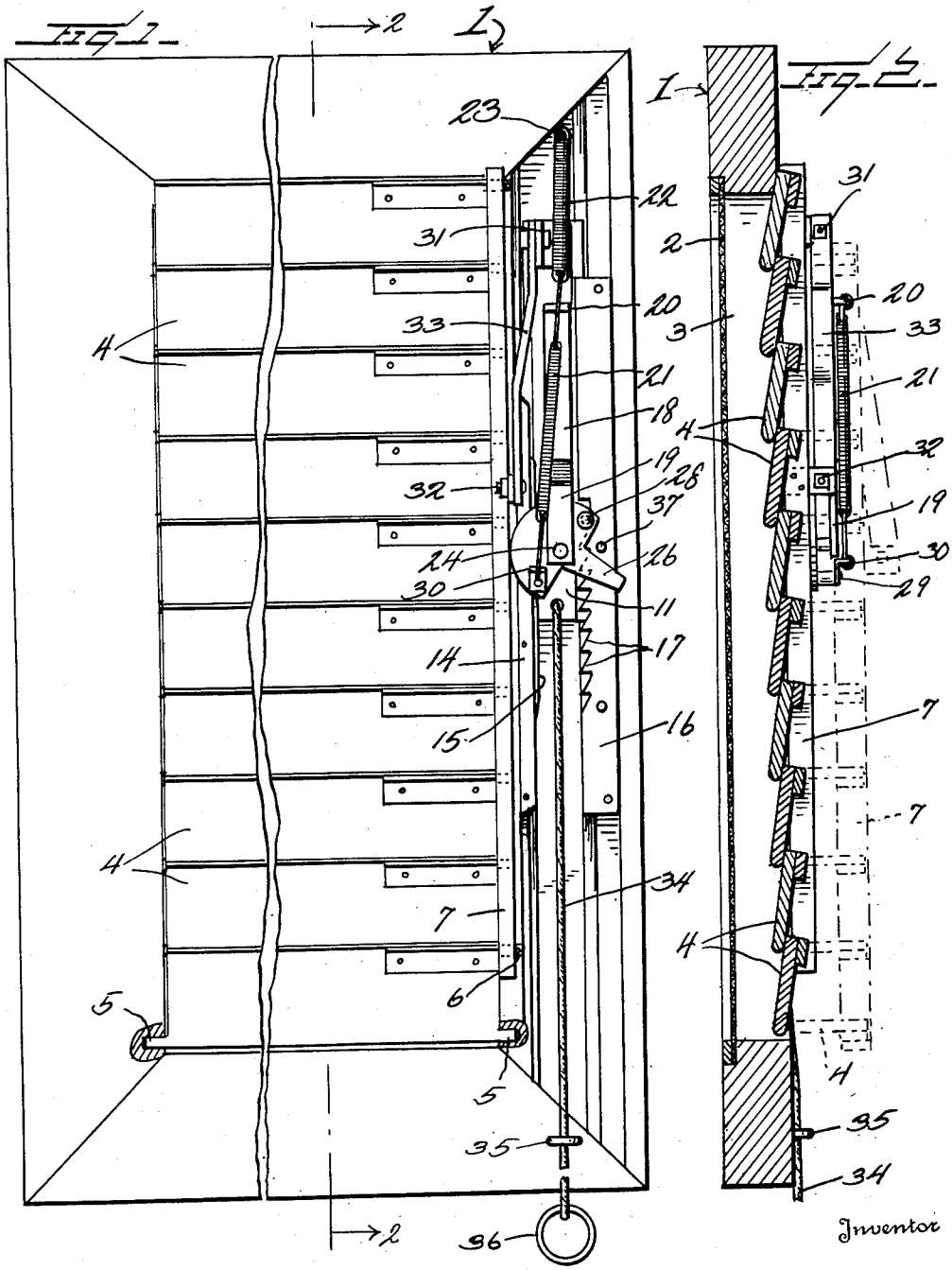
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CLOSURE ACTUATOR

