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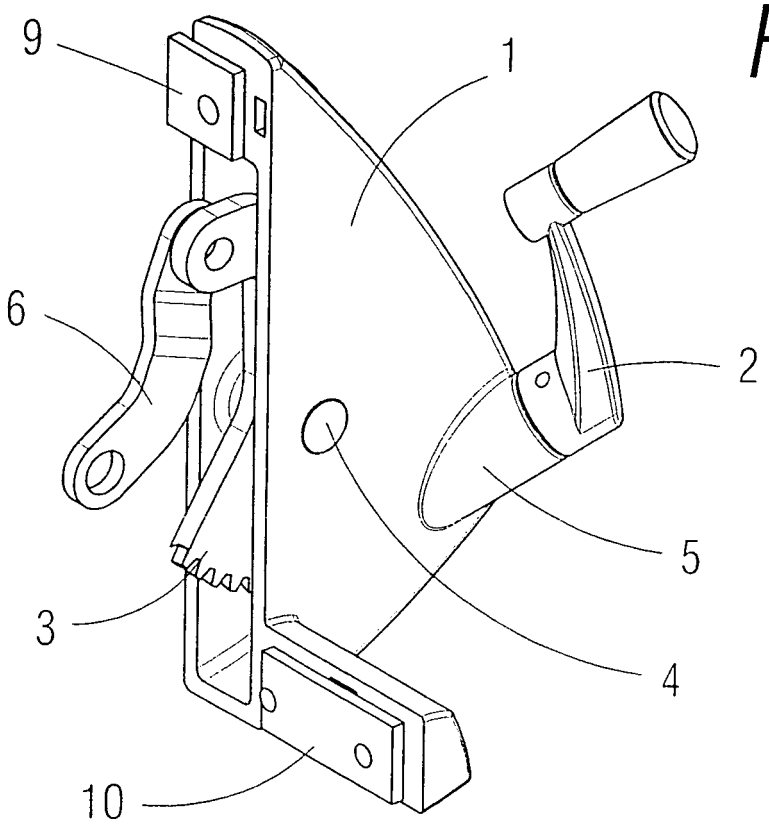
(54) Window opening and closing device

(57) Window activating device for opening and closing windows made up of a multitude of revolving modules or panels around a longitudinal and horizontal axis that includes a means of activation with a handle that has a reducer mechanism, a means of synchronisation and a means of transferring the movement from the handle to both modules or panels that are arranged on at least one side of the window to carry out the synchronised revolving of all of the modules or panels.

FIG.1a



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Description

OBJECT OF THE INVENTION

[0001] The object of the present invention is a device that activates the opening and closing of windows that includes significant innovations and advantages compared to the presently existing devices with the same purpose.

[0002] More specifically, it refers to a window activating device of the type that is made up of a multitude of revolving modules or panels around a longitudinal and horizontal axis that includes a means of activation with a handle that has a reducer mechanism, a means of synchronisation and a means of transferring the movement from the handle to both modules or panels that are arranged on at least one side of the window to carry out the synchronised revolving of all of the modules or panels.

BACKGROUND TO THE INVENTION

[0003] At the present time devices are well known that are made up from a multitude of mobile panels or modules that revolve around a longitudinal axis in such a way that in an open position they are arranged in a parallel manner and are kept equidistant from each other and in a horizontal or inclined position, whilst in a closed position of the window all of the modules are arranged on the same vertical plane.

[0004] This type of window includes mechanisms for activation with a certain degree of complexity that in some way moves the modules in a revolving movement, carrying out the movement of said modules manually by means of a handle located on one side of the window.

[0005] However, it has been proven in practice that said mechanisms have a series of disadvantages that can reduce the versatility for their application, for example, of different types of closures, a reduction of the mechanical resistance that, for example, in the event of using double glazed modules can cause problems of greater forces that give rise to warping or the breaking of certain components and problems of wear and tear of sliding parts.

