Nov. 17, 1931. E. J. ZAHNER ET AL 1,832,174

FRAME WITH OPENING AND CLOSURE THEREFOR

Filed June 24, 1930 2 Sheets-Sheet 1

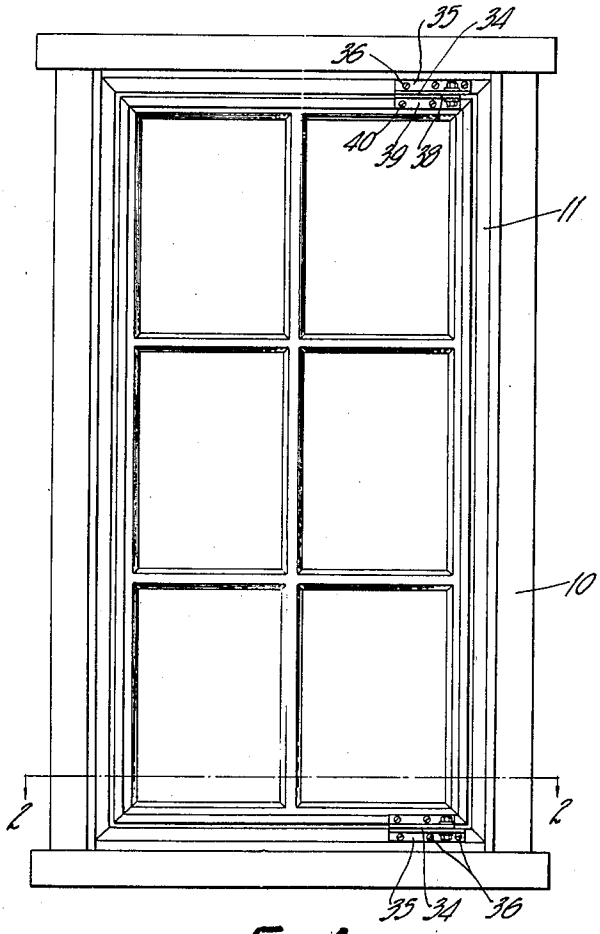


FIG. 1

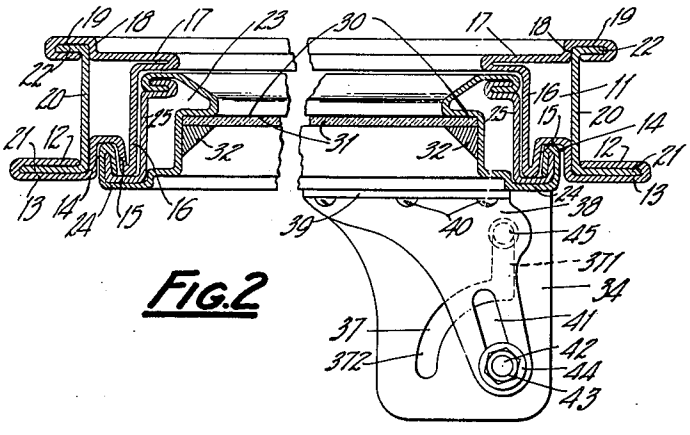


FIG. 2

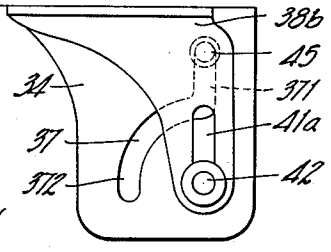


FIG. 5

INVENTORS
Edward J. Zahner
Kenneth G. Reynolds
BY Cudlipp & Word
ATTORNEYS

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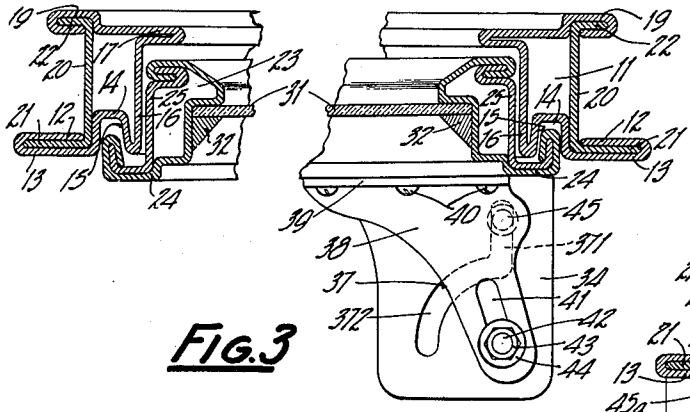