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Fig. 3

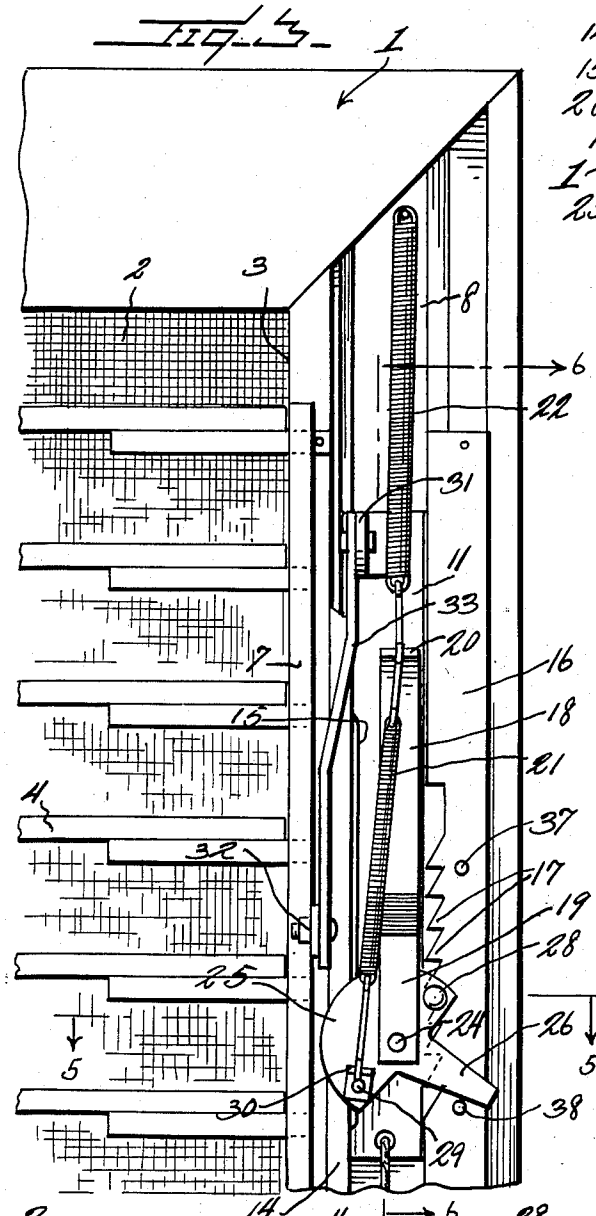



Fig. 4

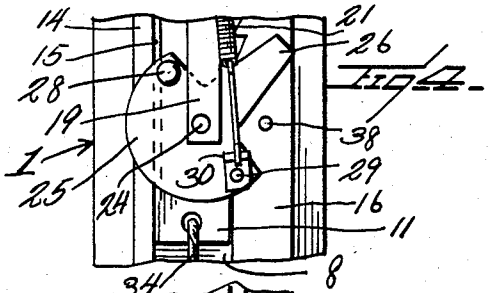



Fig. 6

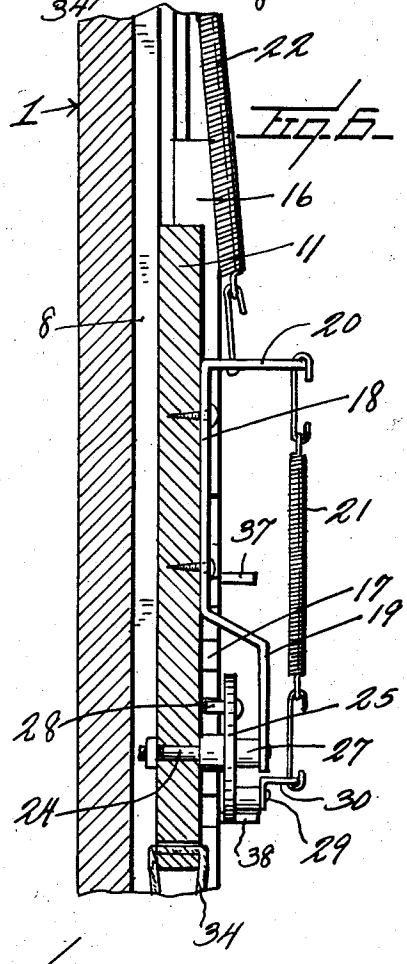
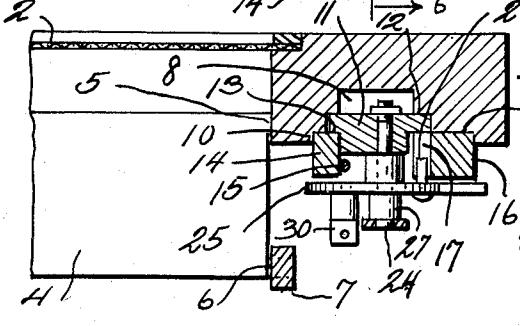



Fig. 5




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2,337,230

## CLOSURE ACTUATOR

Carl Christianson, Underwood, Minn.

Application September 29, 1942, Serial No. 460,158

6 Claims. (Cl. 268—96)

This invention relates generally to the class of closures operators and pertains particularly to an improved operating or control means for actuating pivoted slats of a louver structure.

A principal object of the present invention is to provide in connection with a structure such as a louver in which the slats are pivoted so as to be shifted from a closed to an opened position and vice versa, a novel mechanism whereby such slats can be turned, from a remote point, from a fully closed position to any desired degree of oscillation between the closed position and the fully opened position, the mechanism being so constructed and arranged that it may be made to automatically close the slats, when released, after being shifted or actuated to a predetermined extent.

Another object of the invention is to provide a novel operating mechanism for a closure consisting of a plurality of pivotally mounted slats, in which a pawl and rack are employed for holding the slats in a number of adjusted positions or at different degrees of oscillation, and wherein a novel release means is provided whereby the pawl may be disengaged from the rack after the slats have been shifted to fully opened position, to permit return of the pawl to the starting end of the rack and movement of the slats to closed position, means being provided at the said starting end of the rack for automatically reengaging the pawl with the rack.

The invention will be best understood from a consideration of the following detailed description taken in connection with the accompanying drawings, it being understood, however, that the invention is not to be considered as limited by the specific illustration or description but that such illustration and description constitute a preferred embodiment of the invention.

