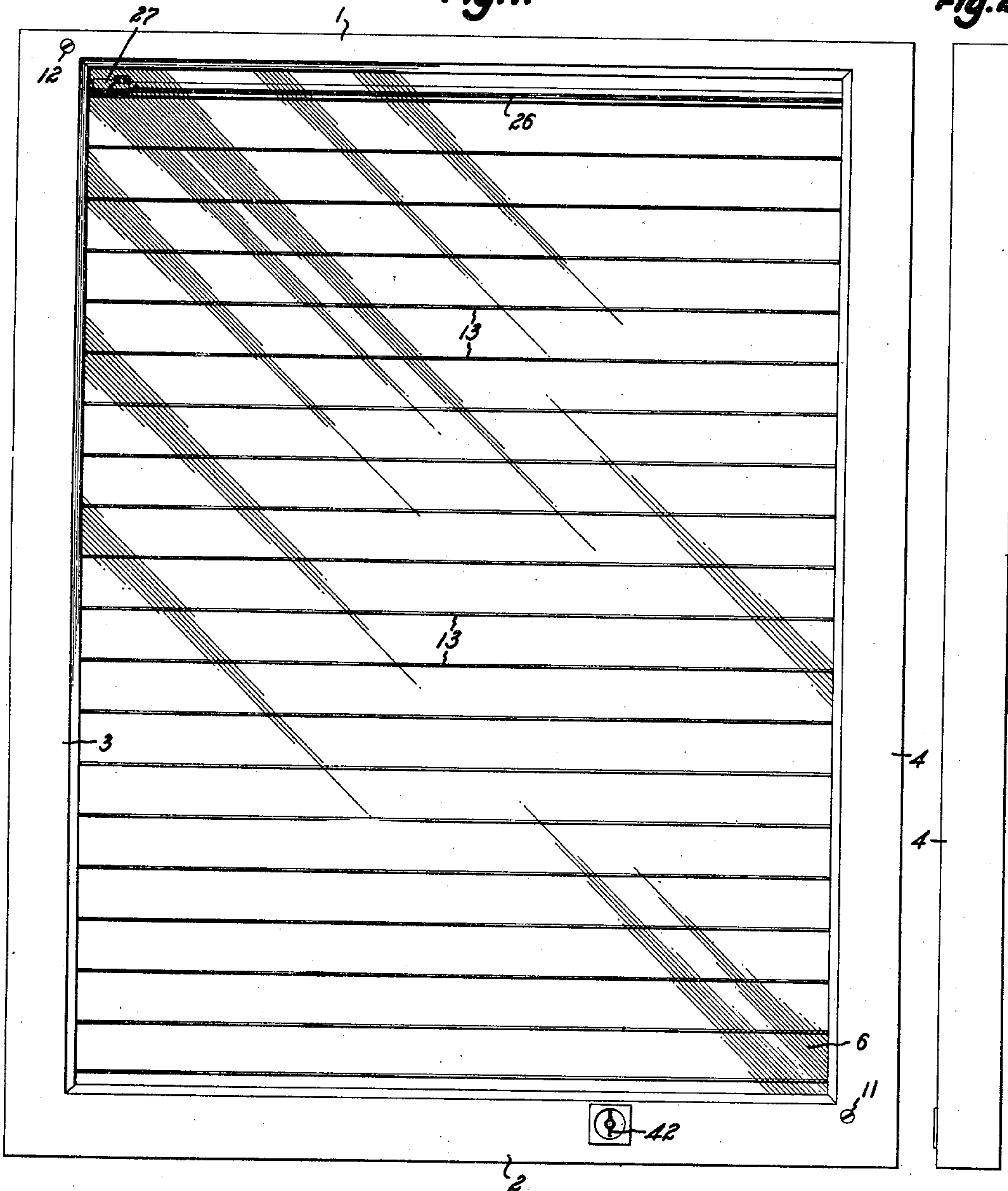
WINDOW AND BLIND CONSTRUCTION

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4 Sheets-Sheet 1

Fig. 1.

Fig. 2.



