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(54) **Sliding hinge window assembly**

(57) Sliding hinge window assembly, comprising a window casing and a window leaf, wherein the window leaf has an upper edge and side edges and at a location spaced apart from the upper edge at its side edges at the location of a first hinge -that is preferably substantially stationary therewith- is hinged to a respective first rod or rod assembly, which at the location of a substantially stationary second hinge is hinged to a respective jamb of

the window casing, wherein at the area in or near the upper edge the window leaf on both sides is rotatably connected by means of a slide, wherein the window casing is provided with guides for the slide, wherein the assembly furthermore comprises a driver positioned for engagement onto the slide in order to move it.

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Description

BACKGROUND OF THE INVENTION

[0001] The invention relates to a sliding hinge window assembly, comprising a window casing and a window leaf.

[0002] Sliding hinge windows are window assemblies of which the window leaf near the upper edge can be hinged with respect to the window casing, and wherein the said hinge connection can also be moved up and down along the window casing. Opening the window results in the upper edge area of the window leaf being lowered, whereas the lower edge of the window leaf moves to the outside.

[0003] Sliding hinge windows can be accommodated in vertical facades or in pitched roofs.

[0004] In a known sliding hinge window the upper edge of the window leaf is guided on both sides in rails by means of pivot pins which rails have been attached in the jambs of a window casing, and approximately halfway the leaf jambs the window leaf is connected to the jambs of the window casing by means of a rod assembly, wherein each rod assembly comprises a straight rod, which at the lower end is slidably accommodated by means of a pivot pin in a guide arranged on the jambs of the window casing and is attached halfway to the jamb of the window casing by means of a rod with hinge ends on a fixed hinge point, situated between both guides.

[0005] After the sliding hinge window has been opened air for ventilation purposes is able to flow in and out over the upper edge and below the lower edge, in order to effect a circulating flow. With respect to a regular centre pivoted window the sliding hinge window has the advantage that in opened condition of the window assembly no part of the window leaf extends into the inner space.

[0006] It is an object of the invention to provide a sliding hinge window that is easy to operate, particularly on pitched roofs.

[0007] It is an object of the invention to provide a sliding hinge window that is relatively easy to mount.

[0008] It is an object of the invention to provide a sliding hinge window that can be reliably operated.

SUMMARY OF THE INVENTION

[0009] From one aspect the invention provides a sliding hinge window assembly, comprising a window casing and a window leaf, wherein the window leaf has an upper edge and side edges and at a location spaced apart from the upper edge at its side edges at the location of a first hinge -that is preferably substantially stationary therewith- is hinged to a respective first rod or rod assembly, which at the location of a substantially stationary second hinge is hinged to a respective jamb of the window casing, wherein at the area in or near the upper edge the window leaf on both sides is rotatably connected by means of a slide, wherein the window casing is provided with guides

for the slide, wherein the assembly furthermore comprises a driver positioned for engagement onto the slide in order to move it.

[0010] The driver facilitates the operation of the window assembly, in the opening direction, in the closing direction and/or in both directions.

[0011] Preferably the driver is attached to the guide or to the jamb of the window casing, as a result of which the opening to the side between window and window casing will not or hardly be additionally limited.

[0012] In one embodiment the driver is adapted for exerting a force on the slide which force is directed towards the second hinge, so that opening the window is facilitated. The window leaf will tend to an open position, so that the user needs to exert little to no force when opening the window counter to gravity. This is particularly advantageous when the sliding hinge window is positioned in a pitched roof.

[0013] Preferably the driver is adapted for independently bringing the window to the fully opened position, and preferably keeping it in said position. The window will then move of its own accord to the open position, without the user having to exert a lifting force onto the window. The window will reliably remain in the open position, as a result of which the ventilation position is maintained. It will furthermore be easier to clean the outside of the window.

[0014] When the driver can be pre-biased, particularly by bringing the window from the open position to the closing position, operation lines, for instance electrical for a motor, are not necessary, as a result of which building in is made easier.

