April 23, 1963 H. E. WOODIN ETAL 3,086,766

CLOSURE AND OPERATING MECHANISM THEREFOR

Filed Feb. 27, 1961 2 Sheets-Sheet 1

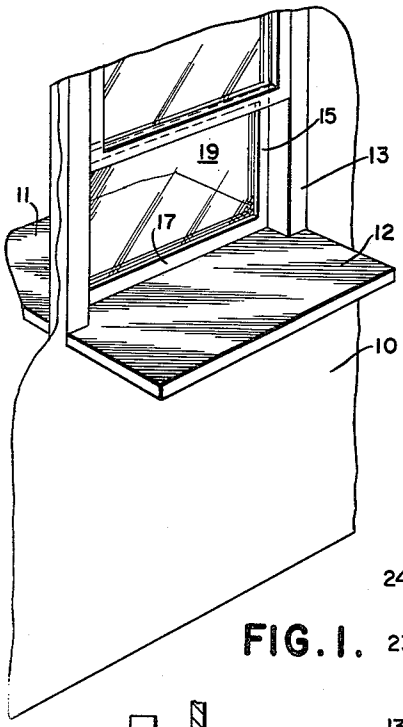


FIG. 1.

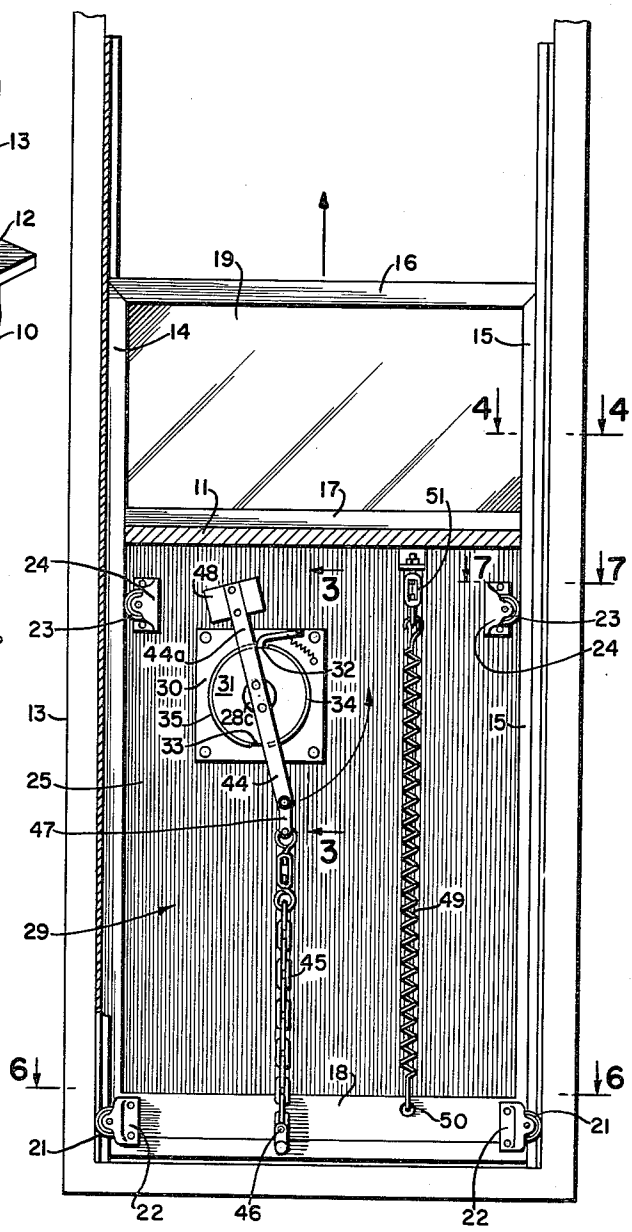


FIG. 2.

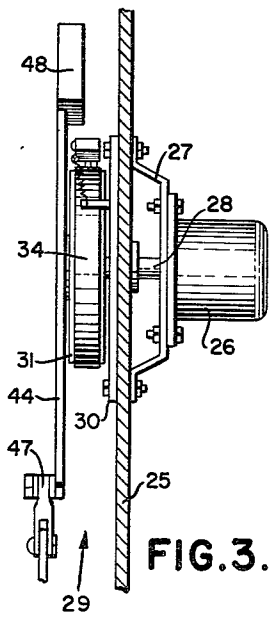


FIG. 3.