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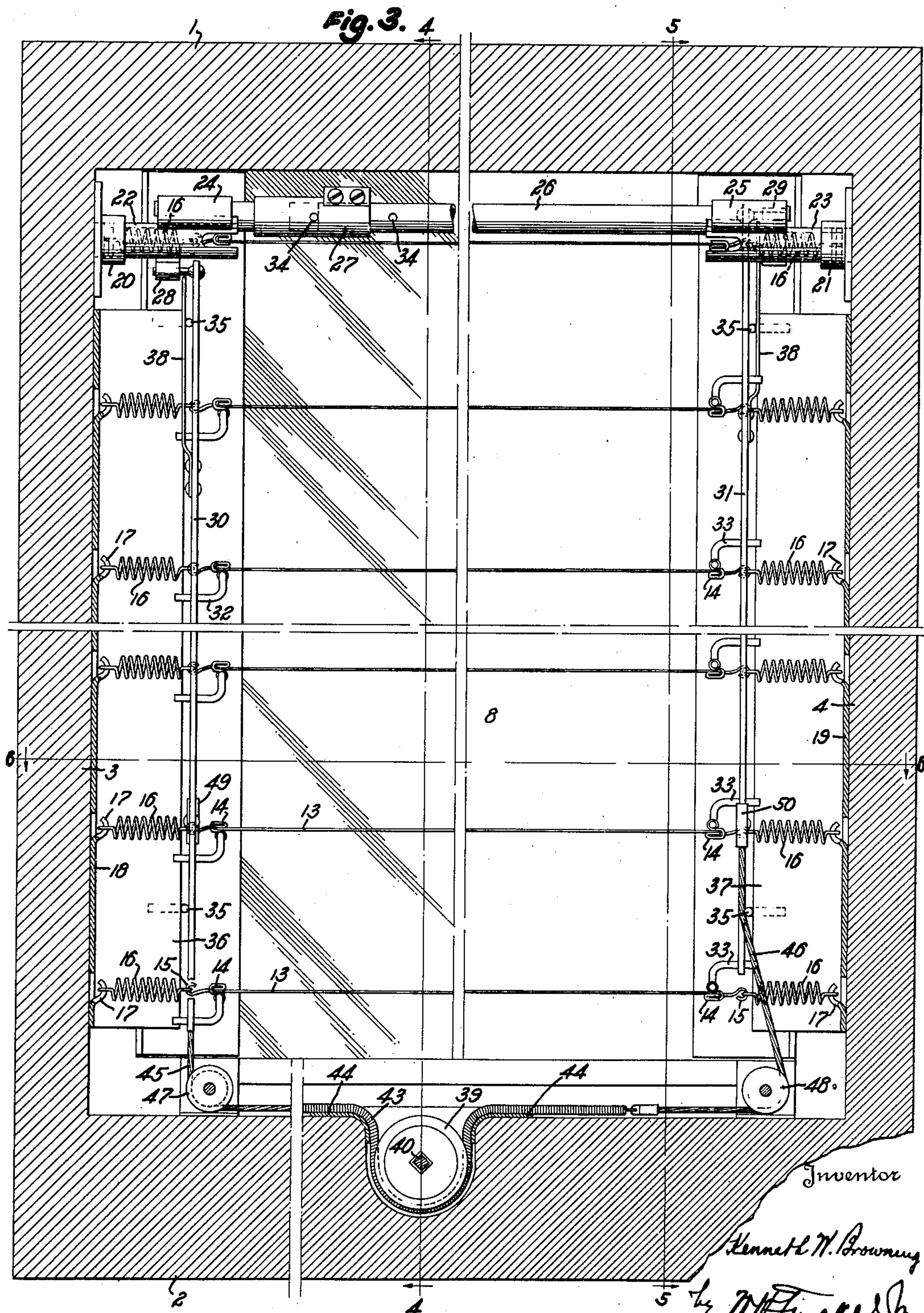
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