(19) Europäisches Patentamt
European Patent Office
Office européen des brevets

(11) EP 1 736 626 A2

(12) EUROPEAN PATENT APPLICATION

(43) Date of publication:
27.12.2006 Bulletin 2006/52

(51) Int Cl.:
E05C 9/00 *(2006.01)* ***E05B 9/08*** *(2006.01)*

(21) Application number: **06445053.9**

(22) Date of filing: **21.06.2006**

(84) Designated Contracting States:
AT BE BG CH CY CZ DE DK EE ES FI FR GB GR HU IE IS IT LI LT LU LV MC NL PL PT RO SE SI SK TR
Designated Extension States:
AL BA HR MK YU

(30) Priority: **23.06.2005 SE 0501484**

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(54) Multipoint rim lock

(57) A rim lock, particularly such a lock fitted subsequently to a door, window, shutter or the like, which includes a through-penetrating opening for accommodating a lock cylinder, wherein the multi-point lock includes a first bolt and at least one second bolt, and coupling means for connecting the bolts with a lock cylinder accommodated in said door opening, for simultaneous manoeuvring of the bolts in response to actuation of the lock cylinder. With the intention of facilitating fitting of the lock, the bolts (3, 4a, 4b) and the coupling (5a, 5b) are disposed in a cassette (1) and a lock cylinder having a cross-sectional shape for guiding or controlling the cassette during mounting projects through a cylinder opening in the cassette.

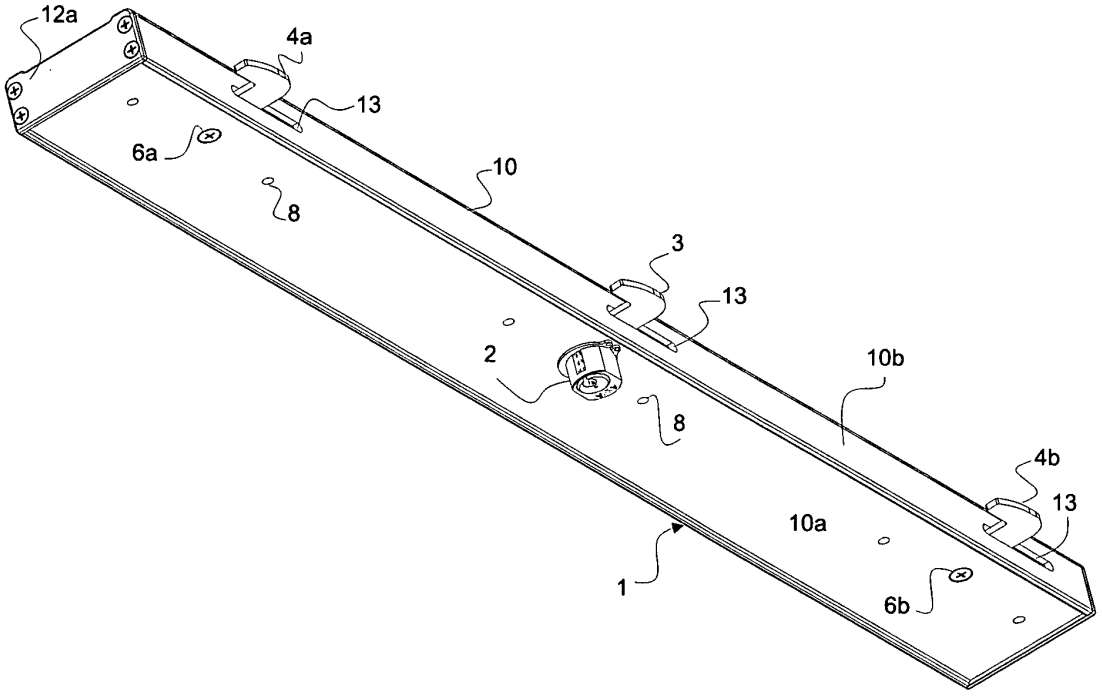

Fig 1

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Description

Field of invention

[0001] The present invention relates to a so-called multipoint rim lock and more particularly to such a lock that is intended for subsequent fitting to a door, a window, a shutter or corresponding structure in accordance with the preamble of claim 1.

Background of the invention

[0002] Many doors, windows and shutters, such as the doors of student lockers in schools, are fitted with a lock that includes only a single bolt, for instance a swing bolt or hook bolt. In the case of such simple lock applications, the bolt is often coupled to a lock cylinder that is positioned midway of the height of the locker door. The lock cylinder is normally manoeuvred with the aid of a key.

[0003] One drawback with this type of single-point lock is that the locker door can readily be broken into, by kicking the corner of the door or by striking said corner in some other way. This is particularly true of larger doors where the distance between the bolt and the corner of the door is relatively large, so as to enable the door to be deformed readily by striking one of the corners of the door.