[0015] In a simple embodiment the driver comprises a spring. The driver may thus comprise a draw spring, particularly a gas draw spring. Such a driver can be placed at almost any location below the path of the slide, so that the slide is not hampered in its upward movement, and/or no particular provisions are necessary to make this possible.

[0016] In one embodiment the driver is disposed below the slide.

[0017] In one embodiment the driver comprises a fluid pressure-operated operation cylinder, which with the cylinder casing is fixedly attached to the window casing and with the piston rod is connected to the slide, or vice versa.

[0018] When the location of attachment of the cylinder casing is situated below the path of the slide, the operation cylinder is able to extend for a large part parallel to those guides. The build-in length is thus kept limited. In case the piston rod is attached to the slide, the occupation of width can be limited.

[0019] In a further simplified embodiment the guides are provided on a rail or other similar profile, wherein at the location of the second hinge the first rod with one end is hinged to the rail. In this way mounting is simplified.

[0020] In a further simplified embodiment the cylinder casing is also fixedly attached to the rail as a result of which mounting is further simplified.

[0021] A further simplification is achieved when the first and second hinges are connected to each other by one single first rod. In that way a substantially triangular structure is realised, wherein the window leaf forms a first side, the first rod a second side and the rail or the window casing assembly the third side.

[0022] In a further development of the sliding hinge window assembly according to the invention, in closed condition of the window leaf the first hinge, the second hinge and the connection with the slide are situated in line with each other.

[0023] In a further development of the sliding hinge window assembly according to the invention the window casing has an upper edge, wherein in the closed condition of the window casing the upper edge of the window leaf is situated close to/against the upper edge of the window casing.

[0024] In a further development of the sliding hinge window assembly according to the invention, a parallelogram mechanism is present between the window leaf and the slide and first rod or rod assembly, wherein the area in or near the upper edge of the window leaf at the location of a third hinge is hinged to a second rod or rod assembly, which at the location of a fourth hinge is hinged to the slide, wherein the jamb in question of the window leaf is part of said parallelogram mechanism as well.

[0025] Due to the parallelogram mechanism near the upper edge area of the window leaf the upper edge is still hinged and slidably connected to the window jambs, but in an indirect manner, as a result of which the upper edge area of the window leaf is also able to move out of the plane of the window casing. In this way the ventilation passage between lintel and the window casing and upper edge of the window leaf can be relatively enlarged. Due to the parallelogram mechanism the movement of the upper edge of the window leaf in a direction parallel to the window casing jambs can also take place a little faster than the movement of the slide along the guides in the window casing jambs.

[0026] The parallelogram mechanism may comprise a third rod which at an end at the location of a fifth hinge is hinged to the slide and at another end at the location of a sixth hinge is hinged to the first rod or rod assembly. In a compact embodiment the fourth and fifth hinge coincide.

[0027] From a further aspect the invention provides a sliding hinge window assembly according to the invention incorporated in a pitched roof.

[0028] The sliding hinge window according to the invention may in particular comprise an inside and an outside to be situated at the side of a residential room and at the outside (surroundings) of an outer wall of a residential room, respectively, wherein the window leaf in the opened position is rotated to the outside.

[0029] The aspects and measures described and/or shown in the application may where possible also be used individually. Said individual aspects may be the subject of divisional patent applications relating thereto.

SHORT DESCRIPTION OF THE DRAWINGS

[0030] The invention will be elucidated on the basis of an exemplary embodiment shown in the attached drawings, in which:

Figures 1-4 show an exemplary embodiment of a movement mechanism for a sliding hinge window according to the invention, in consecutive stages of use; and

Figure 5 shows the movement mechanism of the figures 1-4, arranged in a pitched roof, in the stage of figure 4.

DETAILED DESCRIPTION OF THE DRAWINGS

[0031] The movement mechanism 1 of figures 1-4 comprises a first mounting member 2a and a second mounting member 2b, wherein the mounting member 2b is intended to be fixedly attached in or at a window casing and mounting member 2a is intended to be slid along a window casing jamb when using the movement structure 1.

