June 11, 1957 V. LAVA 2,795,016

BALANCING CLOSURE FOR WINDOWS, DOORS, PARTITIONS AND THE LIKE

Filed May 3, 1951 5 Sheets-Sheet 1

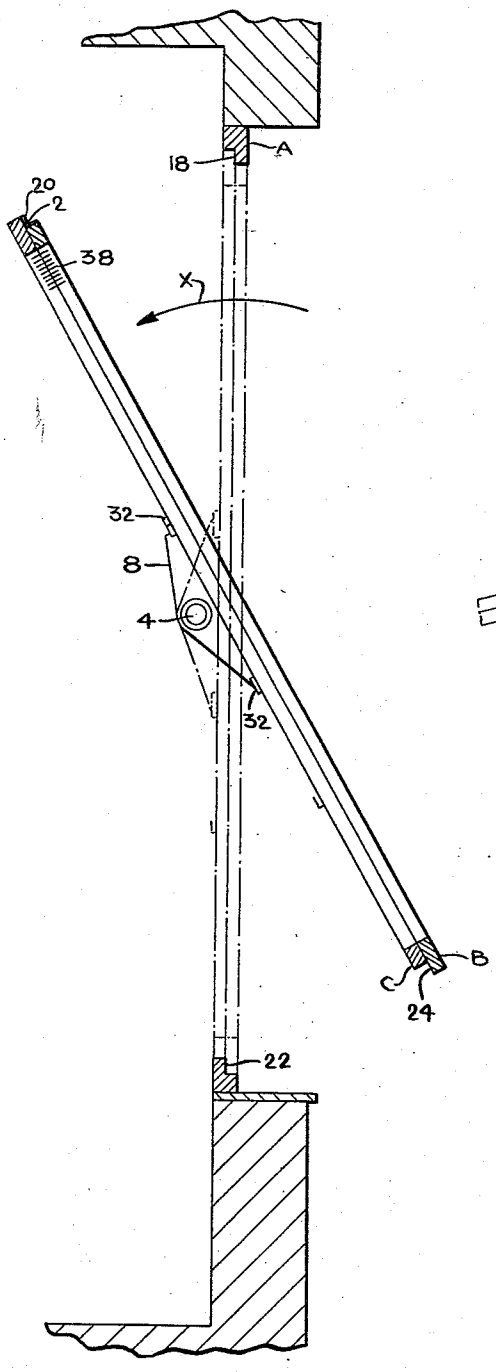


Fig 1

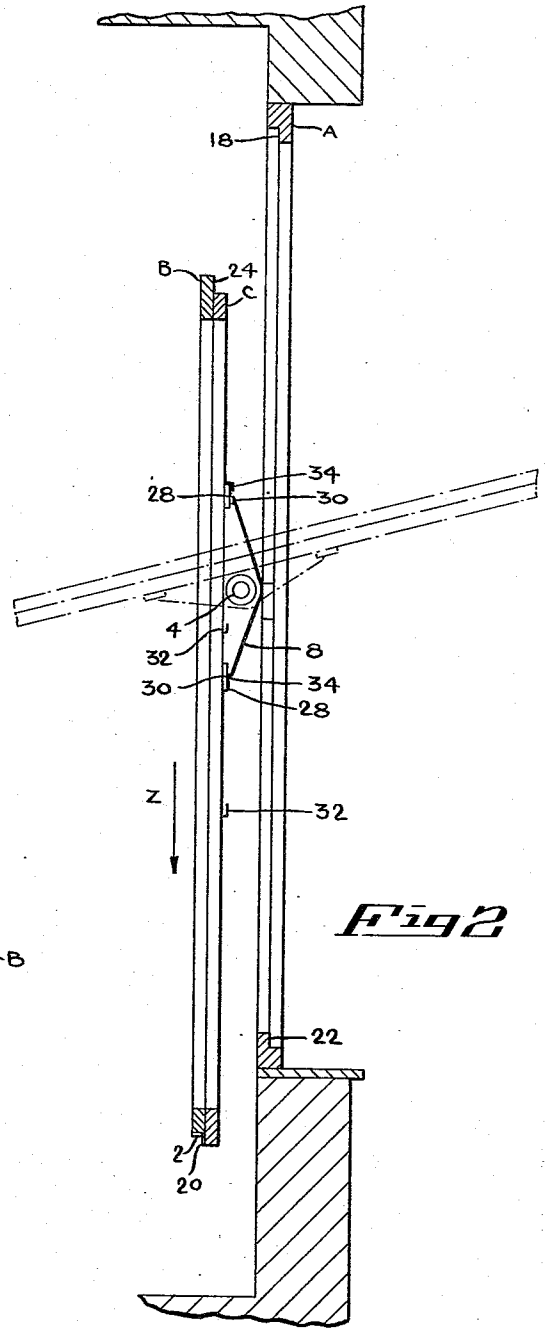


Fig 2

INVENTOR:
VITTORIO LAVA,

BY Ernest P. Marmorek,

HIS AGENT.

