Jan. 14, 1947. F. C. RUSSELL ET AL 2,414,419

CLOSURE DEVICE FOR BUILDING APERTURE

Original Filed Aug. 11, 1941 2 Sheets-Sheet 1

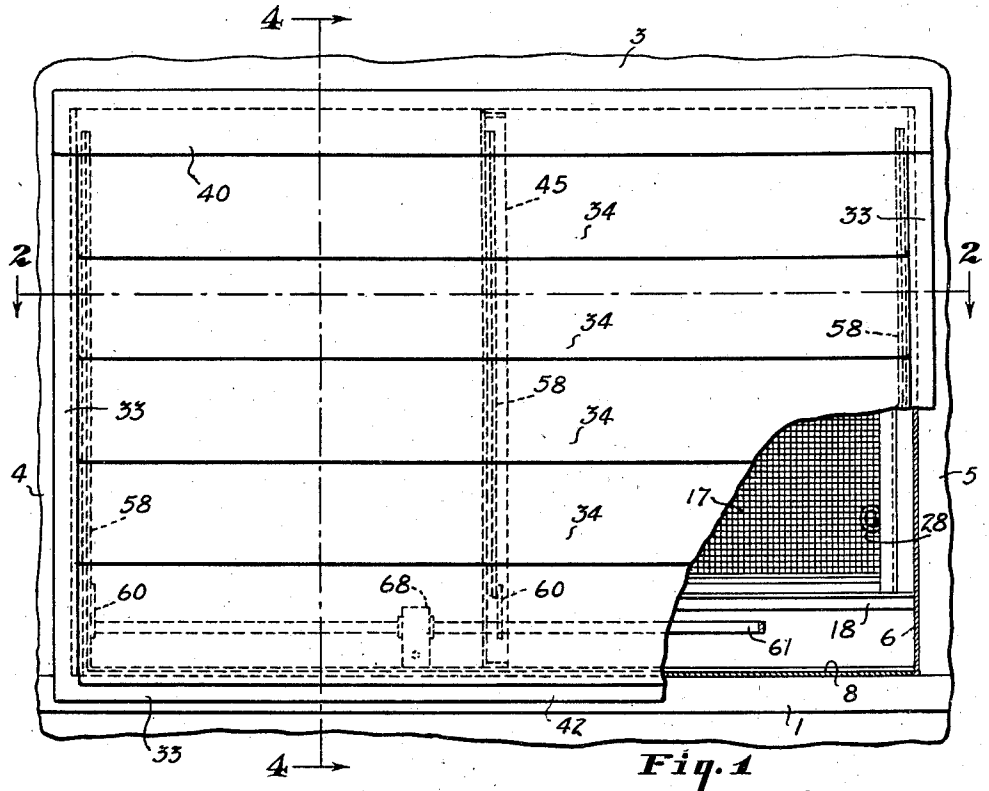


Fig. 1

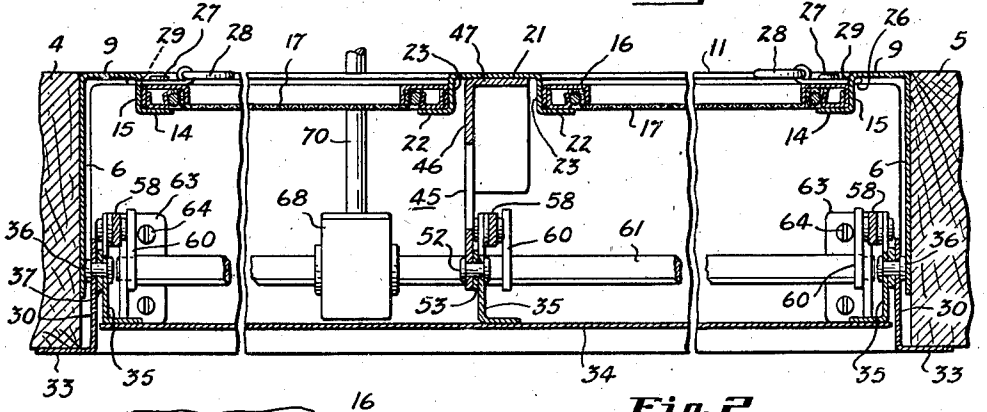


Fig. 2