In the drawings:

Figure 1 is a view in elevation of the closure actuating mechanism embodying the present invention, such mechanism being shown in association with a closure comprising a plurality of pivoted slats which are in closed position, the central portion of the frame in which the slats are mounted and the central parts of the slats being broken away.

Figure 2 is a sectional view taken substantially on the line 2—2 of Figure 1.

Figure 3 is a view in elevation of the actuating and control mechanism showing the positions of the parts when the slats are in fully opened position, the trip arm of the pawl carrier being in position for engagement with the lower trip pin by which the pawl is disengaged from the rack preparatory to closing the slats.

Figure 4 is a view illustrating in elevation the position of the pawl carrier and trip arm after the pawl carrier has been oscillated to contact with the lower trip pin to disengage the pawl from the rack.

Figure 5 is a sectional view taken upon the line 5—5 of Figure 3.

Figure 6 is a vertical section taken substantially on the line 6—6 of Figure 3.

Referring now more particularly to the drawings, the numeral 1 generally designates a frame such as might be set in a window opening in a building wall, where the use of a slatted closure unit is desirable for controlling the admission of light and air. The outer side of the frame may have secured thereto, an insect excluding screen 2 to cover the opening 3 of the frame.

The numeral 4 designates a series of slats which are arranged transversely within the frame opening 3. Each of the slats is pivotally supported within the opening by trunnions 5 which extend from the ends of the slats at the bottom edges thereof, the slats being oscillated upwardly to closed position and when in such position being in overlapping relation, as shown in Figure 2. Thus, the slats when only partially opened will slant or slope upwardly and inwardly and will admit light and air but will prevent the entrance of rain.