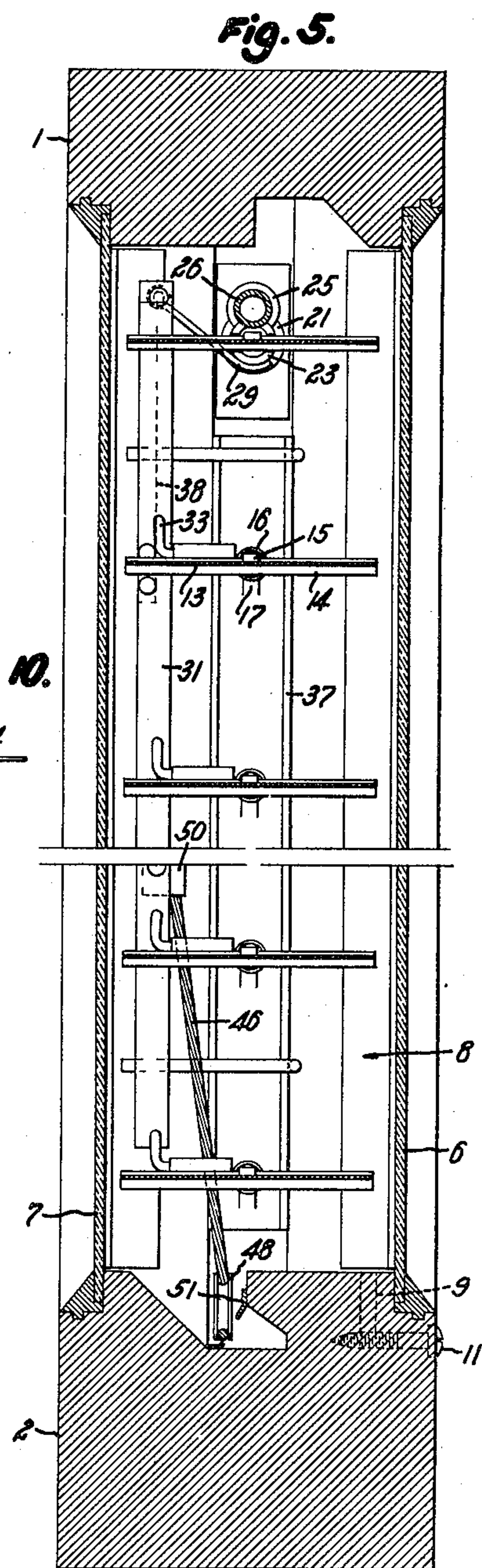
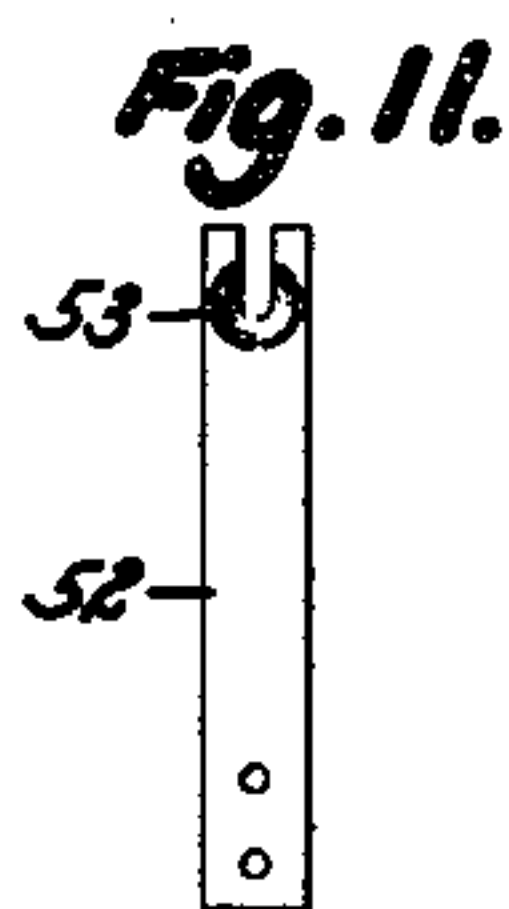
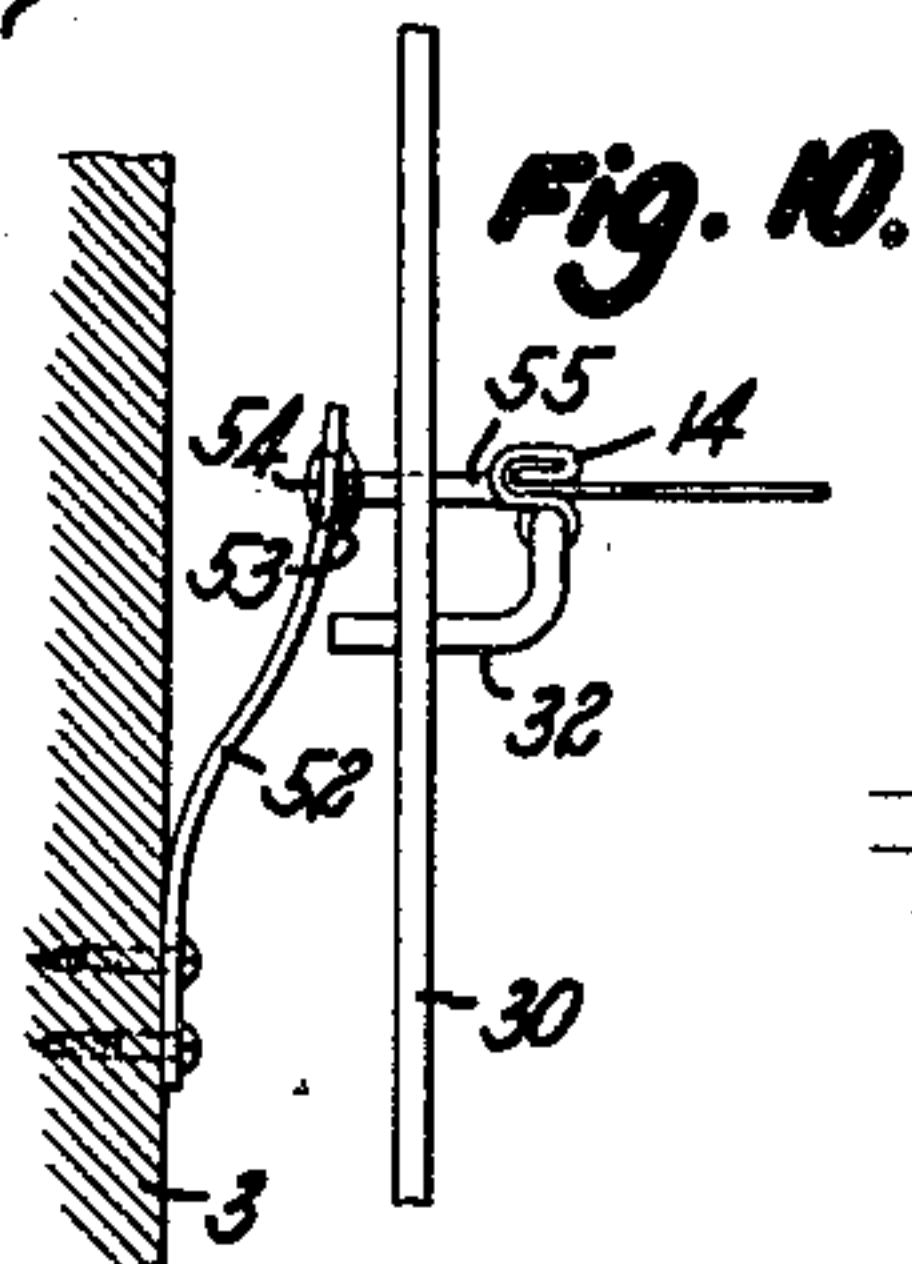