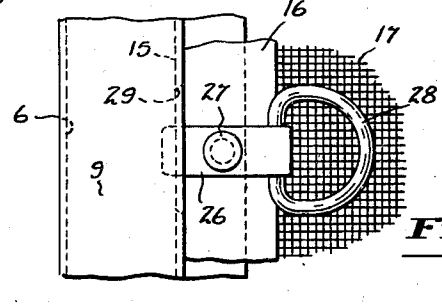


Fig. 3

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CLOSURE DEVICE FOR BUILDING APERTURE

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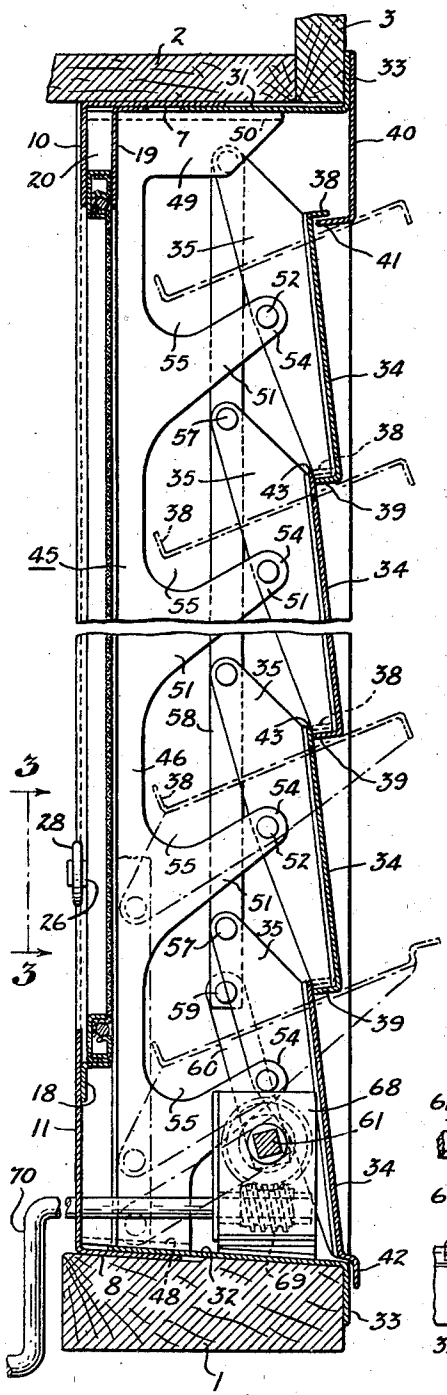


