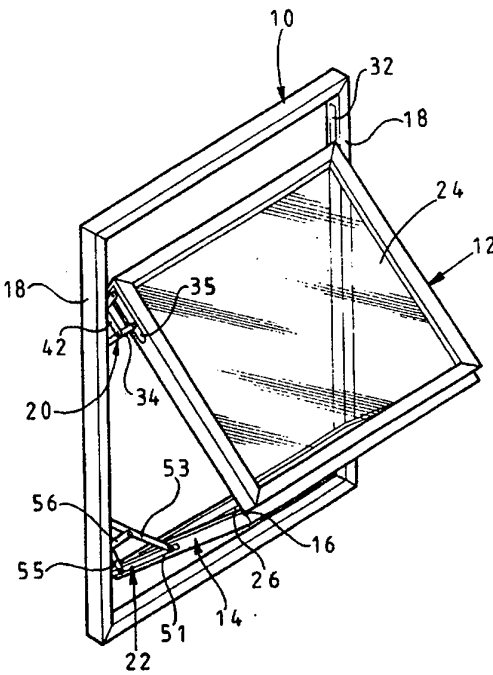




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(21) International Application Number: PCT/GB94/00084 (22) International Filing Date: 14 January 1994 (14.01.94) (30) Priority Data: 9300820.9 16 January 1993 (16.01.93) GB (71) Applicant (for all designated States except US): DECEUN- INCK LIMITED [GB/GB]; Porte Marsh Industrial Estate, Stanier Road, Calne, Wiltshire SN11 9PX (GB). (72) Inventor; and (75) Inventor/Applicant (for US only): WATTS, Peter, David [GB/GB]; 16 Southcliff Road, Market Lavington, Devizes, Wiltshire SN10 4BZ (GB). (74) Agent: A.R. DAVIES & CO.; 27 Imperial Square, Cheltenham, Gloucestershire GL50 1RQ (GB).		(81) Designated States: AT, AU, BB, BG, BR, BY, CA, CH, CN, CZ, DE, DK, ES, FI, GB, HU, JP, KP, KR, KZ, LK, LU, LV, MG, MN, MW, NL, NO, NZ, PL, PT, RO, RU, SD, SE, SK, UA, US, UZ, VN, European patent (AT, BE, CH, DE, DK, ES, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, ML, MR, NE, SN, TD, TG). Published <i>With international search report.</i>
(54) Title: A WINDOW ASSEMBLY 		

(57) Abstract

A window assembly comprises a fixed rectangular open frame (10) and a movable vent comprising two rectangular vent frames (12, 14), one above the other and hingedly connected together along their adjacent edges. Parts of each vent frame remote from the hinge (16) are mounted, by pivoting stays (20, 22), between opposite side frame members of the fixed frame, and the stays are also designed to allow up and down movement of the edges of the vent frames. This allows the vent frames to be moved from a closed position, where they lie flat and one above the other within the fixed frame, to an open position where the vent frames extend in a V-formation with the hinge connection (16) displaced out of the general plane of the fixed frame. The arrangement allows the outer surfaces of the window to be cleaned from inside the building without creating a large enough opening for a child to fall through.

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"A Window Assembly"

The invention relates to window assemblies, and particularly, but not exclusively, to window assemblies for use in high-rise buildings i.e. buildings
5 with three or more floor levels.

It is now common practice for architects and local authorities to specify that windows in high rise buildings must be both child-safe and easily cleaned from inside the building. This often applies both to
10 replacement windows as well as to windows in new buildings.

One common form of window which is designed to meet the cleaning requirement has a vent the sides of which are connected to the fixed frame by hinges which
15 allow the vent to pivot about a horizontal axis which is intermediate the upper and lower edges of the vent. The hinges may be simple pivotal mountings between the vent and the fixed frame members, in which case the axis of pivoting is fixed, or, as is well known, they may be in
20 the form of friction stays, for example four-bar stays, which permit the vent to swing to the open position and therefore, in effect, pivot about a moving axis. In each case the axis of pivoting is normally horizontal, although arrangements are also known where the axis is
25 vertical.

Such arrangements permit the vent to be pivoted to a horizontal, or nearly horizontal position which then allows the outer surface of the glazing panel

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in the vent to be cleaned from inside the building. Some designs of window allow the vent to be almost completely rotated so that the external surface of the glazing panel faces into the interior of the building.

5 While such windows meet the criterion of easy cleaning, they are deficient in terms of child-safety. Normally, some form or lock of lockable stay is provided to limit the extent to which the window can be opened and these are usually so designed that the window cannot
10 normally be opened to a sufficient extent as to enable a child to fall out of the window. However, since cleaning requires the window to be pivoted through a greater angle, the safety devices must be capable of disengagement. For the purposes of child-safety the
15 devices are normally fitted with child-proof locks and these are usually sufficient to prevent the child from opening the window to an unsafe position. However, when the window has been opened for cleaning it is necessarily in an unsafe position and there is therefore
20 a risk of a child falling out of the window should it be left in the position for cleaning, even temporarily.

The present invention therefore sets out to provide a novel form of window assembly where the external surface of the glazed vent can be cleaned from
25 inside the building without necessarily moving the vent to a position where there is a risk that a child could fall out of a window.

According to the invention, therefore, there

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is provided a window assembly comprising a fixed rectangular open frame and a vent movable into and out of the fixed frame, wherein the movable vent comprises two rectangular vent frames hingedly connected together along adjacent edges of the same length, parts of each vent frame remote from said hinge connection being pivotally mounted between opposite frame members of the fixed frame, and at least one of the vent frames also being mounted for translational movement longitudinally of said opposite frame members, whereby the vent frames may be moved from a closed position, where they lie flat and side-by-side within the fixed frame, to an open position where the vent frames are pivoted relatively to one another and to the fixed frame into a V-formation where the hinge connection between the vent frames is displaced out of the general plane of the fixed frame, such pivoting movement being permitted by accompanying translational movement of one or both vent frames longitudinally of said opposite frame members of the fixed frame.