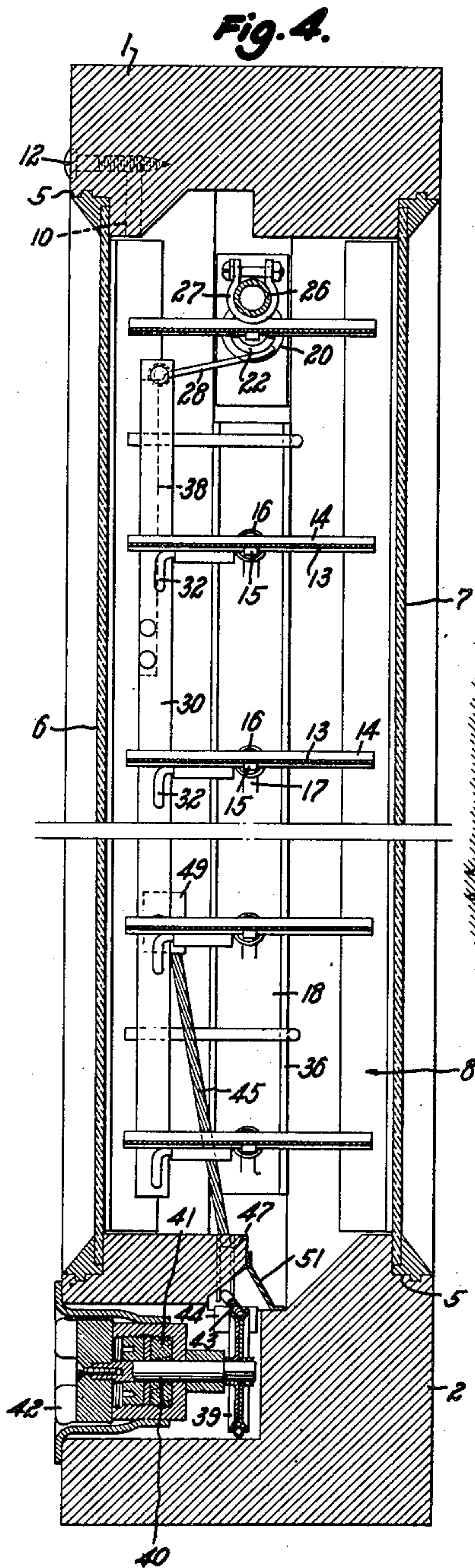
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WINDOW AND BLIND CONSTRUCTION-