DESCRIPTION OF THE INVENTION

[0006] The present invention has been developed for the purpose of providing a device to activate the opening and closing of windows that resolves the stated disadvantages, in addition providing other advantages that will become clear from the description that is attached below.

[0007] The device for the activating of the opening and closing of windows of the present invention, said windows being of the type that includes a multitude of modules or panels that revolve around a longitudinal and horizontal axis, includes manual means of activation that have a handle that is fitted with a reducer device, a means of synchronisation and means of transferring the movement from the handle to both modules or panels arranged on at least one side of the window in order to carry out the synchronised revolving movement of all of the modules or panels.

[0008] The reducer mechanism of the activation means includes an inclined worm gear engaging a toothed section that allows a turn of at least 100 degrees incline, being by preference 112 degrees, including the means of synchronisation of a stainless steel transfer axle that is at one end fitted to the activation means, both ends of the transfer axle being connected to a connecting rod linked to a second connecting rod fitted to the toothed section, each end of the axle including a bushing made from a plastic material that is fixed to a support anchored to the window, and a transfer connecting rod joined to an elongated section and arranged in a vertical manner in order to be moved vertically.

[0009] In addition, each module or panel of the means of transfer is provided with a support element that supports the module or panel, the upper end of said support element being joined to the elongated profile and at its bottom end joined to a elongated swinging bar that is linked at the bottom to the side of the window by means of guides, including an opening to fit a pivot at the centre area of said support element that is connected to a guide piece in order to guide the panels or modules in the closed position.

[0010] Thanks to these characteristics, a device is obtained with an improved working for windows of the type described above that has the following advantages:

1. Capacity to house glass with a reduced intermediate air cavity reducing the manual effort for the user when turning the handle.
2. Possibility of making bigger measurements, for example 1.5 m x 1.5 m.
3. Adaptation to any type of remote control.
4. Allows for the fitting of sealing means in such a way that the grip can be made by the outside or the inside; and
5. The material used in the axle provides greater mechanical resistance and resistance to corrosion.

[0011] In accordance with another device of the invention, the toothed section used has a circumference pitch of 5.20 mm., a tooth angle of 25 degrees and a primary diameter of approximately 76 mm.

[0012] Advantageously, the elongated profiles have a channel on both sides to house slides, said slides being made up of a noticeably rectangular body that has side projections so as to be fixed into the two side channels of the elongated profiles.

[0013] In this way, the warping effect is reduced and at the same time increasing the resistance of the whole assembly in the event of using modules or panels having greater weight.

[0014] In accordance with another characteristic of the

invention, said guide means arranged in the stated transfer means form a fixed element attached to the side of the window that has a grooved section to allow for the vertical movement of a pivot fitted to an elongated swivel bar in such a way that said bar makes a revolving movement, so that in a completely open position of the window modules said elongated bar remains in a horizontal position whilst in a closed position said elongated bar is in a vertical position.

[0015] By preference, the stated grooved section is made up of a first upper section that is appreciably rectangular and a second lower section with a circular shape that coincides with the shape of the two facing sides of the pivot. Thus undesired friction is prevented, which could rapidly wear out the pivot.

[0016] The object of the invention is to provide an activating device in which the revolving modules or panels of the window, in a completely open position of same, are in a horizontal position, all of these being located on the outside part of the window. In contrast to the present systems, the windows that are made up of two or more modules, when they are in the open position, said modules are partially arranged on the external part of the window and on the internal part of the window, reducing space on the inside of the dwelling or site.

[0017] Other characteristics and advantages of the activating device of the present invention will be come clear from the present description of a preferred embodiment, but it is not exclusive, it illustrates by way of example, but the drawings attached are not by way of limitation, in which:

BRIEF DESCRIPTION OF THE DRAWINGS

[0018]

Figures 1a and 1b are rear and front perspective views, respectively, corresponding to the means of activating the window opening and closing device of this present invention;

Figure 2 is an exploded perspective view of the means of synchronising the device object of the invention;

Figure 3 is an exploded perspective view of the means of transfer, and

Figure 4 is a perspective view of the assembly, showing the means of synchronisation and the transfer device fitted partially exploded.