[0032] The mounting members 2a and 2b are connected to each other by means of a pneumatic cylinder 5, having cylinder casing 6 and piston rod 7. At the location of 4a the piston rod 7 is attached to mounting member 2a and at the location of 4b the cylinder 6 is attached to mounting member 2b. In this example the cylinder 5 is designed as a gas draw spring, so that a force directed towards each other is exerted on the mounting members 2a and 2b.

[0033] The mounting member or slide member 2a is provided with a slide block 8, and thus slidably guided in slide path 9 of a rail 3, which is intended to be fixedly attached in a window casing. Mounting member 2b is fixedly attached on the rail 3. The stroke of the slide block 8 is limited by a block 40 attached in the slide path 9 and optionally adjustable as regards location.

[0034] At the end facing the mounting member 2b a hinge 21 (second hinge) is provided at the rail 3, where a rod 12 (first rod) is connected to the rail 3 in a permanent, stationary and hinging manner.

[0035] A further rod 13 (third rod) is hinged to mounting member or slide member 2a at the location of hinge pin 22 (fifth hinge). At the location of hinge pin 23 (sixth hinge) the rods 12 and 13 are hinged to each other. Thus the rods 12, 13 and the part of the rail 3 extending between the hinges 21 and 22 form a triangle, of which the base is adjustable as regards length.

[0036] In this example the triangle side near the rod 13 is built up compositely, substantially in the shape of a parallelogram. Said parallelogram is formed at three sides by the rod 13, and extension 14 of the rod 12, a short rod 15 (second rod), which at the location of hinge pin 24 (fourth hinge) is hinged to mounting member or slide member 2a. Optionally the hinge pins 22 and 24

may coincide, wherein the rods 13 and 15 are able to alternately extend next to each other in order to be both rotatable with respect to each other and with respect to the in that case single hinge pin.

[0037] The parallelogram structure is completed by a relatively long rod 16, which at the location of hinge pins 25 (third hinge) and 26 (first hinge) are hinged to rod 15 and extension 14 of the rod 12, respectively, and with portion 17 extends past the hinge pin 26. The rod 16 is provided with mounting holes 28 for attachment of the window 32, particularly to its window jambs 33 (see figure 5).

[0038] If, in an alternative embodiment that is not shown, the rod 13 itself is intended for mounting of the window leaf, the rod 13 will itself be extended beyond the hinge 23, and for instance have the same length as rod 16/17 in the example shown. In that case the upper edge of the window leaf in operation of the movement mechanism will indeed move along the window casing, yet not be movable in the direction perpendicular to the main plane of the window casing.

[0039] Due to the parallelogram structure 13-16 in the example shown the upper edge of the window will indeed move in the latter direction, as will be clear when considering the figures 1-5.

[0040] In figure 1 the mounting members 2a and 2b are at their maximum mutual distance S1. The window that is not shown there is then in the position closed in the window casing.

[0041] When the window is unlocked the gas draw spring 5 can become active, and the piston rod 7 will be retracted in the direction A. The mutual distance between the mounting members 2a and 2b then becomes smaller, for instance S2, wherein rod 12 hinges in the direction C to the outside about hinge pin 21, rod 13 hinges in the direction B to the outside about hinge pin 22, and the rods 12 and 13 also at the location of hinge pin 23 hinge with respect to each other, in order to form a triangle, with at the location of hinges 21, 22 ever increasing angles and at the location of hinge pin 23 an ever decreasing angle. The mounting member or slide member 2a is then guided by slide block 8 in channel 9 of rail 3, so that a linear movement, in the plane of the window casing, in the direction A is carried out, wherein the mutual distance between the mounting members 2a and 2b becomes smaller and smaller (S3, S2, figures 3 and 4). In figure 4 the maximum opened position to the outside is reached, by abutment of the slide block 8 against stop block 40. The tensile force of the gas draw spring 5 is sufficiently large to keep the window leaf biased in that position, without a locking being necessary. The tensile force, however, is not too large, in order to enable the user to close the window leaf counter the action of the gas draw spring, wherein the gas draw spring is pre-biased again as it were.

