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(54) **A sectional door with an entrance door having a closure system**

(57) A sectional door (S) with a cut out entrance door (P), the entrance door being formed by a number of superimposed panels (P) mutually hinged, wherein each entrance door panel (P) is hinged to a corresponding section of the sectional door (S), and wherein a first entrance door panel (P1) is provided with a lock (L) intended to block the entrance door (P) with respect to the sectional door (S), wherein the lock (L) is operatively connected with vertical shaft segments (6) suitable for being displaced between an opening position and a closing position, which shaft segments (6) end at their end portions in correspondence of the hinge axes of the first panel

(P1), and for the other panels of the entrance door (P) there are provided vertical shaft segments (6) coaxial with said shaft segments (6) of the first panel (P1) and connected to means (B) for blocking with respect to the sectional door (S), the shaft segments (6) of all the panels (P) forming a composite shaft (6) interrupted in correspondence with the hinges among the panels (P), through which shaft the lock is able to operate the blocking means (B) of all the entrance door panels. This composite shaft (6), being interrupted in correspondence of the hinges among the panels (P), does not hinder the displacements of the panels, that are needed for following the curved trajectory of the sectional door (S).

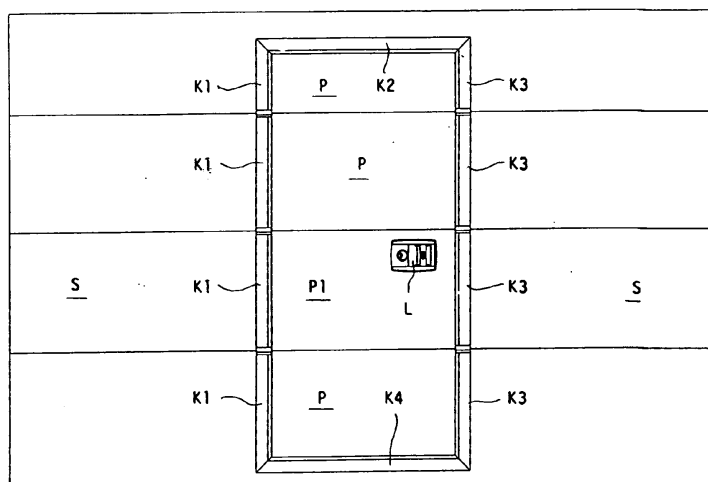


FIG. 1

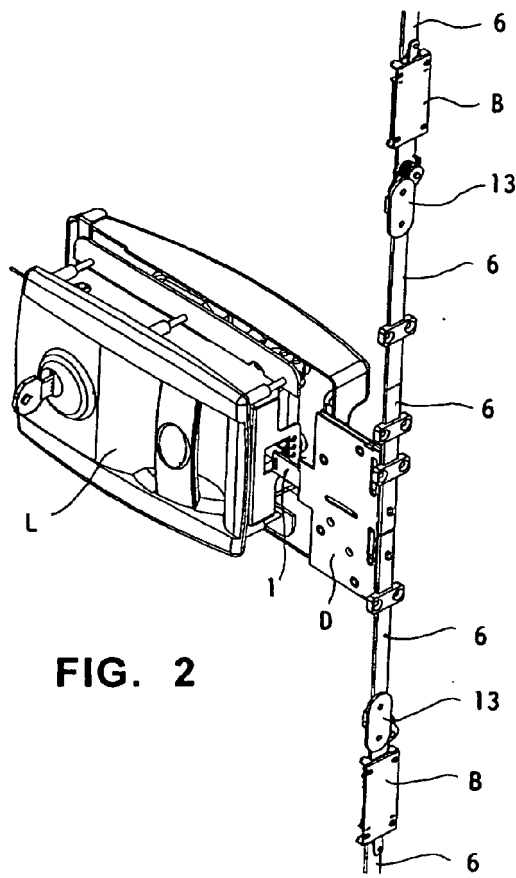


FIG. 2

Description

[0001] The subject of the present invention is a sectional door with a cut out entrance door having a closure system improved with special reference to its security.