Preferably both vent frames are mounted for translational movement longitudinally of said opposite frame members.

Normally the window assembly will be so orientated that the hinge connection between the vent frames is horizontal so that, as the frames are pivoted towards the open position, the top of the upper vent frame moves downwardly and the bottom of the lower vent

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frame moves upwardly. However, the invention does not exclude arrangements where the hinge connection is disposed vertically.

The pivoting movement of the vent frames
5 brings the outer glazed surface of each vent closer to the horizontal while the translational movement of the upper and lower edges of the upper and lower vent frames respectively provides gaps through which the outer surfaces of the vents are accessible for cleaning
10 purposes. Since these gaps only have to be wide enough to permit the passage of an arm and/or cleaning implement, the pivotal mountings of the vent frames can be so designed as to restrict the translational movement to this small amount. The window therefore never
15 requires to be opened to an extent where a child could fall out of it. In spite of the limited gap thus provided at the top and bottom of the window when open, greater ventilation is provided than might otherwise be the case with such gaps, since the V configuration of
20 the vent frames allows the passage of air into and out of the building through the V-shaped gaps at the sides of the projecting vent frames. Other advantages are also provided by the invention, which will be described below.

25 Preferably each vent frame is mounted between said opposite fixed frame members by a pair of pivotal connectors, each connector being mounted between one of said opposite fixed frame members and an adjacent frame

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member of the respective vent frame.

The connectors of at least one of said two pairs of connectors may include a link pivotally connected between one of said opposite fixed frame members and the adjacent frame member of the respective vent frame, whereby said translational movement of the vent frame is permitted by swinging movement of said links as the vent frame is pivoted towards the open position.

10 Alternatively or additionally the connectors of at least one of said two pairs of connectors may each include a pivotal connection between one of said opposite fixed frame members and the adjacent frame member of the respective vent frame, the pivotal connection being displaceable longitudinally of said fixed frame member to permit said translational movement of the vent frame. For example, the pivotal connection may be provided between a part on the vent frame and a slider which is displaceable along a fixed guideway
15 extending longitudinally of the fixed frame member. Means may be provided for releasably locking the slider to the guideway to prevent translational movement of the respective vent frame when required.

Each connector which includes a pivotal link
25 may further include a guideway extending longitudinally of the respective fixed frame member, a slider displaceable along that guideway, and a second link pivotally connected between the slider and the first

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said link. In this case a third link may also be pivotally connected between the slider and a part of the respective vent frame. Also means may be provided for releasably locking the slider to the guideway to prevent translational movement of the respective vent frame when required.

In any of the above arrangements means may be provided for clamping or locking one or more of the pivotal connections to prevent pivotal movement thereof, so as to lock the vent frames in a required position.

Preferably the connectors between at least one of the vent frames and the fixed frame are detachable, whereby that vent frame may be detached from the fixed frame while remaining hingedly connected to the other vent frame. Such possible detachment is desirable in extraordinary circumstances, for example to enable escape through the window in an emergency. However, the detachable connection may readily be made childproof and, unlike the known arrangements referred to earlier, there will be no necessity of detaching the connectors during normal use of the window, including cleaning.

In a preferred window assembly according to the invention the vent frames are disposed one above the other, the upper vent frame being connected to the fixed frame by connectors including pivotal links to provide the required translational movement, and the lower vent frame being connected to the fixed frame by connectors including sliders and guideways to provide the necessary

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translational movement. In this case it is preferably the connectors of the lower vent frame which are detachable for emergency use.

The following is a more detailed description of an embodiment of the invention, by way of example, reference being made to the accompanying drawings in which:

Figure 1 is a diagrammatic perspective view of a window assembly in accordance with the invention,

Figure 2 is a vertical section through the window assembly, shown in a closed position, and

Figures 3 to 5 are vertical sections through the window assembly showing three different open positions.

Referring to Figure 1, the window assembly comprises a fixed rectangular frame 10 which in use is mounted in the window aperture of a building. The movable window vent comprises an upper vent frame 12 and a lower vent frame 14 hingedly connected together by a horizontal hinge 16.

The upper vent frame 12 is pivotally mounted between the opposite vertical frame members 18 of the fixed frame 10 by two friction stays 20 which are so designed, as will be described, to effect downward translational movement of the upper edge of the vent frame 12 as the vent frame is swung outwardly.

The lower vent frame 14 is pivotally connected to the vertical frame members 18 by connectors 22 which

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are of a different type to the friction stays 20 but which also allow, if required, upward translational movement of the lower edge of the vent frame 14 as the vent frame is pivoted outwardly.

5 As will be seen from Figure 1 the construction is such that as the vent frames 12 and 14 are swung towards an open position they are pivoted into a V-formation where the hinge connection 16 is displaced out of the general plane of the fixed frame 10. This
10 provides ventilation and also, as will be described, allows access to the external surfaces of the glazing panels 24 and 26 of the vent frames while still ensuring that the window is child-safe.

The hinge connection 16 may be a simple hinge
15 or may preferably be a compound hinge of the kind described in the above-mentioned co-pending British Patent Application No. 9324331.9, which also describes a window assembly according to the present invention.

Referring now to Figure 2 to 5, the fixed
20 outer window frame 10 is formed in known manner from four sections of any suitable material, for example extruded plastics, connected together to form the rectangular frame.