[0042] Due to the extension 14 of rod 12 the parallelogram structure is also unfolded, wherein the rod 15 is rotated in the direction C about hinge pin 24, over a same

angle as rod 13 about hinge pin 22. Rod 16 here remains substantially parallel to rod 13. Due to the rotation of rod 15 the hinge pin 25 moves, with a component perpendicular to the direction of extension of the rail 3, considered in the drawing, upwards to the outside of the window casing, with which as can be seen in figure 5, also the upper edge 34 of the window 32 exits the roof plane 30. In this way it is achieved that the opening X between the lintel 35 of the window casing 31 and the window 32 is enlarged. Furthermore the parallelogram structure makes sure that a shorter gas draw spring will suffice.

[0043] The gas draw spring tends to a retracted position. In order to prevent that the retracting motion takes place to abruptly it can be considered to make the slide block 8 moveable in the slit 9 under increased friction. Using a gas draw spring makes it possible to let it be situated parallel for a large part to the movement mechanism when in the mounted condition, as can be seen in figure 1. The build-in length can thus remain limited.

[0044] The use of a gas draw spring allows the slide block 8 to reach the top of the window jambs. The gas draw spring is positioned for linear movement along the window casing and as a result forms no impediment in the opening that is left free by the window. In folded condition the assembly remains within the length of the rail 3. The assembly including rail 3 can be kept in stock without taking up too much space and is easy to handle.

Claims

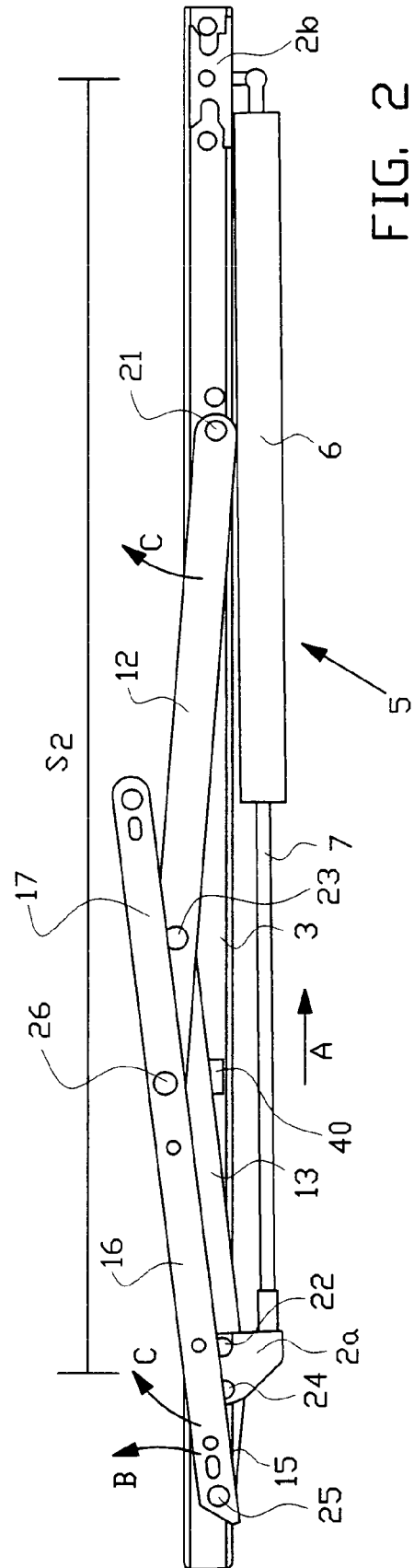
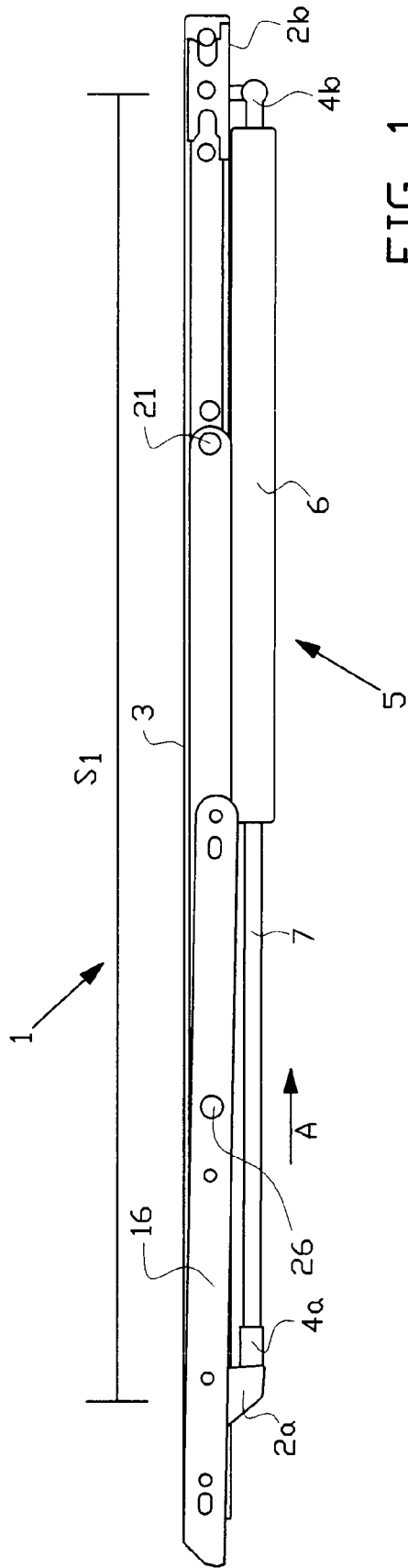
1. Sliding hinge window assembly, comprising a window casing and a window leaf, wherein the window leaf has an upper edge and side edges and at a location spaced apart from the upper edge at its side edges at the location of a first hinge -that is preferably substantially stationary therewith- is hinged to a respective first rod or rod assembly, which at the location of a substantially stationary second hinge is hinged to a respective jamb of the window casing, wherein at the area in or near the upper edge the window leaf on both sides is rotatably connected by means of a slide, wherein the window casing is provided with guides for the slide, wherein the assembly furthermore comprises a driver positioned for engagement onto the slide in order to move it.
2. Sliding hinge window assembly according to claim 1, wherein the driver is attached to the guide or to the jamb of the window casing.
3. Sliding hinge window assembly according to claim 1 or 2, wherein the driver is adapted for exerting a force on the slide which force is directed towards the second hinge.
4. Sliding hinge window assembly according to claim 3, wherein the driver is adapted for independently