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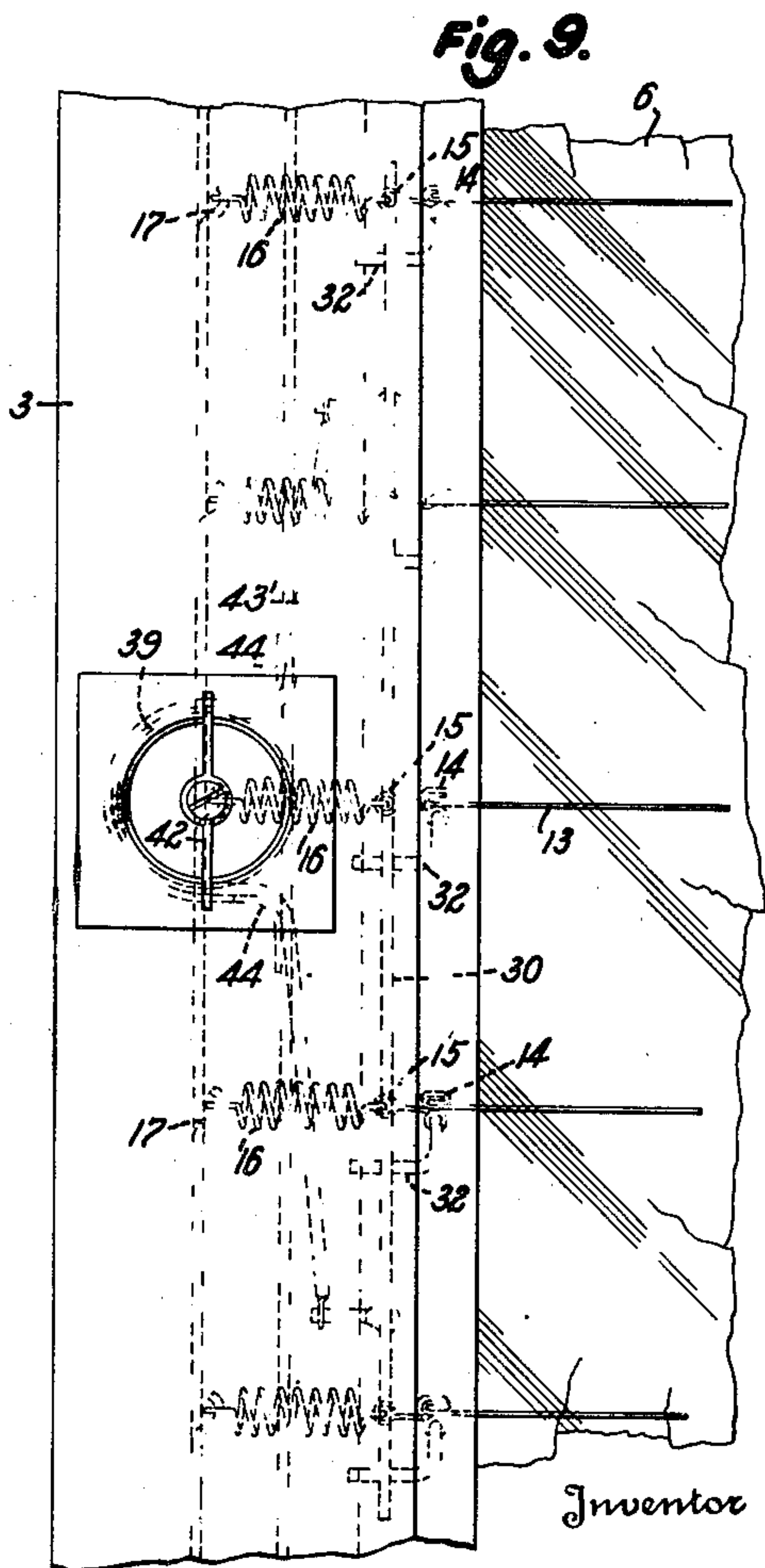
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WINDOW AND BLIND CONSTRUCTION

