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(54) **Safety lock for doors**

(57) Safety lock for doors, particularly applicable to any type of doors, meant to attach the door to its frame securely and occupying a minimum space inside the door, in order to prevent hollow spaces in the door which will affect its strength, comprised by a mortise coupled along the front edge of the door inside which is attached jointly by means of shaft (5), at least one ratchet (4) which is moved from its closed position to its open one by a sliding bar (2).

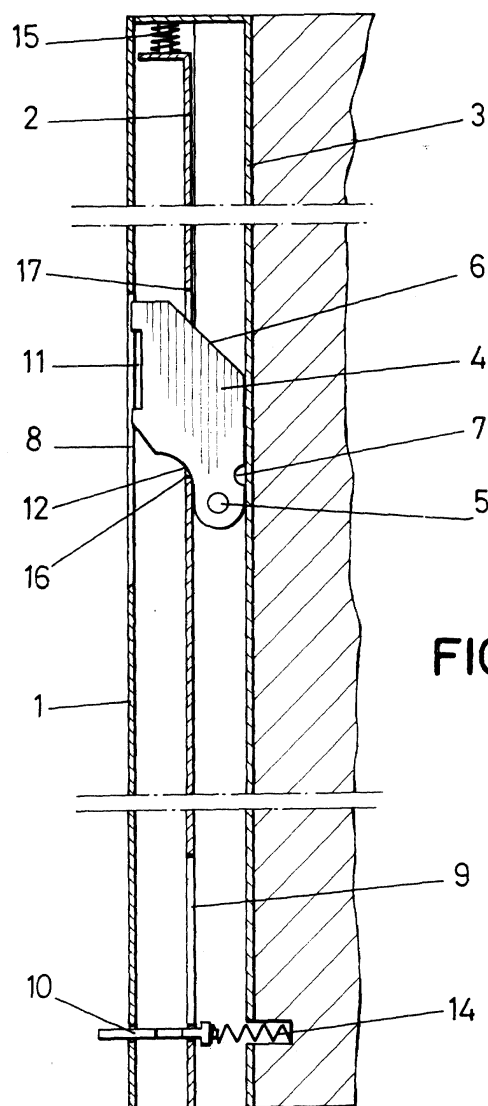


FIG.5

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Description

OBJECT OF THE INVENTION

[0001] The present invention relates to a safety lock, applicable to any type of door, window, gate or similar swiveling elements, particularly applicable to doors, so that this lock serves to immobilize the door within its frame in a safe, inviolable manner, while occupying a minimum space inside it so that large empty spaces are not required inside the door, which would weaken it precisely at the places where it is attached to the frame.

BACKGROUND OF THE INVENTION

[0002] Due to the increased rate of burglary armored doors appeared with special reinforcements and provided with anchorings generally in the form of cylindrical pins, hidden inside the door, which emerge from the door when it is closed and insert in orifices provided in the frame, thus closing the door securely.

[0003] Due to their length and to the mechanism which displaces them outwards, these cylindrical pins require large recesses to be housed in, which result in areas which are weaker and less solid than the rest of the door precisely at the points where it is attached to the frame.

[0004] Because of their actuation means these locking devices sometimes require applying a substantial manual force on the lock, or a number of key turns in order to open the door.

[0005] Also known are plate-type locks external to the door attached to it by bolts, which do not present the aforementioned problem but nevertheless are aesthetically less desirable.

DESCRIPTION OF THE INVENTION

[0006] The description being means to solve the aforementioned problems by providing a lock which requires a minimum space inside the door, consisting of few elements, very simple to use yet very effective and with no unpleasant aesthetic results.

[0007] The lock is meant to be housed within the door along the edge opposite the hinges, and is provided with a number of ratchets for anchoring to the frame. The safety lock is actuated vertically, in other words, in passing from an open to a locked position and vice versa its moving parts move in a vertical direction.

[0008] The lock can be adapted to fit any door and is actuated by conventional means, such as any standard lock or by handles, cams, toothed gears or even electro-mechanical means so that it may be opened or closed at a distance.

[0009] Thus, the safety lock for doors comprises a mortise with a number of ratchets housed in it, which ratchets are the anchoring elements of the lock. The ratchets will be inserted in the mortise on one end by a

shaft which will allow them to balance or move vertically about this shaft.