bringing the window to the fully opened position, and preferably keeping it in said position.

5. Sliding hinge window assembly according to any one of the preceding claims, wherein the driver can be pre-biased, wherein the driver preferably comprises a spring, preferably a draw spring, preferably a gas draw spring. 5
6. Sliding hinge window assembly according to any one of the preceding claims, wherein the driver is disposed below the slide. 10
7. Sliding hinge window assembly according to any one of the preceding claims, wherein the driver comprises a fluid pressure-operated operation cylinder, which with the cylinder casing is fixedly attached to the window casing and with the piston rod is connected to the slide, or vice versa, wherein the location of attachment of the cylinder casing preferably is situated below the movement path of the slide. 15 20
8. Sliding hinge window assembly according to any one of the preceding claims, wherein the guides are provided on a rail or other profile, wherein at the location of the second hinge the first rod with one end is hinged to the rail. 25
9. Sliding hinge window assembly according to claim 5 or 7 and claim 8, wherein the cylinder casing is fixedly attached to the rail. 30
10. Sliding hinge window assembly according to any one of the preceding claims, wherein the first and second hinges are connected to each other by one single first rod. 35
11. Sliding hinge window assembly according to any one of the preceding claims, wherein in closed condition of the window leaf the first hinge, the second hinge and the connection with the slide are situated in a straight line with each other. 40
12. Sliding hinge window assembly according to any one of the preceding claims, wherein the window casing has an upper edge, wherein in the closed condition of the window casing the upper edge of the window leaf is situated close to/against the upper edge of the window casing. 45 50
13. Sliding hinge window assembly according to any one of the preceding claims, wherein between the window leaf and the slide and first rod or rod assembly a parallelogram mechanism is present, wherein the area in or near the upper edge of the window leaf at the location of a third hinge is hinged to a second rod or rod assembly, which at the location of a fourth hinge is hinged to the slide, wherein the jamb in ques-

tion of the window leaf is part of said parallelogram mechanism as well.