DESCRIPTION OF THE PREFERRED EMBODIMENT

[0019] The device for activating the opening and closing of windows that includes a multitude of modules or panels (not shown) with glass revolving around a longitudinal and horizontal axis object of the present invention is fitted with a means of activation that is made up of a handle (2) that includes a reducer mechanism, a means of synchronisation and a means to transfer the movement from the handle to both modules or panels arranged on at least one side of the window to carry out the revolving movement that is synchronised for all of the modules or panels. In this way, in a closed position, all of the panels or modules are arranged on the same vertical plane as the general window frame whilst in an open position all of the modules or panels revolve on an imaginary horizontal and longitudinal axis to the same module. In turn, this imaginary axis moves towards the outside and down, projecting all of the modules towards the outside of the closure, without taking any space on the inside. The imaginary axis of the upper window moves downwards more than the others in order for a hand to be passed between the two glass modules so as to be able to clean said module from the inside.

[0020] As and how shown in Figures 1a and 1b, the means of activation of the device object of the invention that has the main function of transferring the movement to the rest of the window assembly from the movement made by the user includes the following numerically referenced elements:

[0021] A carcass (1) located at a lower edge of the window from which a handle (2) protrudes, a toothed section (3) with a circumferential pitch of 5.2 mm, a 25 degree angle for the teeth and a primary diameter of 76.1 mm. The toothed section (3) is fixed to the carcass (1) by means of a milled axis (4). In addition, the means of activation include an inclined worm gear (5) whose helix angle is 9.3 degrees, an activating connecting rod (6) that allows a turn of the modules through 112 degrees, an upper cover in order to hide the fixing screws (7), a lower cover (8) to hide the fixing screws, an upper plate (9) that includes a threaded opening so as to take a screw to be fixed to a side profile of the window and a lower plate (10) that has two threaded openings so as to take screws to be fixed to a side profile of the window.

[0022] The means of synchronisation can be appreciated in Figure 2 that have the function of synchronising the rotational movement between the two sides of the window and converting the rotational movement into lineal movement, said means being made up of an axis (11) fitted to a connecting rod (12) by one of its ends and that is connected to the activation connecting rod (6) by means of a rivet (13) and a bearing made from a plastic material (14). The opposite end of the connecting rod (12) is joined to a transfer connecting rod (15) by means of a rivet (16) and a plastic bearing (17). It must be stated that the transfer axle (11) has a plastic casing (18) at one end that is fixed to a support (19) that in turn is anchored to the window profile. The transfer connecting rod (15) is fitted to an elongated profile (20) by means of a rivet (21) and a bearing (22) that moves vertically upwards and downwards.

[0023] On the other hand, it can be seen in Figure 3 that the transfer mechanism has a support element (23) on each module or panel (not shown), this supports the module or panel that is, at its upper end, joined to the elongated profile (20) and at the bottom end joined to an

elongated bar (24) that is connected at the bottom to the side of the window, there being an opening (25) on the central area of said support element (23) to be able to fit a pivot (26) that is connected to a guide piece (27) in order to guide the panels or modules in the closed position. The elongated profiles (20) have channel on both sides to house a multitude of slides (28). Each one of the slides (28) is made from an element that is appreciably in the shape of a U, the ends of which have a small protrusion in order to fit into the groove of the elongated profile (20) and a small cylindrical stem protrudes the inside face of said slides (28) in order to fit into a hole located on the elongated profile (20).

[0024] The guide means arranged on the stated means of transfer have a fixed element (29) fixed to the side of the window that has a grooved section (30) in order to allow a vertical movement of a pivot (31) fitted to the elongated swivel bar (24) in such a way that said bar (24) makes a revolving movement, so that in a completely open position of the window modules said elongated swivel bar (24) is in a horizontal position whilst in the closed position said elongated swivel bar (24) is in a vertical position.

[0025] The stated grooved section (30) is made up of a first upper section that is appreciably rectangular and a second lower section with a circular shape that coincides with the shape of the two facing sides of the pivot (31).

