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(54) Mortise lock for a secondary wing of fire doors

(57) A selvage (1) for a secondary wing of fire doors, of the type comprising a body provided with gears associated with respective vertically sliding sliders (19) that engage in corresponding receptacles, one in the threshold and one in the lintel of the opening where the door is installed, the gears being associated with a panic bar for opening. The body is symmetrical with respect to a horizontal plane that passes through the centerline and is provided with two symmetrical bits (11), each of which is individually suitable to engage the panic bar, elastic elements being interposed between the sliders (19) and the gears.

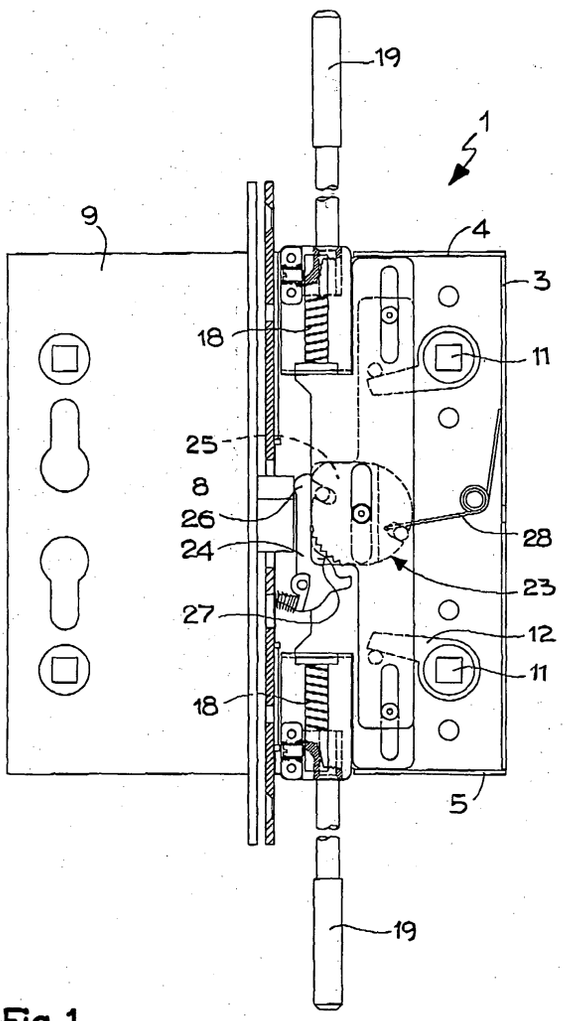

Fig.1

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Description

[0001] The present invention relates to a selvage for a secondary wing of fire doors.

[0002] Fire prevention regulations are designed to prevent the occurrence of fires, contain their expansion and stop their reaction by way of rapid extinguishing actions. Accordingly, prevention includes protection activities aimed at containing the effects of the energies released by a fire in space and time by reducing the rate of flame propagation and extending the period of ignition induction.

[0003] Fire doors are within this field; in fact they must: divide contiguous spaces and prevent the passage of fire and superheated gases from the space at risk to the adjacent space; prevent the propagation of the fire also by heat irradiation, i.e., have a sufficient thermal insulation capacity; allow, even during the fire, the escape of individuals who have remained in the space where the fire has developed, and accordingly always open easily at least in the intended direction; after opening, fire doors must close automatically from any position, therefore even from the fully open position at 180°, in order to rapidly prevent fire propagation; and fire doors must be installed with a preset "direction of escape" from the space at risk toward the outside or toward lower-risk spaces.

[0004] In addition to the wing, the details become particularly important, such as for example the panic bars that ensure opening by simply pushing on said bar and ensure escape from the premises where the fire has developed.

[0005] In a two-wing door, it is necessary to make a distinction between the main wing, which is provided with an opening handle (with an anti-panic function) and is normally used to access the space, and a secondary wing, which is provided with a panic bar and is usually closed. The secondary wing is provided with the selvage associated with the latch that is present in the lock of the main wing.

[0006] Fire doors are installed so as to ensure escape from the space that is exposed to the highest risk of fire toward the space at lower risk: for this reason, both the main door and the secondary door can be installed according to the two different possible opening directions, depending on the installation characteristics.

[0007] From the manufacturing standpoint, the disadvantage linked to this solution is the need to manufacture two different products in order to perform the task of allowing escape in the two possible directions.

[0008] Fully reversible locks are currently known for main doors which allow universality of the door on which they are fitted (said door can in fact open in either direction, depending on how it is installed).

[0009] The aim of the present invention is to obviate the above-cited drawbacks and meet the mentioned requirements, by providing a selvage for a secondary wing of fire doors that is totally reversible, so as to ensure universality of installation of the door on which it is fitted.

[0010] Within this aim, an object of the present invention is to provide a selvage that is simple, relatively easy to provide in practice, safe in use, effective in operation, and has a relatively low cost.