[0002] The sectional doors, which are used mainly for closing garages and like rooms, are formed by a number of superimposed sections which are mutually hinged along horizontal axes. The sectional door, when it is in its lowered condition, substantially lies in a vertical plane closing the entrance to the room, and when it is in its raised condition substantially lies in a horizontal plane parallel to the room ceiling. During the passage from the one to the other of these conditions, the sectional door follows a curved trajectory which is allowed by the hinges provided among the different sections.

[0003] These sectional doors, in consideration of their purposes, usually have a noticeable width, and it would be unnecessarily burdensome to raise the entire sectional door when only the passage of one or more persons is to be allowed. For this reason, in some sectional doors there is cut out an entrance door of reduced size intended to be opened for allowing the passage of persons without raising the entire sectional door. Because the entrance door should have a height proportioned to the persons height, it should extend in correspondence of a number of sections of the sectional door, and therefore also the entrance door should be formed by mutually hinged panels, in order that it can follow the curved trajectory along which displaces the sectional door.

[0004] In most embodiments known in commerce, the entrance door is closed, with respect to the sectional door in which it is cut out, by means of a usual lock which allows to block only one of the panels of the entrance door with respect to the corresponding section of the sectional door. However, this arrangement has a serious drawback, because each panel of the entrance door is correctly held only at the hinged side by a vertical hinge, with respect to the corresponding section of the sectional door, whereas at the opening side only one panel of the entrance door is positively fixed in the closure position by the lock, whereas all other panels of the entrance door are retained through a number of hinges by the sole panel closed by the lock. In view of the inevitable clearances of the hinges, the various panels of the entrance door are not positively retained. This is unwellcome to the users, and at the same time reduces the security of the entrance door, because the unsteadiness of the panels makes easier that such an entrance door is broken open.

[0005] In some more advanced embodiments also known in commerce, the entrance door is provided with a lock intended to block the panel on which it is installed, as well as with a upper and a lower bolt. However the mechanisms of these entrance doors have several disadvantages, and the closure effectiveness is not entirely satisfactory.

[0006] Moreover, in some embodiments known in commerce, the mechanisms of an entrance door that has

been opened are then not ready for a new closure of the entrance door without requiring a special maneuver, or they allow a subsequent opening of the entrance door only from outside.

[0007] According to the document BE-528.030, the entrance door panels are provided with block means acting towards the corresponding panels of the sectional door, a first panel is provided with a maneuver means and a transmission means operates said block means under action of said maneuver means. The maneuver means is a simple handle and the transmission means is an articulated shaft whose articulations correspond, in the closing position, to the hinges between the sections of the sectional door. This arrangement is complicated and it is easily subject to damages. The opening being operated by a simple handle, the closure is not sure as it would be operated by a lock.

[0008] The main object of this invention is to improve the closure system for an entrance door of a sectional door by avoiding the stated disadvantages and ensuring for the entrance door a stable and strong closure of all the component panels by safe and relatively simple means that do not increase the cost of the closure system for the entrance door.

[0009] Another object of the invention is to ensure that the entrance door, after it has been opened, is ready for being closed again without the need of any special maneuver.

[0010] It is also an object of the invention to attain the stated objects by means whose maneuver is easy and does not involve for the user difficulties nor relatively fatiguing maneuvers.

[0011] These objects are attained in a sectional door with a cut out entrance door having a closure system, the entrance door being formed by a number of superimposed panels mutually hinged along horizontal axes lying in correspondence of the hinge axes of the corresponding sections of the sectional door, wherein each entrance door panel is hinged along a vertical axis, at a hinge side of the entrance door, to a corresponding section of the sectional door, and wherein the entrance door panels are provided with block means acting towards the corresponding panels of the sectional door, a first panel is provided with a maneuver means and a transmission means operates said block means under action of said maneuver means, characterized in that said maneuver means is a lock, it is operatively connected with two vertical shaft segments suitable for being displaced, by action of the lock, between an opening position and a closing position, said shaft segments ending at their distal end portions, in the closing position, in correspondence of said hinge axes of the first panel; and in that at least for some other panels of the entrance door there are provided vertical shaft segments coaxial with said shaft segments of the first panel, said vertical shaft segments being connected to the block means intended to block the corresponding panel to the corresponding section of the sectional door, the shaft segments of each panel ending

at their end portions, in the closing position, in correspondence of said hinge axes of the same panel, and the vertical shaft segments of each panel being adjacent to the shaft segments of the adjacent panel, whereby the whole of all the shaft segments for the various entrance door panels forms a composite shaft which is interrupted in correspondence with the hinges among the panels, and the lock is able to operate, through this composite shaft, the blocking means of all the equipped entrance door panels, whereas, during the displacements of the sectional door, said composite shaft, being interrupted in correspondence of the hinges among the panels, does not hinder the relative rotational displacements of said panels, that are needed for following the curved trajectory of the sectional door.

