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(54) **Sliding and privoting assembly and release/closure mechanism threrefor**

(57) The invention relates to a release/closure mechanism for a pivoting assembly comprising an outer frame, at least one construction having a sash frame, a sash, a pivoting arrangement, a close/release button, a biasing component, first close/release interface members and second close/release interface members, whereby, to allow pivotal opening, said button is actuated to move said first interface members counter to said biasing, thereby releasing said second close/release interface members, and, upon closing, said second close/release interface members interface with said first close/release interface members urging them counter to said biasing so that said second close/release interface members can be moved to a position behind said first close/release interface members at which point said biasing component pushes said first close/release interface members to a position locking said second close/release interface members behind said first close/release interface members, and wherein said release/closure mechanism comprises at most one biasing component.

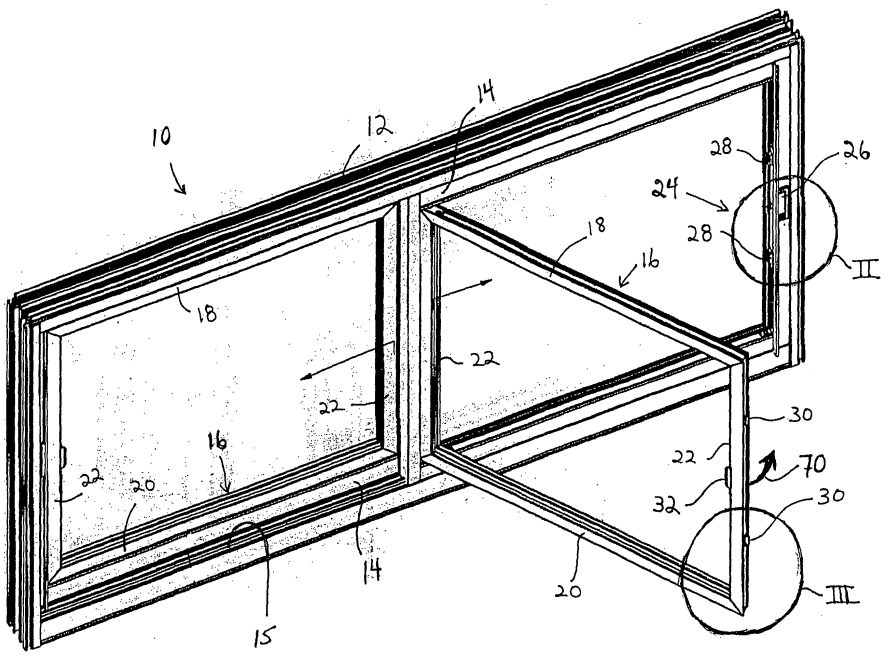

FIG. 1

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Description

FIELD OF INVENTION

[0001] The present invention relates to constructions adapted for sliding and pivoting, particularly windows and doors which may both slide from side to side and pivot open. For convenience, the invention will be described hereinbelow with reference to window constructions.

BACKGROUND OF THE INVENTION

[0002] Sliding windows which pivot inward, for example to facilitate cleaning thereof, are disclosed in the art.

[0003] An example of such a window is described in US 6,276,092 (Neo) providing a combined sliding and pivot window assembly including a plurality of sashes separately pivotally mounted on substantially C-shaped sash support frames that are slidably fixed on rails provided on an outer window frame. The window assembly includes elastic two-end locking mechanisms mounted in a lower rail of the sashes to lock the sashes at upper and lower ends to the sash support frames. The locking mechanisms include a horizontal pull member biased by a spring, a lower locking tab biased by a further spring and an upper locking tab biased by an additional spring. The movement of the tabs is controlled by a trapezoidal cam plate adapted to simultaneously urge a pin attached to the lower tab and a pin attached to a vertical transmission bar to thereby retract the tabs and release the sash for pivoting.

[0004] US Patent Nos. 4,222,201; 4,337,597; 4,592,168; and 5,065,544 provide examples of additional window assemblies with sliding and pivoting features.

SUMMARY OF THE INVENTION

[0005] In accordance with the present invention there is provided a sliding and pivoting assembly and a release/closure mechanism therefor. The sliding and pivoting assembly may be, for example, a window, a door, or the like, and for convenience will be described herein in relation to windows.