[0026] Finally, the activation device of the invention has been shown in Figure 4 with the exception of the means of activation corresponding to a window side to take three modules for the purpose of making the understanding easier of that which has been described above.

[0027] The details, shapes, dimensions and other ancillary elements, likewise the materials used in the manufacture of the activation device can be suitably substituted by others that are technically equivalent and do not deviate from the fundamentals of the invention or from the sphere defined by the claims that are included below.

Claims

1. An activating device for opening and closing windows, said windows being of the type that are made up of a multitude of revolving modules or panels around a longitudinal and horizontal axis that includes a means of activation with a handle (2) that has a reducer mechanism located on one side of the window, a means of synchronisation and a means of transferring the movement from the handle to both modules or panels that are arranged on both sides of the window to carry out the synchronised revolving of all of the modules or panels is **characterised in that**
   the reducer mechanism of the activation means is arranged on the inside of the carcass (1) and includes an inclined worm gear (5) fitted to a toothed section (3)
   the means of synchronisation include a stainless steel transfer axle (11) arranged horizontally that is fitted at one of its ends to the means of activation, both ends being connected to the transfer axle (11) to a connecting rod (12) linked to a second connecting rod (6) fitted to the toothed section (3), each end of the transfer axle having a casing (18) that is fixed to a support anchored to the window, and a transfer connecting rod (15) joined to an elongated profile (20) and arranged in a vertical manner in order to be moved vertically;
   and the transfer means are provided for each module or panel, including a support element (23) that supports the module or panel, the upper end of said support element (23) being joined to the elongated profile (20) and at its lower end it is joined to an elongated swivel bar (24) that is connected at the bottom to the side of the window by means of guides, the central area of said support element (23) having an opening (25) to take a pivot (26) that is linked to a guide piece (27) in order to guide the panels or modules in the closed position.

2. An activating device, according to Claim 1, **characterised in that** the toothed section (3) has a circumferential pitch of 5.20 mm, a tooth angle of 25 degrees and a primary diameter of approximately 76 mm.

3. An activating device, according to Claim 1, **characterised in that** the elongated profiles (20) have a channel on both sides to house at least one slide (28), said slide (28) being made from an appreciably rectangular body that has side protrusions to be engaged into the channels of the elongated profiles (20).

4. An activating device, according to Claim 1, **characterised in that** the said means of guiding are arranged in the said transfer means have a fixed element (29) fixed to the side of the window that has a grooved section (30) in order to allow a vertical movement of a pivot (31) fitted to the elongated swivel bar (24) in such a way that said bar (24) makes a revolving movement, so that in a completely open position of the modules of the window said elongated swivel bar (24) is in a horizontal position whilst in the closed position said elongated swivel bar (24) is in a vertical position.

5. An activating device, according to Claim 4, **characterised in that** the stated grooved section (30) has a first upper section that is appreciably rectangular and a second lower section with a circular shape that coincides with the shape of the two facing sides of the pivot (31).

6. An activating device, according to Claim 1, **characterised in that** the revolving modules or panels of the window in a completely opened position of same, are arranged in a horizontal position, all of them being located on the outside part of the window.