Similarly, each of the vent frames 12 and 14
25 is also formed from four sections of suitable material connected together to form a rectangular frame in which the glazing panels 24 and 26 are mounted. The details of construction of the fixed frame 10 and the vent

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frames 12 and 14 do not form a part of the present invention and these frames may be of any of the alternative forms of construction or design available in the window industry. For example, the frames might be
5 formed from welded plastics extrusions, metal extrusions, combination metal and plastics frame members, or they might even be formed from traditional materials such as wood.

The frame members may be provided with
10 conventional sealing means, for example resilient glazing gaskets, to provide a weather-tight seal at the junction between the vent frames and the fixed frame 10 around the periphery of the window. A weather-tight seal may also be provided between the lower edge of the
15 upper vent frame 12 and the upper edge of the lower vent frame 14. For example the vent frames may be formed with sealing elements 28, 30 which extend along the two hingedly connected vent frame members and are brought into sealing engagement with one another when the vent
20 frames are brought to the closed position, as shown in Figure 2.

Figures 3 to 5 show in greater detail two suitable forms of connector between the vent frames and the fixed frame to provide the necessary pivoting and
25 translational movement. These connectors may be of the kinds described in greater detail in the above-mentioned co-pending British Patent Application No. 9324331.9, although the present invention is not limited to the

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use of connectors of this type.

As best seen in Figures 3 and 4 each upper connector 20 is a friction stay which includes a fixed vertical guideway 32 which is mounted, for example by screwing, adjacent the upper end of the inner surface of each vertical fixed frame member 18. A link 34 is connected at one end, by a pivot pin 36, to a slider 38 which is restrained for vertical sliding movement along the guideway 32. The opposite end of the link 34 is pivotally connected to a bar 35 (see Figure 1) which is mounted longitudinally on the respective side frame member of the upper vent frame 12. A second slider 40 is slidable vertically along the guideway 32, above the slider 38, and the upper end of a further link 42 is pivotally connected to the upper slider 40 by means of a pivotal connection 44. The lower end of the link 42 is connected by a pivotal connection 46 to the link 34 intermediate its ends. Finally a third link 48 extends from a pivotal connection on the slider 40 to the upper end of the aforementioned bar 35 mounted on the side member of the vent frame 12, to which it is connected by a pivotal connection.

The stay 20 allows the upper vent frame 12 to be pivoted outwardly towards the positions shown in Figures 3 to 5, such outward pivoting movement of the vent frame 12 being accompanied by translational downward movement of its upper edge, controlled by downward sliding movement of the sliders 38 and 40 along

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the guideway 32.

As the upper vent frame 12 swings outwardly the two sliders 38, 40 move closer towards one another and a child-proof stop mechanism is provided to limit the angular extent of initial opening of the window. The stop mechanism comprises a locking bar 33 pivotally mounted at its upper end on the upper link 48 at a position intermediate the pivoted ends of the link 48. The lower end of the locking bar 33 is formed with a detent recess 35 which comes into engagement with an extension of the pivot pin 36 when the upper vent frame 12 reaches a predetermined angle of opening, bringing the sliders 38 and 40 to a predetermined distance from one another. The locking bar 33 is biased by gravity and/or by a spring arm 37 into engagement with the extension of the pin 36.

Accordingly, the locking bar 33 locks the window in the open position shown in Figure 3 and opening beyond this position can only be effected by manually displacing the locking bar 33 so that the detent recess 35 disengages from the pin 36, thus allowing further relative movement of the sliders 38 and 40 towards one another, and thus permitting further angular opening of the upper vent frame 12. It will be appreciated that to permit such further opening movement it is necessary to disengage both locking bars 33 on the two stays at the opposite sides of the upper vent frame 12. Such simultaneous disengagement of these locking

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bars will normally be beyond the capabilities of a small child.

In operation of the two stays 20, the freedom of movement of the vent frame is controlled by frictional restraint between the sliders 38, 40 and guideway 32 and/or between the pivotal connections and the parts which they connect. The frictional engagement between one or both of the sliders 38, 40 and guideway 32 may be adjustable, for example by means of a screw passing through the slider and engaging the guideway and locking means may, if required, be provided to lock one or both sliders in a required position to limit the extent to which the upper vent 12 may be opened. Alternatively or additionally there may be associated with the guideway 32 an adjustable locking element which limits the downward movement of the lower slider 38 to a required range. Such locking devices may be of any known kind, and may also be rendered child-proof, as is well known.

Friction stays of a number of different designs are well known which provide pivotal and translatable movement of a window vent and the particular form of stay indicated at 20 is only one example of the type of stay which might be suitable for use in the present invention. Many other forms of such stay may be applicable, including four-bar stays where the lower pivotal connection is provided at a fixed position on the guideway 32 and is not carried by a lower slider.

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In a further form of stay the link 42 is omitted and both links 34 and 47 are pivotally connected to fixed locations on the fixed window frame. In this case the translational movement of the vent is provided
5 solely by the swinging movement of the pivoted links.

In the example shown, the connector 22 between each vertical frame member 18 and the lower vent frame 14 is of a different type from the friction stays 20. Each connector comprises a fixed vertical guideway 50
10 along which is movable a single slider 52.

A link 53 is pivotally connected at one end to the guideway 50 by a fixed pivot point 54. The opposite end of the link 53 is pivotally connected to a bar 51 (see Figure 1) which is mounted longitudinally along the
15 respective side frame member of the lower vent frame 14. A further link 55 is pivotally connected at one end to the slider 52 and at the opposite end to a location on the aforementioned bar 51 mounted on the side member of the vent frame 14. Another link 56 is pivotally
20 connected at one end to the slider 52 and at its opposite end to a location intermediate the ends of the link 53.

