

“AUTOMATIC SYSTEM FOR CLOSING WINDOWS OR DOORS”

TECHNICAL FIELD

The object of the present invention is an automatic locking system for windows or doors.

The invention relates to the technical field of automatic closing systems of doors and windows of buildings and refers to automatic closing systems of a magnetic type.

As is known, the aim of automatic closing systems is to guarantee that the bolts, also known as “closing points”, of a lock installed on a door or window leaf automatically engage, i.e. without the intervention of the user, in special seatings fashioned on the fixed frame of the door or window, when the door or window leaf is in an aligned position to the frame.

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PRIOR ART

Generally, automatic closing systems comprise a lock body installed on a door or window leaf of the door or window and a counter-plate, commonly known as a “strike-plate”, installed on a fixed frame of the door or window. The lock body is provided with bolts, also known as “hooks” or “closing points”, which, when the door or window leaf is in an aligned position to the frame, are released and automatically exit from suitable openings fashioned on the lock body, in order to engage in the counter-plate.

According to a first prior art, when the door or window leaf is in the aligned position with the frame, a mobile magnet housed in the counter-plate is attracted by the ferromagnetic face-plate of the lock body and exits so as to press a projecting button installed on said face-plate. The button is mechanically connected to an unlocking mechanism for releasing the bolts. Therefore, when the door or window leaf and the frame are aligned, the pressure on the button by the magnet activates the unlocking mechanism, causing the release of the bolts and determining the automatic closing of the door or window. The opening of the door or

window occurs by action of a recall mechanism, for example a leverage connected to a handle, which disengages the bolts from the counter-plate. When the door or window leaf is misaligned from the fixed frame, suitable recall means acts on the magnet to cause the magnet to return into the counter-plate; at the same time, said recall means also acts on the unlocking mechanism in order to reposition the unlocking mechanism so that it locks the bolts in a retained condition inside the lock body. In this situation the door or window leaf is distanced from the frame and the door or window is open.

10 The first prior art application described above has some important drawbacks.

Firstly, the presence of an element (the button) projecting from the face-plate of the lock body compromises the safety of the closing system. In fact, if this element is accidentally or deliberately pushed, it activates the unlocking mechanism and causes the release of the bolts, also in the non-aligned condition between the door or window leaf and the frame, with the consequence that the bolts do not engage in the counter-plate and therefore do not determine the closing of the door or window.

Further, this first prior art disadvantageously functions only with lock bodies having a face-plate made of a ferromagnetic material.

According to a second prior art, closing systems exist in which the unlocking mechanism forms a single part with a first magnet which, when the door or window leaf is aligned to the frame, is attracted by a second magnet housed in the counter-plate and arranged in a facing position to a face-plate of the lock body. The attraction of the first magnet towards the second magnet determines a displacement of the unlocking mechanism, causing the release of the bolts and determining the automatic closing of the door or window. To enable the release of the bolts, it is indispensable for the unlocking mechanism to have a displacement stroke that is sufficient for releasing the release mechanism; therefore, the first magnet is housed in the lock body in a very retracted position with respect to a

face-plate thereof, typically at least at about 4 mm from an external surface thereof.

WO2017/158449 describes a closing system in accordance with this second prior art in which the second magnet is slidably housed in the counter-plate and, when the door or window leaf is aligned with the fixed frame and the lock body is facing the counter-plate, the second magnet is attracted by a third magnet, rigidly fixed to the lock body, and approaches the first magnet. In this way the closing system is able to operate independently of the distance between the lock body and counter-plate.

Also in this second type of closing system the activation of the unlocking mechanism and therefore the release of the bolts can also occur in the condition of imperfect alignment between the door or window leaf and the frame, with the consequence that the bolts do not engage in the counter-plate and therefore do not determine the closing of the door or window.

Other examples of automatic systems for closing windows and doors are described in EP2634330, DE8704036, GB1009996 and US7308737.

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AIMS OF THE INVENTION

In this context, the technical task underlying the present invention is to provide an automatic closing system for windows or doors that obviates the drawbacks of the prior art mentioned above. In particular, an object of the present invention is to make available an automatic closing system for windows or doors, which is reliable and secure, i.e. able to prevent accidental exiting of the bolts, or closing points.