Fig. 4

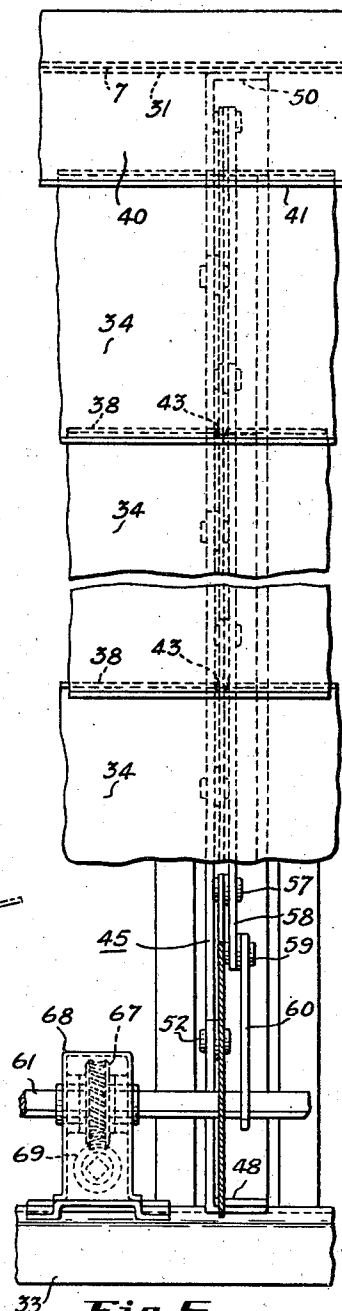


Fig. 5

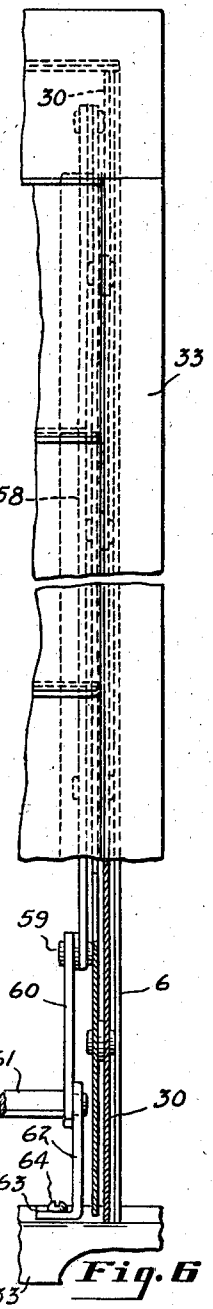


Fig. 6

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CLOSURE DEVICE FOR BUILDING APERTURES

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Original application August 11, 1941, Serial No. 406,302. Divided and this application July 10, 1944, Serial No. 544,282

5 Claims. (Cl. 160—103)

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This invention relates to building construction and has particular reference to an improved closure device for fitting within a framed aperture of a building. More specifically, the invention relates to a closure for a building aperture or opening that includes an adjustable shutter or jalousie in combination with removable window or screen panels.

This application is a division of our copending application Serial No. 406,302, filed August 11, 1941.

It is an object of the invention to provide an improved structure for fitting within a building aperture which combines adjustable shutters on the outside with removable panels that may be of either glass, screen or other material on the inside.

Another object is to provide a device of the character mentioned constructed primarily of relatively thin sheet metal so that the same is light and compact.

Another object is to provide an improved actuating mechanism for operating the vanes or slats of an adjustable shutter or jalousie, and which is particularly suited for such devices having relatively long slats or vanes.

Another object is to provide an improved shutter of jalousie construction wherein the adjacent slats or vanes interlock with one another to provide a light-tight and weatherproof seal, the interlocking parts also being effective to reinforce the slats or vanes against longitudinal bending.

A still further object is to provide a generally improved closure device for fitting within a building aperture which is relatively simple in design and construction and inexpensive to manufacture. Other objects and advantages will become apparent as the following detailed description proceeds, which is made in connection with the accompanying drawings, wherein:

Figure 1 is an elevational view, partly in section and with parts broken away, showing the outside of our improved device mounted in the framed window opening of a building;

Fig. 2 is a horizontal sectional view of the device, foreshortened and with parts removed, taken along the line indicated at 2—2 of Fig. 1 and enlarged with respect to that figure;

Fig. 3 is a fragmentary detail on an enlarged scale showing one of the fastening devices for retaining the removable panel means in the inside frame of the device;

Fig. 4 is a vertical sectional view, foreshortened and with parts broken away, taken substantially on the line 4—4 of Fig. 1 and enlarged with respect thereto;

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Fig. 5 is a fragmentary elevational view, foreshortened, partly in section and with parts removed, showing the center support and the actuating mechanism for the shutters or vanes;

Fig. 6 is a fragmentary elevational view, foreshortened, partly in section and with parts removed, showing one of the side frame members and part of the actuating mechanism for the vanes or shutters.