As the lower vent frame 14 is swung outwardly towards the positions shown in Figures 3 and 4, the
25 connector 22 provides the necessary pivoting movement of the lower end of the vent frame, and also allows vertical translational movement of the lower end of the vent frame, by virtue of this pivoting movement and the

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vertically sliding movement of the slider 52 on the guideway 50.

In a simpler alternative form of connector for connecting the lower vent frame 14 to the fixed window frame, the connector may comprise a single link, one end of which is connected to a slider on the guideway 50 and the opposite end of which is connected to the side frame of the lower vent frame 14. In this case pivotal movement of the lower vent frame is provided by the pivotal connection between the single link and the slider whereas the vertical translational movement is provided by vertical movement of the slider along the guideway 50.

Again, the connector 22 shown in Figures 3 and 4 is only one example of many different forms of connector or stay which may be employed to provide the necessary pivoting and translational movement.

A handle 58 is mounted on the inner face of the upper frame member of the lower vent frame 14 and enables manipulation of the window vent to move it between the open positions shown in Figures 3 and 4 and the closed position shown in Figure 2.

It will be seen that in the open position of the window vent shown in Figure 4 the downward translational movement of the upper vent frame 12 forms a gap 60 at the top of the window which may be made deep enough to allow the passage of an arm or cleaning implement for the purpose of reaching and cleaning the

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outer surface of the glazing panel 24 which has been tilted to face upwardly and is thus accessible through the gap 60.

Similarly, the upward translational movement of the lower vent frame 14 forms a gap 62 at the bottom of the window which may be increased sufficiently to allow an arm or cleaning implement to be passed through the gap to clean the outer surface of glazing panel 26 which now faces downwardly due to the pivotal movement of the vent frame 14. In practice, both of the gaps 60 and 62 will be too narrow to enable a child to fall out of the window even when the window vents are fully opened for the purposes of cleaning. It will be appreciated that such full opening of the window vents will normally only be required for cleaning purposes, and for ventilation purposes, as shown in Figure 3, the gaps will generally be smaller than those required for cleaning.

Although gaps at both the top and bottom of the window are required for cleaning purposes, for the purposes of ventilation alone it may sometimes be desired to have a gap only at the top of the window. In the alternative form of connector mentioned above, where the lower connector comprises a simple pivot on a slider, means may be provided to lock the slider to its guideway so that the lower vent frame 14 merely pivots about the pivotal connection on the slider without accompanying vertical translational movement of the

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lower part of the vent frame. All of the vertical movement necessary to allow pivoting of the vent frames is in this case performed by the upper vent frame 12 moving downwardly. This provides a further safety feature if it is not wished to have any gap at the lower part of the window which is accessible to a child.

In order to provide absolute safety, the connector between the lower vent frame 14 and the side frame of the window could comprise simple connectors which provide pivotal movement only, and do not provide any upward translational movement. In this case it would be impossible to provide a gap at the lower edge of the window and this will provide absolute safety against a child falling out. However, it will be appreciated that this arrangement would negate one of the major advantages of the invention since it would be difficult or impossible to clean the outer surface of the glass of the lower vent from inside the building.

For use in an emergency, the pivotal connections between the lower vent frame 14 and the fixed window frame are preferably detachable so that, in an emergency, the lower vent frame 14 may be completely detached from the window frame and swung outwardly, pivoting from the hinge 16. This then provides a large aperture through which emergency escape may be possible. Obviously, the detachable connection between the vent frame and the fixed frame requires to be child-proof.

In one form of detachable connection for use

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with the connectors 22 shown in the drawings, the bar 51 which is pivotally connected to the ends of the links 53 and 55 may overlies and be detachably connected to a further bar (not shown) which is fixedly mounted on the side frame member of the lower vent frame 14. The coupling between the two bars is such as to make it difficult or impossible for a child to disconnect the two bars. Suitable forms of detachable connection of this type are described in the above-mentioned co-pending British Patent Application No. 9324331.9.

Figure 5 shows the position where the bar 51 on each lower connector 22 has been uncoupled from the corresponding bar (not shown) mounted on the lower vent frame 14, so that the lower vent hangs vertically from the upper vent 12. The vent can then easily be pushed out of the way to provide a large aperture through which escape is possible in an emergency.

Apart from the safety and convenient cleaning aspects already referred to, a window assembly according to the present invention may provide further advantages. For example, the provision of four stays or connectors, one adjacent each corner of the window, will result in positive compression of the flexible sealing gaskets around the whole periphery of the window, providing good weather resistance. The mechanical fixings adjacent each corner of the frame provided by the four stays or connectors provide added strength and wind resistance, compared with conventional vents having only two

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connectors, and will prevent the vents from being blown open by gusts of wind.

Since all parts of both vents move outwardly during opening, there is eliminated any interference
5 between the window vents and internal sills, curtains and blinds. The outward opening arrangement will be that commonly used, although it will be appreciated that for certain applications it may be desirable to have the window vents open inwards. Also, as previously
10 mentioned, although the hinge between the two vents will normally be horizontal, in unusual circumstances it may be required to have the hinge vertical in which case the stays or connectors will be on the horizontal members of the fixed frame.

15 The through-flow ventilation from the sides of the opening, in addition to the gaps at the top and bottom of the window, will ensure excellent room ventilation. The forms of stay or connector required may be simpler and cheaper to manufacture than the
20 comparatively costly hardware required to provide the tilt and reversibility functions of the prior art rotatable windows.