4 Sheets-Sheet 4



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UNITED STATES PATENT OFFICE

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WINDOW AND BLIND CONSTRUCTION

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11 Claims. (Cl. 160—188)

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This invention relates to window and blind construction, and has reference particularly to window blinds generally of the louver or Venetian blind type, although somewhat modified, particularly as respects the latter.

One object of the invention is to provide a construction in which the blind is provided in combination with a double-paned window and is located between the two parallel panes and sealed within the space thus provided, operating means for adjusting the louvers of the blind being arranged for manipulation exteriorly of the window sash or frame in which the panes and blind are mounted.

Another object is to provide, with the sash or frame and panes, an hermetically sealed space within which the blind is mounted and in which may be confined a dehydrated gas, means being provided for introducing and exhausting such gas when required.

A further object is to provide a blind of the louver or slat type, the louvers or slats of which are maintained under resilient tension, thus making possible their formation from thin, flexible material such as sheet metal, sheet plastic, paper, cloth and the like.

A still further object is to provide a blind of louver or slat type in which the louvers are so mounted and controlled that breaking of any of them will not interfere with operation of the others, and in which broken louvers may be removed and replaced with relative ease and without disturbing unbroken ones.

In addition to the known advantages of double-paned windows, and of double-paned windows provided with enclosed blinds adjustable as desired within the space between the window panes by means manipulated from without such space, such as reduction in heat-conduction and transmission of sound, reduction in condensation of moisture, formation of frost and accumulation of dirt on the inner pane, and relatively permanent cleanliness of the blind, the present invention provides a blind of the louver type in which, due to the resilient tensioning of the individual louvers, flexible materials not heretofore suitable may be employed for their construction, and the tensioning means may also serve as pivots of rotation for angular adjustment of the louvers. Moreover, the use of flexible sheet materials such as those hereinbefore referred to, in combination with other features of the invention, makes possible the provision of a blind of a highly efficient and satisfactory nature at low cost of production, installation and maintenance.

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The invention comprises a window and blind construction, including a blind of louver type confined within a space enclosed by the window frame or sash and two panes of translucent, and preferably transparent, material mounted in relative spaced relation; the louvers of the blind being pivotally mounted under tension and being angularly adjustable upon their pivots by common operating mechanism controllable from without the window frame; the pivotal mounting means preferably including resilient members which function as the tensioning means for the louvers. And the invention comprises also various structural and functional details and refinements, 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 in accordance with the invention.

Fig. 2 is an edge view thereof.

Fig. 3 is an enlarged fragmentary sectional elevation showing the structural and operative members of the invention as viewed in Fig. 1.

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

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

Fig. 6 is a sectional plan taken on line 6—6 of Fig. 3 looking in the direction of the arrows.

Figs. 7 and 8 are fragmentary schematic transverse sectional views illustrating the operation of the blind.

Fig. 9 is a fragmentary detail, viewed as in Fig. 1, showing a modification of the arrangement of the operating means.

Fig. 10 is a fragmentary sectional elevation, as viewed in Fig. 3, showing a modified form of resilient pivoting and tensioning means for the blind louvers, and

Fig. 11 is a back view of the resilient pivot member of Fig. 10.

In the embodiment of the invention illustrated in the drawings, the window frame or sash comprises a top rail 1, a bottom rail 2, left stile 3 and right stile 4 suitably rabbeted as at 5 to removably receive the spaced inner and outer panes of glass or other translucent or transparent material 6 and 7, respectively. The space 8 within the frame or sash thus enclosed may be filled with a dehydrated gas by way of channels 9 and 10 adjacent to the bottom and top of the space, re-

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spectively, and normally closed and sealed by screws 11 and 12, respectively.

Within the hermetically sealed and gas-filled space thus provided is arranged the blind comprising a plurality of similar louvers 13 preferably made of flexible sheet material having no appreciable longitudinal rigidity, such as sheet metal, sheet plastic, paper, cloth or the like, and which may have their surfaces so finished as to reflect light and radiant heat to a high degree.

These louvers have their ends appropriately reinforced and transversely supported by rigid terminal members or bindings 14, preferably made of metal and furnished with offstanding hook means or the like 15 which are engaged with the adjacent ends of spiral springs 16 the opposite ends of which are anchored to hook means 17 preferably punched from the webs of channel members 18 and 19 secured, respectively, to the stiles 3 and 4. The support thus provided for the louvers is designed not only to permit their angular adjustment by employing the springs as the sole axial pivots for at least one of their ends, but keeps them under tension, as hereinbefore indicated, and thus seemingly longitudinally rigid, by reason of the fact that the springs are placed under axial tension, and preferably also under torsional stress, when the louvers are installed. Also, due to the tensioning of the louvers, long louvers may be installed without additional supporting means, there being no tendency for them to sag even when made of non-rigid materials such as those referred to. Obviously, if desired, the pivot means at only one end of the louvers may be in a form adapted for tensioning them.

On the stiles 3 and 4 adjacent to the top of the window are mounted bearing members 20 and 21 in which are journaled sleeves 22 and 23, respectively, and these sleeves carry eccentrically arranged socket members 24 and 25, respectively, in which are supported an adjusting and motion-transmitting shaft 26 one end of which is rigid with its supporting socket member and the other end of which is angularly adjustable by means of a clamping collar 27.