[0006] The assembly comprises an outer frame; at least one construction having a sash frame slidable in the outer frame; a sash fitted in the sash frame and including a lower rail, upper rail and pair of stiles; a pivoting arrangement allowing at least one portion of the sash to pivot away from the sash frame; and a release/closure mechanism, for releasing the sash, thereby allowing it to pivot, and for locking it within the sash, the release/closure mechanism comprising: a close/release button; a biasing component for biasing the button; first and second close/release interface members being correspondingly disposed and designed to interface one with the other, whereby, to allow pivotal opening of the construction, the button is actuated to move the first interface members in a direction counter to the biasing thereby releasing the second interface members, and, upon closing of the construction, the second close/release interface members interface with the first close/release interface members urging them in a direction counter to the biasing so that the second close/release interface members can be moved to a position behind the first close/release interface members at which point the biasing component pushes the first close/release interface members to a position locking the second close/release interface members behind the first close/release interface members, and wherein the release/closure mechanism comprises at most one biasing component.

[0007] The release/closure mechanism comprises an outer frame; at least one construction having a sash frame slidable in the outer frame; a sash fitted in the sash frame and including a lower rail, upper rail and pair of stiles; a pivoting arrangement allowing at least one portion of the sash to pivot away from the sash frame; a close/release button; a biasing component for biasing the button; first and second close/release interface members being correspondingly disposed and designed to interface one with the other, whereby, to allow pivotal opening of the construction, the button is actuated to move the first interface members in a direction counter to the biasing, thereby releasing the second interface members, and, upon closing of the construction, the second close/release interface members interface with the first close/release interface members urging them in a direction counter to the biasing so that the second close/release interface members can be moved to a position behind the first close/release interface members at which point the biasing component pushes the first close/release interface members to a position locking the second close/release interface members behind the first close/release interface members; and wherein the release/closure mechanism comprises at most one biasing component.

[0008] According to a particular embodiment of the present invention, the release/closure mechanism further comprises a rod mechanically connecting the button and close/release tabs.

[0009] A particular feature of the assembly and release/closure mechanism of the present invention is that the mechanism is simple and comprises few components, therefore allowing for easy and low cost manufacture and maintenance thereof and simple operation.

[0010] Another particular feature of the present invention is that it need comprise no more than one biasing component while allowing reversible pivotal opening and locked closing of the window.

[0011] A further particular feature of the present invention is that it comprises no cam plate to induce movement of any components in order to allow reversible pivotal opening and locked closing of the window.

DETAILED DESCRIPTION OF THE DRAWINGS

[0012] The invention may be more clearly understood

upon reading of the following detailed description of non-limiting exemplary embodiments thereof, with reference to the following drawings, in which:

Fig. 1 is a perspective view of an embodiment of a window of the present invention;
Fig. 2 is an exploded perspective view of portions II and III of the window of Fig. 1;
Fig. 3 is a perspective view with a cut-away illustrating an embodiment of a release/closure mechanism of the present invention;
Fig. 4 is a sectional view taken along line IV-IV of Fig. 3; and
Figs. 5A and **5B** are exploded perspective views of an embodiment of a pivoting mechanism of the window of the present invention; Fig 5B being an enlarged view of portion V of Fig. 5A.