The profile used for the fixed frame and vent frames will not necessarily have to be specially
25 designed and standard products from profile ranges can normally be utilised.

The two vent frames 12 and 14 may be of equal size, but if required one may be of greater height than

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the other.

Very secure locking of the vent frames can be achieved as a result of the four-corner connection between the window vent and the outer frame. There may
5 be provided two spaced handles of the kind indicated at 58 which may be with or without locks. The handles could operate cockspur catches, or shoot bolts fitted to the meeting rails of the vent frames and protruding from both sides of the frames into the vertical members 18 of
10 the fixed outer frame. Alternatively espagnolette bolts may be mounted vertically on each side of the bottom vent frame 14, protruding into the lower horizontal member of the outer frame 10. Locking points may be incorporated in the friction stays or any other suitable
15 locking devices which are commercially available or specially manufactured may be used.

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CLAIMS

1. A window assembly comprising a fixed rectangular open frame and a vent movable into and out of the fixed frame, wherein the movable vent comprises
5 two rectangular vent frames hingedly connected together along adjacent edges of the same length, parts of each vent frame remote from said hinge connection being pivotally mounted between opposite frame members of the fixed frame, and at least one of the vent frames also
10 being mounted for translational movement longitudinally of said opposite frame members, whereby the vent frames may be moved from a closed position, where they lie flat and side-by-side within the fixed frame, to an open position where the vent frames are pivoted relatively to
15 one another and to the fixed frame into a V-formation where the hinge connection between the vent frames is displaced out of the general plane of the fixed frame, such pivoting movement being permitted by accompanying translational movement of one or both vent frames
20 longitudinally of said opposite frame members of the fixed frame.
2. A window assembly according to Claim 1, wherein both vent frames are mounted for translational movement longitudinally of said opposite frame members.
- 25 3. A window assembly according to Claim 1 or Claim 2, wherein each vent frame is mounted between said opposite fixed frame members by a pair of pivotal connectors, each connector being mounted between one of

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said opposite fixed frame members and an adjacent frame member of the respective vent frame.

4. A window assembly according to Claim 3, wherein the connectors of at least one of said two pairs
5 of connectors include a link pivotally connected between one of said opposite fixed frame members and the adjacent frame member of the respective vent frame, whereby said translational movement of the vent frame is permitted by swinging movement of said links as the vent
10 frame is pivoted towards the open position.

5. A window assembly according to Claim 3 or Claim 4, wherein the connectors of at least one of said two pairs of connectors each include a pivotal connection between one of said opposite fixed frame
15 members and the adjacent frame member of the respective vent frame, the pivotal connection being displaceable longitudinally of said fixed frame member to permit said translational movement of the vent frame.

6. A window assembly according to Claim 5,
20 wherein said pivotal connection is provided between a part on the vent frame and a slider which is displaceable along a fixed guideway extending longitudinally of the fixed frame member.

7. A window assembly according to Claim 6,
25 wherein means are provided for releasably locking the slider to the guideway to prevent translational movement of the respective vent frame when required.

8. A window assembly according to any of Claims 3

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to 7, wherein each connector which includes a pivotal link further includes a guideway extending longitudinally of the respective fixed frame member, a slider displaceable along that guideway, and a second
5 link pivotally connected between the slider and the first said link.

9. A window assembly according to Claim 8, wherein a third link may is pivotally connected between the slider and a part of the respective vent frame.

10 10. A window assembly according to Claim 8 or Claim 9, wherein means are provided for releasably locking the slider to the guideway to prevent translational movement of the respective vent frame when required.

15 11. A window assembly according to any of Claims 1 to 10, wherein means are provided for clamping or locking one or more of the pivotal connections to prevent pivotal movement thereof, so as to lock the vent frames in a required position.

20 12. A window assembly according to any of Claims 1 to 11, wherein the connectors between at least one of the vent frames and the fixed frame are detachable, whereby that vent frame may be detached from the fixed frame while remaining hingedly connected to the other
25 vent frame.

13. A window assembly according to any of Claims 1 to 12, wherein the vent frames, in use, are disposed one above the other, the upper vent frame being connected to

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the fixed frame by connectors including pivotal links to provide the required translational movement, and the lower vent frame being connected to the fixed frame by connectors including sliders and guideways to provide
5 the necessary translational movement.

14. A window assembly according Claim 13, wherein the connectors of the lower vent frame are detachable for emergency use.