Each of the slats at one end and at its top edge, carries a laterally projecting coupling arm 6 and these arms are pivoted to and connected together by a link bar 7 which extends vertically in parallel relation with the inner face of the frame at one side and abuts against such face when the slats are in closed position, as shown in Figure 2. As is also shown in this figure, when the slats are oscillated to opened position the link 7 moves inwardly away from the frame but maintains its parallel relation therewith.

At the side of the frame adjacent to the coupling links 7 the inner face of the frame is provided with the elongated channel or recess 8 which is cut out at each side to provide the track shoulders 9. Outwardly of these shoulders the body of the frame is cut away to form the rabbet 10.

Disposed within the channel 8 is an elongated runner bar 11 which rests at its longitudinal edges upon the track shoulders 9, as is most clearly shown in Figure 5. This runner has the rabbets 12 and 13 formed along its two sides upon the inner face or that face remote from

the track shoulders 9 upon which the runner rests.

The rabbets 10 and 13 cooperate to receive a retaining strip 14, and along that side face remote from the slats, is fixed a wear strip 15.

Opposite from the retaining strip 14 the rabbets 10 and 12 formed, respectively, in the frame and the runner 11, coact to receive the rack bar 16, the teeth 17 of which are directed toward the adjacent runner 11. These teeth are arranged, as shown in Figures 1 and 3, so that the upper or top sides of the teeth slope downwardly and away from the body of the bar 16, while the under sides of the teeth extend transversely of the bar. Thus, a pawl finger is enabled to slide over the teeth when moving down the rack but engages beneath the teeth to prevent its return movement except under the conditions hereinafter described.

Fixed to and extending lengthwise of the inner face of the runner bar 11 is a bracket 18 which, at its lower end, has a portion offset, as indicated at 19, and disposed in spaced parallel relation with the runner bar 11, as is shown most clearly in Figure 6. At its other end the bracket 18 has a portion turned to extend outwardly from the runner forming the tail piece 20 which provides an anchor for an end of each of the two springs 21 and 22 which function, respectively, as the pawl plate oscillating spring and the runner actuating and slat closing spring. This latter spring or runner actuating spring 22 is attached at its other end to the body of the frame, as indicated at 23.

Connecting between the free offset end portion 19 of the bracket 18 and the runner, is a pivot post 24 and this post passes through and has oscillatably mounted thereon the rock plate 25 from which extends, substantially radially with respect to the pivot post, a trip arm 26. This rock plate 25 is held between spacer sleeves 27, one of which, as shown in Figure 6, is interposed between the plate and the portion 19 of the bracket while the other one is interposed between the plate and the runner bar 11. By means of these sleeves the rock plate 25 is maintained in a plane passing across the inner face of the rack bar 16, as is also clearly shown in this figure.

Disposed upon a line passing through the pivot post for the rock plate and perpendicular to the trip arm 26 and to one side of the line of such arm, is a trip pin 28 which is secured to the plate and extends therefrom across the toothed edge of the rack bar 16 for engagement with the teeth 17. Also disposed upon such perpendicular line upon the opposite side of the line of the trip arm 26 is a pull pin 29 to which is attached, through the medium of the angle bracket 30, the other end of the pawl plate oscillating spring 21, as shown most clearly in Figure 6.

At the upper end of the runner bar there is secured a hinge bracket 31 while to the coupling link 7 there is secured a hinge bracket 32, at a substantial distance below the bracket 31 and these hinge brackets are operatively coupled together by a thrust link 33. Thus it will be readily apparent that when the runner bar is shifted longitudinally motion will be transmitted therefrom through the thrust link 33 to the coupling link, whereby the oscillation of the slats will be effected.