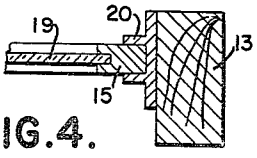


FIG. 4.

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CLOSURE AND OPERATING MECHANISM THEREFOR

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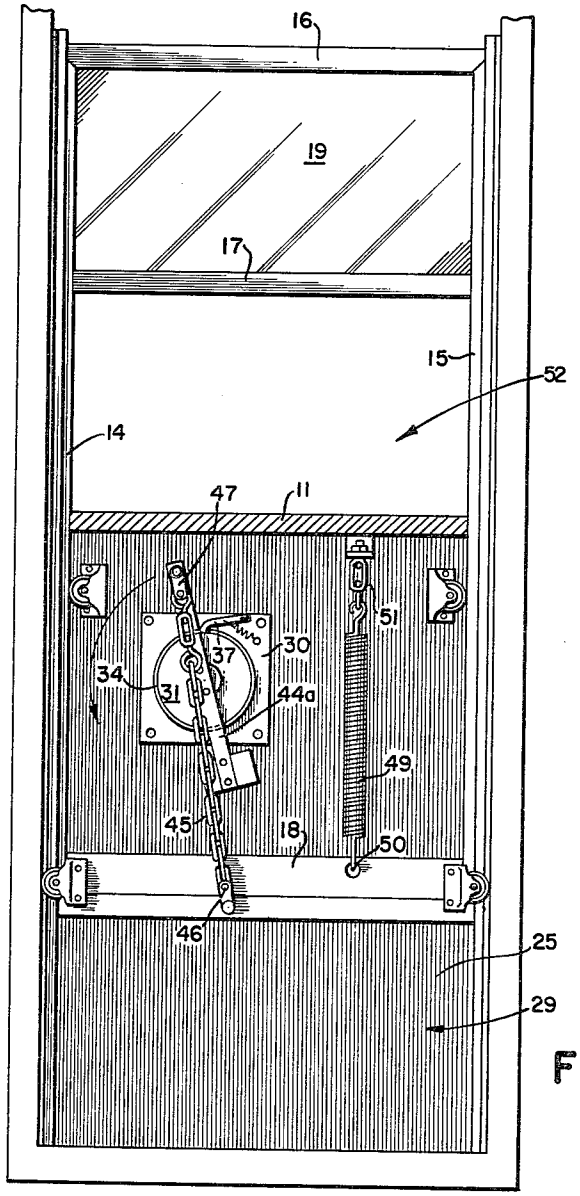


FIG. 5.

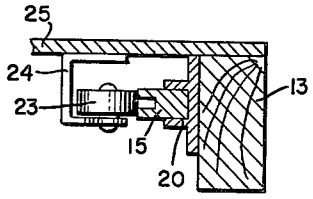


FIG. 7.

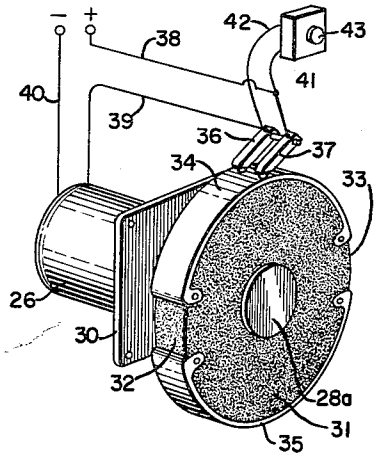


FIG. 8.

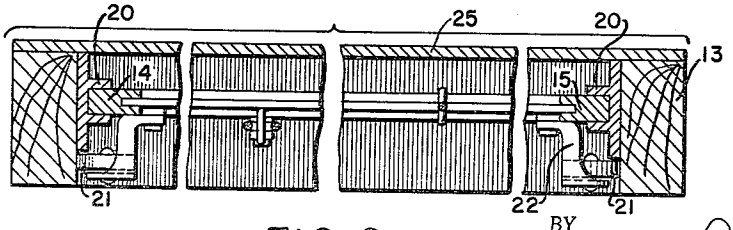


FIG. 6.