"Closing step" is intended as the movement of the window or door leaf from an open position, in which the window or door leaf is not aligned with the fixed frame, towards a closed position, in which the leaf is aligned with the fixed frame.

"Approaching step" is intended as that part of the closing step starting from when the lock body starts to face the counter-plate and ending when the window or door is fully closed, i.e. when the window or door leaf and the

fixed frame are aligned and the lock body is completely facing the counter-plate. The approaching step is divided into an initial approaching step, starting from when the lock body starts facing the counter-plate until the lock body is partially facing the counter-plate, and a final approaching
5 step, starting from when the lock body is partially facing the counter-plate until the window or door leaf and the fixed frame are aligned and the lock body is completely facing the counter-plate.

"Opening side" of the window or door is intended as the side facing in the direction of opening of the leaf. With reference to the window or door leaf
10 or to components of the closing system fitted on the leaf, the opening side corresponds to the side which, in the closing step, last faces the fixed frame or the components of the closing system mounted on the fixed frame. On the contrary, with reference to the fixed frame or to components of the closing system mounted on the fixed frame, the opening side
15 corresponds to the side which, in the closing step, first faces the window or door leaf or components of the closing system fitted on the leaf.

"Closing side" of the window or door is intended as the side facing in the direction of closing of the window or door leaf. With reference to the window or door leaf or to components of the closing system fitted on the
20 leaf, the closing side corresponds to the side which, in the closing step, first faces the fixed frame or components of the closing system mounted on the fixed frame. On the contrary, with reference to the fixed frame or components of the closing system mounted on the fixed frame, the closing side corresponds to the side which, in the closing step, last faces the
25 window or door leaf or components of the closing system fitted on the leaf.

The technical task set and the objects specified are substantially attained by an automatic closing system for windows or doors and by a window or door, comprising the technical features as set out in one or more of the accompanying claims.

30 In accordance with a possible aspect, the automatic closing system comprises a counter-plate, installable on a fixed frame and provided with a

first member, and a lock body, installable on a door or window leaf and having a front portion intended to face the counter-plate when the door or window leaf is aligned with the fixed frame.

The lock body is provided with closing means movable between a release configuration, in which the closing means engages the counter-plate, and a retained configuration, in which the closing means is maintained inside the lock body and does not engage the counter-plate.

A switch is mounted in the lock body which is configured to assume a locking configuration wherein the switch locks the closing means in the retained configuration and an unlocking configuration wherein the switch unlocks the closing means, thereby activating the automatic movement of the closing means from the retained configuration to the release configuration.

The switch and the first member are configured to exchange an activation magnetic-type action adapted to switch the switch from the locking configuration to the unlocking configuration only in a final approaching step of the lock body with respect to the counter-plate, which is a part of a closing step starting from when the lock body is partially facing the counter-plate and ending when the lock body is completely facing the counter-plate.

The switch has a first leaf-side magnetic pole active at the front portion of the lock body. The first member also has a frame-side magnetic pole active at a front portion of the counter-plate. These first magnetic poles are configured in such a way as to generate the activation magnetic-type action only in the final approaching step. The first leaf-side magnetic pole is active only on an opening side so as to magnetically interact with the first frame-side magnetic pole only in the final approaching step of the lock body to the counter-plate and exchange the activation magnetic-type action.

The first magnetic poles are configured so as to generate the activation magnetic-type action only in the final closing step of the lock body with respect to the counter-plate.

The stated technical task and specified objects are substantially achieved also by a door or window comprising an automatic closing system.

The dependent claims, here incorporated for reference, correspond to further embodiments of the automatic system according to the present invention.

In accordance with one aspect of the invention, the switch and the first member are configured to exchange a stabilization magnetic-type action adapted to maintain the switch in the locking configuration at least in an initial approaching step of the lock body with respect to the counter-plate which is a part of the closing step starting from when the lock body starts to face the counter-plate and ending when the lock body is partially facing the counter-plate.

Preferably the activation magnetic-type action and the stabilization magnetic-type action are opposite. Still more preferably the activation magnetic-type action is an attractive action and the stabilization magnetic-type action is a repulsive action.