[0012] In this closure system, the operation of a single lock causes the blocking or unblocking of a number of panels of the entrance door, and the blocking is effected in correspondence of a number of panels of the entrance door, whereby a stable and safe retainment of the entire entrance door is ensured, and this substantially contributes to the security. At the same time, no hindrance is opposed to the displacement of the sectional door along its curved trajectory, because the entrance door panels easily follow the curved trajectory thanks to the composite shaft being interrupted in correspondence of the hinges. The structure of this sectional door with entrance door is simple, sure and relatively inexpensive.

[0013] It is possible to provide the described arrangements only for a certain number of equipped panels of the entrance door, but preferably all the panels of the entrance door are equipped, each of them being provided with a segment of the composite shaft and the respective blocking means, whereby the block in closed position is ensured to all panels, thus attaining the maximum security of the entrance door.

[0014] Preferably, the lock is a usual lock with an operating member displaceable along a horizontal direction, and there is provided a device with toothed wheels converting said horizontal displacement in a movement in vertical direction and in opposite senses of two segments of the composite shaft. This arrangement allows operating the entire composite shaft by requiring from the user the application of a reduced force.

[0015] Preferably, in each equipped panel of the entrance door there is installed an envelope containing a bolt operated by the corresponding segment of the composite shaft, and on said bolt there is pivoted a pawl which, in the closing condition of the lock, engages a portion of said envelope and thus blocks any movement of the bolt.

[0016] Preferably, each bolt carries a pivoted block lever allowed to oscillate within a limited field, this lever being provided with a return spring, and acting, in one of its positions, against a stop member carried by a section of the sectional door, thus blocking the entrance door with respect to the sectional door.

[0017] It is of advantage that said block lever is ar-

ranged in such a manner that it can override the stop member during a closure movement of the entrance door, even if the lock is in the blocking position. In this manner an easy and sure new closure of the entrance door is ensured, without requiring from the user any maneuver.

[0018] Preferably, each bolt has at least one spring which pushes the bolt towards the blocking position thereof.

[0019] It is of advantage that the movement is transmitted to said bolt by the corresponding segment of composite shaft by means of an inclined slot cooperating with a pin provided onto the pawl. In this manner, the composite shaft actuated by the lock operates, in a first step of its opening movement, the disengagement of the pawls of the various panels, and then it displaces the corresponding bolts and, therewith, the block levers.

[0020] These and other features, objects and advantages of the subject of the present invention will appear more clearly from the following description of an embodiment, being a non-limiting example, with reference to the appended drawings, wherein:

Figure 1 represents in front view and in the closed condition a sectional door wherein there is cut out an entrance door for persons.

Figure 2 shows in perspective a lock connected to the device with composite shaft according to this invention.

Figure 3 shows the toothed wheels device that transmits the movement from the lock to the composite shaft.

Figure 4 shows the same component parts of Figure 2, viewed along a horizontal direction parallel to the plane of the entrance door.

Figure 5 shows separately the composite shaft and the component parts connected to it, as they appear in Figure 4.

Figure 6 is a front view of the envelope containing the block means, present in each equipped panel, and of the stop member with which cooperate the block means.

Figure 7 is a view in profile of the component parts represented in Figure 6.

Figure 8 shows the block means in the condition in which they block the entrance door in the closed position.

Figure 9 shows the block means in the condition in which they, due to a first partial displacement of the composite shaft, have made free the pawl which then allows displacing the bolt.

Figure 10 shows the block means in the condition in which they, due to a complete displacement of the composite shaft, have displaced the bolt in the position in which the opening of the entrance door is free.