[0011] This aim and this and other objects that will become better apparent hereinafter are achieved by the present selvage for a secondary wing of fire doors, of the type comprising a body provided with gears associated with respective vertically sliding sliders that engage in corresponding receptacles, one in the threshold and one in the lintel of the opening where said door is installed, said gears being associated with a panic bar for opening, characterized in that said body is symmetrical with respect to a horizontal plane that passes through the centerline and is provided with two symmetrical bits, each of which is individually suitable to engage the panic bar, and in that elastic means are interposed between said sliders and said gears.

[0012] Further characteristics and advantages of the present invention will become better apparent from the following detailed description of a preferred but not exclusive embodiment of a selvage for a secondary wing of fire doors, illustrated by way of non-limiting example in the accompanying drawings, wherein:

Figure 1 is a partially sectional side view of a first embodiment of a selvage according to the invention, coupled to the corresponding lock;

Figure 2 is a partially sectional side view of the first embodiment of a selvage according to the invention, coupled to the corresponding lock, actuated for opening;

Figure 3 is a partially sectional side view of the first embodiment of a selvage according to the invention, proximate to the corresponding lock;

Figure 4 is a partially sectional side view of the first embodiment of a selvage according to the invention, coupled to the corresponding lock, in which the latch releases the detent lever;

Figure 5 is a partially sectional side view of a second embodiment of a selvage according to the invention, proximate to the corresponding lock;

Figure 6 is a partially sectional side view of the second embodiment of a selvage according to the invention, coupled to the corresponding lock, in which the latch releases the slider locking element.

[0013] With reference to the figures, the reference numeral 1 generally designates a selvage for a secondary wing of fire doors.

[0014] Each selvage 1 has a front wall 2, a rear wall 3, an upper wall 4 and a lower wall 5: the four walls that are defined are delimited between two lateral faces 6 (only one of which is shown in the figure).

[0015] The front wall 2 has a central opening 7 for the passage of the latch 8 of the lock 9 associated with the selvage 1.

[0016] The lateral faces 6 have two respective openings 10, which are arranged symmetrically with respect to the centerline of the selvage 1 and in which the shaft of the actuation handle can engage. The handle must be installed on the selvage 1 so that it is aligned with the handle fitted to the lock 9: the choice is therefore dictated by the type of installation of the lock 10 and of the selvage 1 on the fire door.

[0017] The shaft of the actuation handle inserted within the opening 10 (the upper one or the lower one, depending on the type of installation) engages in the bit 11, which is provided with a lever 12, by way of which any angular rotation of the bit 11 is transferred, in the form of a vertical translational motion, to a pair of plates 13.

[0018] The plates 13 have, at their central portion, a wider region 14: each plate 13 has a pusher 15 along one of the sides that delimit the wider region 14. Each plate 13 has, at its ends, a slot 16, in which a pawl 17 is engaged; said pawl is fixed on the face 6 so as to guide the plate 13 during translational motion.

[0019] The pusher 15 is associated, by interposing a disengagement spring 18, with a respective slider 19, which can slide axially within appropriately provided receptacles of the door and whose end is suitable to engage in a receptacle of the threshold or lintel (depending on the direction of installation of the selvage 1).

[0020] The portion of the slider 19 that makes contact with the disengagement spring 18 has an inclined surface 20, which is faced by a threaded hole 21 inside which a grub screw 22 is screwed: the head of the grub screw 22 rests on the inclined surface 20, allowing to adjust the protrusions of the sliders 19 from the door.

[0021] When the sliders 19 are retracted, by way of the action of the handle, which by rotating its shaft entails a rotation of the bit 11, i.e., a translational motion of the plates 13 with a consequent movement of the pushers 15 toward the center, said sliders remain locked in said position to prevent the door from jamming in the open position due to the interference of any otherwise protruding portion of a slider 19 with the floor or ceiling.

[0022] There are various constructive solutions for locking the sliders in the retracted position.

[0023] First of all, one might consider placing units, not shown in the figure, for locking the slider 19 in the retracted position: each unit comprises a tubular element, in which one of the sliders 19 slides, a small spring, which is suitable to tilt the tubular element with respect to the slider 19, blocking its sliding, and a button, whose retraction, following the contact of the door with the lintel or threshold, disengages the small spring from the tubular element, releasing the slider 19.

[0024] As an alternative (as shown in Figures 1 to 4), the selvage can be provided with a detent lever 23, which is interposed between the plates 13 and has an engagement tooth 24 that is forced elastically (by means of an elastic element 28) onto the ring gear 25.

[0025] The engagement tooth 24 has an end portion 26, which interferes with the latch 8 of the lock 9, since the tooth 24 can move from a first configuration, in which it engages the teeth 27 of the ring gear 25 by elastic forcing, to a second configuration, in which it is spaced from the ring gear 25 by way of the action of the latch 8 on the end portion 26.

[0026] Another alternative (shown in Figures 5 and 6) is to provide the selvage 1 with fixed pivots 29, in which the horizontal slots 30 of a lamina 31 are engaged; with an elastically yielding strut 32, which is arranged between the rear wall 3 of the selvage 1 and the rear end of the lamina 31, and with a means 33 for the pivoting of a carousel 34 whose end 35 is accommodated within a recess 36 of the lamina 31.

