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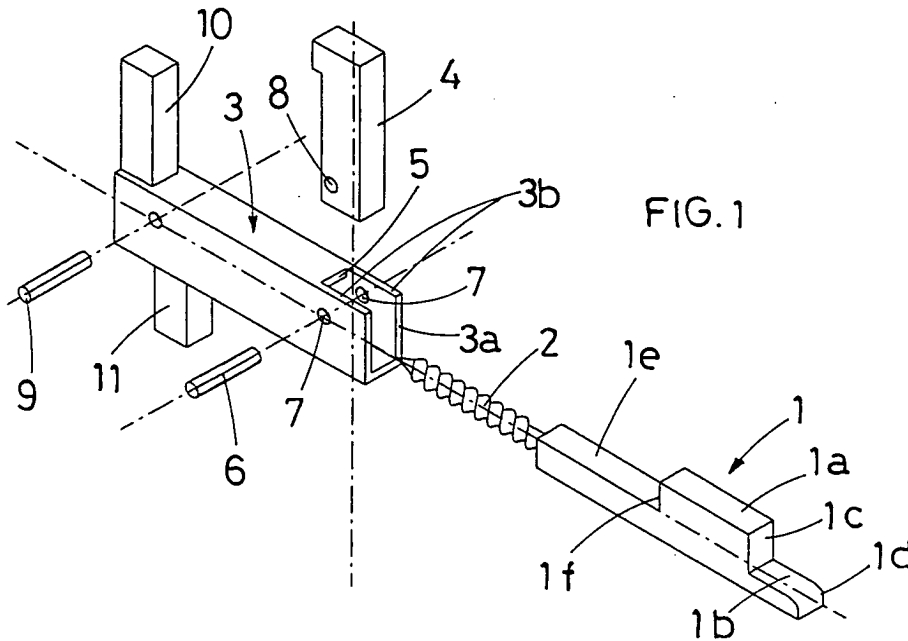
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(54) **Automatic locking device for shutters in fully open position**

(57) This invention refers to an automatic locking device for shutters in fully open position, which comprises a support bracket provided with wall fixing means, with a tubular cursor that is inserted and slides outside the support bracket, being provided with a collapsible

bascule element and a fixed counter-element on the back; it being provided that the point of the support bracket is shaped in such a way as to co-operate with the collapsible element to cause the automatic raising and stable stop in vertical position when the cursor slides backwards.



## Description

**[0001]** This patent application refers to an automatic locking device for shutters in fully open position.

**[0002]** The device is designed to be fixed on the external wall of buildings and used to hold window or door shutters in place in fully open position, in such a way that shutters cannot accidentally close because of wind or get damaged because of repeated shocks, at the end of the opening or closing travel, when shutters are uncontrollably closed or opened by wind or strong air drafts.

**[0003]** Different models of these devices are currently available on the market and can be divided into two main groups: manual and automatic models.

**[0004]** The device that is the object of this patent application belongs to the second group, since it is automatically activated thanks to the presence of articulated elements that receive and use the push of the shutter at the end of the opening travel, when the shutter surmounts the device and touches the external wall of the building.

**[0005]** In other words, the articulated elements do not obstruct the passage of the shutter during opening, although they prevent the shutter from travelling backwards and closing.

**[0006]** In current automatic locking devices, the articulated elements are normally submitted to a return force that makes them stable in idle position, which coincides with the position assumed by the articulated elements to lock the shutter at the end of the opening travel.

**[0007]** The return force is normally exercised by elastic members or counterweights that act on the articulated elements.

**[0008]** Patent EP 0823524 devises an automatic locking device for shutters, in which the shutter is locked inside a forked bracket that oscillates around an horizontal pin and is subjected to the push of an elastically flexible arched plate that holds the bracket in locking position.

**[0009]** Patent EP 0119413 devises an automatic locking device for shutters, in which the shutter is locked by an element that oscillates around an horizontal pin and is subjected to a counterweight that holds the element in locking position.

**[0010]** One of the drawbacks of automatic locking devices for shutters of known type is represented by easy breakage, especially of the elastic members that suffer rapid deterioration, due to stresses and wear caused by atmospheric agents, especially if they are made of oxidizable metal.

**[0011]** Another cause of malfunctioning or breakage is represented by the constructive complexity of the locking devices for shutters of known type, which usually comprise articulated delicate mechanisms, including pins, support bushes for pins, screws, springs and hinges.

**[0012]** The purpose of this invention is to provide a

solution to the aforementioned drawbacks by devising a new automatic locking device for shutters in fully open position, which is composed of a few, simple elements, without the need of using elastic members, counterweights, screws and hinges.