Referring to the drawings by numerals of reference which indicate like parts in the several figures, the invention is illustrated in connection with a shutter type closure for a window opening in a building having wooden frame means defining the window opening. It is to be understood, of course, that the present invention is applicable to buildings constructed of materials other than wood since the present device incorporates a frame that may be received in any conventional type of building aperture. The wooden frame of the building aperture includes a bottom member 1 which may slope outwardly as shown, and a top member 2, the latter abutting against siding or sheathing indicated at 3. Side members of the wooden frame are indicated at 4 and 5. The combination closure having adjustable shutters on the outside of the building and removable panel means on the inside of the building comprises inner and outer frames formed of relatively thin sheet metal. The inside frame formed of suitable sheet metal such as 24-gauge steel by rolling or pressing has side portions 6 and top and bottom portions 7 and 8. Along the inner edges of the top, bottom and side portions of the inside frame are formed integral side flanges 9 and top and bottom flanges 10 and 11. These flanges extend inwardly across the margins of the window aperture and the side flanges have offset portions 14 connected by portions 15 to receive removable panel assemblies comprising sheet metal frames 16 and screening 17. The removable panels may be of conventional construction and glass or other material may be substituted for the screening 17. Angle pieces 18 of sheet metal, suitably welded or otherwise secured to the inside of the bottom flange 11, support the removable panels, and retainers 19 formed of angle shaped strips of sheet metal are secured to the top portion 7 of the inside frame so as to extend in spaced parallel relation to the top flange portion 10, thereby providing a channel or space 20 into which the upper edge of the removable panel can be pushed to clear the bot-

tom edge of the panel over the upper edge of the flange 11 when removing or replacing the panel.

As shown in Fig. 2, a number of the removable panels may be disposed across the width of the building aperture and in such case one or more vertical mullions 21 may be employed. These mullions are formed of sheet metal by rolling or pressing to channel shape, providing offset flanges 22 which correspond to the offset portions 14 of the side flanges 9. Thus, the removable panels are normally recessed into the inside frame of the structure and disposed in bearing engagement with the offset flanges 14 and 22 and in abutting relation to the connecting portions 15 along the side flanges 9 and corresponding connecting portions 23 along the sides of the mullion 21.

Suitable means for retaining the removable panels in the inner frame of the device is provided. In the present instance latch levers or elements 26 are pivoted to the frame members 16 of the panels at 27 and are provided with rings 28 by means of which the levers can be turned on the pivots 27 so that the ends of the levers may be moved into and out of registering slots 29 formed in the connecting portions 15 of the side flanges 9 and the corresponding portions 23 of the center mullion 21.

The outside frame of the device is also made of sheet metal which is preferably of heavier gauge than that used for the inner frame described above, such, for example, as sheet steel of about 14-gauge. Side portions 30 of the outer frame are disposed in parallel relation to the side portions 6 of the inside frame and are overlapped by the latter in telescopic relation as shown in Fig. 2. Similarly, top and bottom portions 31 and 32 of the outer frame are parallel to the top and bottom portions 7 and 8, respectively, of the inner frame and are overlapped by the latter in telescopic relation as shown in Fig. 4. Integral flanges 33 are formed on the top, bottom and side portions of the outer frame and extend angularly from such portions away from the building aperture so as to lie against the adjacent surfaces of the wooden frame members 1, 3, 4, and 5. By this arrangement the joint between the combination closure device of the present invention and the material or members framing the building aperture can be readily made weather-tight by caulking or the like. Also, if desired, siding or similar material can be applied to the building so that the ends thereof overlap the flanges 33 of the outer frame of the device.

The telescopic relation of the inside and outside frames of the closure device provides for adjustment of the device to fit building apertures of different depths. In the drawings the device is shown assembled for minimum depth, it being understood that for building having walls of greater thickness, the inner and outer frames may be drawn apart while retaining their telescopic relation so as to increase the depth or space between the angularly disposed flanges 9, 10 and 11 of the inside frame with respect to the flanges 33 of the outside frame.

A plurality of elongated slats or vanes 34, which may be formed of relatively thin sheet metal, such as 20-gauge steel, are disposed horizontally across the outer frame between the side portions 30 of the latter. To the underside of the slats or vanes and at their ends and in the center thereof a number of actuating levers 35 or hinge elements are secured, as by welding. The levers 35 at the ends of the slats are received on pivot pins 36 which extend through the side portions 30 of the frame, suitable washers 37 being provided to separate the levers from the frame. Thus, the slats or vanes 34 are mounted to turn about spaced horizontal axes from the closed positions shown in full lines, Fig. 4, to the open positions shown in broken lines of the same figure. Along the parallel top and bottom edges of the slats or vanes 34 are formed, as by bending, integral flanges 38 and 39. These flanges are angularly disposed with respect to the body portions of the slats and serve to reinforce the slats against longitudinal bending, thereby providing a relatively stiff structure although formed of thin metal. The flanges of each slat or vane extend in opposite directions from the plane of the slat, the top flange extending upwardly or outwardly while the bottom flange extends inwardly or downwardly. Each of the slats 34 is of greater width than the space between adjacent pivot pins 36 so that when the slats are moved or rotated to closed position, the top flange 38 of each slot moves behind and above the bottom flange 39 of the next adjacent slat. Thus, an interfitting relationship is provided which effects a light-tight substantially weather-tight seal between the slats. Each of the bottom flanges 39 is preferably of greater width than the top flange 38 with which it interlocks so that the bottom flanges abut against the body portions of the next adjacent slats when the latter are moved to closed position. Portions of the top flanges are removed or cut away in the regions of the levers 35 so as to clear the latter in closing the shutter, as shown at 43, Fig. 5.