[0027] The carousel 34 has two lateral wings 37, each of which is pivoted to one of the plates 13; a translational motion of the plates 13 is associated with each rotation of the carousel 34. Each lamina 31 has a flap 38, which protrudes into the front opening 7 for accommodating the latch 8: the flap 38, and therefore the lamina 31 and the end 35 of the carousel 34, by way of the action of the latch 8, performs a translational motion from a first configuration, in which it rests on the front wall 2 of the selvage 1 and the carousel 34 is inclined with its end 35 toward the flap 38, to a second configuration, in which it is spaced from the front wall 2 by way of the action of the latch 8 and in which the carousel 34 has turned clockwise.

[0028] At least one of the plates 13 has a toothed surface 39, which is suitable to engage detachably a tooth 40 of the lamina 31.

[0029] The operation of the invention is as follows: since the selvage 1 is completely symmetrical, it can be fitted both on a door that turns clockwise when pushed and on a door that turns counterclockwise when pushed. The different installation depends exclusively on how the selvage 1 is orientated, and is provided so that the panic bar is at the same height as the handle provided on the door that is coupled to it and on which the lock 9 is fitted.

[0030] As a consequence of the actuation of the panic bar, the sliders 19 retract and remain retracted due to the presence of one of the three constructive solutions described above.

[0031] Their release occurs only, in the first case, when the door is arranged adjacent to the jamb, which presses the button, and in the other two cases when the latch 8 presses respectively against the portion 26 or the flap 38.

[0032] It has thus been shown that the invention achieves the intended aim and objects.

[0033] The invention thus conceived is susceptible of numerous modifications and variations, all of which are within the scope of the appended claims.

[0034] All the details may further be replaced with other technically equivalent ones.

[0035] In the embodiments that follow, individual characteristics, given in relation to specific examples, may

actually be interchanged with other different characteristics that exist in other embodiments.

[0036] Moreover, it is noted that anything found to be already known during the patenting process is understood not to be claimed and to be the subject of a disclaimer.

[0037] In practice, the materials used, as well as the shapes and dimensions, may be any according to requirements without thereby abandoning the protective scope of the appended claims.

[0038] The disclosures in Italian Patent Application No. BO2003A000560, from which this application claims priority, are incorporated herein by reference.

[0039] Where technical features mentioned in any claim are followed by reference signs, those reference signs have been included for the sole purpose of increasing the intelligibility of the claims and accordingly such reference signs do not have any limiting effect on the interpretation of each element identified by way of example by such reference signs.

Claims

1. A selvage for a secondary wing of fire doors, of the type comprising a body provided with gears associated with respective vertically sliding sliders (19) that engage in corresponding receptacles, one in the threshold and one in the lintel of the opening where said door is installed, said gears being associated with a panic bar for opening, **characterized in that** said body is symmetrical with respect to a horizontal plane that passes through the centerline and is provided with two symmetrical bits (11), each of which is individually suitable to engage the panic bar, and **in that** elastic means are interposed between said sliders (19) and said gears.

2. The selvage according to claim 1, **characterized in that** each one of said gears comprises two plates (13), which are contoured and superimposed so that they can slide axially within said selvage (1) and are shaped at one end so as to form a pusher (15), an angular spring (28), which has an arm that rests on the rear wall (3) of said selvage (1) and another arm that is engaged on an element that is rigidly coupled to said plates (13) in order to keep their faces rested respectively against the upper wall (4) and the lower wall (5) of said selvage (1), and two lever arms (12), which are rigidly coupled to said bits (11) and rest on elements that are rigidly coupled to said plates (13).

3. The selvage according to claim 1, **characterized in that** said elastic means are axially-acting springs (18), each of which has a head that rests on the end arranged inside said selvage (1) of the respective slider (19) and an opposite head that rests on an end pusher of the respective gear, said spring (18) uncoupling said slider (19) and said gear.

4. The selvage according to the preceding claims, **characterized in that** by way of the action of said panic bar said gears pass from a first configuration, in which the respective mutually opposite and symmetrical pushers are proximate to the corresponding head of the selvage (1), the ends of the sliders (19) being engaged in said receptacles, to a second configuration, in which said pushers are proximate to the centerline of the selvage (1), the ends of the sliders (19) being retracted inside said selvage (1).

5. The selvage according to claim 1, **characterized in that** respective units for locking the slider (19) in the retracted position inside the door are fitted on said sliders (19) at at least one of the ends that engage in said receptacles.

6. The selvage according to claim 5, **characterized in that** said units comprise: a tubular element, in which one of said sliders (19) slides; a small spring, which is suitable to tilt said tubular element with respect to the slider, locking said sliding; and a button, whose retraction as a consequence of the contact of the door with the lintel or threshold disengages said small spring from said tubular element.

7. The selvage according to claims 1 and 2 and as an alternative to claim 5, **characterized in that** said selvage comprises a detent lever (23), which is interposed between said plates (13) and has an engagement tooth (24), which is forced elastically onto the ring gear (25).

8. The selvage according to claim 7, **characterized in that** said engagement tooth (24) has an end portion (26), which interferes with the latch (8) of the lock (9), said tooth (24) being movable from a first configuration, in which it is engaged in the teeth (27) of said ring gear (25) by elastic forcing, to a second configuration, in which it is spaced from said ring gear (25) by way of the action of said latch (8) on said end portion (26).