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BALANCING CLOSURE FOR WINDOWS, DOORS, PARTITIONS AND THE LIKE

Filed May 3, 1951 5 Sheets-Sheet 2

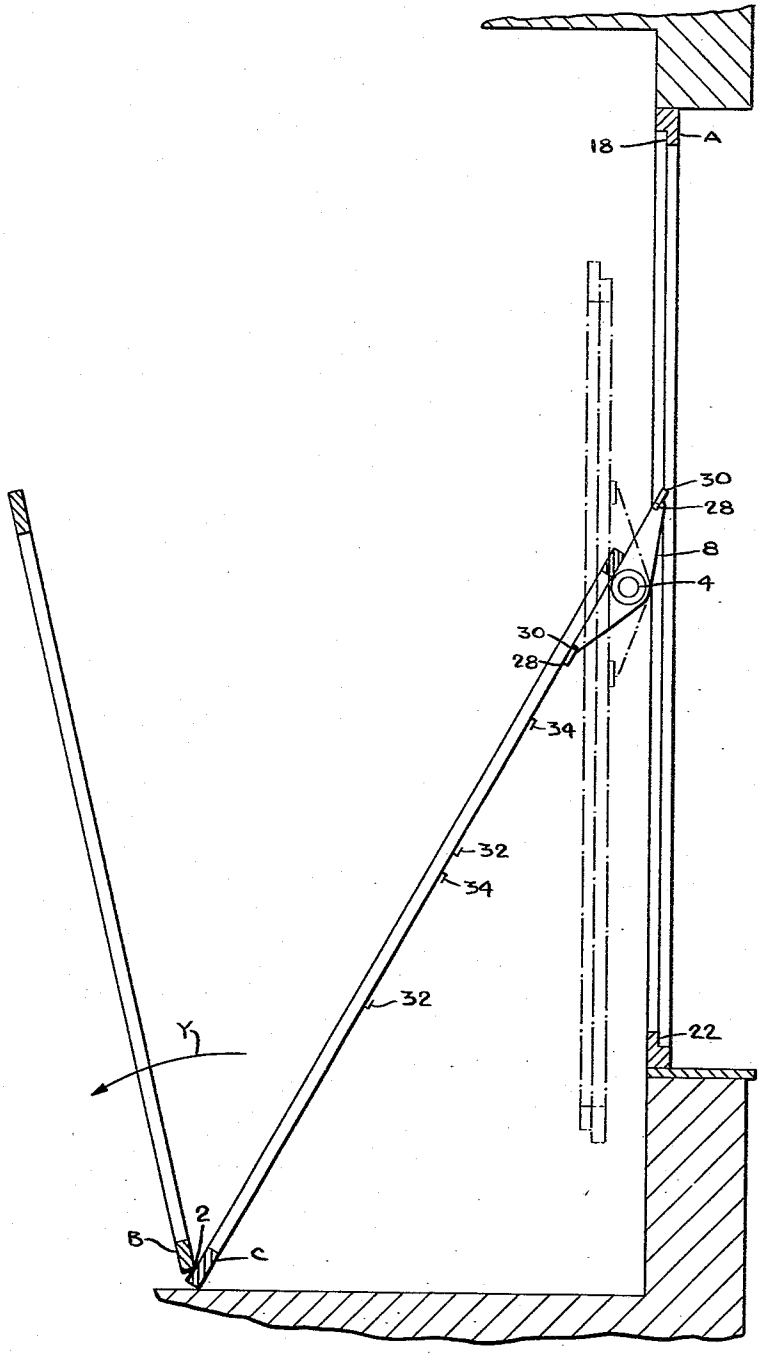


Fig 3

INVENTOR:
VITTORIO LAVA,

BY

Edmund D. Marmorek,

HIS AGENT.