[0010] When locked the ratchets are in a horizontal position, extending outside the mortise through windows made in the latter, one per ratchet, within which each ratchet can move from the locked to the open position as it moves vertically with respect to its axis.

[0011] Likewise, inside the mortise and along it is a sliding bar which moves only vertically as its shape makes it fit perfectly inside the mortising, preventing it from moving in any other direction.

[0012] This sliding bar comprises a U-shaped profile with rectangular windows made in its core, one for each ratchet.

[0013] In its vertical motion the sliding bar will move the ratchets from their locked to the open position and vice versa, thus locking or unlocking the door.

[0014] Thus, in the locked position the ratchet rests horizontally on the lower edge of the mortise window, and on it in turn due to gravity rests the upper edge of the corresponding sliding bar window within a half-rule groove made in the upper part of the ratchet.

[0015] When the lock is opened the sliding bar moves upwards, driven by the door lock or any other conventional element which is not object of this invention, so that eventually the lower edge of each sliding bar window meets a circular recess made in the lower part of the ratchets and therefore, due to the upwards motion of the sliding bar and to the circular shape of these recesses, the ratchets will swivel about the shaft and slowly rise through the mortise windows until they are vertical and hidden within the mortise, thus in an open position unlocking the lock and therefore allowing the door to be opened.

[0016] In order to maintain the sliding bar in a stable raised position and thereby the ratchets and door in an unlocked situation, on the lower face of the sliding bar, i.e. on the core of the U-shaped profile, is provided an inverted T-shaped notch in which an anchoring element is inserted which allows vertical movement of the sliding bar, so that when the bar reaches the end of its upwards path this anchoring element inserts in the wide part of the notch driven by an elastic element such as a spring, thus preventing the bar from sliding downwards.

[0017] The front end of the anchoring element is beveled, as well as the outer face of the frame to which the door is locked, these bevel matching so that when the door is closed they touch and slide against each other, making the anchoring element recede and overcome the resistance of the spring until the anchoring element is released from the notch and frees the sliding bar to move downwards by action of gravity.

[0018] In its downwards motion the sliding bar ceases to support the ratchets and eventually touches with the top edge of each of its windows a sloping face of the ratchets, moving them away from their resting position in the open unlocked situation until they are swiveling on the shaft due to their weight. The ratchets thus move

downwards through the mortise window and return to the locked position.

[0019] This safety lock can be made from any metal or combination thereof.

DESCRIPTION OF THE DRAWINGS

[0020] As a complement of the description being made and to aid a better comprehension of the characteristics of the invention, attached to this descriptive memory as an integral part of the same is a set of drawings, where, for purposes of illustration only and not intended as a definition of the limits of the invention the following is shown:

[0021] Figure 1 shows a perspective view of the door, open, where one can see the lock placed along the front edge, incorporating a number of ratchets. Also shown in this figure is a conventional lock as a standard actuation element.

[0022] Figure 2 shows a perspective view of one of the ratchets of the safety lock, once the door lock is coupled to the door, representing the ratchet in the open position and in a dotted line in a closed position, also showing the sliding bar within the mortise.

[0023] Figure 3 shows a perspective view similar to that of figure 2 of the notch made in the sliding bar and the anchoring element inserted in it when the lock is in the open position.

[0024] Figure 4 shows a sectional view of the safety lock in the closed position.

[0025] Figure 5 shows a sectional view of the safety lock similar to figure 4 in the open position.

PREFERRED EMBODIMENT OF THE INVENTION

[0026] In view of these figures and particularly of figure 1, it can be seen that the safety lock for doors comprises a mortise, in this preferred embodiment made by coupling profiles (1) and (3).

[0027] This mortise is provided with a window (6) for each ratchet on the outer side of the lock, thus allowing each ratchet (4) to extend beyond the mortise and be coupled within an anchoring orifice made for this purpose in the frame of the door, and to move vertically to pass from the open to locked positions and vice versa. Each ratchet (4) is connected jointly to the mortise by a shaft (5).

[0028] Likewise, inside the mortise is provided a sliding bar (2) which will house ratchets (4) and which consists of a U-shaped profile with a rectangular window in its core for each ratchet.