9. The selvage according to claims 1 and 2 and as an alternative to claims 5 and 7, **characterized in that** said selvage (1) is provided with fixed pivots (29), in which the horizontal slots (30) of a lamina (31) are engaged; with an elastically yielding strut (32), which is arranged between the rear wall (3) of the selvage (1) and the rear end of said lamina (31); and with a means (33) for the pivoting of a carousel (34), whose end (35) is accommodated within a recess (36) of said lamina (31).

10. The selvage according to claim 9, **characterized in**

that said carousel (34) has two lateral wings (37), each of which is engaged with one of said plates (13), a translational motion of said plates (13) being associated with each rotation of the carousel (34).

11. The selvage according to claim 9, **characterized in that** said lamina (31) has a flap (38) that protrudes into the compartment (7) for accommodating the latch (9).

12. The selvage according to claim 11, **characterized in that** said flap (38) and therefore said lamina (31) and said end of said carousel (34), by way of the action of the latch (9), performs a translational motion from a first configuration, in which it rests on the front wall (2) of said selvage (1) and said carousel (34) is inclined so that said end (35) thereof lies toward said flap (38), to a second configuration, in which it is spaced from said front wall (2) by way of the action of said latch (8) and in which said carousel (34) has turned clockwise.

13. The selvage according to one or more of the preceding claims, **characterized in that** at least one of said plates (13) has a toothed surface (39), which is suitable to engage detachably in a tooth (40) of said lamina (31).

14. The selvage according to one or more of the preceding claims, **characterized in that** said slider (19) has, at each portion of the slider (19) that is arranged inside said selvage (1), an inclined surface (20) that is directed toward the front wall (2).

15. The selvage according to one or more of the preceding claims, **characterized in that** a threaded hole is provided in said selvage (1) and is aligned with said inclined surface of said slider (19) and a grub screw (22) is adjustably engaged in said hole, said grub screw being suitable to rest its head on said inclined surface (20).