June 11, 1957 V. LAVA 2,795,016

BALANCING CLOSURE FOR WINDOWS, DOORS, PARTITIONS AND THE LIKE

Filed May 3, 1951 5 Sheets-Sheet 3

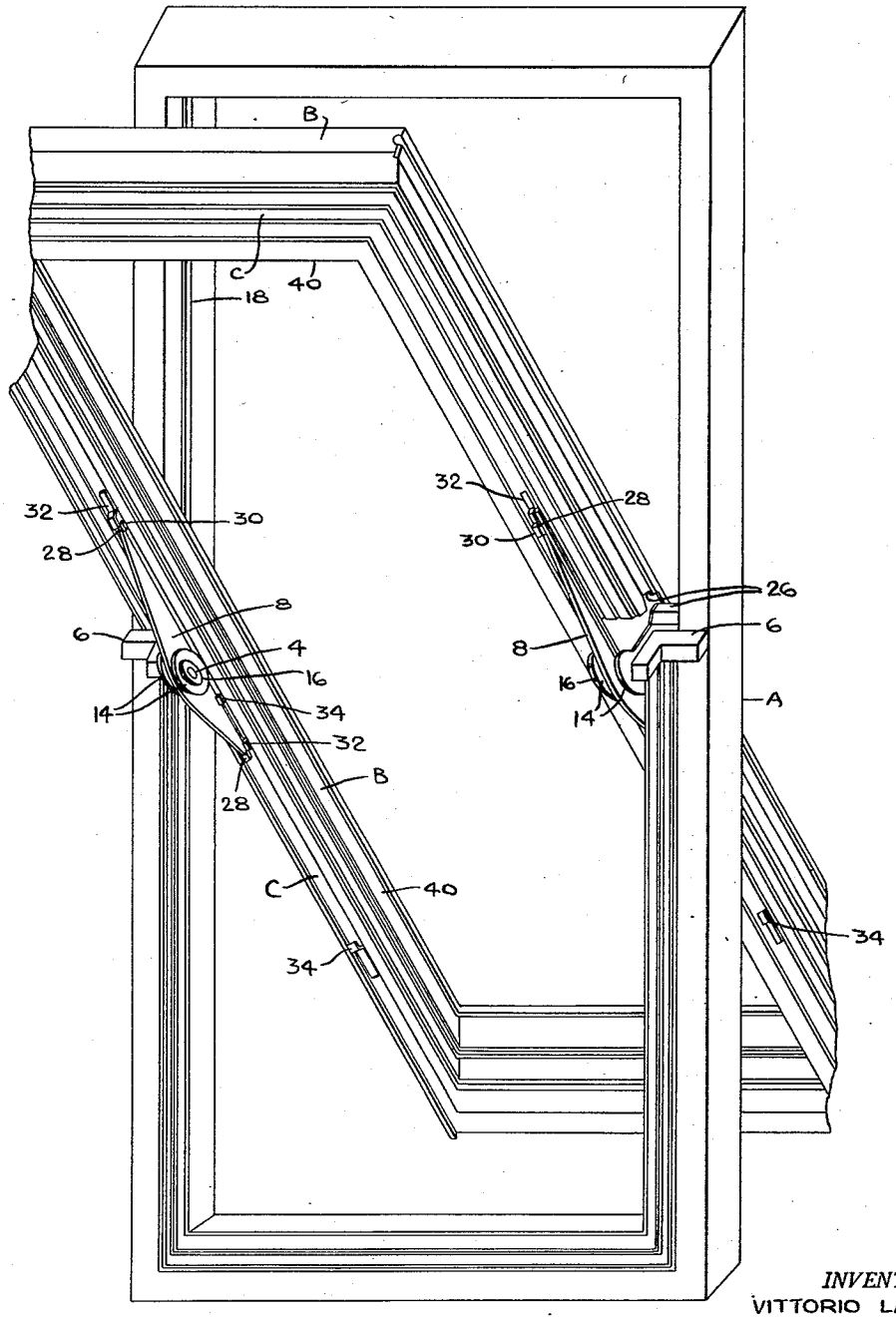


Fig 4

INVENTOR:
VITTORIO LAVA,

BY

Edmund D. Marcinek,

HIS AGENT.