Preferably the switch has a second leaf-side magnetic pole having opposite polarity to the polarity of the first leaf-side magnetic pole. The second leaf-side magnetic pole is active at the front portion of the lock body and only on a closing side.

Preferably the first frame-side magnetic pole extends so as to magnetically interact with the second leaf-side magnetic pole at least in the initial approaching step, exchanging the stabilization magnetic-type action, and so as to magnetically interact with the first leaf-side magnetic pole only in the final approaching step, exchanging the activation magnetic-type action.

In accordance with one aspect of the invention, the switch is adjustable to reverse the position of the first leaf-side magnetic pole and the second leaf-side magnetic pole on the plane of the front portion of the lock body.

According to an aspect of the invention, the switch is movable between a
5 locking position, corresponding to the locking configuration, and an unlocking position, corresponding to the unlocking configuration. Still more preferably the switch is defined by a locking pin axially slidable between the locking position and the unlocking position.

In accordance with one aspect of the invention, the locking pin, preferably
10 made of a non-magnetic material, comprises a permanent magnet arranged along the longitudinal axis and having opposite poles active on opposite sides of the same longitudinal axis and two ferromagnetic elements adjacent to the permanent magnet arranged respectively on a closing side and on an opening side and respectively defining a first leaf-
15 side magnetic pole and a second leaf-side magnetic pole as an effect of the interaction with the permanent magnet.

Preferably the locking pin is rotatable about the longitudinal axis to reverse the position of the first leaf-side magnetic pole and the second leaf-side magnetic pole on the plane of the front portion of the lock body.

20 In accordance with one aspect of the invention, the first member is movable with respect to the counter-plate. Preferably a second member, distinct and separate from the switch, is integrally fixed to the lock body in such a way that, when the leaf is aligned with the fixed frame, the second member exercises an attraction force of a magnetic type on the first
25 member which approaches the first member to the lock body in such a way that it magnetically interacts with the switch to activate the automatic switching of the closing means from the retained configuration to the release configuration.

Preferably the second member is arranged at the front portion of the lock
30 body.

Preferably the first member is movable, for example slidably or rotatably, between a retracted configuration in which the first member is retracted inside a housing of the counter-plate and an extracted configuration in which the first member is extracted from the housing, to approach the switch.

Preferably the first member, when in the extracted configuration, is in a resting condition, even indirectly, against an edge surface forming part of the lock body, at the switch.

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DESCRIPTION OF THE DRAWINGS

Further characteristics and advantages of the present invention will become more apparent from the following indicative, and hence non-limiting, description of a preferred, but not exclusive, embodiment of an automatic closing system for windows or doors, as illustrated in the appended drawings, in which:

- figure 1 illustrates an overview in lateral section of an embodiment of an automatic closing system according to the invention, in an operating condition corresponding to the alignment between the door or window leaf and the fixed frame;
- figure 2 illustrates a view in lateral section of a component of the automatic closing system shown in figure 1, in an operating condition corresponding to a misalignment between the door or window leaf and the frame;
- figure 3 illustrates a front view of the component shown in figure 2;
- figure 4 illustrates a view in section according to the line IV-IV of figure 2;
- figure 5 illustrates a view in section according to the line V-V of figure 2;
- figure 6A illustrates a perspective view of a detail of figure 5;
- figure 6B illustrates an exploded perspective view of the detail of figure 6A;

- figures 7A-7D show views in horizontal section which illustrate the operation of the automatic closing system shown in the previous figures.

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DETAILED DESCRIPTION OF THE INVENTION

5 With reference to figure 1, an automatic closing system for windows or doors, according to the invention, is denoted in its entirety by number 1. With reference to figures 7A-7D, a door or window 100 is shown comprising a door or window leaf 101 and a fixed frame 102.

The system 1 comprises a counter-plate 2 installable on the fixed frame
10 102 and having an opening 2a, a housing 2b and a front portion 2c.

The counter-plate 2 is provided with a first member 3, preferably a first magnetic member 3, housed in the housing 2b. Preferably, the first member 3 is defined by a permanent-type magnet. For example the permanent magnet of the first member 3 has a first frame-side magnetic
15 pole 3a, active on the front portion 2c of the counter-plate 2. In the specific example illustrated in the accompanying drawings this first frame-side magnetic pole 3a is shown as a south pole.