Along the top of the outer frame is a depending apron 40 which may be secured as by welding to the flange portion 33 of the top portion of the frame and is formed with an inwardly extending angularly disposed flange 41 that underlies the top flange 38 of the uppermost slat 34 when the jalousie or shutter is closed. The lowermost slat is formed along its bottom edge with an offset flange portion 42 which extends below the bottom portion 32 of the outer frame in overlapping relation to the flange 33 thereof.

When the building aperture for which the device of the present invention is to constitute a closure is of considerable width, as, for example, four or more feet, it is desirable that the slats 34 be supported centrally as well as at their ends. Accordingly, a center support indicated generally at 45 is disposed in upright position transversely across the rear of the slats 34 and between the top and bottom portions 31 and 32 of the outer frame. This center support comprises an elongated member 46 which may be formed of heavy gauge sheet or plate metal and has one edge bent at a right angle to provide a flange 47 which is received within the channel of the mullion 21 and abuts against the latter when the inner and outer frames are assembled in the manner shown in the drawings. The laterally extending flange portion 47 reinforces the support member, preventing lateral bending of the same. The bottom of the support 45 is formed with a bent over portion 48 which may be secured as by welding to the bottom portion 32 of the outside frame. A lateral extension 49 at the top of the support 45 is formed with a bent over flange 50 which may be secured as by welding to the top portion 31 of the outer frame.

At spaced intervals along the length of the support 45 are laterally extending upwardly curved integral arms 51, the outer ends 54 of which

carry pins 52 by means of which the levers 35 in the centers of the slats are pivotally mounted on the arms 51, washers 53 being interposed between the levers and the arms if desired. The pivot pins 36 and 52 are located between the top and bottom edges of the vanes and adjacent the longitudinal axis of the center of gravity of the moving parts of the shutter mechanism so that the slats or vanes are substantially balanced on the pivot pins, requiring minimum effort in their adjustment.

As shown in Fig. 4, the outer ends 54 of the upwardly directed arms 51 are separated from the body member 46 of the center support by a space 55 which receives the top edges of the slats or vanes 34 when the latter are turned to their extreme open positions shown by the broken lines. Thus, the center support of the present invention is so arranged that the slats or vanes can be rotated or turned upwardly to a position in which the top edges swing inwardly and downwardly until they are lower than the bottom edges, thereby disposing the slats so that light is reflected into the interior of the building through the openings between the slats or vanes, the surfaces of the vanes that normally face outwardly serving as reflectors and facing inwardly partially toward the member 46 of the center support, and being disposed at an acute angle to the latter.

Portions 56 of the levers 35 extend beyond the edge flanges 38 of the slats and are pivotally connected by pins 57 to tie bars 58 for simultaneous actuation of the slats upon vertical movement of the tie bars. The lower ends of the tie bars are pivotally connected by pins 59 to arms 60 rigidly secured on a rotatable rod 61 journaled at its ends in upstanding brackets 62 having flanged portions 63 fastened to the bottom portion 32 of the outer frame by means of screws 64.