June 11, 1957 V. LAVA 2,795,016

BALANCING CLOSURE FOR WINDOWS, DOORS, PARTITIONS AND THE LIKE

Filed May 3, 1951 5 Sheets-Sheet 4

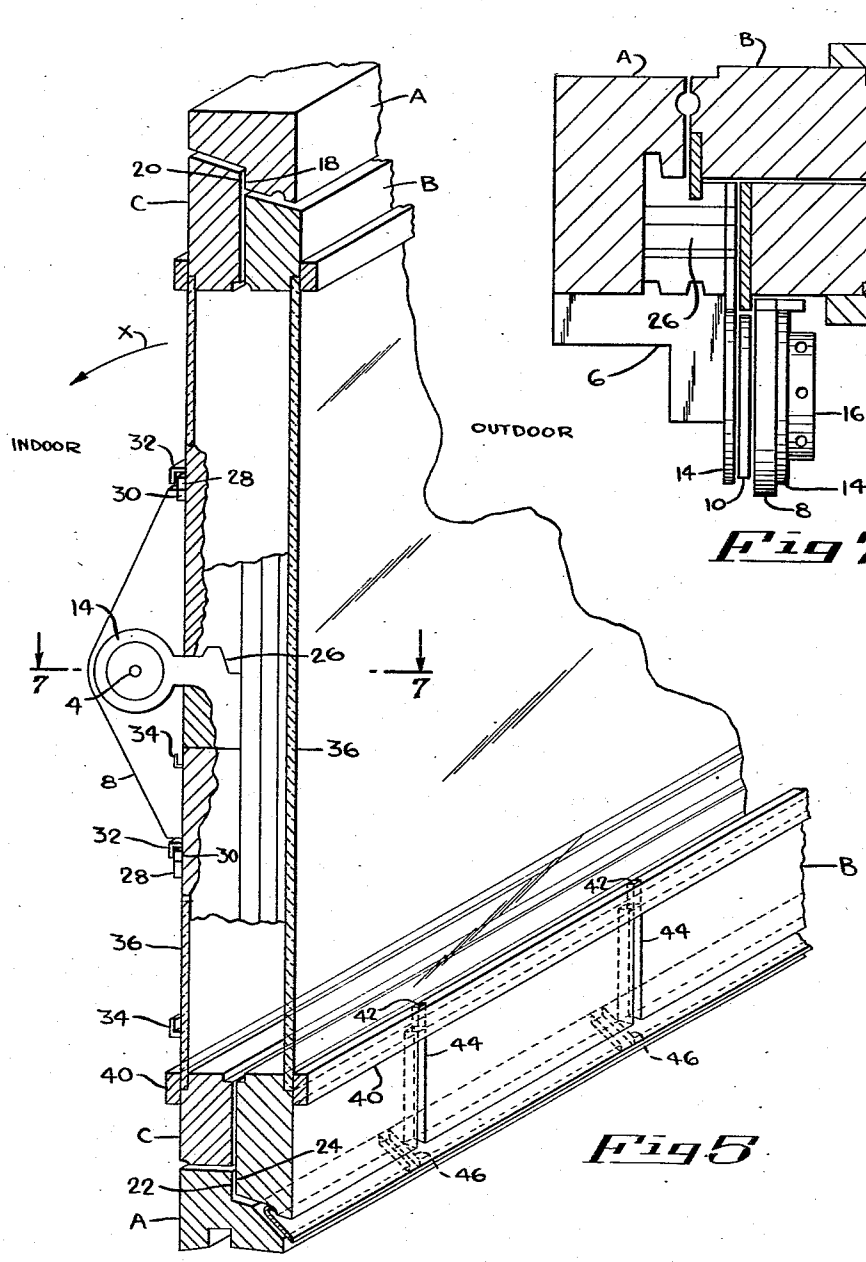


Fig 5

Fig 7

INVENTOR:
VITTORIO LAVA,

BY

Edward D. Manwarth,

HIS AGENT.

June 11, 1957 V. LAVA 2,795,016