[0029] The inner face of sliding bar (2) is provided with an inverted T-shaped notch (9). in which an anchoring element (10) is inserted, allowing bar (2) to slide along its lateral narrowing. This anchoring element (10) is constantly acted on by a spring (14) towards the outside of the door.

[0030] When the lock is in the closed position ratchets

(4) are horizontal and extend out of window (8), resting on the frame anchoring orifice, and the upper edge (17) of the windows on sliding bar (2) rest on ratchet (4) on the half-rule groove (7), whose function will be explained below.

[0031] Anchoring element (10) is at the topmost position of notch (9) as shown in figure 4.

[0032] Thus, when the door is opened by means of the lock or any other conventional means these devices shall move sliding bar (2) upwards, so that it eventually touches each ratchet (4) with its lower edge (16) on the rounded recess (12), which because of its shape and of the upwards motion of the bar (2) will gently raise the ratchets (4) making them swivel about shaft (5).

[0033] The upwards motion of sliding bar (2) has only to overcome the weight of ratchets (4) and the slight force of spring (14) so that a large force is not required to free ratchet (4) from its anchoring.

[0034] Each ratchet (4) moves through the corresponding window (8) until it is hidden away in the position of figure 5, that is, in the vertical open position, at which time the anchoring element (10) is placed opposite the widest part of notch (9) and by action of spring (14) enters it and locks it in place, preventing sliding bar (2) from descending and thus securing ratchets (4) in the open position, supporting them by contact of the lower edge (16) on the rounded recess (12).

[0035] Beveled edge (13) of anchoring element (10) is now visible outside the door so that when the latter is closed the bevel meets the outer face of the frame which is purposefully also beveled, so that the closing motion is transmitted to the anchoring element (10) in an inwards direction, overcoming the resistance of spring (14). Said element (10) leaves its original position and allows sliding bar (2) to descend under its own weight.

[0036] As a complement of this action a spring (15) is proposed which will push the sliding bar downwards from its top part, so that spring (15) aids gravity in order to overcome any unwanted friction which may hinder the downwards motion of the sliding bar.

[0037] In its downwards motion sliding bar (2) ceases to support ratchets (4) and eventually the upper edge (17) of each window bears against slope (6) of ratchets (4) making each of these move away from its rest position and pivot about shaft (5), and thus to fall under gravity to the locked position inserting themselves in the anchoring orifice provided in the frame, resting on it with the aid of notch (11).

[0038] This motion is aided by the fact that in the open position of figure 4, each ratchet (4) has its center of gravity displaced from its resting point, shaft (5), which facilitates their swiveling to the closed locked position.

[0039] In order to prevent the lock from being opened fraudulently from the outside by attempting to lift ratchets (4), such as by inserting a thin plate between the door and the frame when the door is locked, the invention provides a half-rule groove (7) so that in the closed position sliding bar (2) rests inside this groove (7) on

each ratchet, as shown in figure 4.

[0040] In this way if there is an attempt to lift ratchets (4) by means other than sliding bar (2) they will rise somewhat, but the edge of groove (7) which is farthest from shaft (5) will meet the inside of bar (2) and will not be able to continue its upwards motion. Thus the only possible way in which the ratchets (4) may be raised is by means of sliding bar (2), which in turn is driven by the door lock.

[0041] The invention provides a further advantage as it allows to leave the door open without risk of it shutting involuntarily due to an air current or similar reason, and then being unable to open it if the key were not available.

[0042] For this reason, when the door is opened ratchets (4) are in the unlocked position and anchoring element (10) extends slightly beyond the door, as shown in figure 5, it is possible to manually operate element (10) to free sliding bar (2) lowering both this bar and the ratchets (4). In this way if the door is open ratchets (4) extend beyond it preventing the door from accidentally locking.

[0043] This description is not extended in the understanding that any expert in the field will understand the scope of the invention and the advantages derived thereof.

[0044] The materials, shape, size and arrangement of the elements are subject to variation as long as they do not represent a departure from the essence of the invention.