DETAILED DESCRIPTION OF THE INVENTION

[0013] Referring initially to Fig. 1, there is shown an embodiment of a window assembly **10** of the present invention comprising an outer frame **12,** sash support frames **14** with tracks **15,** and sashes **16.** The sashes **16** comprise an upper rail **18,** lower rail **20** and a pair of stiles **22** (hereinafter, collectively referred to as a *window,* which typically comprises a window pane; not shown).
[0014] The window assembly **10** further comprises a release/closure mechanism **24** including a close and release lever or button **26,** a pair of close/release tabs **28** and a pair of close/release brackets **30** correspondingly located with the tabs and adapted to interact therewith. The close/release button **26** has a low profile to allow free sliding passage of an outer window passed any adjacent inner window. The button **26** may thus project out only a minimal distance from the sash support frame **14,** be flush thereto or be recessed. A handle **32** is also provided to facilitate pivotally opening the window.
[0015] Figs. 2-4 provide details of the release/closure mechanism **24.** The button **26** has integral therewith, or connected thereto, a projection **34,** which in turn interfaces with a rod **36,** for example by passing through a slot **38** therein. The close/release tabs **28** (only one seen in Figs. 2-4) are attached to the rod **36** at upper and lower locations thereof. The rod **36** is biased upward, for example by a spring **40,** and thus the button **26** and tabs **28** are so biased.
[0016] The close/release brackets **30** are L-shaped having legs **42** and **44,** the latter having a lower surface **46.** The tabs **28** have a slanted top surface **48** adapted to interface with the bottom surface **46** of the brackets **30,** as will be discussed below.
[0017] Figs. 5A and 5B illustrate an example of a pivoting arrangement **50,** which may include identical sets of components located at the two corners of one side of the window, designated as corners **52** and **54,** for allowing the windows to pivot (the components being shown only at corner **52**). The pivoting arrangement **50** comprises an angle bracket **53** connected to a corner of the sash **16,** corresponding to the corner **52,** by suitable fastening means such as screws **54.** The angle bracket **53** comprises a pivot pin **56** having a washer **58** associated therewith.
[0018] The pivoting arrangement **50** further comprises a plate **60** attached to the sash support frame **14** at corner **52** and attachable thereat by any suitable means. The plate **60** comprises a suitably sturdy element **62** corresponding to the pin **56** designed to allow the pin to pivot thereat. The pin **56** may alternatively be received by a portion (not illustrated) of the sash support frame **14,** which may for such purpose should be an appropriately reinforced portion thereof.
[0019] It should be understood that the pivoting arrangement **50** could be adapted to allow the window to pivot, for example, at its midpoint, whereby one side of the window pivots inward and one side pivots outward, with only minor changes to the pivot arrangement; essentially accomplished by designing the angle bracket **53** as a flat plate (like plate **60**) with a pin like pin **56.** It should be further understood that the positions of the pins **56** and elements **62** could be reversed whether the pivoting arrangement **50** is at the corners **52, 54** or at some point along the sashes **16** and rails **18, 20.**

Operation:

[0020] Assuming that the window is initially in a pivot-open position (e.g. as shown in Fig.1), to close the window, it is pushed in a direction shown by arrow **70.** When the window is about to close, the lower surfaces **46** of the close/release brackets **30,** will interface with corresponding slanted top surfaces **48** of the close/release tabs **28.** At this point, the action of the brackets **30** on the slanted faces **48** as the window is closed will push the tabs **28** downward in the direction of arrow **72** (Fig. 3), against the upward force of the spring **40.** When the brackets **30** have reached the backside of the tabs **28** and the window is closed, the tabs will be freed and will be pushed upward by the spring **40,** thus locking the brackets behind the tabs to secure the window in the closed position.
[0021] To open the window, the button **26** is pushed against the force of spring **40** thereby lowering projection **34,** rod **36** and tabs **28.** This frees the brackets **30** from behind their corresponding tabs **28** whereby the window may be opened, possibly with the aid of handle **32.**
[0022] Additional embodiments include the following:

(a) the release/closure mechanism **24** could be designed in a reverse fashion. In other words, the button **26** and tabs **28** could be biased downward, with slanted faces **48** being at the bottom of the tabs. The top surface of the leg **44** of the brackets **30** would then interface with the bottom face of the tabs **28** to urge them upward upon pivot-closing of the window.
(b) To release the window to allow pivoting, the but-

ton **26** could be pushed in any of a variety of motions including downward, upward or inward. Operation by an upward or downward pushing on the button **26** should be understood by the above description, whereas releasing the operation by pushing inwardly can be realized, for example, by a portion or component of the button comprising a slanted face, analogous to that of surface **48,** adapted to interface with the projection **34** to urge it in a direction counter to the biasing direction of spring **40.**

(c) Instead of the tabs **28** being biased, the brackets **30** could be biased, either upward or downward, and upon pivot-closing of the window the slanted top surfaces **48** of the tabs **28** would push their corresponding brackets **30** downward or upward, respectively, until the brackets are located behind the tabs whereupon the brackets would be urged back upward or downward, respectively, by the spring **40** to lock behind the tabs. In such a case, the button **26** would actuate movement of the brackets **30** instead of the tabs **28,** *mutatis mutandis.*

[0023] The above-described embodiment of the window assembly **10** of the present invention comprises two close/release tabs **28** and close/release brackets **30.** Such an assembly secures the window at more than one point to provide desirable characteristics such as better sealing, limiting window warpage, etc. To potentially enhance these characteristics, the assembly **10** may comprise more than two sets of tabs and brackets.