BALANCING CLOSURE FOR WINDOWS, DOORS, PARTITIONS AND THE LIKE

Filed May 3, 1951 5 Sheets-Sheet 5

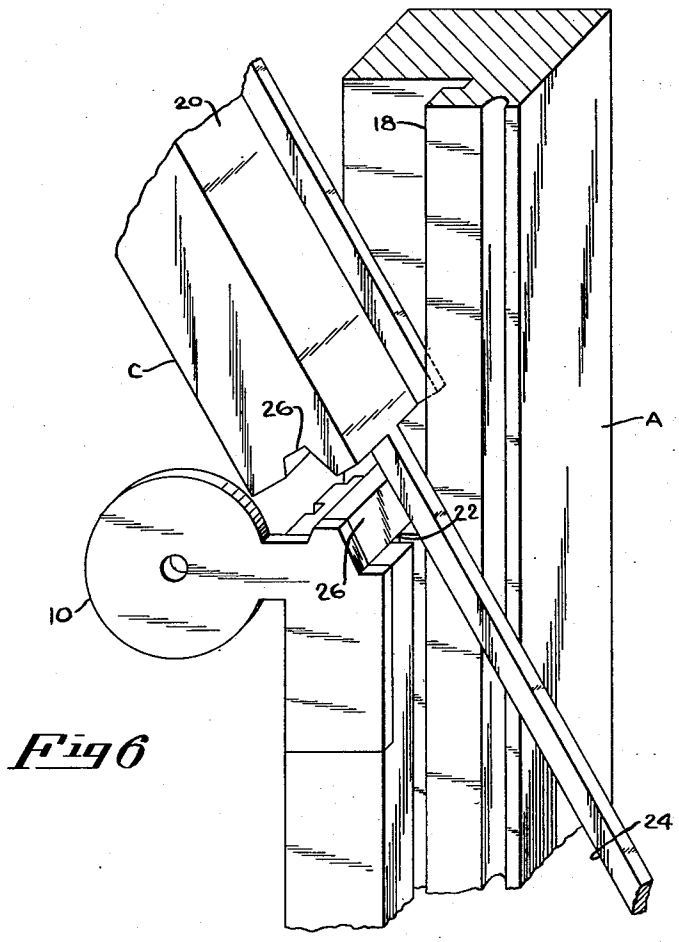


Fig 6

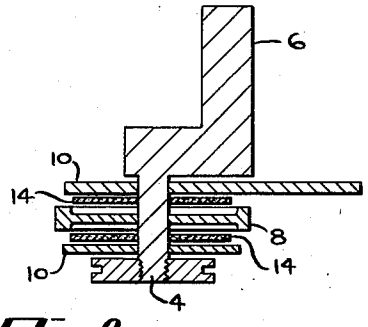


Fig 8

INVENTOR:
VITTORIO LAVA,

BY Jesse D. Marmorek,

HIS AGENT.