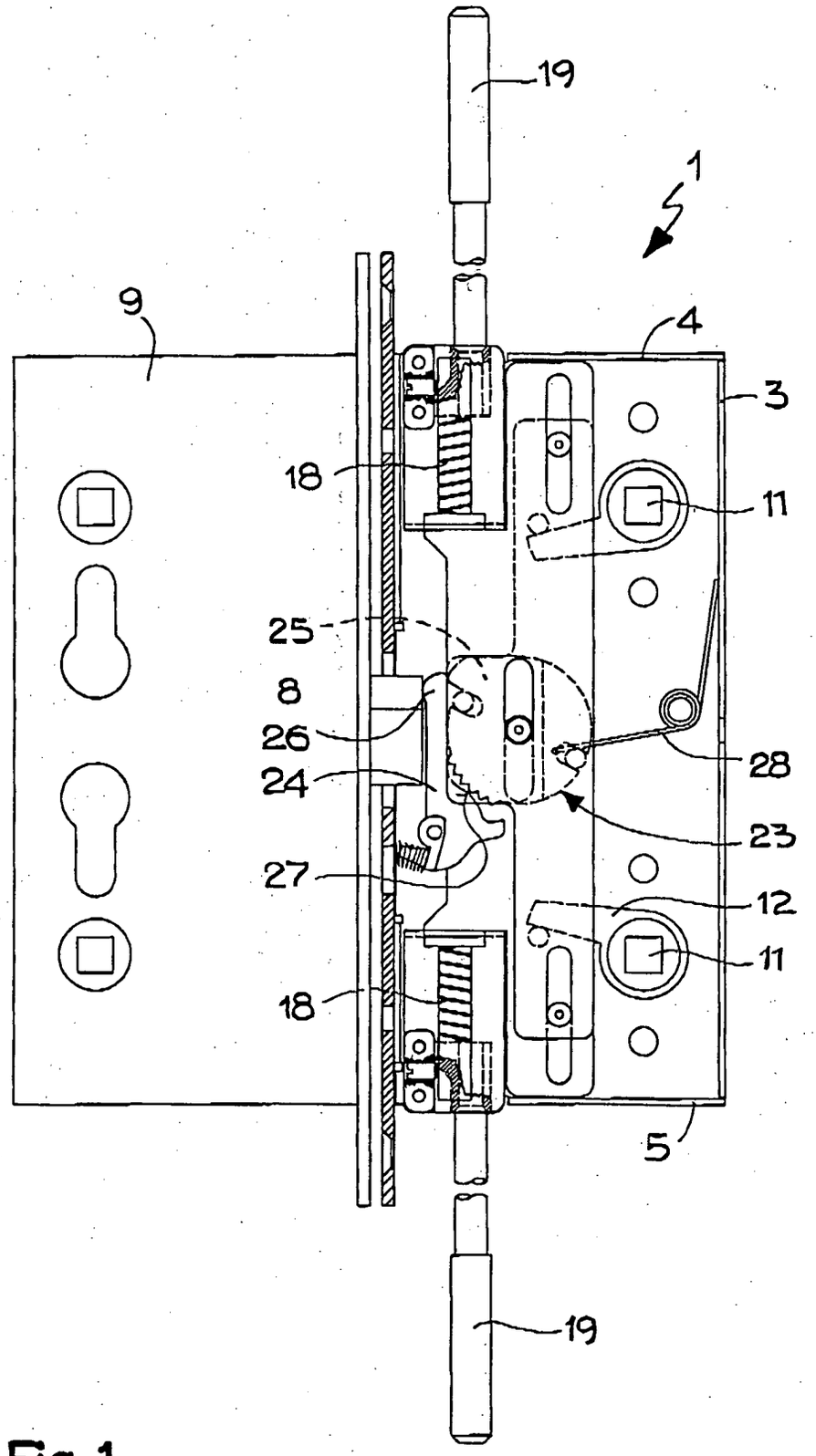

Fig.1

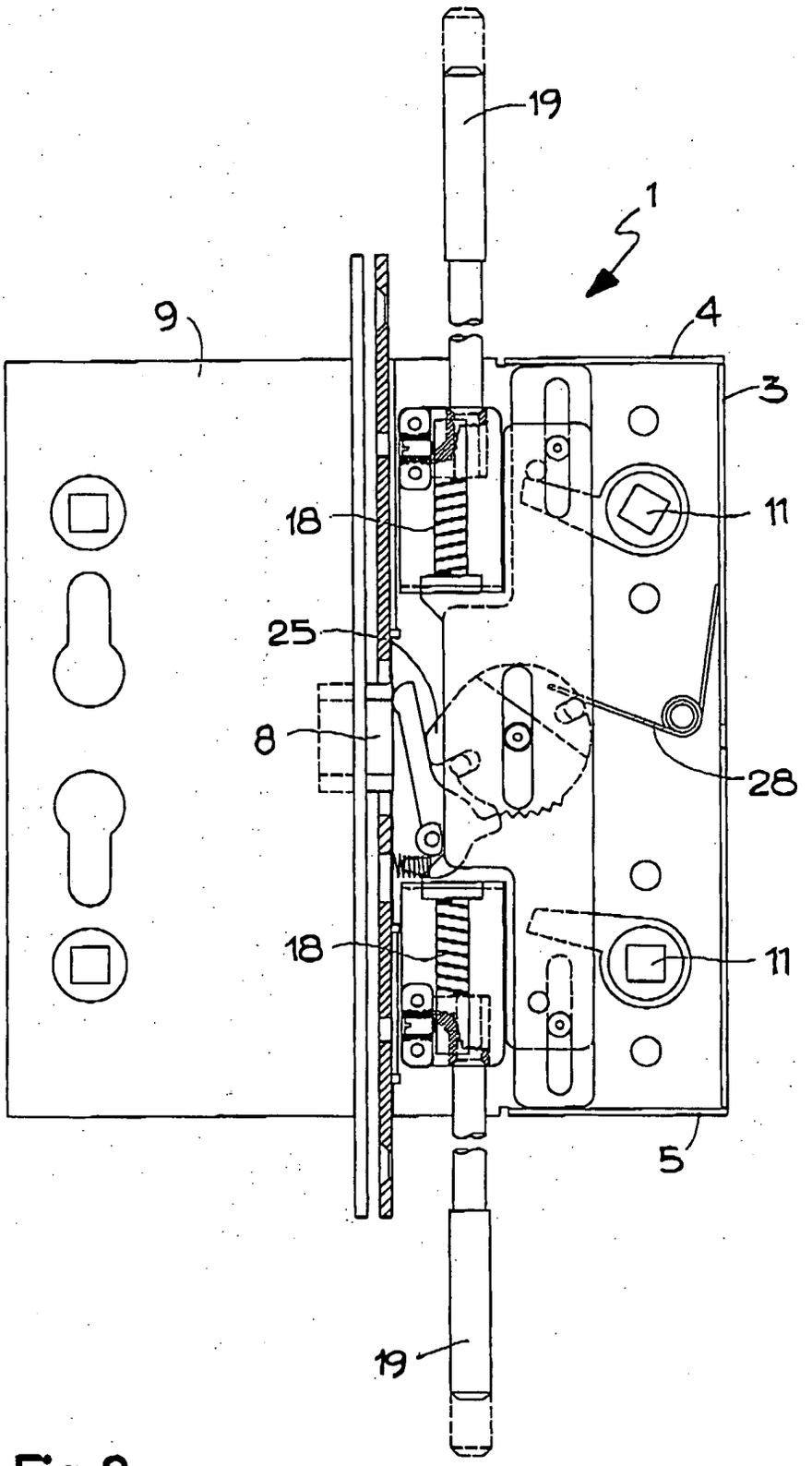

Fig.2