14. Sliding hinge window assembly according to claim 13, wherein the parallelogram mechanism comprises a third rod which at an end at the location of a fifth hinge is hinged to the slide and at another end at the location of a sixth hinge is hinged to the first rod or rod assembly.
15. Sliding hinge window assembly according to claim 14, wherein the fourth and fifth hinge coincide.
16. Sliding hinge window assembly according to any one of the preceding claims, incorporated in a pitched roof.



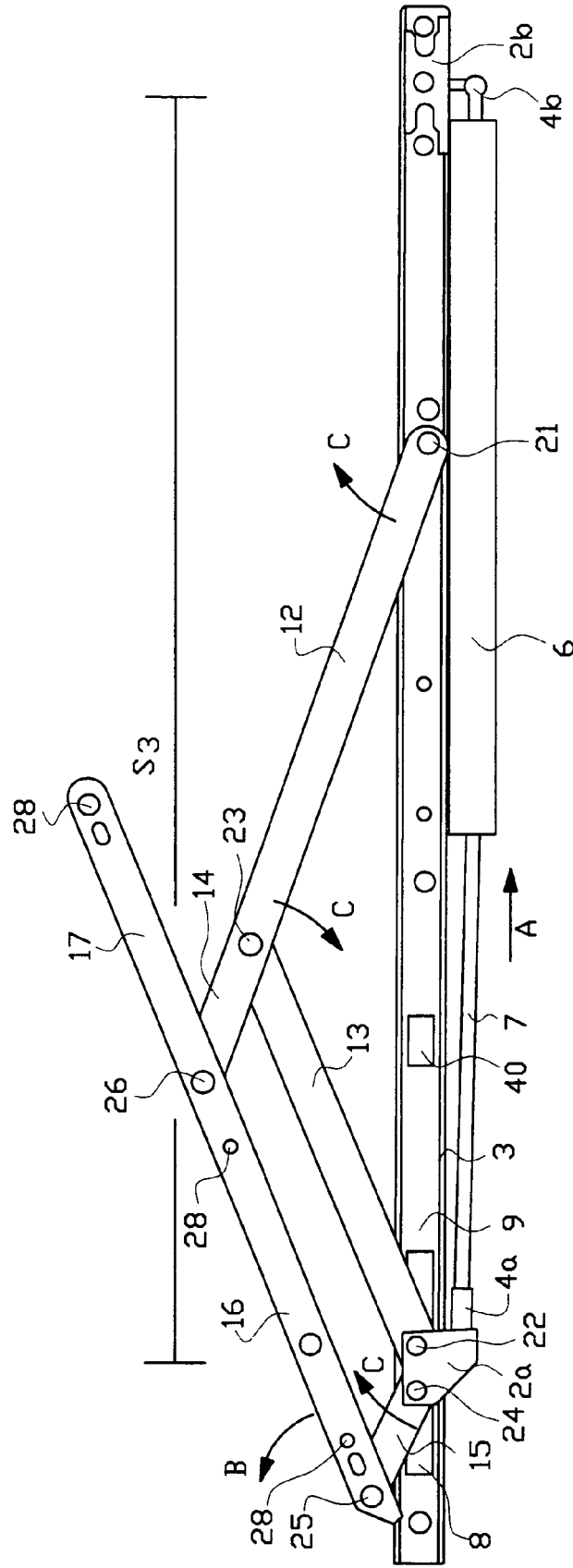
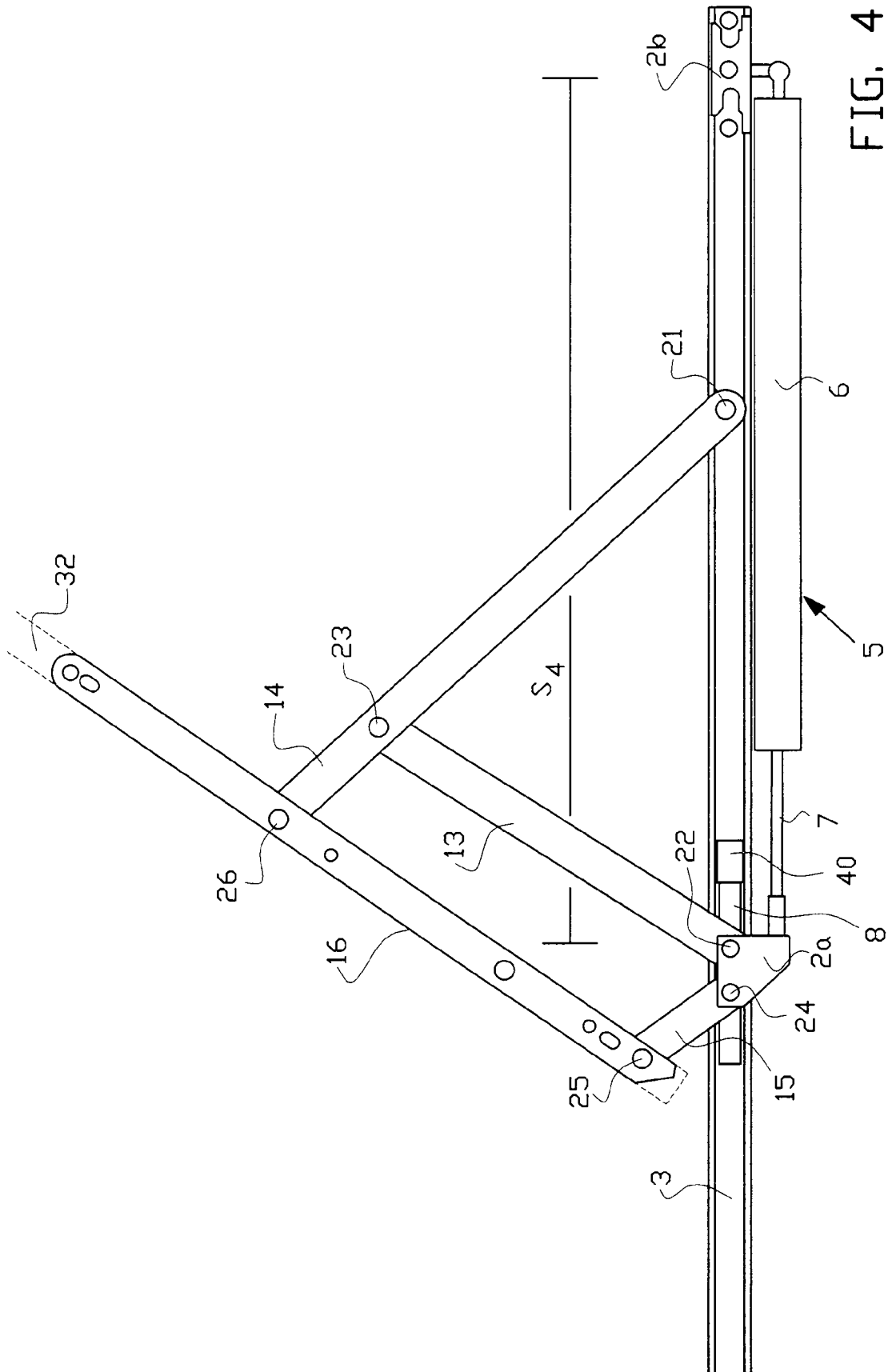