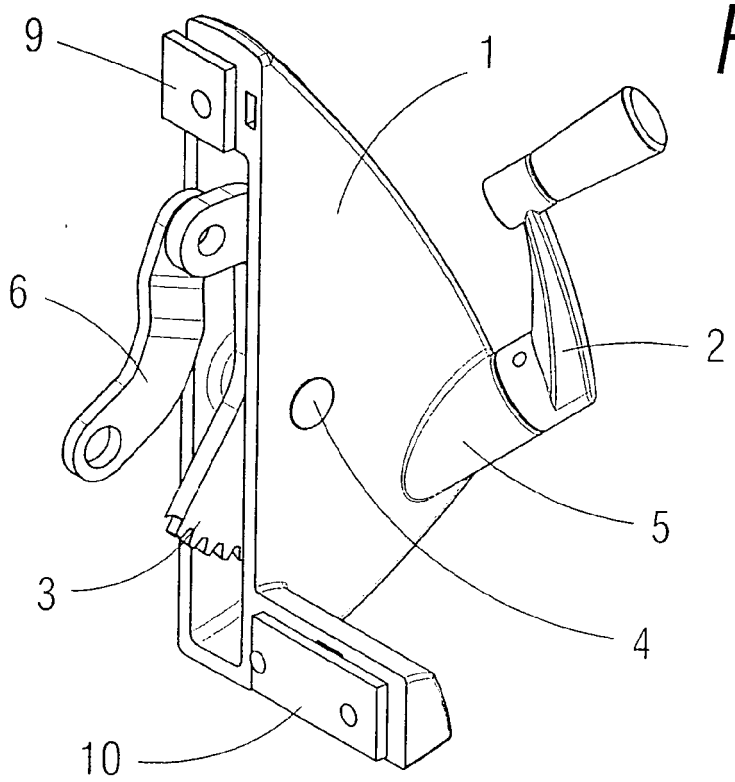


FIG.1a

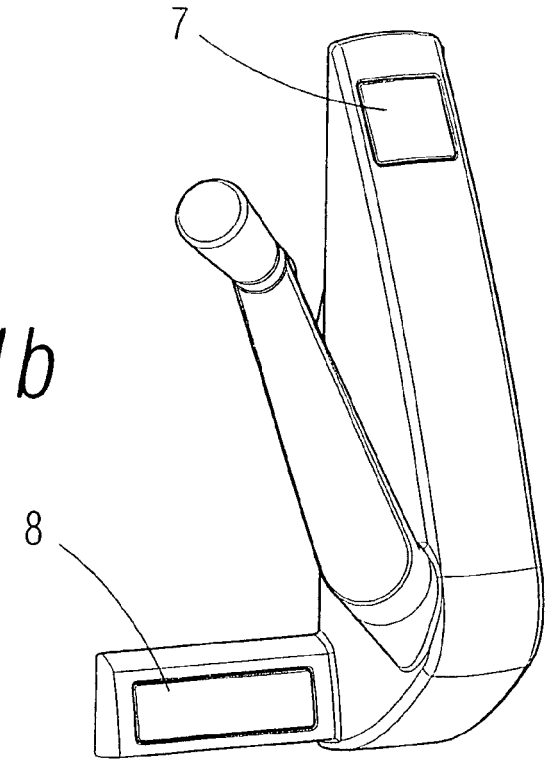