The first magnetic member 3 is preferably movable with respect to the counter-plate 2, and in particular with respect to the housing 2b, between
20 a retracted configuration in which the first member is retracted inside the housing 2b of the counter-plate 2 and an extracted configuration in which the first member is extracted from the housing 2b to approach a switch 5 housed in the lock body 20. Still more preferably the first magnetic member 3 is slidably movable.

25 According to an aspect of the invention, the counter-plate can be made of a ferromagnetic material or a non-ferromagnetic material.

With reference to figures 1 and 2, the system 1 comprises a lock body 20 installable on the door or window leaf 101, having an opening 20a and a front portion 20b intended to face the counter-plate 2 when the door or
30 window leaf is aligned with the fixed frame.

The lock body 20 is provided with closing means 4. The closing means 4 is movable between a release configuration (figure 1), in which it engages the counter-plate 2, and a retained configuration (figure 2), in which it is maintained inside the lock body 20 and does not engage the counter-plate. The closing means preferably comprises a hook 4a which has a hooked portion 4b suitable for being inserted in the opening 2a of the counter-plate 2, engaging the same counter-plate.

With particular reference to figures 1 and 2, the system 1 comprises a switch 5 housed in the lock body 20.

10 The switch 5 is configured to assume a locking configuration, wherein the switch 5 locks the closing means 4 in the retained configuration, and an unlocking configuration wherein the switch unlocks the closing means 4, thereby activating the automatic movement of the same closing means from the retained configuration (figure 2) to the release configuration
15 (figure 1).

In the case in which the closing means 4 comprises a hook 4a, the switch 5 activates the release of the hook 4, which, passing through an opening 20a of the lock body 20 and the opening 2a of the counter-plate 2, hooks the hooked portion 4b of the same counter-plate.

20 Preferably the switch 5 is movable, for example slidable, between a locking position, corresponding to the locking configuration, and an unlocking position, corresponding to the unlocking configuration.

The switch 5 can be housed completely inside the lock body 20 to prevent accidental activations, or tampering, of the closing system, ensuring the
25 security of the door or window.

The first magnetic member 3 magnetically interacts with the switch 5 to activate the switching thereof from the locking configuration to the unlocking configuration and cause the automatic passage of the closing means 4 from the retained configuration (figure 2) to the release
30 configuration (figure 1). In particular the first magnetic member 3

magnetically interacts with the switch 5 to bring it from the locked position to the unlocked position.

The interaction between the first magnetic member 3 and the switch 5 will be described in the continuation of the present description.

5 In accordance with one aspect of the present invention, the system 1 can comprise a second member 6, preferably a second magnetic member 6, integrally fixed to the lock body 20 so that when the door or window leaf is approached to the fixed frame, the second magnetic member 6 exercises a force of attraction on the first magnetic member 3 to bring it into the
10 extracted configuration, i.e. to approach it to the lock body 20. The second member 6 is preferably defined by a permanent-type magnet.

With reference to figures 1 and 2, the second magnetic member 6 is arranged at the front portion 20b of the lock body 20 intended to face the counter-plate 2. For example the permanent magnet of the second
15 member 6 has a magnetic pole active on the front portion 20b of the lock body 20, for example a north pole.

When the door or window leaf on which the lock body 20 is installed is approached to the fixed frame and aligns therewith to operate the closing of the door or window, the fixed, second magnetic member 6 attracts the
20 movable, first magnetic member 3 so as to approach it to the switch 5 to activate the release of the closing means which lock the door or window, as will be described in the continuation of the present description.

According to an aspect of the invention, the switch 5 is distinct and separate from the second magnetic member 6. This circumstance
25 advantageously enables optimising both the functioning of the switch and the positioning of the second magnetic member, since the second magnetic member is most effective in a flush or projecting position with respect to the front portion of the lock body, while the switch is best housed in the lock body for reasons of security.

30 According to a possible embodiment of the invention illustrated, for example, in figures 1 and 2, the switch 5 and the second magnetic

member 6 can be installed on a same support 7. The presence of the support advantageously gives compactness to the closing system and simplifies the maintenance operations, as it is able to remove, with a single operation, both the functional elements of the lock body, i.e. the switch
5 and the second magnetic member.