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United States Patent Office 3,086,766 Patented Apr. 23, 1963

3,086,766

CLOSURE AND OPERATING MECHANISM THEREFOR

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Filed Feb. 27, 1961, Ser. No. 91,988
4 Claims. (Cl. 268—124)

The present invention relates to closure and operating mechanism therefor, and has for an object to provide a compact, simply operating form of mechanism for opening and controlling the closing of windows, doors, including garage doors, or other closures.

More particularly the invention has been designed for the windows of drive-in restaurants where automobile patrons are served from counters in the restaurant building through windows which must be opened and closed great numbers of times in a day and for this purpose the invention aims to provide an operating mechanism which will be durable, efficient and easily and quickly responsive to the controls.

With the foregoing and other objects in view, the invention will be more fully described hereinafter, and will be more particularly pointed out in the claims appended hereto.

In the drawings, wherein like symbols refer to like or corresponding parts throughout the several views:

FIGURE 1 is a fragmentary, perspective view of a wall of a drive-in restaurant equipped with a closure and operating mechanism in accordance with the present invention showing the closure, which in this instance is a sash, in the closed position.

FIGURE 2 is a longitudinal sectional view through the window casement or frame showing the sash in the down closed position and the operating parts in similar position.

FIGURE 3 is a vertical cross sectional view taken on a much magnified scale on the line 3—3 in FIGURE 2.

FIGURE 4 is a fragmentary horizontal sectional view taken on the line 4—4 in FIGURE 2.

FIGURE 5 is a view similar to FIGURE 2 showing the sash and operating parts in the raised position.

FIGURE 6 is a horizontal sectional view taken on an enlarged scale on the line 6—6 in FIGURE 2.

FIGURE 7 is a fragmentary horizontal sectional view taken on the line 7—7 in FIGURE 2.

FIGURE 8 is an isometric view of the motor-controller assembly illustrating a preferred circuitry.

Referring more particularly to the drawings, in FIGURE 1, 10 designates a wall of a building containing a kitchen where food is prepared, 11 a counter within the building on which the ordered food, when prepared, is placed adjacent a window through which the food may be passed out onto an external shelf 12 from which the motorist patron may pick up the articles or the articles may be carried by runners or waiters from the shelf to the vehicles. The shelf may or may not be used but is in effect a continuation of the counter which forms in effect a sill for the sash which moves up and down in the window casement or frame 13.

Referring more particularly to FIGURES 2 and 5, the sash is comprised of side stiles 14, 15, an upper rail 16, an intermediate rail 17 and a lower rail 18 connecting the lower end portions of the side stiles 14, 15 a considerable distance below the counter 11 which is straddled by the side stiles 14 and 15.

A glass pane 19 or mesh screen may be fitted in the sash between the rails 16 and 17.

As shown in FIGURES 4, 6 and 7, the side stiles 14 and 15 slide up and down in channels 20 within the window casement 13, being guided in such substantially vertical movement by nylon or other rollers carried by brackets 22 from the lower rail 18 and by nylon or other rollers 23 carried by brackets 24 affixed to a panel 25 which with the outer wall 10 encloses a lower chamber in the casement 13 in which is conveniently housed the operating mechanism with the exception of the electric motor 26 which is preferably carried by supporting structure 27 from the exterior of such panel 25. The armature shaft 28 or a geared down shaft therefrom through a reduction gear is mounted through the panel 25 and extends into the chamber 29 where it passes through an installing assembly plate 30 affixed by bolts or other fastenings to the panel wall 25. Within the lower chamber 29 and affixed to the shaft 28 is a rotary controller 31 in the form of a wheel or drum preferably made from a body of electrically non-conducting material providing arcuately narrow non-conducting or insulating areas 32 and 33 on the circumference of the wheel 31 substantially diametrically opposed to one another and between which are copper or other arcuate conducting areas or strips 34, 35.