Claims

1. Safety lock for doors applicable to any type of door or similar swiveling device which means to safely anchor the door to its frame while occupying a minimum space within the door and which can be driven by any conventional means such as a key operated lock, essentially characterized in that it comprises a mortise along the front edge of the door incorporating at least one ratchet (4) which is connected jointly by one end to the mortise by a shaft (5) and a sliding bar (2) which may move vertically and houses ratchets (4) on which it acts in order to move them using the upper and lower edges of a window provided in its core, one window provided for each ratchet (4), and a notch (9) in which an anchoring element (10) inserts, which is pushed outwards by a spring (14).
2. Safety lock for doors as in claim 1, characterized in that in the closed position ratchet (4) rests horizontally on the frame anchoring orifice, and sliding bar (2) rests on the half-rule groove (7) of the ratchet, so that during the upwards motion of sliding bar (2) the lower edge (16) of each window meets rounded recess (12) of each ratchet, making the ratchet pivot upwards about shaft (5), releasing it from its anchor-

ing and leaving it in the open position.

3. Safety lock for doors as in above claims, characterized in that in the downwards motion of sliding bar (2), when ratchets (4) are in the open position, it ceases to support these with its lower edge (16) and eventually the upper edge (17) meets the sloping face (6) of each ratchet (4), removing these from their resting open position so that they pivot about shaft (5) and fall under gravity to their closed position, inserting themselves in the anchoring mortise of the frame.
4. Safety lock for doors as in above claims, characterized in that during the upwards motion of sliding bar (2) anchoring element (10) is at the top of notch (9) allowing sliding bar (2) to rise so that when said anchoring element (10) is opposite the lower wider part of notch (9) it is inserted in it by the action of a spring (14), at which time beveled edge (13) extends beyond the door so that when the door closes it will meet the outer edge of the frame, which is also beveled, so that anchoring element (10) will recede, overcoming the push of spring (14), leaving the lower widening of notch (9) and allowing sliding bar (2) to descend by its own weight.
5. Safety lock for doors as in claim 1, which in order to prevent the lock from being opened in an undesired manner is characterized in that ratchets (4) are provided with a half-rule groove (7) on their top face, inside which rests the upper edge (17) of window (4) of sliding bar (2) associated to each ratchet (4), so that if there is an attempt at lifting these by means other than the sliding bar (2) the edge of groove (7) which is farthest from shaft (5) will meet sliding bar (2) and will not be able to move further, and therefore ratchets (4) will not rise.