[0024] Alternatively, according to a particular embodiment of the present invention (easily understood and thus not shown), a more simple window assembly is provided wherein the assembly comprises only one tab and bracket arrangement. Such arrangement is typically located midway along the stile **22** and adjacent the button **26.** With such a configuration, not only is there one less tab and bracket arrangement, there is no need for the rod **36,** and the tab **28** may be directly connected to the button's projection **34.**

[0025] Alternatively, the window assembly **10** could be one comprising a window that pivots out from the top, pivoting at lower corners of the window, or, pivoting at a point along the right and left stiles of the window - for example at the midpoint thereof.

[0026] There are a variety of sliding and pivoting assemblies or constructions (e.g. windows, doors and the like), and release/closure mechanisms therefor, that can be devised according to the present invention and that the above description is merely explanatory. Thus, the present window and release/closure mechanism therefor can be embodied in a variety of aspects falling within the scope of the present invention, *mutatis mutandis.*

Claims

1. A release/closure mechanism for a pivoting assembly comprising:

an outer frame;
at least one construction having a sash frame slidable in said outer frame;
a sash fitted in said sash frame and including a lower rail, upper rail and pair of stiles;
a pivoting arrangement allowing at least one portion of said sash to pivot away from said sash frame;
a close/release button;
a biasing component for biasing said button;
first close/release interface members and second close/release interface members being correspondingly disposed and designed to interface one with the other, whereby,
to allow pivotal opening of said construction, said button is actuated to move said first interface members in a direction counter to said biasing, thereby releasing said second close/release interface members, and, upon closing of said construction, said second close/release interface members interface with said first close/release interface members urging them in a direction counter to said biasing so that said second close/release interface members can be moved to a position behind said first close/release interface members at which point said biasing component pushes said first close/release interface members to a position locking said second close/release interface members behind said first close/release interface members; and
wherein said release/closure mechanism comprises at most one biasing component.

2. The release/closure mechanism according to claim **1**, wherein the first close/release interface members are constituted by at least one close/release tab and the second close/release interface members are constituted by at least one close/release bracket.

3. The release/closure mechanism according to claim **2,** wherein the tab(s) comprise a slanted surface adapted to slidingly interface with a portion of the bracket(s) to urge the tabs in a direction counter to the biasing, upon pivotal closing of the construction.

4. The release/closure mechanism according to any of the preceding claims, wherein the close/release button is disposed in the sash frame.

5. The release/closure mechanism according to any of the preceding claims, wherein the close/release button is disposed in the stile.

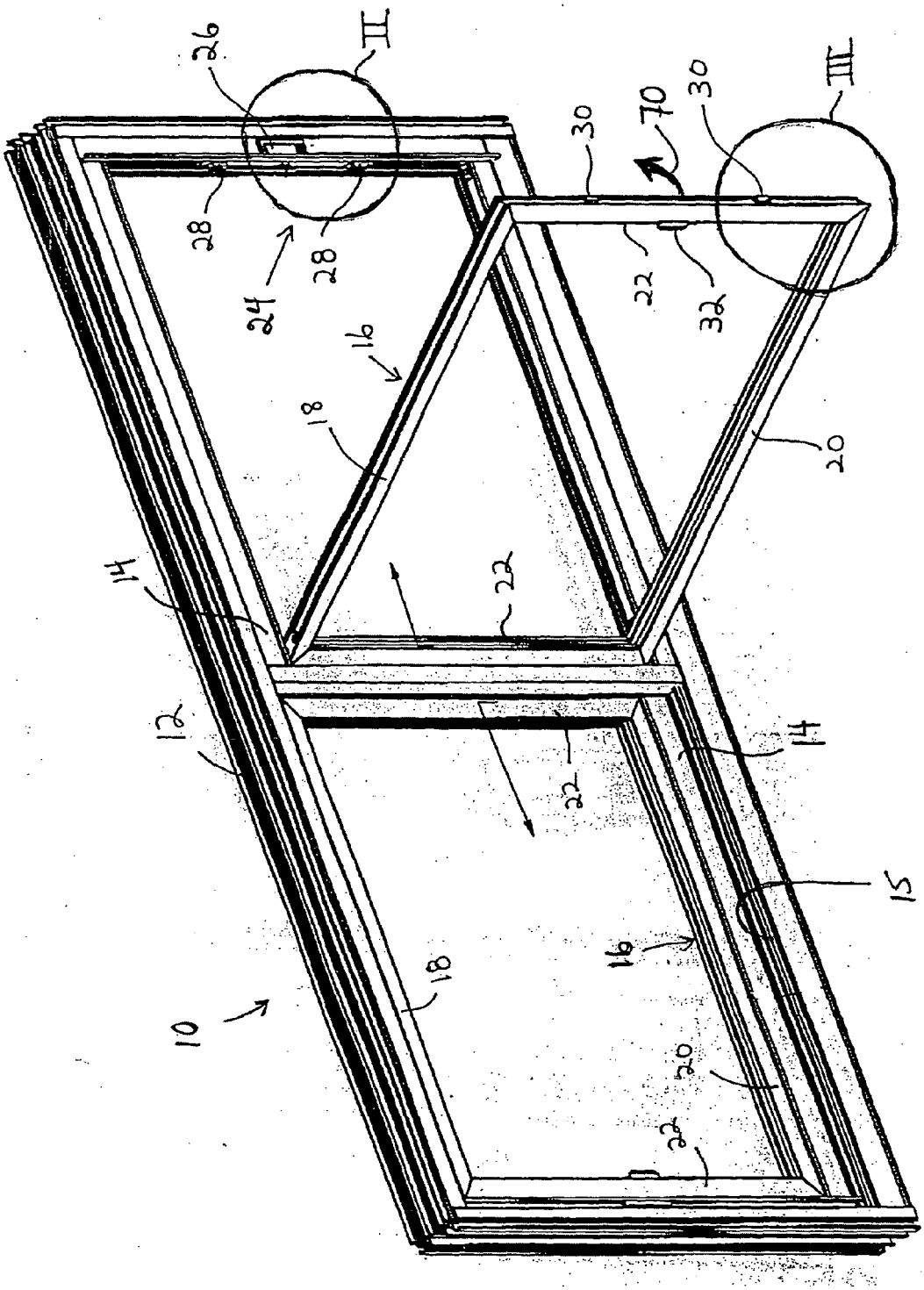
6. The release/closure mechanism according to any one of claims **2-5,** wherein the close/release button actuates the tab(s).