According to an aspect of the invention, the first magnetic member 3, when in the extracted configuration, is preferably in a contact configuration, including indirect contact, against an edge surface forming part of the lock body, at the switch. Indirect contact means that the first
10 magnetic member can rest on the aforesaid edge surface also by means of interposition of another member, for example a surface of a containing tray of the first magnetic member. This edge surface can be for example the front portion 20b of the lock body 20 or, as shown in the figures, the support 7.

15 According to an aspect of the invention, recall means 8 is present for returning the first magnetic member 3 into the retracted configuration inside the housing 2b, when the lock body 20 is distanced from the counter-plate 2, i.e. when the door or window leaf is not aligned to the fixed frame. The recall means 8 preferably comprises an elastic element 9.
20 Alternatively, the recall means comprises a ferromagnetic component conformed so as to exercise a force of attraction on the first magnetic member of a smaller entity with respect to the force of attraction which the second magnetic member exercises on the first magnetic member, when the door or window leaf is aligned to the fixed frame.

25 According to an embodiment of the invention, the switch 5 is defined by a locking pin 10 which has a longitudinal axis "X" along which it slides axially between the locking position, preferably retracted in the lock body 20 and corresponding to the retained configuration of the closing means 4, and the unlocking position, preferably extracted from the lock body 20 and
30 corresponding to the release configuration of the closing means.

Preferably, the locking pin 10 is associated with an elastic recall member 11, typically a helical spring, which returns it to the locked condition, when the door or window leaf is distanced from the frame, according to that which will be more fully described in the following paragraphs.

- 5 The locking pin 10 is preferably made of non-magnetic material and comprises a permanent magnet 12 arranged along the longitudinal axis "X" and having opposite poles active on opposite sides of the same longitudinal axis. L1 denotes an opening side of the door or window and L2 denotes a closing side of the door or window.
- 10 For example on the opening side L1 the north pole of the permanent magnet 12 is active and on the closing side L2 the south pole of the permanent magnet 12 is active.
- Two ferromagnetic elements 13a, 13b are adjacent to the permanent magnet 12, arranged to contact respectively on the opening side L1 and
- 15 on the closing side L2 and respectively defining a first leaf-side magnetic pole 14a and a second leaf-side magnetic pole 14b as an effect of the interaction with the permanent magnet 12. For example the first leaf-side magnetic pole 14a is the north pole and the second leaf-side magnetic pole 14b is the south pole.
- 20 The first leaf-side magnetic pole 14a is active on the opening side L1 and the second leaf-side magnetic pole 14b is active on the closing side L2.
- Moreover the first leaf-side magnetic pole 14a and the second leaf-side magnetic pole 14b are active at the front portion 20b of the lock body 20.
- Preferably the locking pin 10 is rotatable about the longitudinal axis "X"
- 25 (arrow R of figure 3) to reverse the position of the first leaf-side magnetic pole 14a and the second leaf-side magnetic pole 14b on the plane of the front portion 20b of the lock body 20. In particular the locking pin 10 is rotatable 180° about the longitudinal axis "X". In this way the switch 5 is adjustable in order to adapt to "right" or "left" doors or windows.
- 30 As will be described in the continuation, the first leaf-side magnetic pole 14a and the second leaf-side magnetic pole 14b are arranged with respect

to the first magnetic member 3 so as to interact with the first magnetic member 3 and generate a stabilization magnetic-type action at least in an initial approaching step of the door or window leaf with respect to the fixed frame and an activation magnetic-type action only in a final approaching step of the door or window leaf with respect to the fixed frame. These actions will be described with reference to figures 7A-7D which illustrate the door or window 100 having the lock body 20 (in particular the switch 5 is shown) and the counter-plate 2 (in particular the first magnetic member 3 is shown), in some operating steps of the invention.

10 Figure 7A shows the final part of the closing step of the door or window, when the door or window leaf and the fixed frame are not yet approached and the lock body 20 is therefore distal to the counter-plate 2. In the counter-plate 2, the first magnetic member 3 is held in the retracted configuration by the recall means 8, while on the lock body 20, the switch 5 (locking pin 10) does not interact with the first magnetic member 3 and maintains the closing means 4 in the retained configuration. In particular the switch 5 (locking pin 10) is held in the locked position by the elastic recall element 11.