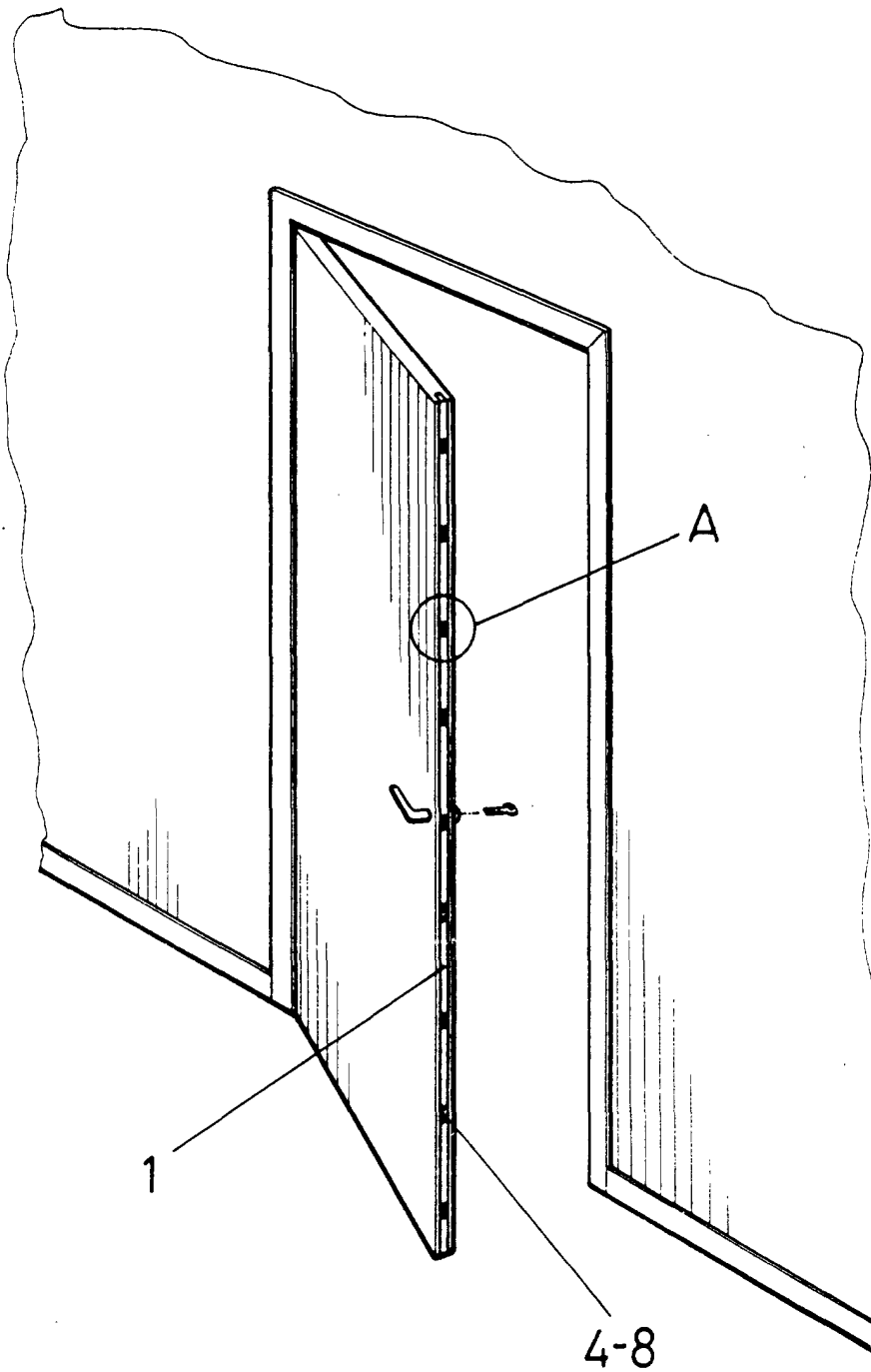