The sleeves 22 and 23 enclose and anchor the springs 16 of the top louver 13 and have jaw engagement with the terminals of this louver to accomplish its angular adjustment. Also, they are furnished with offstanding arms 28 and 29 pivotally connected with reciprocable links 30 and 31 to which the louvers 13 are operatively connected by means of axially offset crank arms or pintles 32 and 33 carried by the louver terminals. With this arrangement it will be apparent that the relative angular adjustment of the sleeves 22 and 23 afforded by the clamping collar 27 provides a means whereby the opposite ends of the several louvers, even though independently pivoted upon the springs 16, may simultaneously be brought into alignment. To aid in relative angular adjustment of the sleeves 22 and 23, the shaft 26 and clamping collar 27 are provided with openings 34 into which leverage rods (not shown) may be inserted, so that as one part is held stationary the other may be angularly adjusted with respect to it, and the collar 27 thereafter tightened up to maintain such adjustment.

It will be noted that the pintles 32 and 33 are, respectively, above and below the louvers and that the springs 16 are all wound in the same sense, thus the angular or torsional stresses exerted upon the opposite ends of the louvers are reversed and any tendency of the springs to affect the angular adjustment of the louvers is re-

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moved. Moreover, the torsional stress imposed upon the springs 16 when they are installed overcomes any tendency for the pintles 32 and 33 to rattle in the openings in the links 30 and 31 with which their ends are engaged. And it will be noted further that, due to the axially offset arrangement of the pintles 32 and 33, tight closure of the louvers is afforded and their operating mechanism is prevented from reaching dead center when the blind is closed, thus preventing binding.

The links 30 and 31 are maintained in proper position by guides 35 mounted upon the flanges 36 and 37 of channels 18 and 19, respectively, and embraced between the links and spring arms 38 carried by them.

As shown in Figs. 1-6 and 9, respectively, the exteriorly projecting operating means for adjusting the angular position of the louvers may be arranged either in the bottom rail 2 or in one of the stiles 3, 4.

Where the operating means are in the bottom rail the V-pulley 39, which has its shaft 40 sealed by a packing 41 and extends to a flush thumb button 42, is provided with a spring belt 43 running over friction plates or guides 44, and to the ends of this belt are attached cables or cords 45 and 46 running under pulleys 47 and 48 and connected by clamps 49 and 50 to the links 30 and 31, respectively. Thus upon rotation of the pulley in a clockwise direction the louvers will be rotated upon their spring pivots 16 from open to closed position, as shown in Fig. 7, or any intermediate angular position, and upon rotation of the pulley in a counter-clockwise direction the louvers will be moved from closed position to the angular position shown in Fig. 8, or any intermediate angular position.

Where the operating means are in one of the stiles, as shown in Fig. 9, the cables or cords 45, 46 and pulleys 47, 48 may be dispensed with and the ends of the spring belt 43' directly connected to one of the links 30 or 31, as shown. With this arrangement, if the pulley 39 is rotated motion will be imparted from the link to which the ends of the belt are connected to the other link by way of the shaft 26.

In either arrangement, if the pulley 39 is rotated past the limits of angular adjustment of the louvers, no damage to the louvers or to their operating mechanism can result, for the reason that the pulley will merely slip upon the spring belt.

Any tendency for the angular adjustment of the louvers to be disturbed by vibration is counteracted by the grip of the friction guide plates 44 upon the spring belt.

The spring belt and cables or cords, where they pass along the bottom rail, are protected from damage by broken glass, dirt, etc., by a guard 51 (Figs. 3 and 4).

Instead of using springs of conventional types, such as those shown at 16, for pivoting and tensioning the louvers, other types which will serve the purpose of the invention may be substituted for them.

In the modification shown in Figs. 10 and 11 one such alternative is illustrated. There a flat, or leaf, spring 52, is fastened to the window stile, and its upper, free end is slotted and provided with a ball socket 53 (Fig. 11) for engagement with the complementary head 54 of a pivot extension 55 of the terminal member 14 of the louver.

It will be apparent that the blind is of simple, relatively cheap and durable construction and

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that it is capable of long and continuous service without failure or breakage. Moreover, should any of the louvers be damaged or carried away by a missile thrown through the window, the operation of the other louvers will not be impaired, and the broken louvers may be replaced cheaply and expeditiously. Also, as all operating mechanism may be concealed behind the rails and stiles of the frame or sash, excepting possibly the parts 26 and 27, the window provided with the blind of the invention is attractive in appearance.

Furthermore, the window and blind are susceptible of embodiment in various types and sizes of sashes without appreciable modification and with the use of the same supporting and controlling elements, such as fixed sashes, double-hung sashes, casements, etc.

By providing two channels 9 and 10 for introduction of gas into the space 8, it is possible to exhaust contaminated gas from one while introducing fresh gas through the other.

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 blind of louver type, a louver member capable of angular adjustment upon its longitudinal axis, and pivot means connected with the ends of the louver member, at least one of said pivot means being a spiral spring having one of its ends connected to the end of the louver member and its other end connected to a fixed part, said spring constituting the sole pivot means for its respective end of the louver member and being capable of exerting tension on said louver member longitudinally thereof.