Figure 11 shows as the block means allow a new closure of the entrance door even if the lock thereof is in the blocking position.

[0021] With reference to Figure 1, reference S designates a sectional door, of which only four sections are represented, and reference P designates an entrance door which is cut out in the four represented sections of the sectional door S; therefore, also the entrance door is composed of four panels. Corresponding to the opening made for the entrance door P, the corresponding sections of the sectional door S are provided with frame elements K1, K2, K3 and K4. Corresponding to the frame elements K1, the panels of the entrance door P are hinged to the corresponding sections of the sectional door S, whereas corresponding to the other frame elements K2, K3 and K4 takes place the opening of the entrance door P. A lock L is applied to a first panel P1 of the entrance door P for allowing the closure and the opening of the entrance door P.

[0022] According to the idea of the invention, the closure by lock of the entrance door P should take place corresponding to a number of frame elements K3, and preferably corresponding to all these frame elements.

[0023] With reference to Figures 2 to 4, the lock L installed on the first panel P1 of the entrance door has an operating member 1 which displaces along a horizontal direction, and there is provided a device D with toothed wheels as that represented, by way of example, in Figure 2, which converts the horizontal movement of the operating member 1 in a movement in vertical direction, in opposite senses, of two shaft segments 6. The represented device D with toothed wheels comprises a double rack 2 connected to the operating member 1 of lock L, meshing with pinions 3 which on their turn mesh with toothed wheels 4 operating two racks 5 connected to the shaft segments 6.

[0024] In the closure condition of lock L, the shaft segments 6 of the first panel P1 end at their distal end portions in correspondence with the horizontal hinges of the first panel P1 with the other panels P of the entrance door. Therefore, in this condition, the presence of the shaft segments 6 does not hinder the relative rotational movements of the panels P, which should be free during the displacements of the sectional door S along its curved trajectory.

[0025] On their turn, the other panels P of the entrance door are also provided with vertical shaft segments, which are designated by the same reference 6 and are coaxial with said shaft segments 6 of the first panel P1. The shaft segments of each panel P end at their end portions, in the closure position of the lock L, in correspondence with the hinge axes of the same panel P, and the vertical shaft segments 6 of each panel 6 are adjacent to the vertical shaft segments 6 of the adjacent panel. In this manner, the whole of all shaft segments 6 of the different panels P of the entrance door forms a composite shaft which is interrupted in correspondence with the hinges between panels, so that the relative rotational movements of the panels P is not hindered, but the composite shaft behaves like an uninterrupted shaft in the lowered condition of the sectional door S.

[0026] The vertical shaft segments 6 of the panels P are connected to block means B suitable for blocking the corresponding panel with respect to the corresponding section of the sectional door. In view of the preceding explanations, lock L is able to operate, through the composite shaft formed by the shaft segments 6, the block means B of all the panels P.

[0027] The block means B of panels P may have different structures, but it will now be described a structure that is particularly suitable for the block means B.

[0028] As represented in Figures 6 to 8, preferably a block means B comprises an envelope 7 containing a bolt 8 operated by the corresponding segment 6 of the composite shaft, and on said bolt 8 is pivoted a pawl 9 which, in the closure condition of the lock (Figure 8), engages a portion of said envelope 7 and blocks any movement of the bolt 8.

[0029] Each bolt 8 has pivoted a block lever 11 which is allowed to tilt within a limited field, which is provided with a return spring 12, and which in one of its positions rests against a stop member 13 carried by a section of the sectional door S, thus blocking the entrance door P with respect to the sectional door S.

[0030] Said block lever 11 is so arranged that it can override the stop member 13 during a closure movement of the entrance door P, even if the lock L is in its blocking position. This condition in which lever 11 overrides the stop member 13 is represented in Figure 11. In this manner, an easy and sure new closure of the entrance door P is ensured, without requiring any maneuver by the user.

[0031] Each bolt is provided with at least one spring 14 which stresses the same towards the blocking position.

[0032] The movement is transmitted to said bolt 8 by the corresponding segment 6 of the composite shaft by means of an inclined slot 15 wherein is engaged a pin 10 provided onto the pawl 9. In this manner, the composite shaft 6 actuated by the lock L operates, in a first step of its opening movement, the disengagement of the pawls 9 of the various panels P (Figure 9), and then it displaces the corresponding bolts 8 and, therewith, the block levers 11, thus making the panel P free from the stop member 13 of the corresponding section of the sectional door S (figure 10).