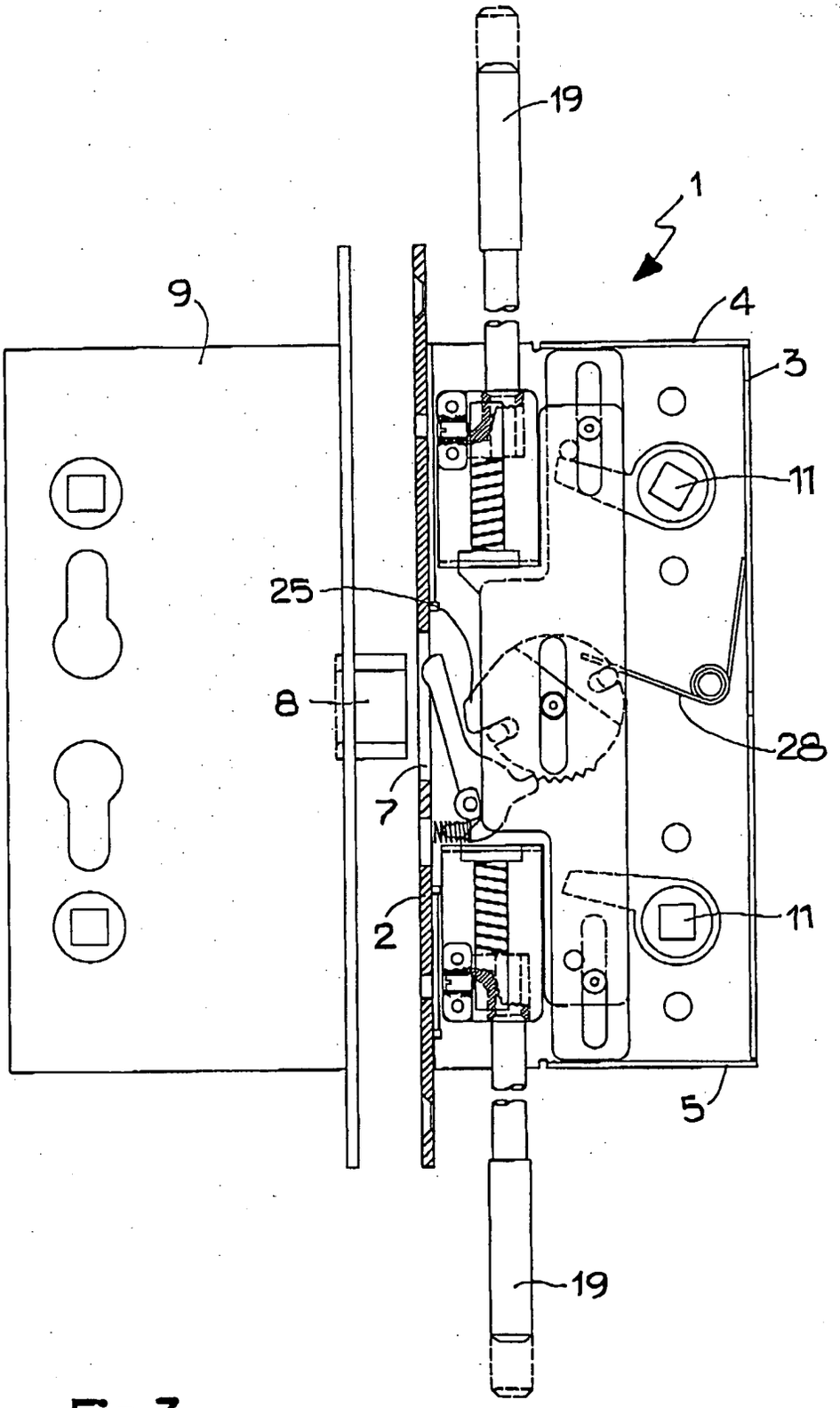

Fig.3

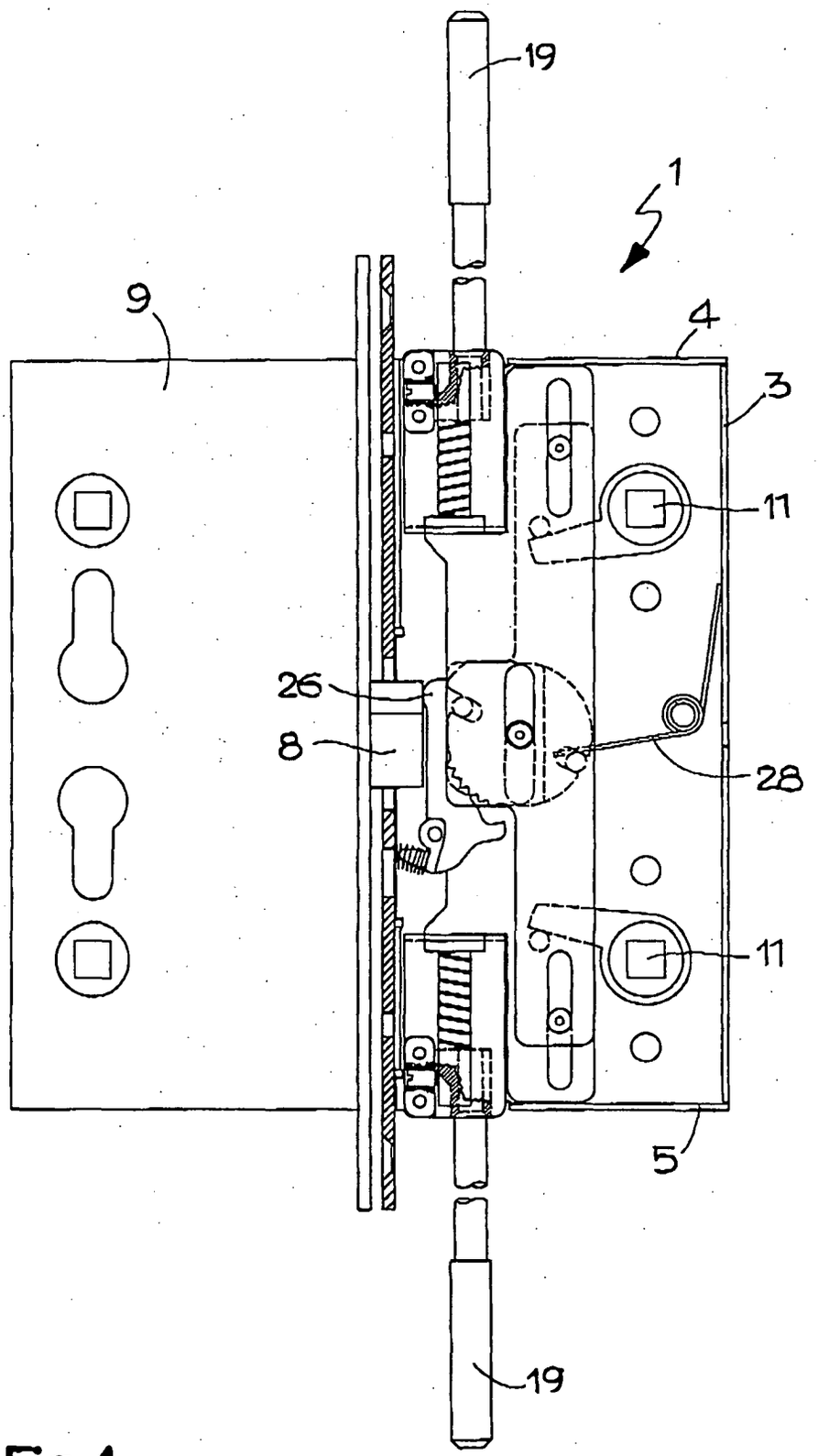

Fig.4