Figure 7B shows the initial approaching step of the door or window leaf with respect to the fixed frame, in which the lock body 20 starts facing the counter-plate 2. If present, the second magnetic member 6 attracts the first magnetic member 3 (arrow A) which assumes the extracted configuration, resting on the front portion of the lock body 20, at the switch 5 (locking pin 10). In greater detail, in the case in which the support 7 is present, the first magnetic member 3, in the extracted configuration, rests thereon.

In this initial approaching step of the door or window leaf with respect to the fixed frame, the second leaf-side magnetic pole 14b magnetically interacts with the first leaf-side magnetic pole 3a exchanging a stabilization magnetic-type action adapted to maintain the closing means 4 in retained configuration, in particular to maintain the switch 5 (locking pin 10) in the locked position. This interaction is obtained thanks to the fact that the

second leaf-side magnetic pole 14b is active on the closing side L2, i.e. on the side which first faces the first leaf-side magnetic pole 3a.

In accordance with the illustrated example, the stabilization magnetic-type action is a repulsive action (arrow F1) exercised between the second leaf-side magnetic pole 14b (south pole) and the first frame-side magnetic pole 3a (south pole).

In the case in which the second magnetic member 6 is present, the intensity of the magnetic fluxes is such as to ensure that the first magnetic member 3 is maintained in the extracted configuration by the action of the attraction of the second magnetic member 6 while the repulsive action exercised between the first leaf-side magnetic pole 14b (south pole) and the first frame-side magnetic pole 3a (south pole) maintains the switch 5 in the locked position (in cooperation with the elastic recall element 11).

Remaining in the locked position, the switch 5 (locking pin 10) maintains the closing means 4 in the retained configuration.

Figure 7C shows the completion of the final approaching step of the door or window leaf with respect to the fixed frame, when the leaf and the fixed frame are aligned and the lock body 20 is completely facing the counter-plate 2.

During the final approaching step of the door or window leaf with respect to the fixed frame, the switch 5 and the first magnetic member 3 exchange an activation magnetic-type action adapted to activate the switching of the closing means 4 between the retained configuration and the release configuration. In the case in which the closing means 4 comprises a hook 4a, the latter is released and, passing through an opening 20a of the lock body 20 and the opening 2a of the counter-plate 2, hooks its hooked portion 4b to the same counter-plate.

In particular, during the final approaching step of the door or window leaf with respect to the fixed frame, the switch 5 and the first magnetic member 3 exchange an activation magnetic-type action adapted to move the switch 5 between the locked position and the unlocked position (arrow B).

This activation magnetic-type action is exercised only during this final approaching step. This interaction is obtained thanks to the fact that the first leaf-side magnetic pole 14a is active only on the opening side L1, i.e. on the side which last faces the first magnetic member 3.

- 5 In accordance with the illustrated example, the activation magnetic-type action is an attractive action (arrow F2) between the first leaf-side magnetic pole 14a (north pole) and the first frame-side magnetic pole 3a (south pole).

According to the illustrated example, the first frame-side magnetic pole 3a
10 extends so as to magnetically interact with the second leaf-side magnetic pole 14b at least in the initial approaching step, exchanging the stabilization magnetic-type action, and so as to magnetically interact with the first leaf-side magnetic pole 14a only in the final approaching step, exchanging the activation magnetic-type action.

- 15 The intensity of the magnetic fluxes is such as to ensure that the activation magnetic-type action is greater than the stabilization magnetic-type action, for which the switch 5 passes from the locked position to the unlocked position, also overcoming the elastic recall element 11. In the case in which the second magnetic member 6 is present, the intensity of the
20 magnetic fluxes is also such as to ensure that the first magnetic member 3 is maintained in the extracted configuration by the action of the attraction of the second magnetic member 6.

In general, preferably the activation magnetic-type action and the stabilization magnetic-type action are opposite.

- 25 Figure 7D shows the opening step of the door or window, when the door or window leaf and the fixed frame are partially approached and the lock body 20 is therefore still partially facing the counter-plate 2. The closing means 4 is recalled in the retained configuration, for example by the movement of a handle (not shown) activated by a user or by a key, or
30 even by an electric motor.