7. The release/closure mechanism according to any one of claims **2-6,** wherein the close/release button actuates the bracket(s).

8. The release/closure mechanism according to any one of claims **1-7,** further comprising a rod adapted to transfer movement actuated by the button, to one interface members.

9. A sliding and pivoting assembly comprising: an outer frame; at least one construction having a sash frame slidable in said outer frame; a sash fitted in said sash frame and including a lower rail, upper rail and pair of stiles; a pivoting arrangement allowing at least one portion of said sash to pivot away from said sash frame; and a release/closure mechanism as defined in any one of claims **1 - 8,** for releasing said sash, thereby allowing it to pivot, and for locking it within said sash.

10. The sliding and pivoting assembly according to claim **9,** wherein it is constituted by a window assembly and the construction is a window.


II
III
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28
24
30
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12
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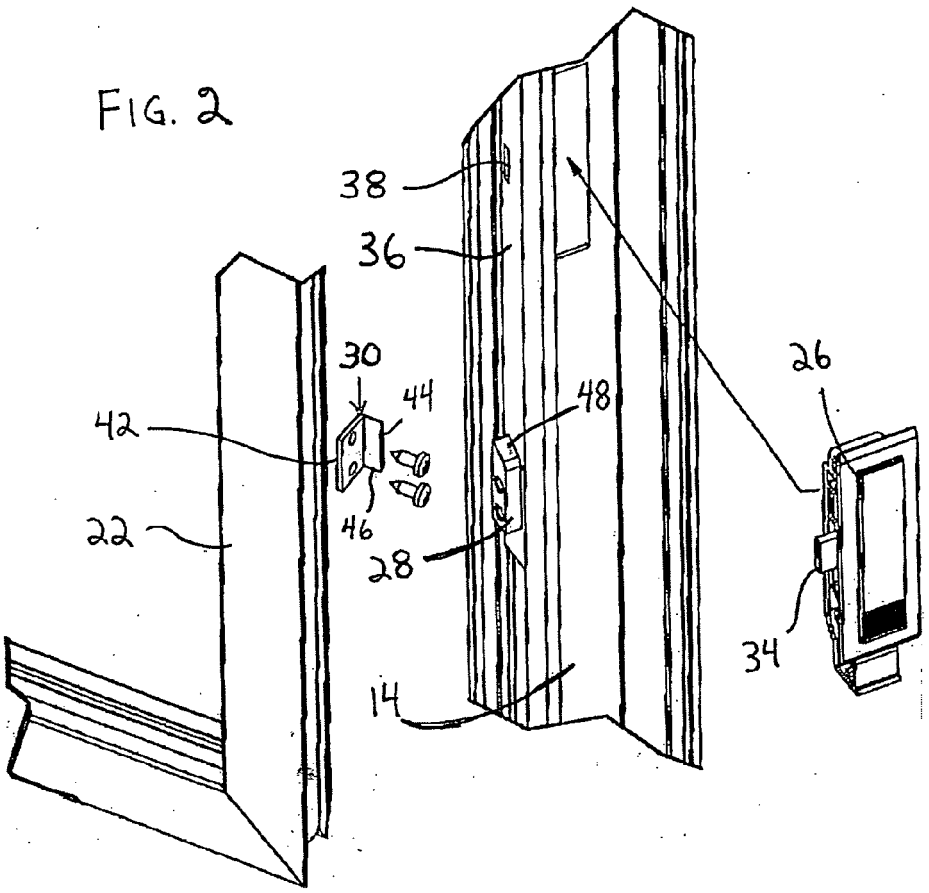
18
10
20
22