United States Patent Office 2,795,016
Patented June 11, 1957

2,795,016

BALANCING CLOSURE FOR WINDOWS, DOORS, PARTITIONS AND THE LIKE

Vittorio Lava, Milan, Italy

Application May 3, 1951, Serial No. 224,331

6 Claims. (Cl. 20—42)

The present invention relates to a balancing closure for windows, doors, partitions and the like.

The balancing closure, which possesses technical and economical advantages over the common sash models, is known to be subject to inconveniences. In particular, in the types known up to now, it is not possible to secure an effective air and water tightness along the whole of the perimeter of the frame, inasmuch as, in correspondence with the axis of oscillation, where the opposite joints converge, the pivot of rotation interrupts the continuity of the joints themselves. In the known types, moreover, it is not possible to realize an adjustable opening together with a complete inversion of the movable frame and there is no possibility of entirely drawing said movable frame into the place for normal maintenance operations: nor is there a possibility of withdrawing the movable from the fixed frame by simple operations.

The object of the present invention is a balancing closure that eliminates all the inconveniences above cited and that presents besides particular advantages that will better be evident in the course of the description.

The balancing closure according to the invention comprises a fixed as well as a movable frame, so connected as to permit a movement of manual rotation and of manual sliding of the latter in regard to the former, so that the movable frame may be rotated for determining the desired opening of the closure, may be upturned and may be caused to slide until it re-enters entirely the room. The connection between the two frames is effected, according to the invention, by means capable of rotating with respect to one frame and to permit a sliding of the other one, for instance by a pair of brackets or supports pivoted on the fixed frame, and upon which the movable frame may be fixed so as to allow it to slide when so desired, and also of being entirely withdrawn by a simple operation.

According to the invention the pivots around which is effected the rotation of the connecting means above mentioned and therefore also of the movable frame, determine an axis of rotation parallel to the planes of the closure but external to the thickness of the closure. This is designed to provide a connection without any gap of continuity between the joints above the axis of rotation and those below it. There is provided, in correspondence with the inversion of the joints of the two frames along the sides having the pivots, a joint at right angles with the longitudinal joints and parallel to the axis of rotation, in such a manner as to ensure the continuity of the joint along the whole perimeter of the frame.

Preferably, according to the invention, the movable frame is divided into two parts, opening in the manner of a book and each one of them provided with a pane, said parts determining an interspace that can contain a Venetian blind with metallic strips that can be gathered up and the blades of which can be tilted. Said movable frame can, however, be differently constituted, for instance, by only one element.

A preferred form of construction of a window closure

according to the present invention is illustrated as an exemplification in the accompanying drawings, to which the following description relates.

Fig. 1 is a schematic longitudinal sectional view showing the closure in two different positions.

Fig. 2 is a sectional view, similar to Fig. 1, but showing two further positions.

Fig. 3 is a sectional view, similar to the preceding views, but showing a further position.

Fig. 4 is a fragmentary perspective view of the complete closure.

Fig. 5 is a fragmentary perspective view, partly in section, that shows a detail of the frames with the rain water drip canals.

Fig. 6 is a schematic perspective view showing a detail of the frames in connection with the balance pivot.

Fig. 7 is a fragmentary sectional view, partly in elevation, taken on line 7—7 of Fig. 5; and

Fig. 8 is a fragmentary sectional view, showing the pivot sections with the friction device.

With reference to said figures, by A is indicated the fixed frame of the closure, while by B and C are indicated the two parts constituting the movable frame. Parts B and C are hinged together along side 2 (perpendicularly to the sides carrying the pivots) so as to permit the free opening of the frame, as indicated in Fig. 3 with an arrow Y, by an operator, for cleaning. It is understood that at least one of the other sides will have suitable means of connection of parts B and C (means not shown), such as locking means to keep the frame normally closed. In Figs. 1 to 3 are shown with full and dotted lines some positions that the movable frame can take with respect to the fixed one. The opening is effected, by turning the upper section of the parts B and C towards "Indoor" (Fig. 5), according to arrow X.