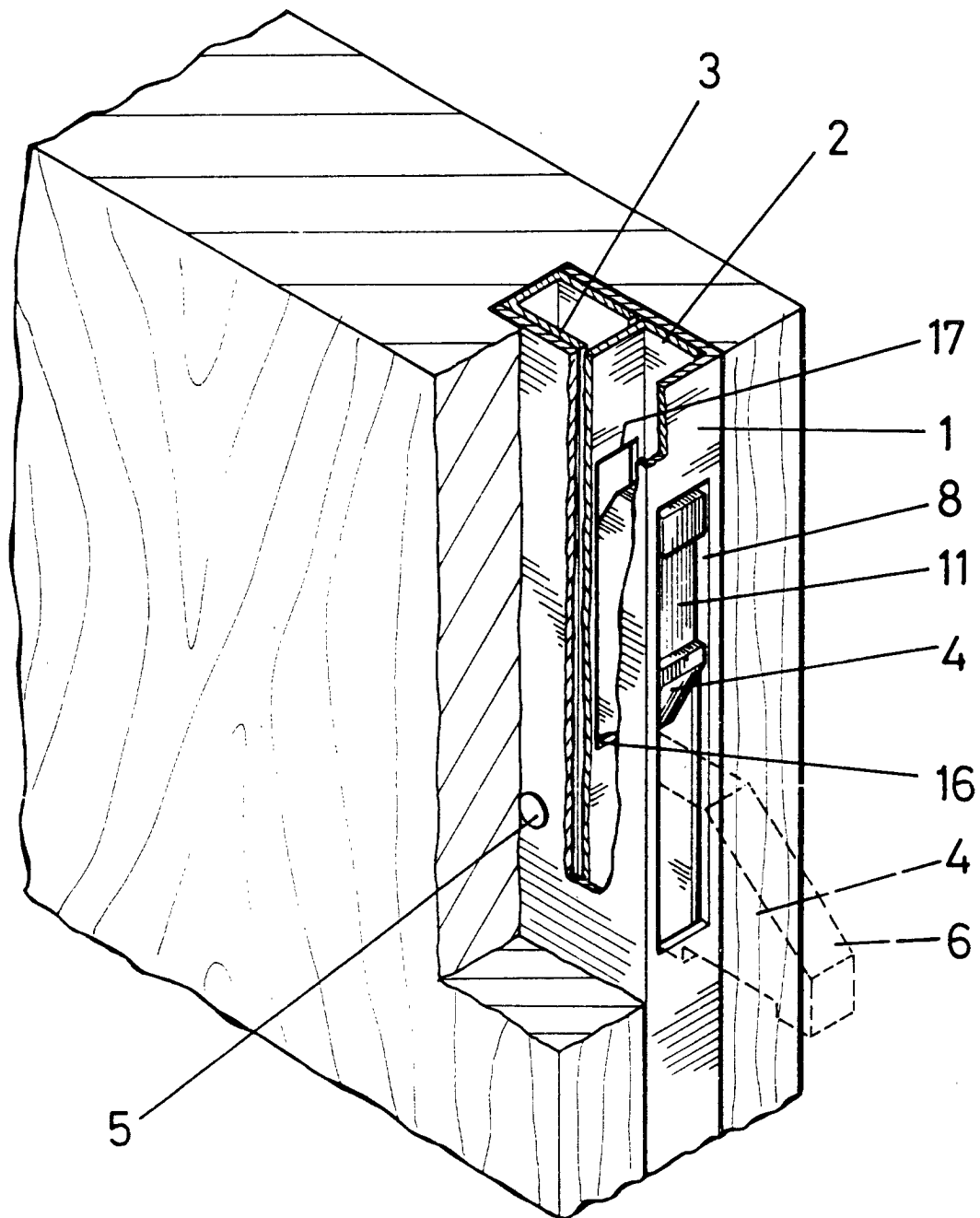