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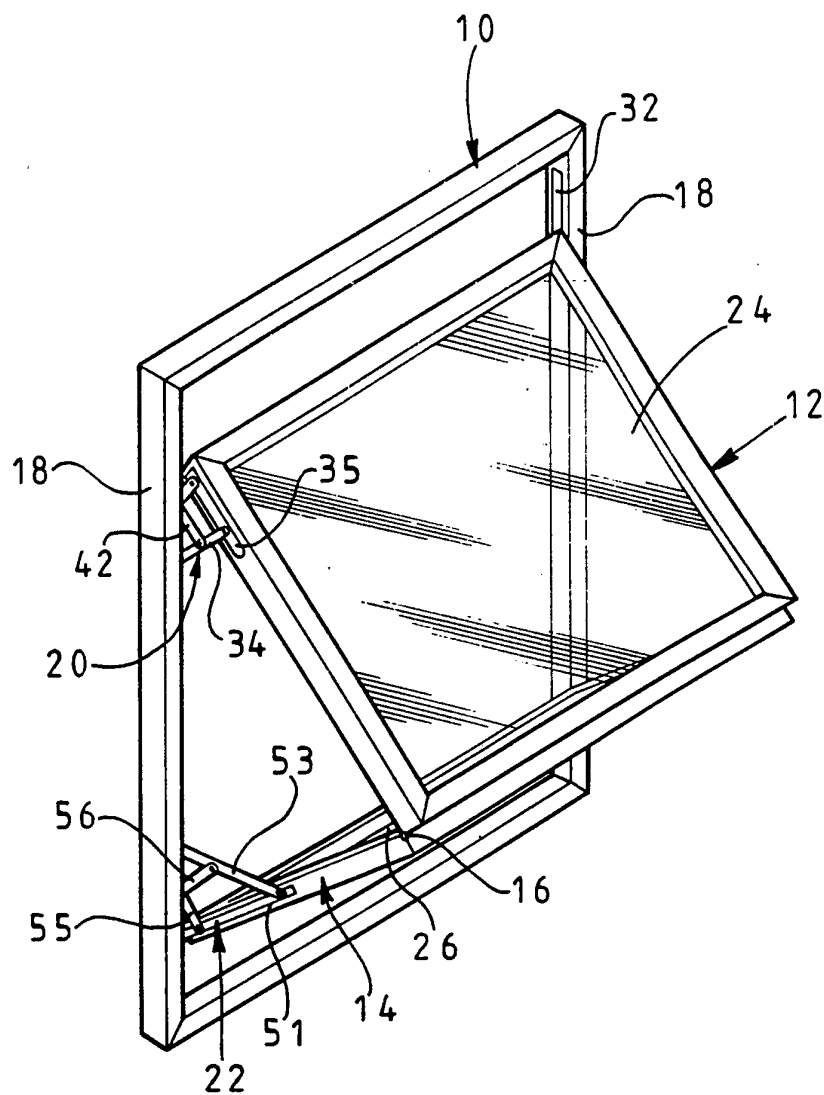
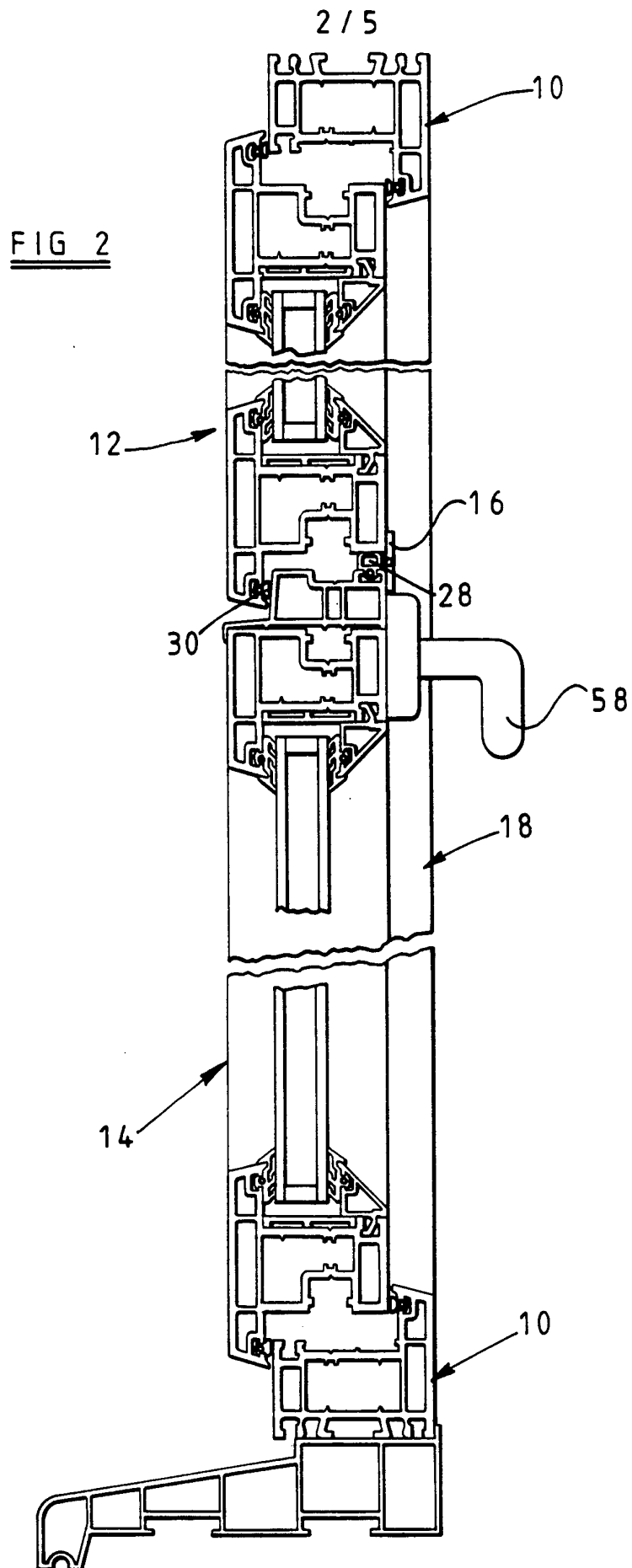