FIG. 3

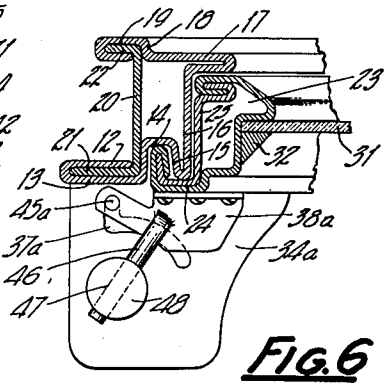


FIG. 6

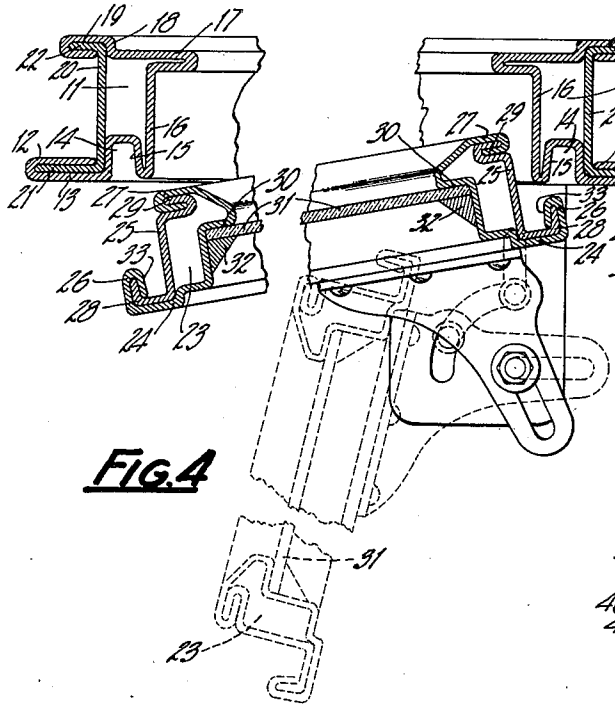


FIG. 4

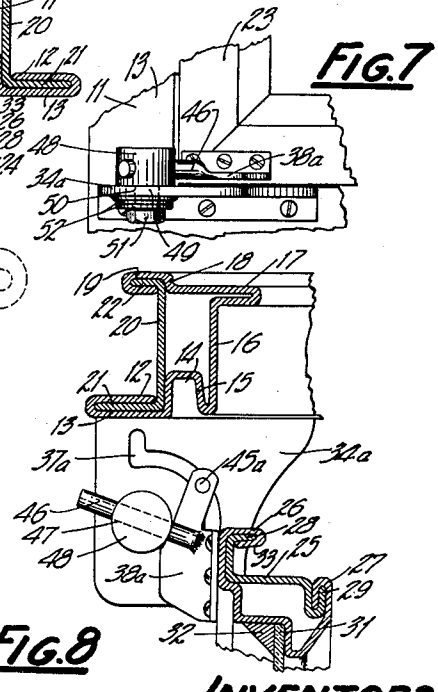


FIG. 7

FIG. 8

INVENTORS
Edward J. Zahner
Kenneth G. Reynolds
By Andrus & Wood
ATTORNEYS

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UNITED STATES PATENT OFFICE

EDWARD J. ZAHNER, OF LA PORTE, INDIANA, AND KENNETH G. REYNOLDS, OF ALBANY, NEW YORK

FRAME WITH OPENING AND CLOSURE THEREFOR

Application filed June 24, 1930. Serial No. 463,417.

Our invention more particularly relates to a frame and its opening and a closure which is sealed against the frame.

With the ordinary swinging window or other closure, it is impossible to provide a groove and rib on the respective parts extending entirely around the frame and closure, as the rib and groove at the upper and lower portions of the respective parts would engage and prevent opening of the closure. Our invention overcomes the foregoing difficulty by the provision of means which insures a bodily movement of the closure outwardly away from the frame followed by a swinging movement of the closure.

Our invention will best be understood by reference to the accompanying drawings in which we have illustrated a preferred embodiment and in which—

Fig. 1 is a front view of a portion of a frame in which the window jamb is mounted and of the swinging window;

Fig. 2 is a section taken along the line 2—2 of Fig. 1 but omitting the frame structure of the building surrounding the window jamb, and showing the window in closed position;

Fig. 3 is a view similar to Fig. 2 but showing the position of the window when it is slightly opened, with the ribs of the window frame still located within the frame or jamb of the window;

Fig. 4 is a view illustrating in full lines the position occupied by the window after it has completed its bodily outward movement and at the point where it begins to swing on a fixed pivot, and in dotted lines the window in open position;

Fig. 5 is a modification illustrating an arrangement in which all parts of the closure are initially moved outwardly in parallel paths;

Fig. 6 is a fragmentary view illustrating a further modification of our invention;

Fig. 7 is a front view of Fig. 6; and

Fig. 8 is a view similar to Fig. 6 but showing the window in its open position.