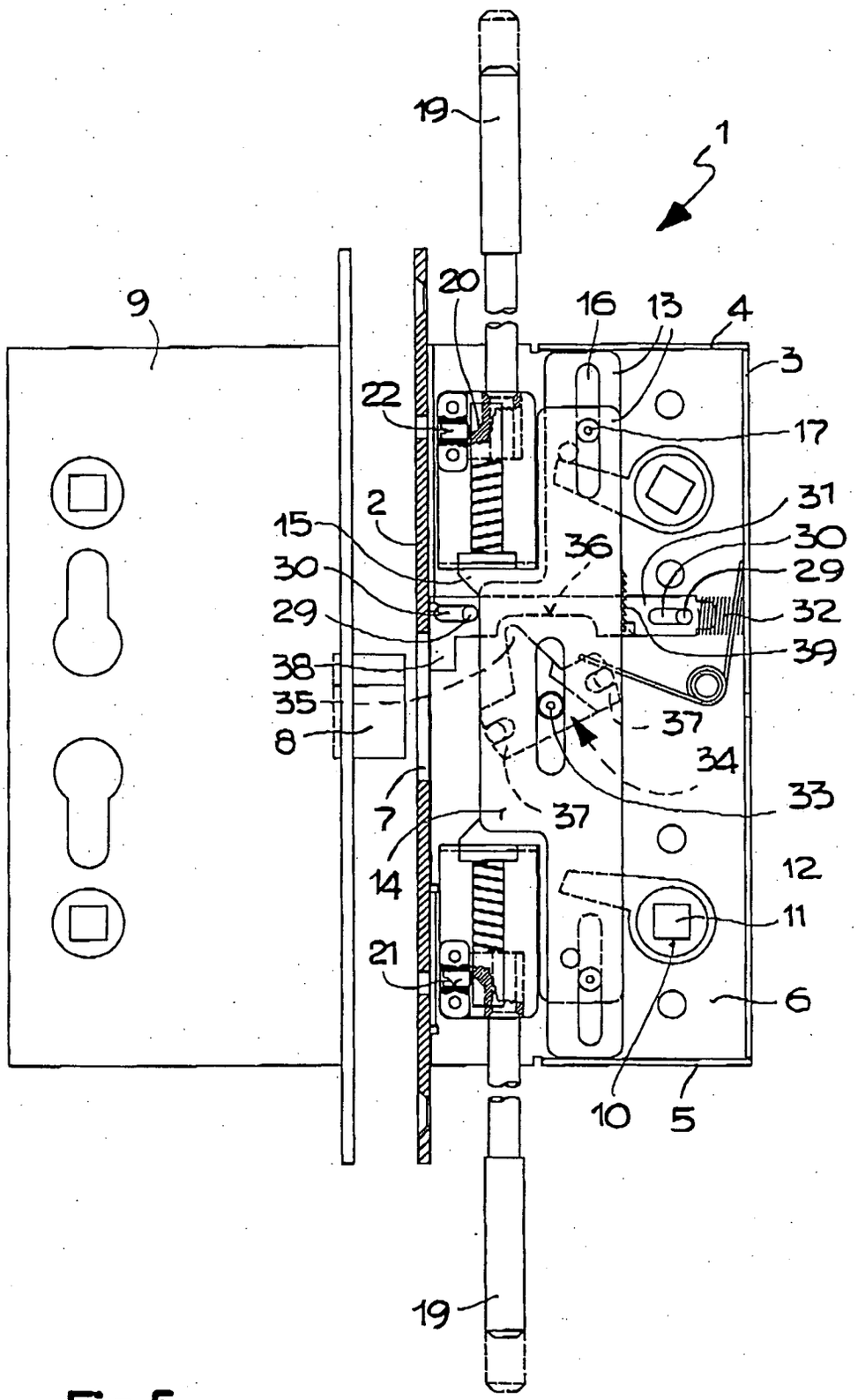
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Fig.5