Such movement may be imparted to the runner bar downwardly against the tension of the runner actuating or control spring 22, in any suitable manner. There has here been shown a pull cord 34 extending downwardly through a suitable guide 35 and having at its lower end a finger ring 36 by means of which downward movement of the runner bar may be effected, but it will be readily apparent that other means for moving the runner bar may be employed and, therefore, it is to be understood that the invention is not to be limited to this specific form of runner bar actuator.

As previously stated, and as is illustrated in Figures 1, 3 and 4, the trip arm 26 extends across the inner face of the rack bar 16. This arm is interposed between upper and lower trip pins 37 and 38, respectively, such pins being disposed adjacent the ends of the row of teeth 17.

The action of the pawl plate oscillating spring 21 retains such plate in a position where the trip arm 26 extends obliquely downwardly across the rack bar and the pawl pin 28 is engaged against the rack bar, except when the runner actuating spring is moving the runner upwardly to close the slats of the closure structure. The pawl pin 28 is, therefore, upon one side of dead center for the stated perpendicular line upon which the pawl and pull pin 29 are located, while the pull pin is upon the opposite side of such center. Consequently, when it is desired to shift the slats from the closed position in which they are shown in Figures 1 and 2 to the open position in which they are shown in Figure 3, or to a position intermediate between these extremes, when the runner bar is pulled downwardly the pull pin will move over the teeth of the rack bar and will engage beneath such teeth to prevent the runner being pulled back by the increasingly tensioned spring 22. When the slats are in fully opened position, as shown in Figure 3, the trip arm of the rock plate or pawl plate will be against or in close proximity to the lower trip pin 38, as shown in Figure 3. If further downward movement is now imparted to the runner bar the trip pin 38 will oppose such movement of the trip arm 26 and will cause the trip arm and rock plate or pawl plate to be oscillated upon the pivot 24, thereby moving the pawl pin 28 and the pull pin 29 onto a dead center where the said perpendicular line upon which these pins are disposed with respect to the length of the trip arm, will be vertical or the pawl pin may be oscillated past such dead center to throw the pull pin upon the opposite side, as shown in Figure 4. The pawl pin will then be in sliding contact with the wear strip 15, as shown in Figure 4, and the trip arm will be directed obliquely upwardly across the rack bar, as is also shown in this figure. Consequently, when the downward pull upon the runner bar is released the runner actuating spring 22 has full control to pull the runner back to its starting position and thus close the slats. At the same time that the runner bar is moved into its starting position the upwardly extending trip arm 26 will engage the upper trip pin 37 and the pawl rock plate will be swung or snapped over to its starting position where the pawl pin is again in contact with the toothed edge of the rack bar.

From the foregoing it will be readily seen that there has been provided in the present invention a novel control mechanism for a closure having pivoted slats, whereby such slats may be readily opened to any desired degree and automatically closed and such actuation of the slats may be effected from a remote point.

I claim:

1. In an actuator mechanism for a closure comprising a plurality of pivoted slats, means coupling the slats for simultaneous oscillation, a runner disposed to move along a path transverse to and substantially in the plane of the slats, adjacent said coupling means, an operative coupling between the runner and said means whereby reciprocal movement of the runner effects oscillatory movement of the slats, a toothed rack disposed adjacent to and extending along the path of movement of the runner in said plane, a shiftable pawl carried by the runner for engaging the teeth of the rack on movement of the runner in one direction to oscillate the slats to open position, resilient means connected with the runner and resisting movement thereof in the said one direction, and mechanism in operative relation with the pawl for effecting release of the pawl from the rack when the runner has been moved a predetermined extent in the said one direction comprising a trip engaged by and shifting the pawl out of engagement with the rack to permit the retraction of the runner and pawl by said resilient means and a second trip engaged by and shifting the pawl into reengagement with the rack teeth after the pawl has been fully retracted by the resilient means.