FIG. 1

FIG. 2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36
30
44
48
26
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46
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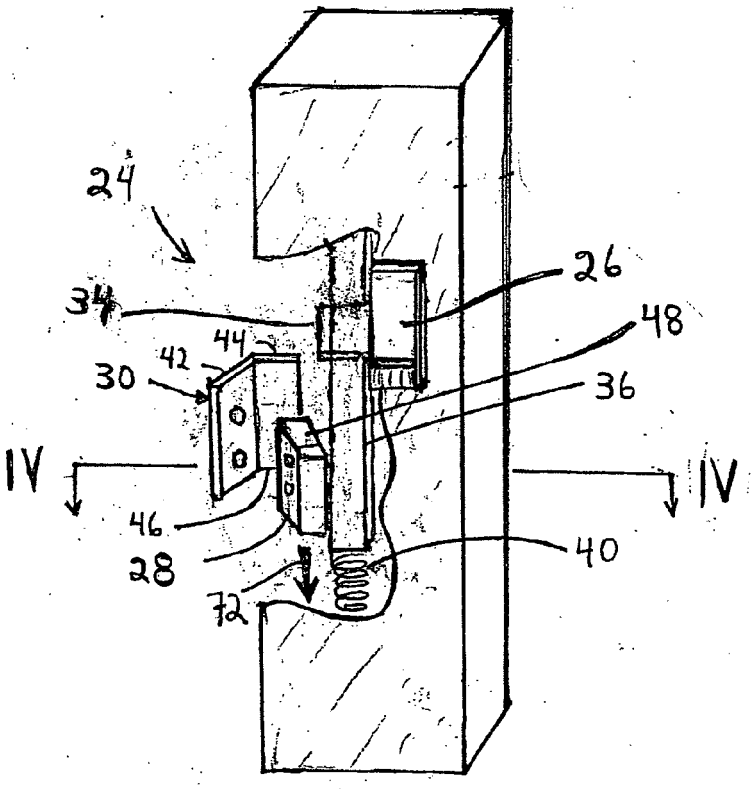
28
34
14