**[0013]** Another purpose of this invention is to devise an automatic locking device for shutters in fully open position, which is composed of elements with simple geometrical configuration that can be produced easily and economically.

**[0014]** The last purpose of this invention is to devise an automatic locking device for shutters in fully open position, which is composed of a few elements that can be assembled easily and rapidly also by non-specialised workers without the use of special expensive machinery.

**[0015]** The device of the invention comprises a support bracket provided with a threaded rod for wall fixing, a tubular cursor that is inserted and slides outside the support bracket, a collapsible bascule element pivoted at the front end of the cursor, with a fixed counter-element that projects from the back end of the cursor.

**[0016]** The point of the support bracket is shaped in such a way that it advantageously co-operates with the base section of the collapsible element, normally in lowered position, which is automatically raised in vertical position when the tubular cursor is forced to slide backwards along the support bracket due to the push exercised by the shutter on the counter-element, when the shutter reaches the end of the opening travel.

**[0017]** In this way, at the end of the opening travel, the shutter remains locked in the space between the fixed counter-element and the collapsible element momentarily raised in vertical position.

**[0018]** Evidently, the collapsible element must be lowered in horizontal position to close the shutter and the backward downward rotation of the element is only possible if the element is moved away from the point of the support bracket.

**[0019]** This means that the push exercised by the shutter against the collapsible counter-element cannot lower the element, whose base opposes the point of the support bracket.

**[0020]** To close the shutter, it is therefore necessary to eliminate the opposition by manually moving the cursor forward in order to move the base of the collapsible element away from the point of the support bracket.

**[0021]** For major clarity the description of the locking device for shutters according to the present invention continues with reference to the enclosed drawings, which are intended for purposes of illustration only and not in a limiting sense, whereby:

- Fig. 1 is an exploded axonometric view of the components of the device of the invention;
- Fig. 2 is an axonometric view of the device of the invention, assembled and sectioned with its vertical symmetrical plane;
- Figs. 3 to 6 are cross-sectioned views of the device

of the invention, showing the sequence of movements needed to lock the shutter automatically and release it manually.

**[0022]** With reference to Figs. 1 and 2, the device of the invention comprises a support bracket (1) provided with a threaded rod (2) for wall fixing, a tubular cursor (3) that is inserted and slides outside the support bracket (1), a collapsible bascule element pivoted at the front end of the tubular cursor (3), with rectangular cross-section that exactly matches the cross-section of the central body (1a) of the support bracket (1).

**[0023]** The front of the support bracket (1) ends with a thinner section (1b) joined to the central body (1a) by means of a right step (1c).

**[0024]** The point (1d) of the ending section (1b) has a profile with rounded off corner.

**[0025]** The front end of the tubular cursor (3) has a notch (5) affecting the upper wall only (3a) and having the same (or higher) depth as the length of the ending section (1b) of the support bracket (1).

**[0026]** The collapsible element (4) is housed and pivoted inside the front end of the tubular cursor (3) by means of a transversal pin (6) inserted into two holes (7) located on the vertical walls (3b) of the cursor (3) and into one hole (8) located near the base of the collapsible element (4) that in vertical position is exactly housed inside the notch (5).

**[0027]** The support bracket (1) is hollow in a long section of the upper border, thus forming a thin section of support bracket (1e), on which the screw (2) is applied, being joined to the body (1a) by a right step (1f) designed to engage - during the forward travel of the tubular cursor (3) - with a matching bar (9) that goes across the cursor (3) near the back end, from which a fixed counter-element (10) projects, with a downward projecting knob (11) near and below the front end.

**[0028]** With reference to Figs. 3 and 4, the description continues with the procedure used to automatically lock the shutter at the end of the opening travel in the space between the fixed counter-element (10) and the collapsible element (4) momentarily in vertical position.

**[0029]** When the shutter is opened, the collapsible element (4) must be in lowered position, and the cursor (3) must be in maximum forward position with respect to the support bracket (1), as shown in Fig. 1.

**[0030]** When the shutter reaches the end of the opening travel, the lower side of the shutter goes beyond the element (4) and touches the counter-element (10) causing the backward sliding (shown by F1) of the cursor (3), with consequent interference between the base of the collapsible element (4) and the point (1d) of the support bracket (1); the interference causes the automatic raising (shown by F2) of the element (4) that is now in vertical position inside the notch (5), engaging against the right step (1c) above the ending section (1b) of the support bracket (1), as shown in Fig. 2.

**[0031]** When the device is in the configuration shown

in Fig. 2, the push exercised by the shutter (not shown in the figures) against the collapsible counter-element (4) cannot lower the element, whose base opposes the point of the support bracket (1).