FIG.1b

FIG.2

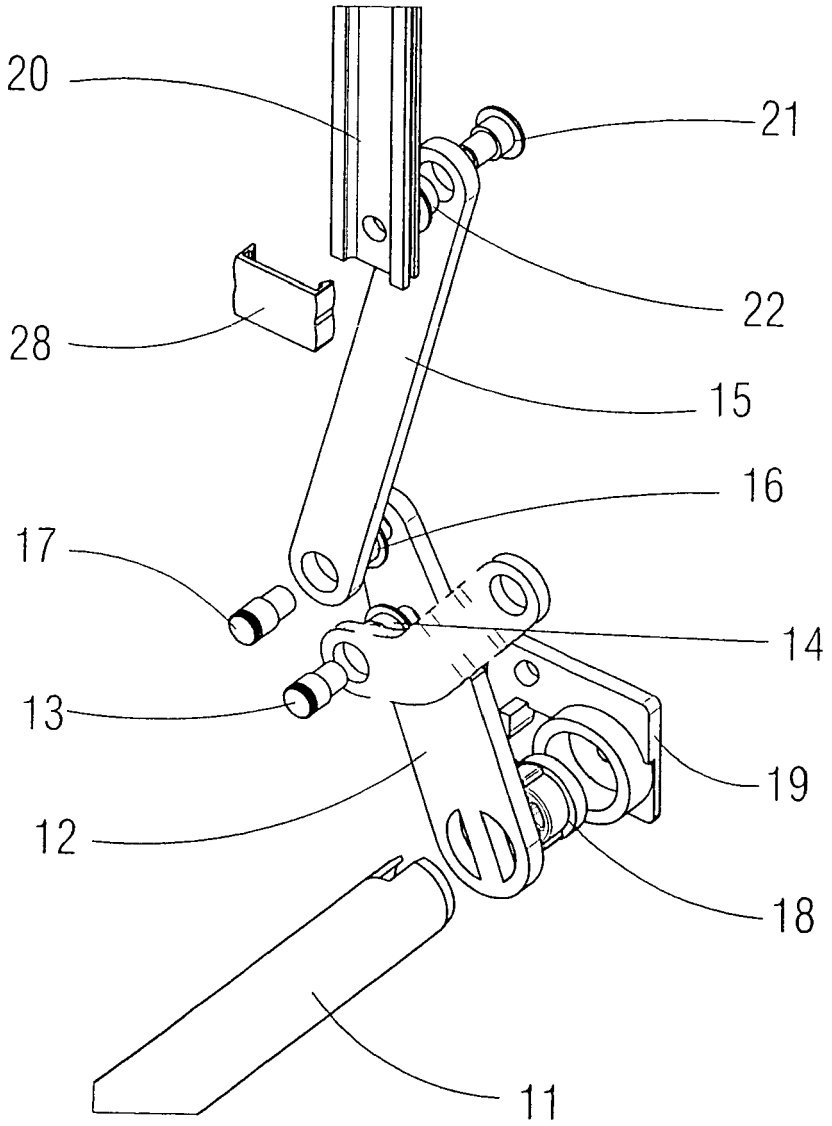
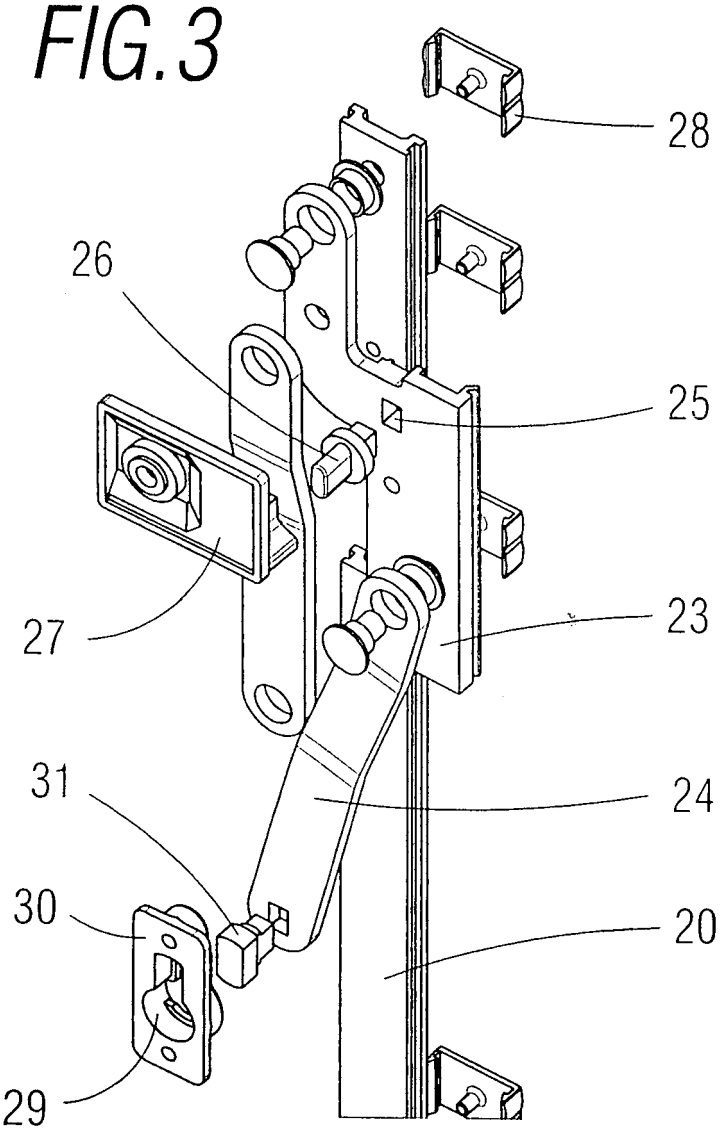