[0033] The device according to the invention may be installed only on a certain number of equipped panels P of the entrance door, however it is preferred that all the panels P of the entrance door are equipped by providing the same with the segments 6 of composite shaft and the corresponding block means B, whereby the blocking in closed position is ensured for all panels P, thus attaining the maximum security of the entrance door.

[0034] It is to be understood that this invention is not limited to the embodiment which has been described and shown as an example. Several possible modifications have been stated in the description, and others are available to those skilled in the art. These modifications and others, as well as any replacement by technically equiv-

alent means, may be applied to what has been described and shown, without departing from the scope of the present Patent, as defined by the Claims.

Claims

1. A sectional door (S) with a cut out entrance door (P) having a closure system, the entrance door being formed by a number of superimposed panels (P) mutually hinged along horizontal axes lying in correspondence of the hinge axes of the corresponding sections of the sectional door (S), wherein each entrance door panel (P) is hinged along a vertical axis, at a hinge side (K1) of the entrance door, to a corresponding section of the sectional door, wherein at least some entrance door panels (P) are provided with block means (B) acting towards the corresponding panels of the sectional door (S), and wherein a first entrance door panel (P1) is provided with a maneuver means and a transmission means operates said block means under action of said maneuver means, **characterized in that** said maneuver means is a lock (L) intended to block the entrance door with respect to the sectional door, is operatively connected with two vertical shaft segments (6) suitable for being displaced, by action of the lock (L), between an opening position and a closing position, said shaft segments (6) ending at their distal end portions, in the closing position, in correspondence of said hinge axes of the first panel (P1); and **in that** at least for some other panels (P) of the entrance door there are provided vertical shaft segments (6) coaxial with said shaft segments (6) of the first panel (P1), said vertical shaft segments (6) being connected to the block means (B) intended to block the corresponding panel to the corresponding section of the sectional door, the shaft segments (6) of each panel (P) ending at their end portions, in the closing position, in correspondence of said hinge axes of the same panel, and the vertical shaft segments (6) of each panel being adjacent to the shaft segments (6) of the adjacent panel, whereby the whole of all the shaft segments (6) for the various entrance door panels (P) forms a composite shaft (6) which is interrupted in correspondence with the hinges among the panels, and the lock (L) is able to operate, through this composite shaft (6), the blocking means (B) of all the equipped entrance door panels, whereas, during the displacements of the sectional door (S), said composite shaft (6), being interrupted in correspondence of the hinges among the panels, does not hinder the relative rotational displacements of said panels (P), that are needed for following the curved trajectory of the sectional door (S).
2. A sectional door with an entrance door, as set forth in Claim 1, **characterized in that** all the panels (P)

of the entrance door are equipped, each of them being provided with a segment (6) of the composite shaft and the respective blocking means (B), whereby the block in closed position is ensured to all panels.

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3. A sectional door with an entrance door, as set forth in Claim 1, **characterized in that** the lock (L) has an operating member (1) displaceable along a horizontal direction, and there is provided a device (D) with toothed wheels (3,4) converting said horizontal displacement in a movement in vertical direction and in opposite senses of two segments (6) of the composite shaft.
4. A sectional door with an entrance door, as set forth in Claim 1, **characterized in that** in each equipped panel (P) of the entrance door there is installed an envelope (7) containing a bolt (8) operated by the corresponding segment (6) of composite shaft, and on said bolt (8) there is pivoted a pawl (9) which, in the closing condition of the lock, engages a portion of said envelope (7) and thus blocks any movement of the bolt (8).
5. A sectional door with an entrance door, as set forth in Claim 4, **characterized in that** each bolt (8) carries a pivoted block lever (11) allowed to oscillate within a limited field, this lever being provided with a return spring (12), and acting, in one of its positions, against a stop member (13) carried by a section of the sectional door, thus blocking the entrance door with respect to the sectional door.
6. A sectional door with for an entrance door, as set forth in Claim 5, **characterized in that** said block lever (11) is arranged in such manner that it can override the stop member (13) during a closure movement of the entrance door, even if the lock (L) is in the blocking position.
7. A sectional door with an entrance door, as set forth in Claim 4, **characterized in that** each bolt (8) has at least one spring (14) which pushes the bolt towards the blocking position thereof.
8. A sectional door with an entrance door, as set forth in Claim 4, **characterized in that** the movement is transmitted to said bolt (8) by the corresponding segment (6) of composite shaft by means of an inclined slot (15) cooperating with a pin (10) provided onto the pawl (9), whereby the composite shaft (6) actuated by the lock (L) operates, in a first step of its opening movement, the disengagement of the pawls (9) of the various panels (P), and then it displaces the corresponding bolts (8) and, therewith, the block levers (11).