**[0032]** To close the shutter, it is therefore necessary to eliminate the opposition by manually moving the cursor (3) forward in order to move the base of the collapsible element (4) away from the point of the support bracket (1).

**[0033]** This movement is easy to make thanks to the presence of the knob (11), which is grabbed by the user to move the cursor (3) forward (as shown by F3), coming to a stop when the transversal bar (9) engages the step (1f) of the support bracket (1).

**[0034]** Only when the interference of section (1b) with the base of the collapsible element (4) has ended, the element (4) can move forward (as shown by F4) to a perfectly horizontal position, as shown in Fig. 6.

## Claims

1. Automatic locking device for shutters in fully open position, **characterised in that** it comprises a support bracket (1) provided with wall fixing means, with a tubular cursor (3) that is inserted and slides outside the support bracket for a predefined section, being provided with a fixed counter-element (10) on the back that projects upwards, while the front end of the tubular cursor (3) is provided with a collapsible bascule element (4) that in vertical position is housed inside a notch (5) located on the upper wall (3a) of the cursor (3); it being provided that the point of the support bracket (1) is shaped in such a way as to co-operate with the element (4) to cause the automatic raising and stable stop in vertical position when the cursor (3) slides backwards.
2. Automatic locking device for shutters in fully open position as defined in the preceding claim, **characterised in that** the cursor (3) is provided with a downward projecting knob (11) on the front end.
3. Automatic locking device for shutters in fully open position as defined in one or more of the preceding claims, **characterised in that** the cursor (3) is provided with a bar (9) that goes across its back end.
4. Automatic locking device for shutters in fully open position as defined in one or more of the preceding claims, **characterised in that** the support bracket (1) has a central body (1a) and ends with a thinner section (1b) joined to the central body (1a) by means of a right step (1c) and **in that** the point (1d) of the ending section (1b) has a profile with rounded off corner.

5. Automatic locking device for shutters in fully open position as defined in one or more of the preceding claims, **characterised in that** the support bracket (1) is hollow in a long section of the upper border, thus forming a thin section of support (1e) joined to the body (1a) by a right step (1f) designed to engage with the bar (9) when the cursor (3) slides forward. 5
6. Automatic locking device for shutters in fully open position as defined in one or more of the preceding claims, **characterised in that** the collapsible element (4) is pivoted inside the front end of the tubular cursor (3) by means of a transversal pin (6) inserted into two holes (7) located on the vertical walls (3b) of the cursor (3) and into one hole (8) located near the base of the collapsible element (4). 10 15
7. Automatic locking device for shutters in fully open position as defined in claim 1, **characterised in that** the support bracket (1) is provided with a threaded rod (2) for wall fixing. 20
8. Automatic locking device for shutters in fully open position as defined in claims 5 and 7, **characterised in that** the threaded rod (2) is applied on the section (1e) of the support bracket (1). 25