To the side posts of the fixed frame A are connected by suitable means, for instance by L-shaped sections 6, two co-axial pivot pins 4 for the rotation of the movable frame. The axis of rotation or oscillation, as the figures clearly indicate, is external, viz. is outside of the thickness of the closure and in the case illustrated it is external in respect with the surface of the closure that lays inside the room.

Around each of the pivots 4 can rotate a means of connection with the movable frame, in the example shown, a formed plate 8 with which cooperate, as will be said further on, the side posts of the movable frame B, C. Each pivot 4 carries a plate 8 and also discs 10 and plates 14. One of the discs 10 is elongated and forms a bracket connected to the stationary frame. The end of each pivot 14 is threaded and engages on the threaded end a bushing 16. By tightening the bushing 16, the friction adverse to the turning of the plate 8 is increased. Thus, the movable frame, which rests on the plates 8, may be held in a desired position by adjustment of the members 16.

Plates 14 in Fig. 8 are fixed and pressed, through friction discs 10 (made for instance from asbestos, or other suitable material) against the oscillating part of the friction device, by means of a threaded bushing 16, one bushing 16 being mounted on the threaded end of each pivot pin 4, which makes it possible to adjust the friction device.

The mechanism described admits of establishing at will the inclination of the movable part of the closure by the reason that said friction counteracts the action of gravity that tends to cause the closure to turn in a sense opposite to that of arrow X.

The particular location of the axis of oscillation with respect to the plane of the closure permits of realising a perfect continuity of the joints between movable frame B, C and fixed frame A. The latter, namely the fixed

frame A for instance, has, in fact, in the section above the axis of the pivot a joint **18** turned towards the inside (that collaborates with joint **20** turned towards the outside of the oscillating parts B and C), while in the section below the axis of pivotment the part A has a joint **22** turned towards the outside (intended to collaborate with joint **24** of frame B and C which looks towards the inside). In correspondence with the inversion of the joints is provided a joint surface orthogonal to said joints, that is, parallel with the axis of rotation of the movable frame, extending substantially along the whole width of the two longitudinal joints. Said joint surface is indicated by **26** in the drawings and has, in the example illustrated, a special shape with a prismatic projection, with the sides inclined so as not hinder the relative movement of frames $B=C$ with relation to the fixed frame A.

Plates **8**, triangular in form, are not rigidly connected to part C of the movable frame but only rest against the internal surface of the posts of said frame. The ends of the resting side of plate **8** have each a nose **28**, while a second nose **30** is provided at its side. On the side posts of part C of the movable frame are fastened a pair of hooks **32** and a second pair of hooks **34** looking in opposite directions. Each hook **32** is open towards the joint **20**, and each hook **34** open towards the joint **24**. The two hooks of each pair are displaced as compared to the hooks of the other pair on each side post so as to engage the plate **8** one with an end nose **28** and the other one with a side nose **30**.

Thus, it is evident that frame CB can slide by manual operation longitudinally relative to the support plates **8** and is pressed against the plates **8** during the sliding by gravity; the sliding may be carried out for a distance depending from the mutual distance between the paired hooks **32** and **34**, and at the end of the movement the frame is caused to be rigidly bound to said plates **8** by means of either one of the pairs of hooks. It is evident that the connection might be realized with different devices and operate for several fixed positions. When the frame is in an intermediary position between the hooks, it may be lifted off the plates **8** and if desired be redeposited thereon near one end of the frame, as shown in Fig. 3.

By observing Figs. 1 and 2 the working is obvious. In the former figure the frame loads plate **8** through the pairs of hooks **32**. However, when the frame is manually turned through 180° with respect to its closed position (Fig. 2) it transfers its weight on plate **8** through the hooks **34**. This means that the frame has slid over plates **8** in the direction of arrow Z, this being permitted by its disengagement from the upper cross piece of fixed frame that would otherwise have hindered the complete upturning towards the inside of the movable frame.