FIG. 3



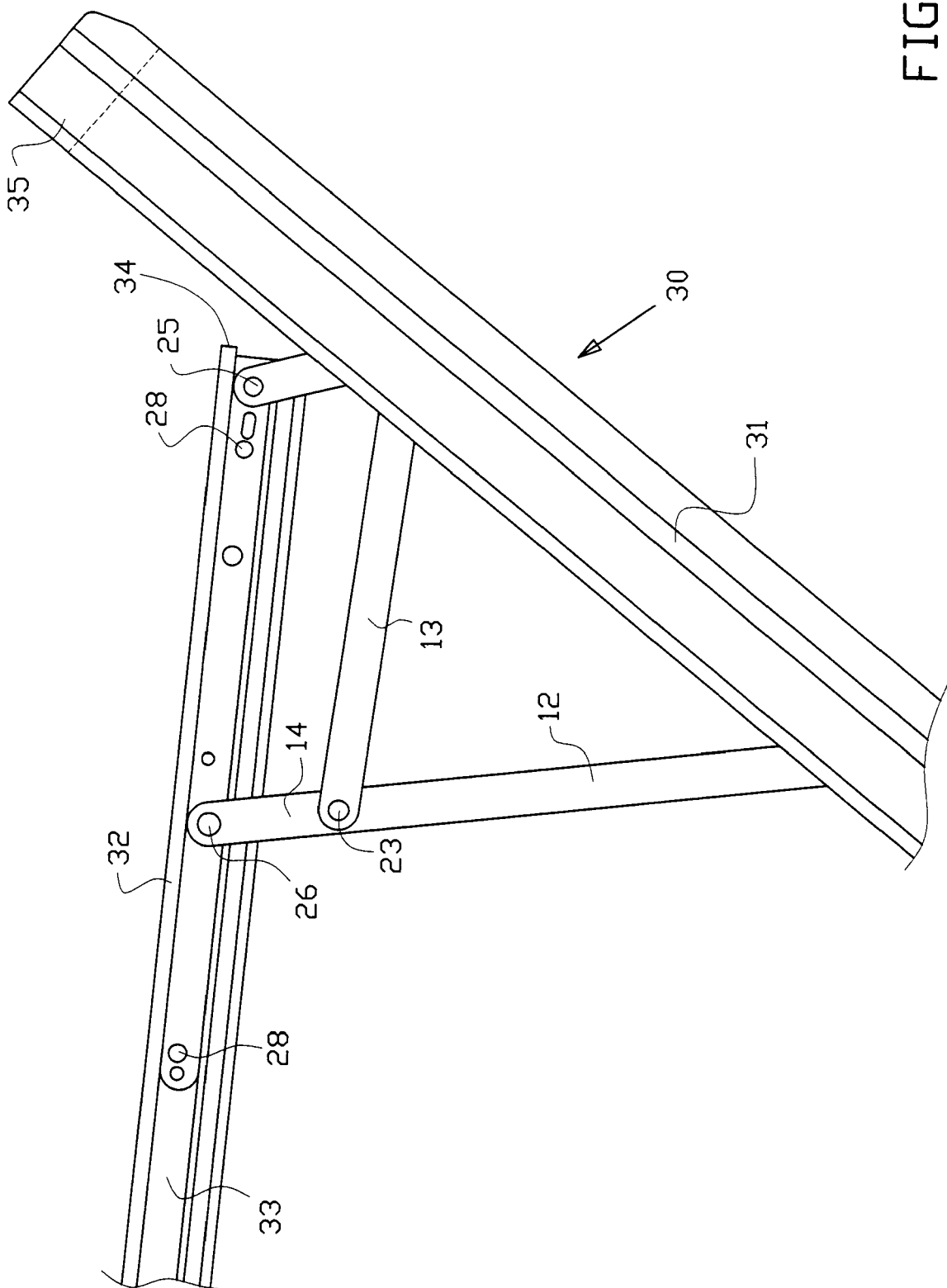


FIG. 5



European Patent
Office

EUROPEAN SEARCH REPORT

Application Number
EP 06 07 6466

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
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			TECHNICAL FIELDS SEARCHED (IPC)
			E05D E04D E06B
The present search report has been drawn up for all claims			
Place of search The Hague		Date of completion of the search 13 October 2006	Examiner Guillaume, Geert
CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document			

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EPO FORM 1503 03.82 (P04C01)

**ANNEX TO THE EUROPEAN SEARCH REPORT
ON EUROPEAN PATENT APPLICATION NO.**

EP 06 07 6466

This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report.
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13-10-2006

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