As a result of the opening movement of the door or window leaf (arrow C),

the first leaf-side magnetic pole 14a moves away from the first frame-side magnetic pole 3a and no longer interacts therewith. The second leaf-side magnetic pole 14b and the first frame-side magnetic pole 3a remain facing, magnetically interacting and exchanging a magnetic-type action, similar to the stabilization magnetic-type action, which brings the switch 5 back to the locked position (arrow C). In accordance with the illustrated example, the second leaf-side magnetic pole 14b (south pole) and the first frame-side magnetic pole 3a (south pole) exchange a repulsive action (arrow F1) which brings the switch 5 back in the locked position.

10 Upon the complete distancing of the door or window leaf from the fixed frame, in the case in which the first member 3 is movable between the extracted configuration and the retracted configuration, the first member 3 is returned to the retracted configuration by the recall means 8 in so far as it is no longer subject to the magnetic interaction with the second magnetic member 6.

In a possible embodiment, not shown, the first magnetic member 3 can be rotatably movable between a retracted configuration inside the housing 2b of the counter-plate and the extracted configuration of the housing 2b, to approach the switch 5. This characteristic can be provided in combination with any characteristic of the previously described embodiment.

20 Moreover, the arrangement of the magnets, and in particular of the magnetic poles, can be different with respect to that which is described and illustrated.

The invention provides important advantages. In fact, the magnetic systems concerned are arranged in such a way as to generate an activation magnetic-type action only in the final approaching step of the door or window leaf with respect to the fixed frame and possibly a stabilization magnetic-type action in the initial approaching step, thus allowing a safe and reliable switching of the switch and therefore a safe and reliable passage to the release configuration of the closing means.

The restoration of the retracted configuration of the closing means is also safe and reliable.

CLAIMS

1. An automatic system (1) for closing windows or doors, comprising:
- a counter-plate (2) installable on a fixed frame and provided with a first member (3);
 - 5 - a lock body (20) installable on a door or window leaf and having a front portion (20b) intended to face said counter-plate (2) when the door or window leaf is aligned with the fixed frame, wherein said lock body (20) is provided with closing means (4) movable between a release configuration, wherein the closing means (4) engages the counter-plate (2) when the
10 counter-plate (2) is aligned with the lock body (20), and a retained configuration, wherein the closing means (4) is maintained inside the lock body (20) and does not engage the counter-plate (2);
 - a switch (5) mounted in the lock body (20), said switch (5) being configured to assume a locking configuration wherein the switch (5) locks
15 the closing means (4) in the retained configuration (4) and a unlocking configuration wherein the switch unlocks the closing means (4), thereby activating the automatic movement of the closing means (4) from the retained configuration to the release configuration;
- characterised in that
- 20 said switch (5) and said first member (3) are configured to exchange an activation magnetic-type action adapted to switch said switch (5) from the locking configuration to the unlocking configuration only in a final approaching step of said lock body (20) with respect to said counter-plate (2), which is a part of a closing step starting from when the lock body is
25 partially facing the counter-plate and ending when the lock body is completely facing the counter-plate,
 - said switch (5) having a first leaf-side magnetic pole (14a) active at the front portion (20b) of the lock body (20) and said first member (3) having a frame-side magnetic pole (3a) active at a front portion (2c) of said counter-
30 plate (2), wherein said first leaf-side magnetic pole (14a) is active only on an opening side (L1) so as to magnetically interact with said first frame-

side magnetic pole (3a) only in said final approaching step and exchange said activation magnetic-type action.

2. The automatic system (1) for closing windows or doors according to claim 1, wherein said switch (5) and said first member (3) are configured to exchange a stabilization magnetic-type action adapted to maintain said switch (5) in the locking configuration at least in an initial approaching step of said lock body (20) with respect to said counter-plate (2) which is a part of the closing step starting from when the lock body starts to face the counter-plate and ending when the lock body is partially facing the counter-plate.

3. The automatic system (1) for closing windows or doors according to claim 2, wherein said activation magnetic-type action and said stabilization magnetic-type action are opposite, preferably said activation magnetic-type action being an attractive action and said stabilization magnetic-type action being a repulsive action.