FIG.1



A
FIG. 2

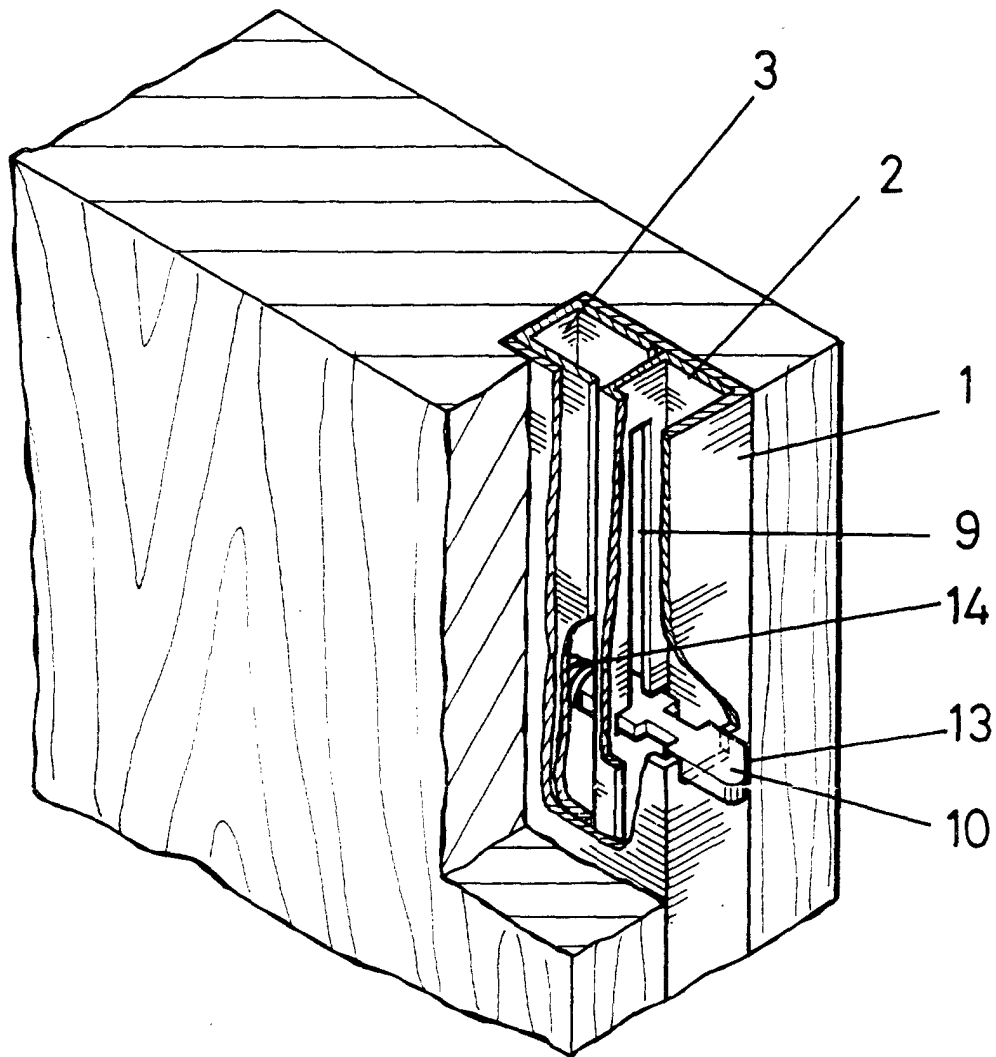
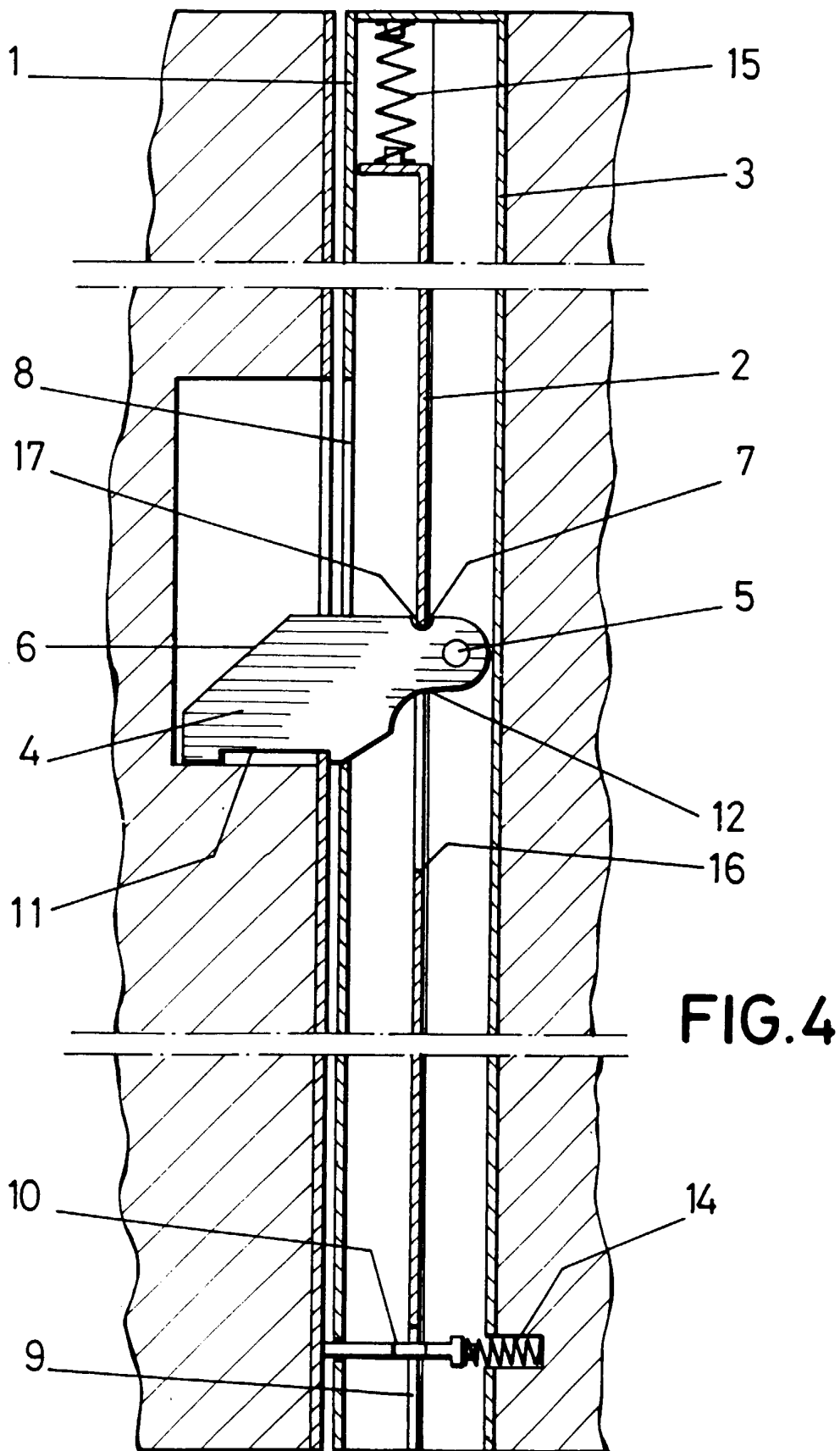
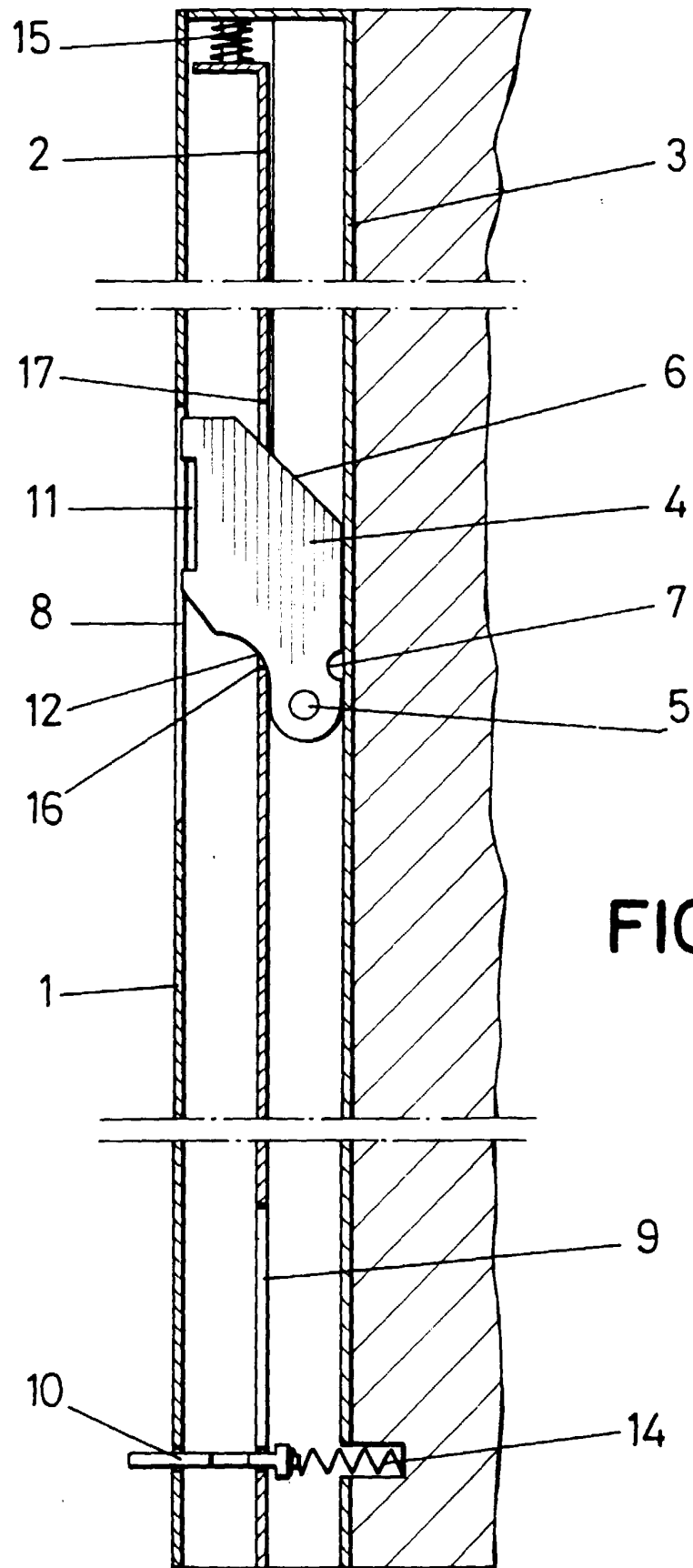


FIG.3







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EUROPEAN SEARCH REPORT

Application Number
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The present search report has been drawn up for all claims			
Place of search THE HAGUE		Date of completion of the search 19 May 2000	Examiner Westin, K
CATEGORY OF CITED DOCUMENTS		T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document	
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EPO FORM 1503 03 82 (P04C01)

**ANNEX TO THE EUROPEAN SEARCH REPORT
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