Like reference characters indicate like parts throughout the drawings.

Referring to the drawings, and first to Figs. 1 to 4, 10 (Fig. 1) indicates a portion of the frame work of a building structure in which the window frame or jamb, indicated generally at 11, is mounted.

While our invention is in no sense limited to the use of rolled sheet metal, it finds a very useful application in connection therewith, and we have illustrated our invention with both the window frame, or jamb and the window sash formed of such rolled sheet metal.

The sheet metal may be formed of stainless steel although obviously our invention is not limited to the material of which the parts are formed nor to the character of the metal when such is used.

While the contour of the section, both of the window frame or jamb and the window sash constitute no part of our present invention, we have illustrated the window frame as hollow. In the form illustrated the frame of the window is formed of two parts one of which comprises a flange as indicated at 12, the metal being folded back upon itself at 13 with a space between the folds, and formed with a groove, 14, which is preferably tapered at one side from the outside of the frame inwardly as at 15. The metal is again folded back upon itself as at 16, and at the opposite side of the frame as at 17 to form a strengthening rib. The opposite end of the first section is bent outwardly as at 18 and the metal folded back on itself to form an enclosure, 19. The other section of the frame is formed of a plate, 20, which telescopes with the first section and provided at its ends with flanges, 21 and 22, the flange, 21, being received between the folded portions, 12 and 13, and the flange, 22, being received in the fold at the opposite end of the other section.

Likewise the particular contour of the sash indicated generally at 23, constitutes no part of our present invention. In the embodiment of our invention illustrated the sash is also formed of two telescoping sections, 24 and 25. The section, 24, is folded back upon itself at one end as at 26, the two folds being spaced, and at its opposite end as at 27, within which folds the flanges, 28 and 29,

formed on the other section, 25, are respectively received. The section, 24, is formed with a ledge as at 30 against which the window pane, 31, may be received and secured in position as by putty, 32. The folded end, 26, forms a rib which engages the groove, 14, on the sash. The inner side of the rib, 28, is preferably tapered slightly as at 33 to form a tight engagement with the tapered edge of the groove, 14. The tapering of one side of the groove and one side of the rib is particularly desirable where the window jamb and the window sash are formed of rolled sheet metal as in the embodiment of our invention illustrated and which is more or less flexible, as the tapered portion of the rib forms a continuous tight joint with the tapered side of the groove.

It is to be understood that the entire frame of the window including the lock and hinge jamb sections together with the head rail and the sill sections, preferably are the same form and contour in cross section as that described, and the same is true of the sash of the window. Both sections therefore at the opposite sides of Figs. 1 to 4 are the same as those already described. Groove, 14, and the rib, 26, which engages therewith extend continuously around the frame and the sash respectively. It will be understood furthermore that while we have illustrated the jamb of the window as provided with a groove and the sash as provided with a rib, the sash may be provided with a groove and the jamb with a rib which engages therewith.

It is obvious that the window described could not be swung outwardly on a fixed pivot at one side of the sash, as the rib on the top and lower portions of the sash would engage the grooves in the head rail and in the sill of the jamb and thereby lock the window in closed position, as heretofore indicated.

In order to avoid the foregoing difficulty we provide means by which the window is first moved bodily away from the window frame and is then swung on a fixed pivot.

In the embodiment of our invention illustrated brackets, 34, are secured to the sill and the head rail respectively, of the window jamb, and are preferably provided with flanges, 35, by which the brackets may be secured to the sides of the frames as by screws, 36.

Each of the brackets, 34, is provided with a slot, 37, comprising a straight portion, 371, preferably extending outwardly normal to the plane of the window jamb and a portion, 372, formed as an arc of a circle. The window sash is also provided with brackets, 38, located immediately above and below the brackets, 34, at the lower portion and the upper portion respectively which are secured to the window jamb. At least one of the brackets of the sash is supported on a bracket of the jamb. The brackets, 38, are also provided with flanges, 39, by which these brackets are secured to the lower portion and to the upper portion, respectively, of the sash as by screws, 40. Each of the brackets, 38, is also provided with a slot, 41, which, in the embodiment illustrated, is arranged at a slight angle to the plane of the window sash. A bolt or stem 42, secured to the bracket, 34, extends throught the slot, 41, and may be retained in position therein as by a nut, 43, a washer, 44, being interposed between the nut and the bracket, 38. It will, of course, be understood that any desired means may be provided for retaining the bolt or stem, 42, in position in the slot, 41. Similarly a stem or bolt, 45, is secured to the bracket, 38, and extends downwardly through the slot, 37, and may be retained therein by means similar to those by which the bolt or stem 42, is retained in the slot, 41, and which are not completely illustrated and need not be described.