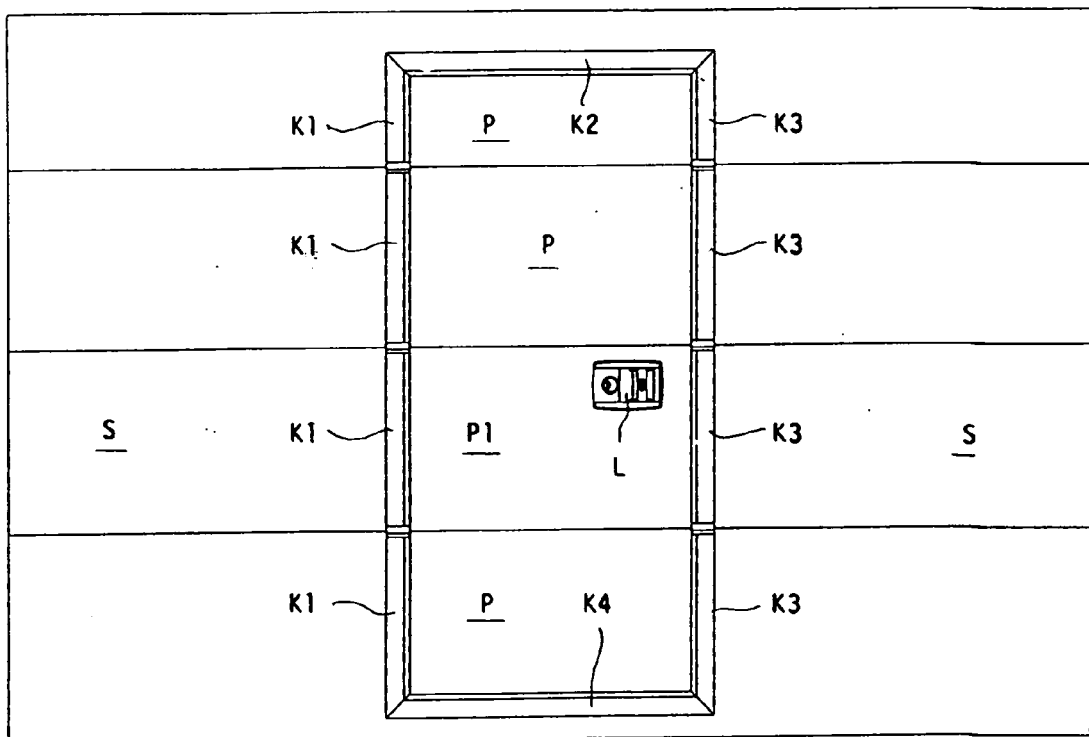


FIG. 1

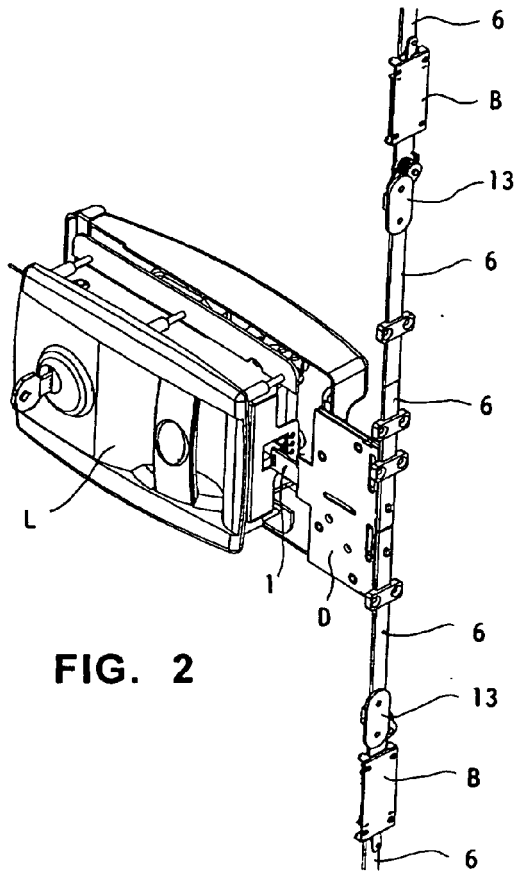


FIG. 2

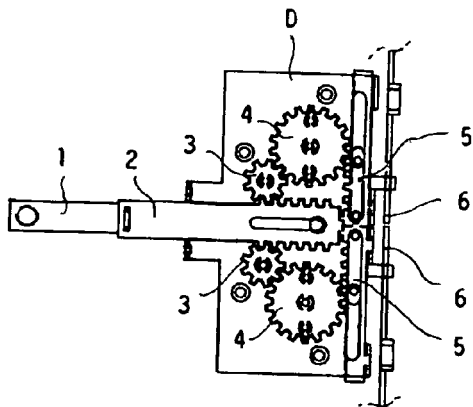


FIG. 3

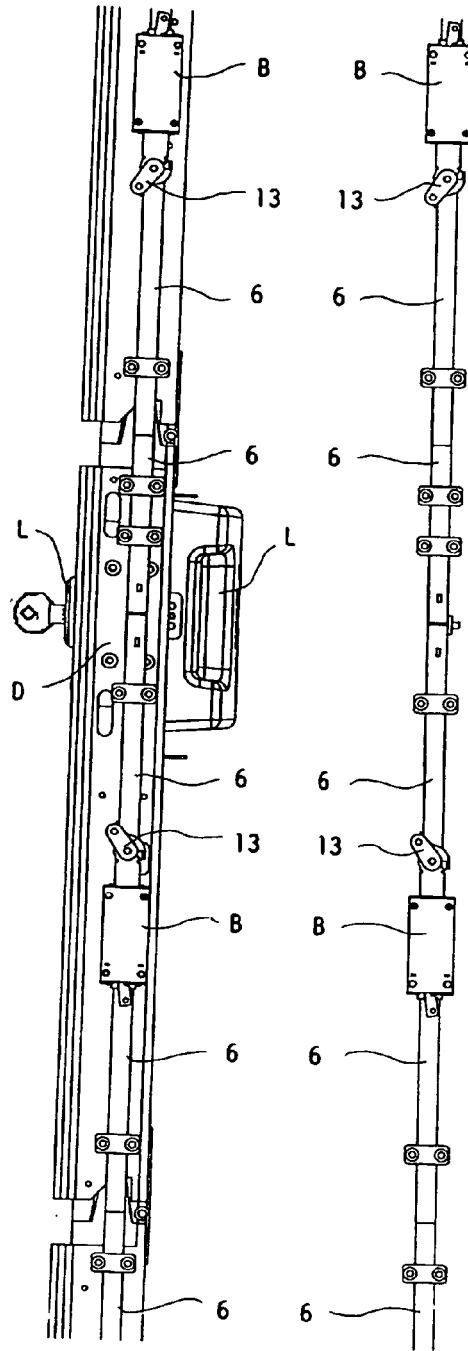


FIG. 4

FIG. 5

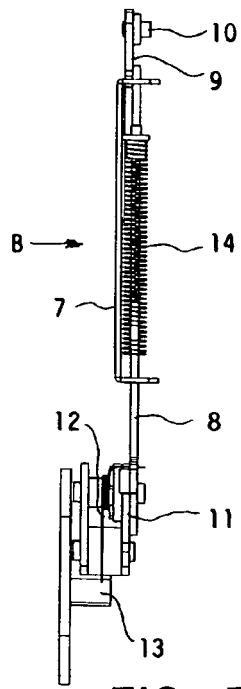


FIG. 7

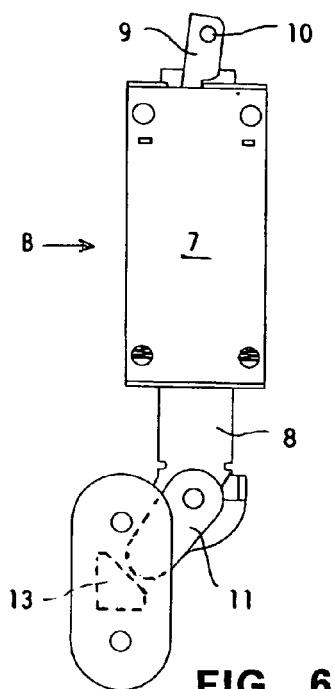


FIG. 6

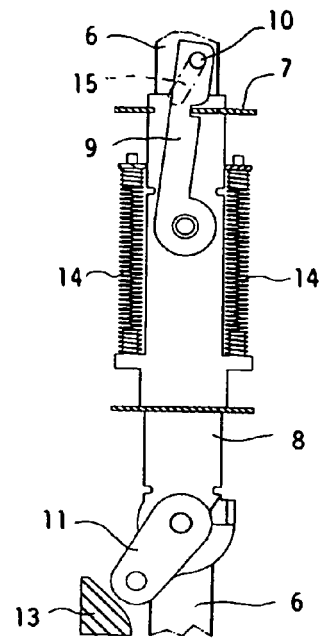


FIG. 8