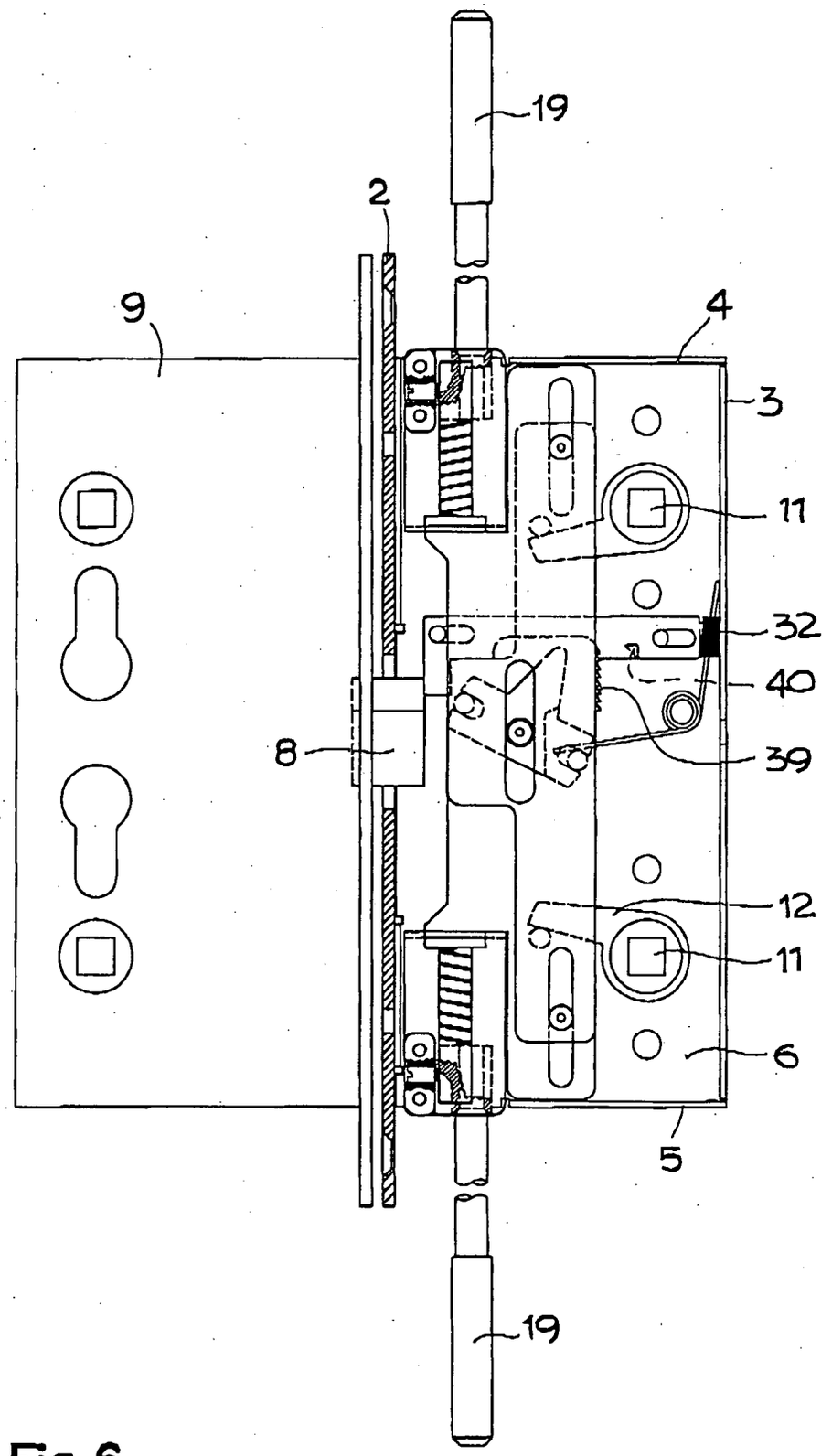

Fig.6