Assuming now that the window occupies the closed position illustrated in Fig. 2 and it is desired to open the window, it may be pushed outwardly from the inside. As the window moves to the position illustrated in Fig. 3 the stem or bolt, 45, slides along the straight portion, 371, of the slot 37 and the slot, 41, in the bracket, 38, moves along the stem or bolt, 42. The window therefore is compelled during its initial movement to move bodily outwardly away from the frame, and when the window occupies the full line position indicated in Fig. 4 the stem, 45, has reached a position where the straight portion, 371, of the slot, 37, merges with the circular portion, 372, and the slot, 41, of the bracket, 38, has moved over the bolt or stem, 42, until the latter is then received at the inner end of the slot, as also indicated in Fig. 4.

As the circular portion, 372, of slot, 37, is drawn about the axis of the stem, 42, as a center, the window in moving from the full line position indicated in Fig. 4 to the dotted line position, the stem, 45, moves along the circular portion, 372, of the slot, about the stem, 42, as an axis which remains in the end of slot 41, during this movement, and the window moves about a fixed vertical axis.

In returning the window to the closed position, the operation of the parts is obviously reversed.

In the embodiment of our invention illustrated in Fig. 5 the parts are generally the same as those illustrated in Figs. 1 to 4. The arm, 38*b*, however, is provided with a slot, 41*a*, extending normal to the plane of the window frame, so that initially the window moves bodily away from the window frame in such a way that all points of the window move in parallel paths.

In Figs. 6, 7 and 8, we have illustrated a modified form of our invention in which a

bracket, 34*a*, is secured to the jamb of the window and a cooperating bracket, 38*a*, secured to the sash of the window. In this embodiment of our invention the bracket, 38*a*, is provided with a stem, 45*a*, which engages a slot, 37*a*, of the same form as that described in connection with Figs. 1 to 4. In the embodiment illustrated however the bracket, 38*a*, is provided with an arm, 46, which may be circular in cross section and which passes through an opening, 47, in a rotatable member, 48, mounted on the plate or bracket, 34*a*. The member, 48, is preferably provided with a contracted portion, 49, as indicated in Fig. 7, which extends through an opening, 50, in the plate, 34*a*. A nut, 51, may be secured on the end of the contracted portion, 49, of the member, 48, suitable washers, 52, being interposed between the nut and the bracket, 34*a*.

While we have illustrated our invention as applied to a window, it will, of course, be understood that it may also be applied to doors, safes, or any place where a closure for an opening is desired.

While we have illustrated a groove and rib on the frame and sash of the window respectively, it will be understood that other forms of members projecting from the frame and sash of the window which are engageable with each other and form a substantially tight seal could be utilized.

The device embodying our invention provides a seal between the window frame thus preventing passage through the closure of air, rain etc. At the same time the window may readily be opened without binding.

While we have described our invention in its preferred embodiment, it is to be understood that the words which we have used are words of description rather than of limitation, and that changes within the purview of the appended claims may be made without departing from the true scope and spirit of our invention in its broader aspects.

What we claim is—

1. In combination, a frame provided with an opening, a closure for said opening, and cooperating means for insuring an initial bodily movement of said closure away from said frame in opening the closure followed by a swinging of said closure about a fixed axis.

2. In combination, a frame provided with an opening, a closure for said opening, and means comprising brackets secured to the frame and the closure respectively, each bracket being provided with a slot and a stem engaging the stem and the slot respectively of the other, the parts being constructed and arranged to insure an initial bodily movement of said closure away from said frame in opening the same followed by a swinging of said closure about a fixed axis.

3. In combination, a frame member provided with an opening, a closure member for said opening, the one member being formed with a groove and the other with a rib each extending entirely around the respective members and engageable with each other, and cooperating means attached to the frame and to the closure, respectively, and insuring an initial bodily movement of the closure away from the frame in opening the closure followed by a swinging movement of the said member about a fixed pivot.