2. In an actuating mechanism for a closure comprising a plurality of pivoted slats, means coupling the slats together for simultaneous oscillation, a runner disposed adjacent said coupling means for movement along a path perpendicular to the axis of oscillation for the slats, an operative coupling between the runner and said means whereby reciprocal movement of the runner effects oscillatory movement of the slats, spring means yieldingly holding said runner at one end of its path of movement to maintain said slats in closed position, means for effecting movement of the runner in opposition to said spring means for oscillating the slats to opened position, an elongated fixed element disposed at one side of and along the path of movement of the runner, said runner, element and slats lying in a common plane extending the width of the closure mechanism movable with the runner and cooperating with said fixed element for securing the runner against retraction by said spring means at any one of a number of positions along the path of movement of the runner to secure the slats in selected open positions, and means for releasing said mechanism from said fixed element to effect return of the runner to its initial position by said spring means and the closing of the slats.

3. A structure as set forth in claim 2, in which said fixed element comprises a toothed rack, and said mechanism includes a pawl supported upon the runner for movement in said plane toward and away from the rack.

4. In an actuating mechanism for a closure comprising a plurality of pivoted slats, means coupling the slats for simultaneous oscillation, a runner disposed adjacent said coupling means for movement along a path perpendicular to the axis of oscillation of the slats, an operative coupling between the runner and said means whereby reciprocal movement of the runner effects oscillatory movement of the slats, spring means operatively coupled with the runner and constantly urging movement of the runner to that end of its path in which the slats are in closed position, a rock member pivotally mounted upon the runner for movement therewith and for oscillation on an axis perpendicular to the axis of oscillation of the slats, a toothed rack disposed at one side of the path of movement of the runner, a pawl carried by the rock member for engagement with the teeth of the rack, said slats, pawl, runner and rack lying in a common plane extending the width of the closure, spring means normally urging oscillation of the rock member in a direction to engage the pawl with the rack teeth, said pawl running over the rack teeth upon movement of the runner toward the other end of its path and functioning to hold the runner in a number of positions in opposition to the first spring means to maintain the slats in selected open positions, means for turning said rock member to a position to disengage the pawl from the rack at a predetermined position of movement of the runner along said path, the second-mentioned spring functioning after the said turning of the rock member to maintain the pawl out of contact with the rack, and means for returning the pawl into contact with the rack through oscillation of the rock member upon return of the runner to the said one end of its path by the spring means connected therewith.

5. In an actuating mechanism for a closure comprising a plurality of pivoted slats, means coupling the slats for simultaneous oscillation, a runner disposed adjacent said coupling means for movement along a path extending perpendicular to the axis of oscillation of the slats, an operative coupling between the runner and said means whereby reciprocal movement of the runner effects oscillation of the slats, spring means connecting the runner with a fixed element on the closure and constantly urging movement of the runner to one end of its path for the closing of the slats, a toothed rack disposed at one side of said path, a rock member pivotally mounted on the runner for oscillation on an axis extending perpendicular to the rack and to the oscillation axis of said slats, a pawl pin carried by the rock member at one side of said axis for engagement with the rack teeth, said slats, runner, rack and pin lying in a common plane extending the width of the closure, spring means connecting the rock member at the opposite side of the axis with the runner and constantly urging oscillation of the rock member to move the pawl pin into engagement with the rack, and a trip means for oscillating the rock member, said trip means functioning to turn the rock member upon movement of the runner to a predetermined extent toward the other end of said path whereby to swing the point of connection of the second spring means with the rock member across the pivot of the rock member to hold the pawl disengaged from the rack for return of the runner to the said one end of the path and to reversely oscillate the rock member after return of the runner to swing the point of connection of the second spring back across the turning axis of the rock member for reengagement of the pawl pin with the rack teeth.

6. An actuating mechanism as set forth in claim 5, in which said trip means comprises a single arm carried by the rock member and directed obliquely across the rack in the direction of movement of the runner during the opening of the slats, and spaced trip pins between which said arm moves and with which the arm engages at the extreme of its movement with the runner to effect the turning of the rock member.

CARL CHRISTIANSON.