24
26
34
48
44
42
30
36
IV
IV
46
40
28
72

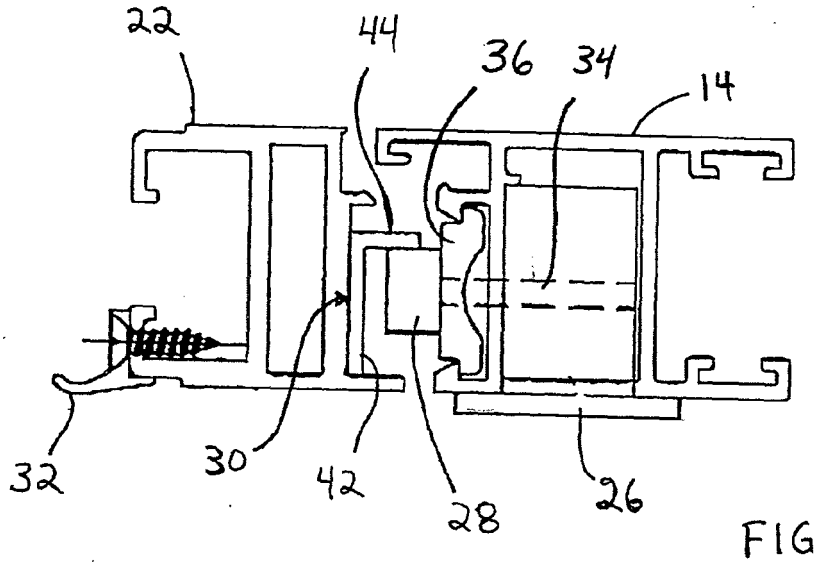


FIG. 4

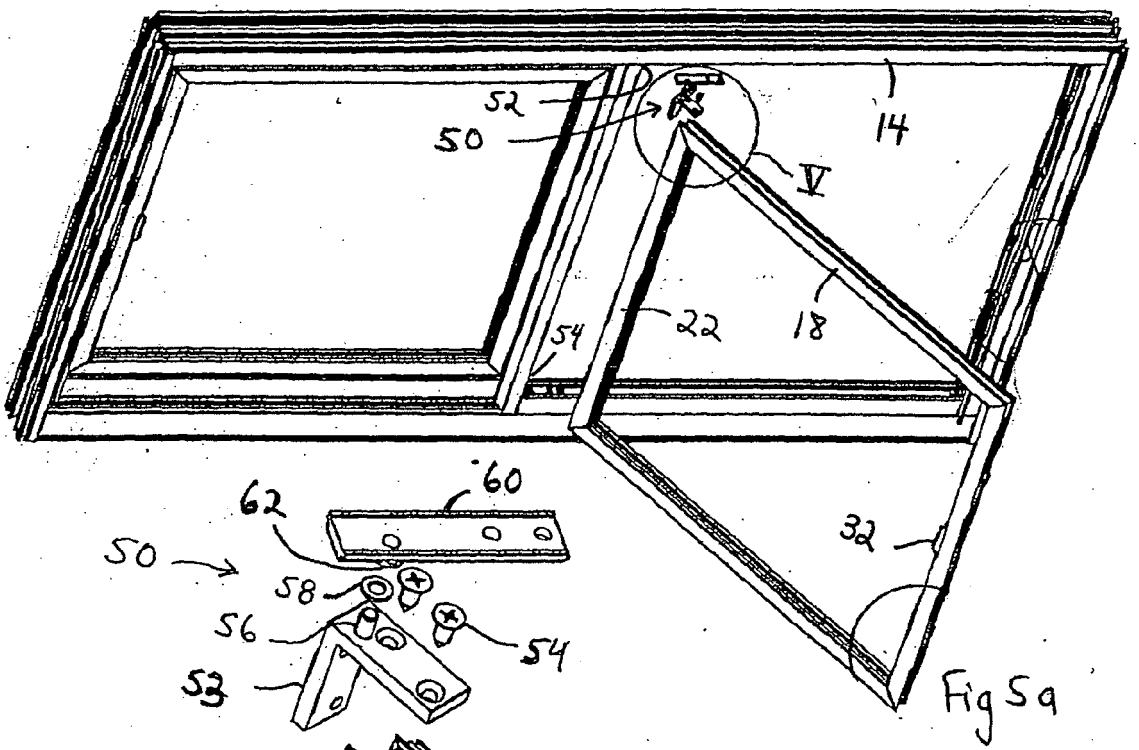


Fig 5a

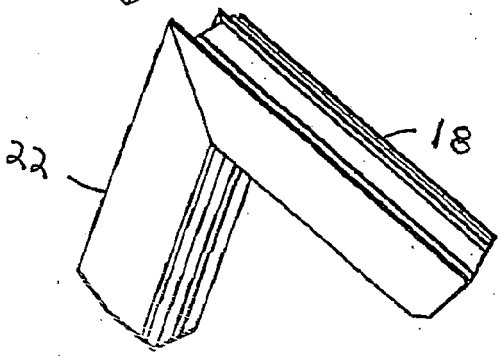


FIG. 5b

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EUROPEAN SEARCH REPORT

Application Number
EP 06 07 6524

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Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
X	US 4 553 353 A (SIMPSON HAROLD [US]) 19 November 1985 (1985-11-19) * figure 2 * -----	1-10	INV. E05D15/58
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TECHNICAL FIELDS SEARCHED (IPC)

E05D
E05C

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
Munich	21 November 2006	Yates, John

CATEGORY OF CITED DOCUMENTS

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3

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REFERENCES CITED IN THE DESCRIPTION

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