4. In combination, a frame member provided with an opening, a closure member for said opening, the one member being formed with a groove and the other with a rib each extending entirely around the respective members and engageable with each other, the one being provided with a tapered side engaging the tapered side of the other, and cooperating means attached to the frame and to the closure, respectively, and insuring initial bodily movement of the closure away from said frame followed by a swinging movement of said member about a fixed pivot.

5. In combination, a frame provided with an opening, and a groove extending entirely around the frame, a closure for said opening provided with a rib engaging the groove in said frame when the closure is in the closed position, and cooperating means attached to the frame and to the closure, respectively, and insuring an initial bodily movement of the closure away from said frame followed by a swinging movement of said frame about a fixed pivot.

6. In combination, a frame member provided with an opening, a closure member for said opening, both the frame member and the closure member being formed of sheet metal, the one member being formed with a groove and the other with a rib, each extending entirely around the respective members and engageable with each other, and cooperating means attached to the frame and to the closure, respectively, and insuring an initial bodily movement of the closure away from the said frame followed by a swinging movement of said member about a fixed pivot.

7. In combination, a vertically disposed frame, provided with an opening, a closure therefor, horizontally disposed bracket plates secured to said frame and said closure respectively, at least one of said bracket plates for the closure being supported upon a bracket plate for the frame, and means associated with said bracket plates for insuring an initial bodily movement of the closure away from the frame in opening the closure followed by a swinging movement of the said member about a fixed pivot.

8. In combination, a vertically disposed frame provided with an opening, a closure therefor, horizontally disposed bracket plates secured to said frame and said closure respectively, at least one of said bracket plates

for the closure being supported upon a bracket plate for the frame, each of said bracket plates being provided with a slot and a stem engaging the stem and the slot respectively of the other, the parts being constructed and arranged to insure an initial bodily movement of said closure away from said frame in opening the same followed by a swinging movement of said closure about a fixed pivot.

9. In combination, a frame provided with an opening, a closure therefor, bracket plates secured to said frame and to said closure respectively, a first bracket plate secured to said closure being supported on a second bracket plate secured to said frame, said first bracket plate being provided with a straight slot in which is received a first stem secured to said second bracket plate, and said second bracket plate being provided with a slot in which is received a second stem secured to said first bracket plate and having a straight portion extending normal to the plane of said frame and a circular portion described about said second stem as a center.

10. In combination, a window jamb provided with an opening, a window for closing said opening, the one being provided with a groove and the other with a rib, each extending entirely around the respective members and engageable with each other, and cooperating means attached to the jamb and to the window respectively, and insuring an initial bodily movement of the window away from the jamb in opening the window followed by a swinging movement thereof about a fixed axis.

11. In combination, a window jamb provided with an opening, a window for closing said opening, said jamb being provided with a groove and said window being provided with a rib engaging with said groove, both the groove and the rib extending entirely around the respective members, and cooperating means attached to the window jamb and to the window respectively, and insuring an initial bodily movement of the window away from the jamb in opening the window followed by a swinging movement of the window about a fixed axis.

12. The combination with a frame provided with an opening therein and having a projecting element extending continuously around said opening, of a closure therefor provided with a projecting element extending continuously around said closure and engageable with the projecting element on the frame to form a seal, a movable, pivotal mounting for said closure for effecting an opening thereof, and means for guiding the movement of the pivotal mounting away from said frame during the opening operation to effect a disengagement of said projecting elements.

13. The structure set forth in claim 12 in which one of said projecting elements is composed of yieldable material.

14. The structure set forth in claim 12 in which both of said projecting elements are composed of yieldable material.

15. In combination, a frame member provided with an opening, a closure for said opening, both of said members being formed of flexible sheet steel, the one member being formed with a groove and the other with a rib each extending entirely around the respective members and engageable with each other, a side of the rib engaging a side of the groove, and cooperating means attached to the frame and to the closure, respectively, and insuring an initial bodily movement of the closure away from the frame in opening the closure followed by a swinging movement of the closure about a fixed pivot.

16. In combination, a frame member provided with an opening, a closure for said opening, both of said members being formed of flexible sheet steel, the one member being formed with a groove and the other with a rib each extending entirely around the respective members and engageable with each other, the rib and the groove each being provided with a tapered side, the tapering side of the rib engaging the tapering side of the groove, and cooperating means attached to the frame and to the closure, respectively, and insuring an initial bodily movement away from the frame in opening the closure followed by a swinging movement of the closure about a fixed pivot.

EDWARD J. ZAHNER.
KENNETH G. REYNOLDS.