4. The automatic system (1) for closing windows or doors according to claim 2 or 3, wherein said switch (5) has a second leaf-side magnetic pole (14b) having opposite polarity to the polarity of said first leaf-side magnetic pole (14a), said second leaf-side magnetic pole (14b) being active at the front portion (20b) of the lock body (20) and only on a closing side (L2).

5. The automatic system (1) for closing windows or doors according to claim 4, wherein the first frame-side magnetic pole (3a) extends so as to magnetically interact with said leaf-side magnetic pole (14b) at least in said initial approaching step, exchanging said stabilization magnetic-type action, and so as to magnetically interact with said first leaf-side magnetic pole (14a) only in said final approaching step, exchanging said activation magnetic-type action.

- 5 **6.** The automatic system (1) for closing windows or doors according to claim 4 or 5, wherein said switch (5) is adjustable to reverse the position of the first leaf-side magnetic pole (14a) and the second leaf-side magnetic pole (14b) onto the plane of the front portion (20b) of the lock body (20).
- 10 **7.** The automatic system (1) for closing windows or doors according to one or more of the preceding claims, wherein said switch (5) is movable between a locking position, corresponding to the locking configuration, and an unlocking position, corresponding to the unlocking configuration, and is preferably defined by a locking pin (10) axially slidable between said locking position and said unlocking position.
- 15 **8.** The automatic system (1) for closing windows or doors according to claim 7, wherein said locking pin (10), preferably made of a non-magnetic material, comprises a permanent magnet (12) arranged along the longitudinal axis (X) and having opposite poles active on opposite sides of the same longitudinal axis and two ferromagnetic elements (13a, 13b) adjacent to the permanent magnet (12) arranged respectively on a closing side (L2) and on an opening side (L1) and respectively defining a first leaf-side magnetic pole (14a) and a second leaf-side magnetic pole (14b) as an effect of the interaction with said permanent magnet (12).
- 20 **9.** The automatic system (1) for closing windows or doors according to claim 8, wherein said locking pin (10) is rotatable about the longitudinal axis (X) to reverse the position of the first leaf-side magnetic pole (14a) and the second leaf-side magnetic pole (14b) on the plane of the front portion (20b) of the lock body (20).
- 25 **10.** The automatic system (1) for closing windows or doors according to one or more of the preceding claims, wherein said first member (3) is
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movable with respect to the counter-plate (2), and wherein a second member (6), distinct and separate from said switch (5), is integrally fixed to the lock body (20) in such a way that, when the leaf is aligned with the fixed frame, said second member (6) exercises an attraction force of a magnetic type on the first member (3) which approaches said first member (3) to the lock body (20) in such a way that it magnetically interacts with the switch (5) to activate the automatic switching of the closing means (4) from the retained configuration to the release configuration.

10 **11.** The automatic system (1) for closing windows or doors according to claim 10, wherein the first member (3) is movable, preferably slidably or rotatably, between a retracted configuration wherein the first member (3) is retracted inside a housing (2b) of the counter-plate (2) and an extracted configuration wherein the first member (3) is extracted from said housing (2b), to approach the switch (5), and wherein when it is in the extracted configuration, the first member (3) is in a resting condition, even indirectly, against an edge surface forming part of the lock body (20), at the switch (5).

20 **12.** A door or window, characterised in that it comprises an automatic closing system (1) according to any one of the preceding claims.

ABSTRACT

An automatic system (1) for closing windows or doors, comprising a counter-plate (2) provided with a first member (3) and a lock body (20). Closing means (4) is movable between a release configuration, in which it engages the counter-plate (2) when the latter is aligned with the lock body (20), and a retained configuration, in which it is maintained inside the lock body (20) and does not engage the counter-plate (2). A switch (5) is mounted in the lock body (20) and is configured to assume a locking configuration in which the switch (5) locks the closing means (4) in the retained configuration and an unlocking configuration in which the switch (5) unlocks the closing means (4). The switch (5) and the first member (3) are configured to exchange an activation magnetic-type action adapted to switch the switch (5) from the locking configuration to the unlocking configuration only in a final approaching step of the lock body (20) to the counter-plate (2).

[FIG. 5]