2. In a blind of louver type, a louver member formed of flexible material capable of angular adjustment upon its longitudinal axis, and pivot means connected with the ends of the louver member, at least one of said pivot means being a spiral spring having one of its ends connected to the end of the louver member and its other end connected to a fixed part, said spring constituting the sole pivot means for its respective end of the louver member and being capable of exerting tension on said louver member longitudinally thereof.

3. In a blind of louver type, a plurality of louver members capable of angular adjustment upon their longitudinal axes, pivot means connected with the ends of said louver members for supporting them in relative spaced relation, at least one of the pivot means of each louver member being a spiral spring having one of its ends connected to the end of the louver member and its other end connected to a fixed part, said spring constituting the sole pivot means for its respective end of the louver member and being capable of exerting tension longitudinally of its respective louver member, and means for imparting similar angular adjustment to all of said louver members simultaneously.

4. In a blind of the louver type, a louver member formed of flexible material, means for pivotally supporting said louver member at its ends for angular adjustment, and means for angularly adjusting the opposite ends of said louver member separately whereby the said ends may be properly aligned.

5. In a blind of the louver type, a louver member formed of flexible material, means for pivotally supporting said louver member at its ends for angular adjustment, and means including a

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partible shaft the parts of which are capable of relative angular adjustment and of being fixed in such adjustment, and connections between said parts and the opposite ends of said louver member for angularly adjusting the opposite ends of said louver member separately whereby the said ends may be properly aligned.

6. In a blind of louver type, a louver member capable of angular adjustment, pivot means connected with the ends of said louver member including spiral springs the opposite ends of which are connected respectively with the ends of the louver member and with fixed parts, and means for angularly adjusting said louver member, said springs adapted to exert axial and torsional stresses upon the ends of said louver member to hold it taut, the opposite ends of said louver member being at opposite angles connected with said adjusting means so that the torsional stress of one of said springs is counteracted by the other, whereby tendency of the springs to disturb the angular adjustment of the louver member is eliminated.

7. In a blind of louver type, a louver member capable of angular adjustment, pivot means connected with the ends of said louver member including spiral springs the opposite ends of which are connected respectively with the ends of the louver member and with fixed parts, and means for angularly adjusting said louver member, said springs adapted to exert axial and torsional stresses upon the ends of said louver member to hold it taut, the opposite ends of said louver member being connected at opposite angles with said adjusting means and at opposite sides of the central longitudinal axis of the louver member, whereby the torsional stress of one of said springs is counteracted by the other and the tendency of the springs to disturb the angular adjustment of the louver member is eliminated.

8. In a blind of louver type, a plurality of flexible louver members capable of angular adjustment, laterally rigid terminals applied to the ends of said louver members, pivot means for each of said louver members connected at the ends thereof with said terminals, said pivot means including resilient members for longitudinally tensioning and exerting torsional stress upon said louver members, and operating means for angularly adjusting all of said louver members simultaneously, including reciprocable links flanking the ends of said louver members, and crank means carried by the ends of the louver members and engaged with said links, the torsional stress exerted upon said louver members serving to prevent rattling between said links and crank means, and means for imparting reciprocation to said links.

9. In a blind of louver type, a plurality of flexible louver members capable of angular adjustment, laterally rigid terminals applied to the opposite ends of said louver members, pivot means for each of said louver members connected at the opposite ends thereof with said terminals, said pivot means including resilient members for longitudinally tensioning said louver members, and operating means for angularly adjusting all of said louver members simultaneously, including reciprocable links flanking the ends of said louver members, and crank means carried at the ends of the louver members and engaged with said links, and means for imparting reciprocation to said links, including belt means connected with at least one of said links and pulley means frictionally engaging said belt means and manually

operable to impart louver adjusting motion thereto.

10. In a blind of louver type, a plurality of louver members pivoted upon their longitudinal axes for angular adjustment, and operating means for angularly adjusting said louver members including a link mounted adjacent to each end of said louver members, said links being arranged respectively at opposite sides of the longitudinal axes of said louver members and being simultaneously reciprocable in opposite directions, means connecting the ends of said louver members with said links, respectively, and mechanism including a single belt and pulley means for actuating said links, said pulley frictionally engaging said belt and manually rotatable to impart oppositely directed reciprocation to said links.

11. In a blind of louver type, a plurality of louver members pivoted for angular adjustment with respect to their longitudinal axes, links connected with said louver members and operable to

impart angular adjustment thereto, and means connected with said links and adjustable with respect thereto to obtain proper alignment of the two ends of each of said louver members and similar angular adjustment of all of said louver members.

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