Bearing on the periphery of this wheel 31 are a pair of electrically conducting brushes 36, 37 electrically insulated from one another and connected in circuit with the electric motor 26 by conductors 38 and 39. The conductors 38, 39 together with conductor 40 constitute a main motor energizing circuit which is normally open when the brushes 36, 37 are in contact with the insulating areas 32 and 33.

A starting circuit includes conductors 41, 42 and the common conductors 39, 40, which starting circuit is open at a push button switch 43, spring biased to an open position.

Associated with the rotary controller 31 and rotating therewith is an arm 44 affixed to move with the controller or to the controller shaft 28^a which is an extension of the motor or reduction gear shaft and on which the rotary controller 31 is affixed. The arm 44 may be affixed to the rotary controller or to the shaft 28^a so that it partakes of the same rotary movement in the same phase. The arm 44 extends radially from the shaft 28^a and controller 31 and at an outer end portion is affixed to a flexible link 45, the lower end of which is anchored to the lower rail 18 at the point indicated at 46. This flexible link may be in the form of a chain. As shown in FIGURE 3 this flexible link 45 is attached to the rotary lifting arm 44 laterally of the plane of rotation of the arm 44 by a swivel connection 47. This swivel connection 47 allows the arm to rotate past the chain 45 in moving from the lower position of FIGURE 2 to the upper position of FIGURE 5 and in moving from the upper position down to the lower position on the other side of the arc.

The elevating arm 44 preferably has a tailpiece 44^a extending in an opposite radial or diametric direction and carrying a counterweight 48.

It is preferred that the point of connection 46 between the lower end of the flexible link 45 and the lower sash rail 18 be offset laterally from a vertical line dropped from the center of rotation of the shaft 28^a and controller wheel 31, and also it is preferred that the arm 44 have

initial and final rest positions which are slightly diagonal; all for the purpose of avoiding dead centers and possible binding of the sash in the window frame channels. In short, these dispositions are desirable to effect linear thrust vertically throughout the raising movement of the sash in the window frame.

A coil spring 49 has its lower end secured at 50 to the lower rail 18 of the sash and through an adjusting turnbuckle 51 is connected at its upper end to the counter 11.

In operation, assuming an initial lower position of the sash as shown in FIGURE 2, with the arm 44 extending substantially downward either in a vertical or diagonally displaced position, where the brushes 36 and 37 rest upon an insulated area 32, the link 45 is taut and spring 49 distended to its maximum open height. The main circuit is therefore open at the brushes 36, 37, and the starting circuit is open at the push button switch 43.

To raise the window the push button 43 is depressed closing a circuit 38, 41, 43, 42, 39, motor 26 and return conductor 40 thus initially energizing the motor 26 sufficient to rotate the shafts 28, 28a and the controller 31 to bring the adjoining conducting strip or area 34 beneath the brushes 36 and 37 through which the circuit is closed through these insulated brushes and the rotation of the motor continues through an angular distance of the shaft 28a and controller wheel 31 commensurate with the circumferential length of the conductive area 34. When the successive insulating area 33 arrives beneath the brushes 36, 37 the main circuit will be interrupted and rotation of the motor 26 discontinued. It will thus be seen that the arm 44 has been rotated from the position of FIGURE 2 to that of FIGURE 5 through an angular distance of approximately 180 degrees during which it has applied continual upward thrust through the flexible link or chain 45 to the sash, thus raising the sash from the window opening 52 (FIGURE 5) and rendering accessible the items of food placed by the cook or preparation department upon the counter 11.

In this FIGURE 5 the spring 49 has been relaxed to its shut height although it may be still under some tension.

While the sash is arranged to drop by gravity or by its own weight, it cannot do so until the chain 45 is relaxed and dropping of the window sash through its own weight is opposed by the counterweight 48 by the friction of the rotating parts and by the regenerative brake characteristic of the electric motor. These features combined or singly provide a counterbalance for the window sash so that it becomes necessary to rotate the arm 44 in the direction of the arrow in FIGURE 5 downwardly to relax the chain and this is accomplished by again depressing the switch button 43, closing the starting circuit through the motor 26 to initially move the insulating area 33 of the control wheel 31 off the brushes 36, 37 and to bring the next successive conducting area 35 beneath the brushes so as to close the main motor circuit and provide for a pre-selected angular travel of the arm 44 down to the lower position of FIGURE 2. The motor thus drives the arm down, relaxing its restraint on the flexible link 45 which thus permits the sash to drop by its own weight. In doing so, it progressively elongates or stretches the tension spring 49 so that as the intermediate rail 17 approaches the counter sill 11, the spring 49 has acquired sufficient potential energy to slow or retard the descent of the sash to an extent that the sash will not injure hands of the restaurant personnel and will not itself or its mechanism be injured by obstacles remaining in its path, which latter will avoid closing of the sash until such obstacles are removed.