The rod 61 may be conveniently made of square cross section and the arms 60 provided with square holes which receive the rod, thereby preventing relative turning. A gear 67 having a square hole is mounted on the rod 61 to actuate the latter, and is housed within a casing 68 which journals a worm 69 that meshes with the gear 67. A crank 70 extends through a suitable opening in the flange portion 11 of the inside frame and has a squared end which is received within a suitable socket in the worm 69 so as to rotate the latter when the crank is actuated. The casing 68 is suitably attached to the bottom portion 32 of the outer frame. Upon actuation of the crank 70 in one direction, the rod 61 is turned by means of the worm 69 and the gear 67 in a clockwise direction, as viewed in Fig. 4, about an axis parallel to the turning axis of the shutter vanes, so as to raise the tie bars 58 to the full line position shown in which the louvres or slats 34 are closed with their edges in interlocked relationship. Rotation of the crank 70 in a reverse direction turns the square rod 61 in a counterclockwise direction, as viewed in Fig. 4, so as to lower the tie bars 58 to the broken line position shown, which opens the louvres or vanes to the broken line position illustrated or to any desired intermediate position.

The present invention thus provides a combination shutter device and removable panel closure for building apertures which is adjustable as to size and which is provided with improved means for supporting and actuating relatively long slats or shutter vanes. The use of the elongated rotable rod 61 which extends in parallel relation to the turning axes of the shutter vanes permits the operating mechanism to be connected to each of the vanes at a plurality of points, thereby effecting uniform operation of the shutters without binding, twisting or warping of the parts. Although not essential to the present invention, it is desirable that the bottom portions 8 and 32 of the frame described herein be disposed so that they slope downwardly toward the outside, thereby permitting rain and condensation to be run off.

While the inner and outer frames of the device have been described as adjustable so as to fit building apertures of different depths by means of the sliding telescopic connection between the frames, it is contemplated that, if desired, the overlapped portions shown in Figs. 2, 4, and 6 may be secured together as by welding, riveting or bolting.

The principles of the present invention may be utilized in various ways, numerous modifications and alterations being contemplated, substitution of parts and changes in construction being resorted to as desired, it being understood that the embodiments shown in the drawings and described above are given merely for purposes of explanation and illustration without intending to limit the scope of the claims to the specific details disclosed.

What we claim is:

1. A structure of the character described for fitting within a framed building aperture comprising inside and outside sheet metal frames formed with overlapping side portions, the outside frame having angularly disposed flanges for resting flatwise against the outside of the building frame and the inside frame having angularly disposed flanges extending into the building aperture, said last named frame having outwardly offset inner edge portions, panel means removably mounted in the inside frame against the inner side of the offset flange portions, an adjustable shutter assembly mounted between the side portions of the outside frame, and means extending through the inside frame for actuating the assembly.

2. A structure of the character described comprising a frame for fitting within a frame building aperture, a channel shaped sheet metal mullion extending between the top and bottom portions of the frame intermediate the sides thereof, panel means removably mounted across the frame and having connection with the mullion, a plurality of shutter vanes adjustably mounted outwardly of the mullion, a center support disposed within the channel of the mullion and having outwardly extending arms for supporting the shutter vanes, and means for simultaneously adjusting the shutter vanes to different positions.

3. A structure of the character described for fitting within a building aperture comprising inner and outer frames having peripheries telescopically disposed with respect to one another, a panel and means mounting the same across the inner frame for facile removal therefrom, an adjustable shutter assembly and means mounting the same across the outer frame, and means extending through the inner frame for actuating the assembly.

4. A structure of the character described for mounting in a building aperture comprising an inner closure comprising a frame with a panel removably mounted therein, an outer closure comprising an adjustable shutter assembly, said

shutter assembly comprising an upright support mounted between said closures and provided with vertically spaced outwardly projecting arms and a horizontal vane pivoted to each of said arms to swing inwardly from a closed position into the spaces between said arms, and means for simultaneously actuating said vanes including an actuating member extending through the inner closure.

5. A structure of the character described for mounting in a building aperture comprising an inner closure comprising a frame with a panel

removably mounted therein, an outer closure comprising an adjustable shutter assembly, said shutter assembly comprising an upright support between said closures and having vertically spaced outwardly projecting arms, a horizontal vane pivoted intermediate its ends to each arm, an arm attached to each vane adjacent an end thereof, an upright bar pivoted to the vane arms for moving the vanes simultaneously, and means for actuating said bar.

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