It is possible, of course, to obtain the complete disengagement of the hooks from plates **8**, and in this case frame $B=C$ can slide over said plates until it comes back inside the room, as shown by Fig. 3.

Parts B and C can be opened by the operator by turning, as said above, part B in the direction of arrow Y around hinges **2**. In the position shown in Fig. 3, the part B would be held by hand. The panes can then be cleaned in the inside and normal operations of maintenance can be carried out.

The upturning of the frame as in Fig. 2 permits cleaning the outer pane.

Either of parts B and C is preferably equipped with a pane **36** so as to create a tight chamber functioning as a thermic and acoustic insulation.

In the interspace between the two panes **36** can be disposed a blind, for instance a Venetian blind schematically indicated at **38** (Fig. 1), that may be operated even when the closure is shut (by strings not shown in the drawing). The blind should preferably be of the metallic strip type that can be gathered upwards or lowered and suitably oriented in order to have the desired screening effect.

Panes **36** are fastened by means of simple strips **40** having a rectangular section fixed to parts B and C of the movable frame.

Lower external strip **40** (Fig. 5) has internal grooves **42** corresponding to grooves **44** of part B of the frame. Said grooves create drip canals for rain water that eventually should assemble on the outside lower edge of the movable frame (and especially when said edge is inclined towards the outside). Other grooves **46** on the lower edge of the fixed frame are intended to permit the discharge of the condensate that would eventually form in the interspace between the two panes.

I claim:

1. In a balancing closure, for windows or the like, in combination, a fixed frame, a movable frame rotatable relative to said fixed frame and being slidable between two opposite extreme positions perpendicularly of its axis of rotation, journalling means between said frames operable for guiding said movable frame in rotation relative to said fixed frame and including pivoting means for said movable frame for manual rotation thereof about its axis of rotation, and having surfaces for the manual sliding of said movable frame thereon, and disposed on the exterior of said fixed frame, said fixed frame comprising an upper section including a projection facing in one direction perpendicularly of said axis and a lower section having a projection facing in an opposite direction, said movable frame having extensions for abutment with said projections for sealing said fixed frame in the closed position throughout both sections and having external slide surfaces for engagement with the surface of said journalling means, said journalling means having portions rotatable about said pivot axis and including noses on said surfaces, and means connected to said movable frame and including on each of said slide surfaces groups of hooks spaced from each other operable to engage some of the noses of said rotatable portions in each of said extreme positions.

2. In a balancing closure, as claimed in claim 1, said lower projection of said fixed frame having at least one part of prismatic shape adjacent the pivoting means for the movable frame with its side inclined for clearing the path of movement of said movable frame, said movable frame having matching prismatic recesses engaging said prismatic parts of said fixed frame when the balancing closure is shut.

3. In a balancing closure, as claimed in claim 1, said pivoting means comprising friction elements operable for frictionally engaging said rotatable portions at any desired position of inclination of said movable frame in its rotation relative to said fixed frame.

4. In a balancing closure, as claimed in claim 3, together with, said pivoting means including a threaded bushing operable to adjust the degree of friction applied by said elements.

5. In a balancing closure, for windows or the like, in combination, a fixed frame, a movable frame being revoluble and shiftable relative to said fixed frame, a pivot mechanism journalled with relation to said fixed frame and including two oppositely disposed rotatable members each having a plane slide surface, opposite portions of said movable frame abutting against said slide surfaces and being manually slidable thereon in opposite directions for the shifting of said movable frame relative to said fixed frame between opposite extreme shifting positions and being manually rotatable with said members for rotation of said movable frame relative to said fixed frame, and means apportioned between said slide surfaces and said portions of said movable frame operable for releasable latching interengagement between said movable frame and said rotatable members in each extreme shifting position.

6. In a balancing closure, as claimed in claim 5, said

last named means including two pairs of hooks secured to said movable frame for each pivot, the hooks of each pair facing in one direction, opposite to that of the other pair, and projections on said pivot mechanism operable for engaging a pair of hooks in each extreme position.

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