Now it will be understood that the counter 11 and/or shelf 12, being the window sill, is in effect a part of the window casement or frame and in fact may be attached to the frame.

Nylon rollers are provided at each side of the window

frame so that when the sash raises and lowers it does not cut the aluminum frame by reducing friction.

To prevent the momentum of the motor and the weight of the window from carrying the controller wheel past the insulating gaps or areas, the chain 45 is not connected to the sash rail 18 directly below the shaft 28a, but several inches to the right of the vertical line dropped from the shaft to the lower rail 18.

The device is specifically designed for use in drive-in eating establishments, yet it can be easily used in cold storage rooms, banks or any public or private service window. The drive mechanism could be easily used to raise and lower overhead doors by placing it above rather than below the door. As a matter of fact the operating device may be placed in the window casement above the sash position of FIGURE 5 and the lower end 46 of the chain 45 may be attached to the top rail 16 of the shaft with the spring 49 also attached at its lower end to this same top rail 16 and having its upper end adjustably or otherwise connected to the upper cross beam of the window casement.

The operating device is substantially foolproof. In case of a power failure the sash will not bind in the frame. If the power goes off when the window is up the offset chain allows the window to be lowered by a slight downward manual pressure. The window can be easily operated manually. The window can be easily lifted manualy.

Any type of window or overhead door can be used. Either a screen or glass window, or a combination of both, may be employed.

The unit is easily installed. It can be contained within the standard studding and can be used with any kind of window or closure. The height to which the window is raised can be easily changed.

The window provides for efficiency. A quick touch of the button 43 by any part of the body will either open or close the window. Any number of button switches can be used to control the window from various places. Intermittent operation allows a single switch to both raise and lower the window. The window is effective in excluding insects and dust. It makes air conditioning possible.

There are practically no working parts to wear out and the mechanism requires no adjusting. All working parts are accessible.

Although we have disclosed herein the best form of the invention known to us at this time, we reserve the right to all such modifications and changes as may come within the scope of the following claims.

What we claim is:

1. A closure and operating mechanism therefor comprising

(*a*) a frame let into a wall of a building and having

(*b*) an opening therein,

(*c*) a closure slidable substantially vertically in the frame in moving into and out of the opening and biased by gravity to a lowered position,

(*d*) elevating means connected to the closure for raising the same,

(*e*) drive means connected to the elevating means for driving the elevating means both upwardly and downwardly, and

(*f*) control means for the drive means having at least a part affixed to move with the elevating means, said elevating means comprising

(*g*) a rotary arm, and

(*h*) a flexible link connected between the arm and the closure.

2. A closure and operating mechanism therefor as claimed in claim 1 in which the flexible link is attached to the closure

(*i*) at a point offset from a vertical line dropped from the center of rotation of the arm.

3. A closure and operating mechanism therefore as claimed in claim 1 in which the flexible link is adapted

(*i*) to exert upward thrust on the closure when the rotary arm is raised and to exert negative thrust on the closure in the descending movement of the rotary arm,

(*j*) whereby the closure descends by gravity as the flexible link is slackened by descending movement of the rotary arm, and

(*k*) spring means connected between the frame and closure adapted to be distended by the falling movement of the closure and to retard the closure in its final descending motion.

4. A closure and operating mechanism therefor as claimed in claim 1 in which the arm is

(*i*) counterweighted and the flexible link is

(*j*) a chain affixed at its upper end to a free end portion of the arm and at its lower end to a part of the closure.

References Cited in the file of this patent

UNITED STATES PATENTS

1,260,435 Norwood ---------- Mar. 26, 1918