FIG.3



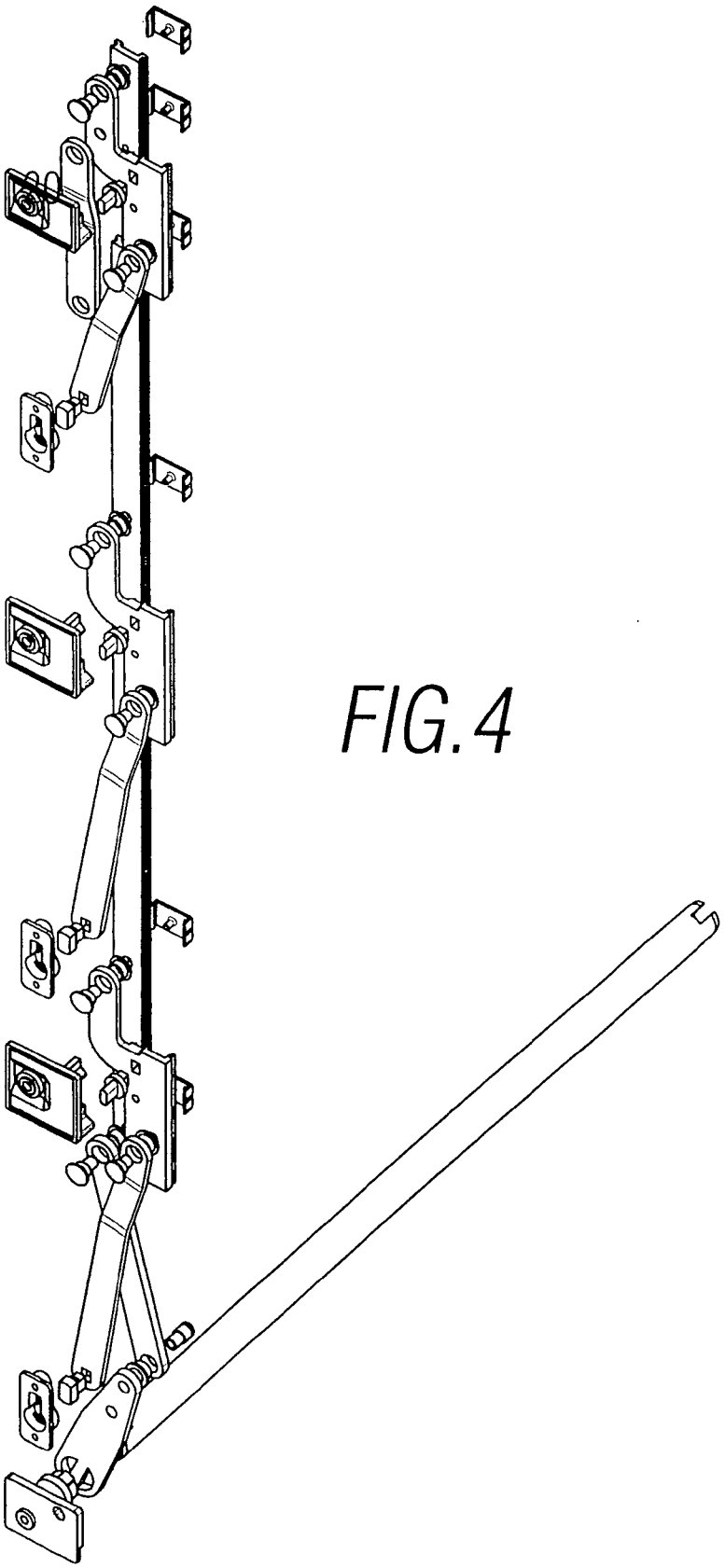


FIG.4