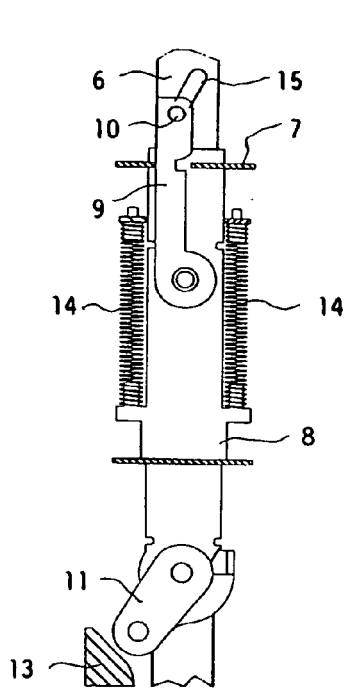


FIG. 9

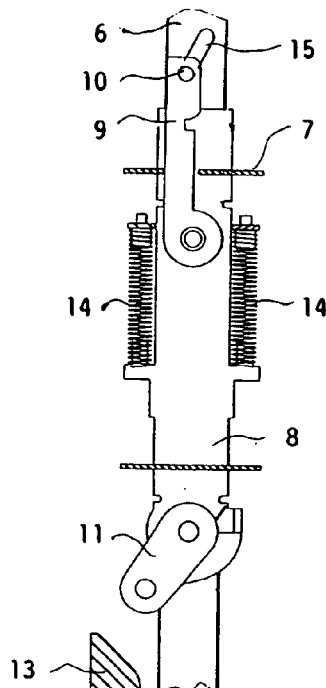


FIG. 10

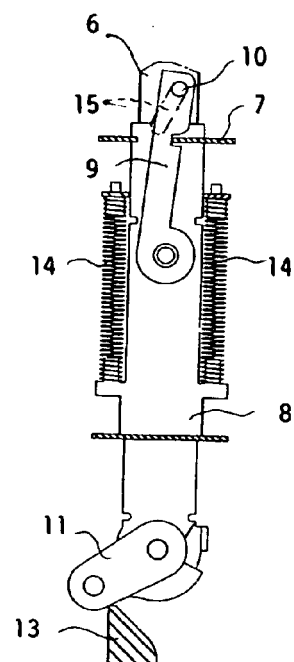


FIG. 11



EUROPEAN SEARCH REPORT

Application Number
EP 11 00 5900

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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 18 November 2011	Examiner Pérez Méndez, José F
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EPO FORM 1503 03.82 (P04C01)

**ANNEX TO THE EUROPEAN SEARCH REPORT
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EP 11 00 5900

This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report. The members are as contained in the European Patent Office EDP file on
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