FIG 1



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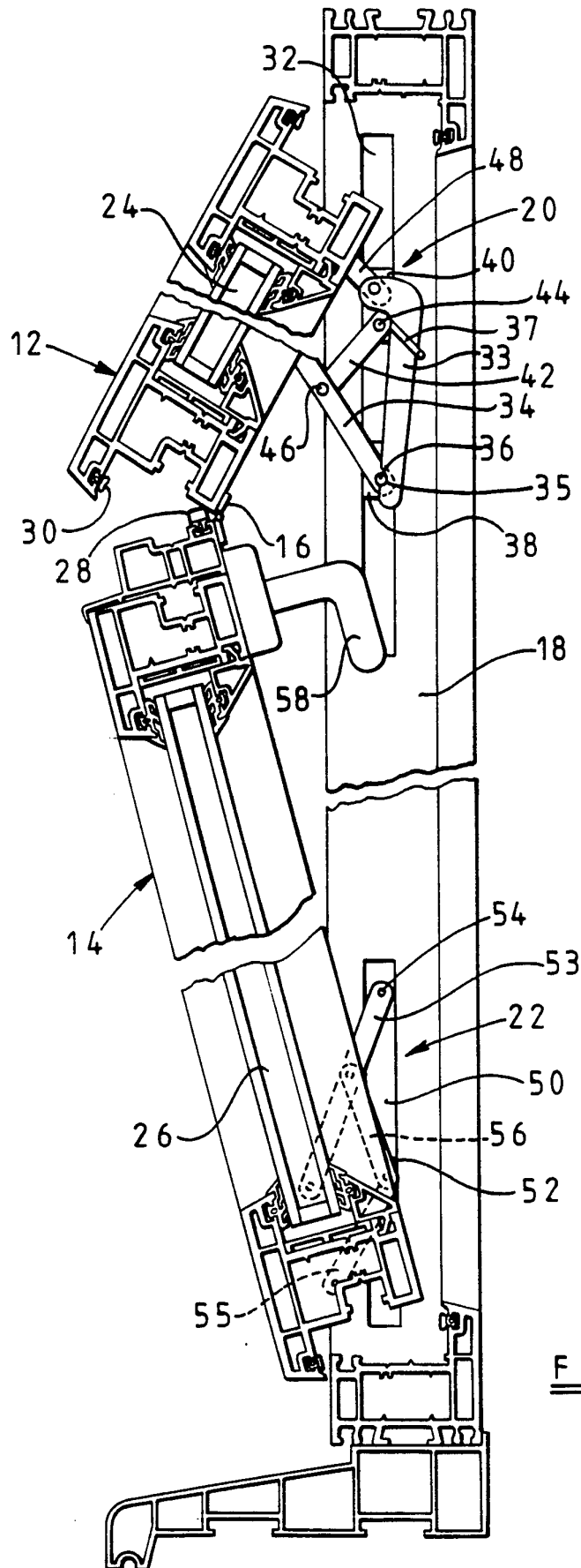
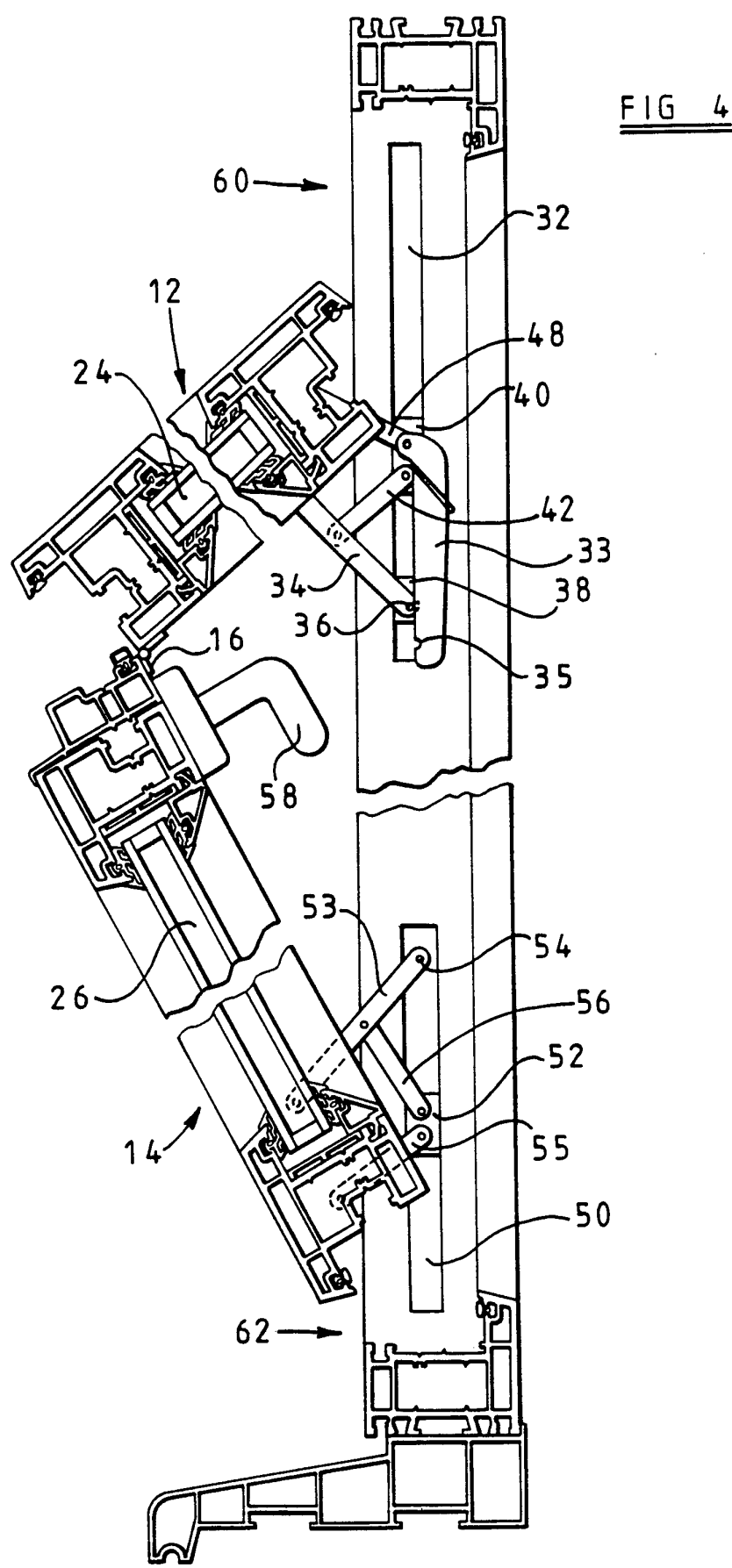
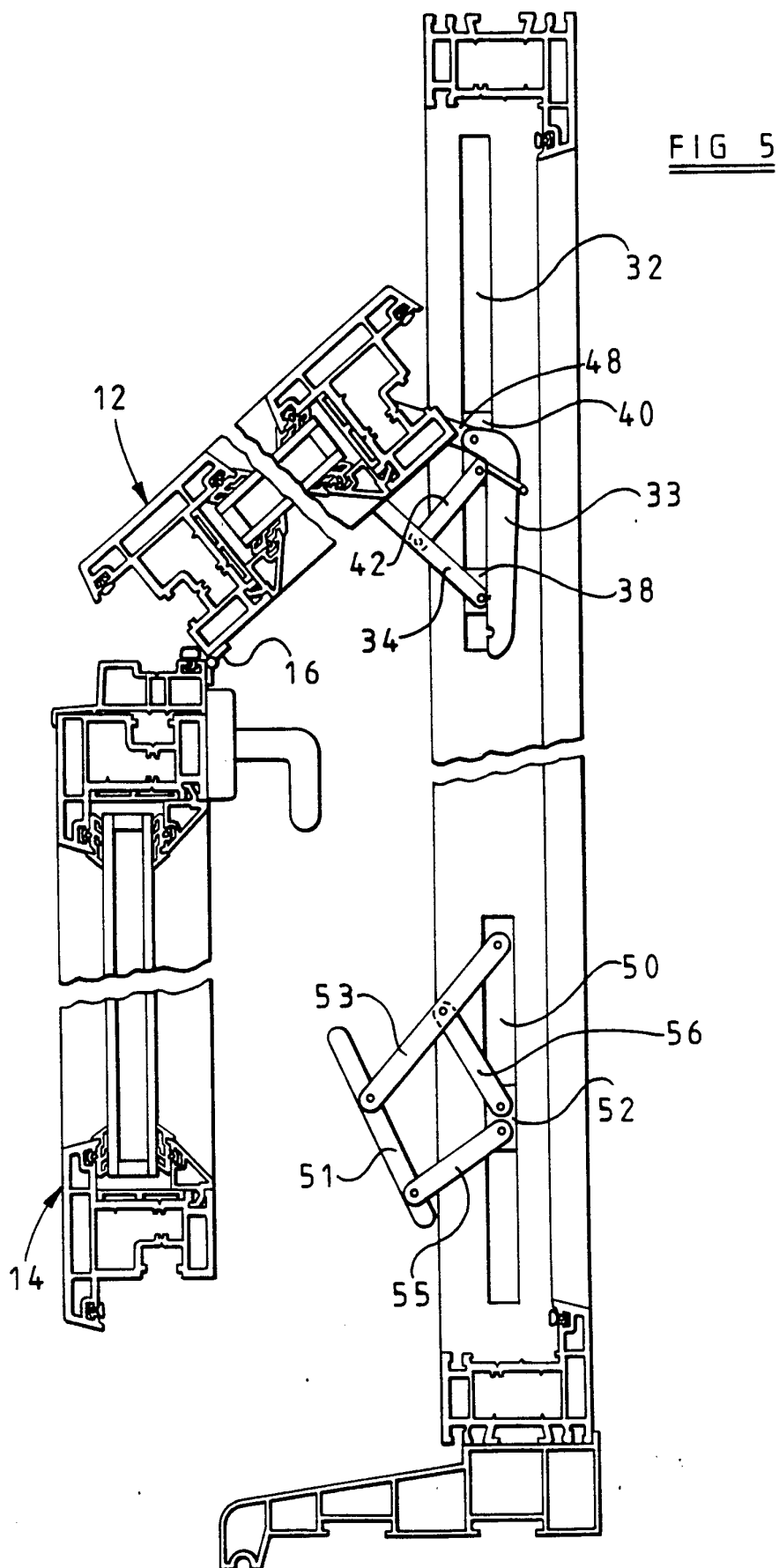


FIG 3

SUBSTITUTE SHEET



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SUBSTITUTE SHEET

INTERNATIONAL SEARCH REPORT

International application No.
PCT/GB 94/00084A. CLASSIFICATION OF SUBJECT MATTER
IPC 5 E05D15/26

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC 5 E05D E06B

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US,A,4 850 417 (DEUKAI) 25 July 1989	1-6,11, 13
Y	see column 2, line 24 - column 5, line 4; figures 1-8 ---	7-10,14
Y	WO,A,91 16518 (NICO MANUFACTURING) 31 October 1991 see abstract; figures 1,5 ---	7-10
X	US,A,2 330 696 (WARD) 2 July 1942	1-3,5-7, 11,12
Y	see page 1, column 1, line 55 - page 2, column 1, line 6; figures 1-6 -----	14

☐ Further documents are listed in the continuation of box C.☒ Patent family members are listed in annex.

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Date of the actual completion of the international search

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INTERNATIONAL SEARCH REPORT

information on patent family members

International application No.

PCT/GB 94/00084

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US-A-4850417	25-07-89	NONE	
WO-A-9116518	31-10-91	AU-A- 7752291 GB-A- 2243403	11-11-91 30-10-91
US-A-2330696		NONE	