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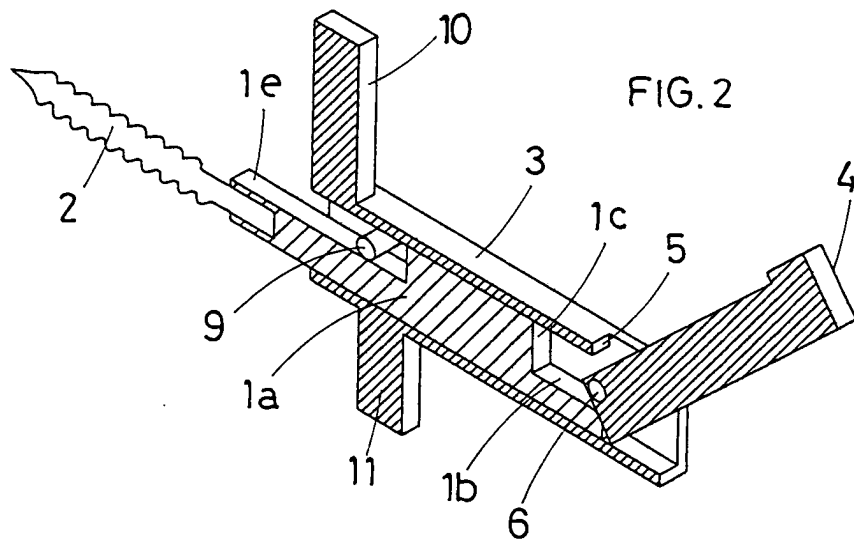
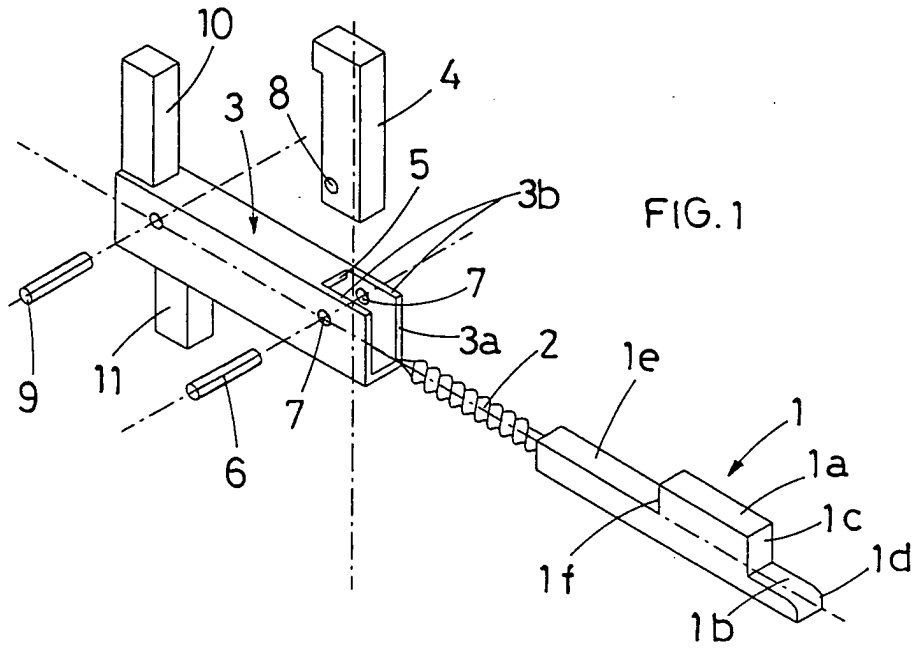
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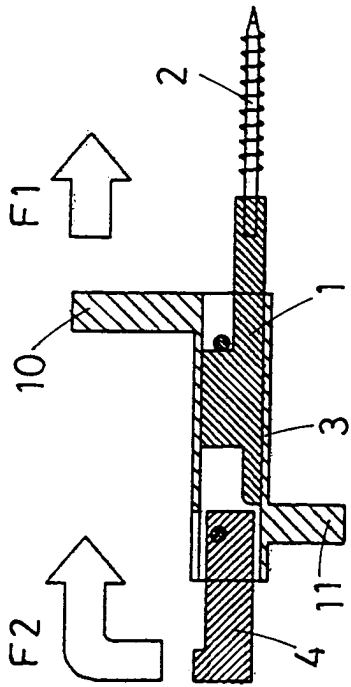


FIG. 3

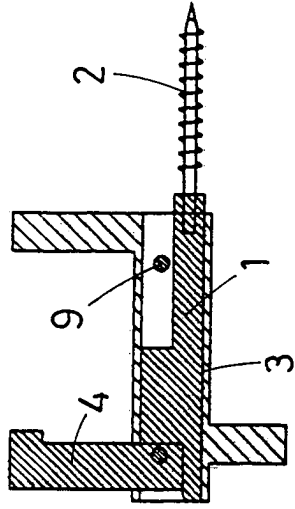


FIG. 4

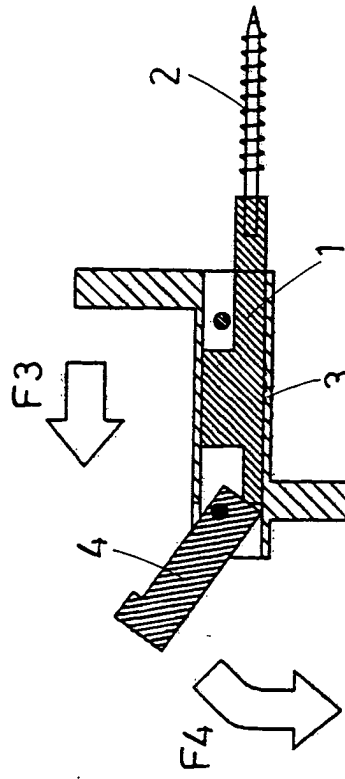


FIG. 5

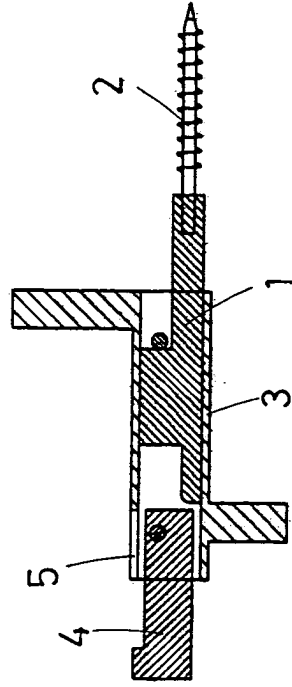


FIG. 6