[0004] In order to make forcing and damaging of such locker doors more difficult to achieve, it is known to provide the doors, either during manufacture or subsequent thereto, with further bolts, typically a bolt in the vicinity of each corner at the edge of the door that faces away from the door hinge. Such subsequently mounted bolts consist, for instance, of hook bolts which are connected to the existing central bolt through the medium of tension bolts or corresponding means. This subsequent fitting procedure is relatively complicated and requires the acquisition and storage of a number of loose separately transported components, thereby incurring a relatively high material handling costs. Moreover, such subsequent mounting of separate lock components means that said components must be fitted and connected on site, which can be a complicated process and give rise to ergonomic problems, since the person fitting the lock components is often forced to stoop very low or to stretch upright to a high level, often over relatively long periods of time. Furthermore, some of these components must be mounted in holes specially provided in the door to this end, wherewith the task of measuring the positions of the holes, marking these positions and making said holes is both complicated and time consuming.

Summary of the invention

[0005] Accordingly, one object of the present invention is to provide a readily fitted multi-point lock.

[0006] Another object of the invention is to provide a multipoint lock with which there can be used an opening that is already provided in a door for the accommodation of an existing lock cylinder therewith simplifying subsequent fitting of the multipoint lock.

[0007] Another object of the invention is to provide such a multipoint lock with which subsequent fitting of the lock requires a minimum number of loose components.

[0008] Another object of the present invention is to provide such a multipoint lock that can be produced relatively simply and cheaply.

[0009] Another object of the present invention is to provide such a multipoint lock which is both safe and reliable.

[0010] These and other objects of the invention are achieved with a multipoint lock of the kind described in the first paragraph of the description and having the special technical features set forth in the characterizing clause of the accompanying claim 1.

[0011] Because all of the components included in the multipoint lock are housed in a cassette, which is mounted securely on the door, it is unnecessary to measure, mark or make holes for fixating the lock bolts or other components when fitting the lock. Other than the screw fasteners or the like that may be required to secure the cassette to the door, no loose components are involved in fitting of the lock, therewith considerably simplifying handling of material.

[0012] The multipoint lock further comprises a lock cylinder that is housed in the cassette and which projects out through the cylinder opening in the cassette. The lock cylinder has a cross-sectional shape that includes two opposing curved edges and two opposing straight edges for guiding or controlling the position of the lock cylinder of the cassette when fitting the lock cylinder into a door opening that has a corresponding cross-sectional shape. By this means fitting the multipoint lock is further simplified. When fitting the multipoint lock there is first dismantled a lock cylinder that may be present in the door, whereafter the lock cylinder housed in the cassette is inserted into and fastened to the opening present in the door. The corresponding cross sectional shapes of the lock cylinder housed in the cassette and the cylinder opening in the door automatically guides the entire cassette to its correct position with regard to all three of its vertical, horizontal and rotational position. No further adjustment of the position of the cassette is therefore required and the cassette may directly be fastened to the door, for example by means of screws, rivets or the like.

[0013] The present invention thus enables a multipoint lock to be fitted to doors and the like in a much simpler manner than was earlier the case.

[0014] As a result of the cylinder opening provided in one wall of the cassette, a lock cylinder already present in the door can also be used in the subsequent fitting of an inventive multipoint lock. The lock cylinder hosed in the cassette is then dismounted from the cassette. The lock is fitted by unscrewing the existing bolt from the cylinder present in the door. That part of the cylinder which projects out from the door is then inserted into the cas-

sette through the cylinder opening. The position the cassette may be adjusted by rotating the cassette about the lock cylinder until the cassette is roughly parallel with the longitudinal direction of the door. However, the cylinder opening provided in the cassette preferably has a cross sectional shape which corresponds to the cross sectional shape of the dismounted lock cylinder. In case the lock cylinder of the door also has a corresponding cross sectional shape, the adjustment by rotation of the cassette may be omitted. The first bolt is then fixed to the part of the lock cylinder that projects into the cassette, wherewith the cassette is held in place temporarily until the cassette has been secured to the door.

[0015] The cassette wall in which the cylinder opening is provided conveniently comprises mounting holes for permanently fastening the cassette to the door. One particular advantage afforded by these mounting holes is that after the cassette has been positioned and temporarily fixed as described above, the holes can be used as a template for drilling corresponding mounting holes in the door.

[0016] The cassette conveniently includes a profiled element that forms a cassette base part. This simplifies the manufacture of the multipoint lock and renders manufacture less expensive, since one and the same type of profiled element can be cut readily to a desired length in the manufacture of multipoint locks of different lengths corresponding to doors of mutually different sizes. By giving the profiled element a generally U-shaped cross-section, it is possible to use standardized components for forming other cassette walls, wherewith the cassette wall opposite the bottom of the profiled element is cut to an appropriate length.

[0017] Further advantages afforded by the inventive multipoint lock and further features thereof will be apparent from the dependent claims and from the following detailed description.

Detailed description of exemplifying embodiments

[0018] Various exemplifying embodiments of the invention will now be described with reference to the accompanying figures of the drawings, wherein

Figure 1 is a perspective view of that side of multipoint lock that faces towards the door, in accordance with one embodiment of the invention;

Figure 2a is a perspective view of the multipoint lock taken from a different direction than the figure 1 illustration and figure 2b is a similar view although with certain parts omitted;

Figure 3 is a perspective view of the multipoint lock shown in figure 1 fitted to a door with certain lock parts being omitted;

Figure 4a is a plan view of a locker door to which the multipoint lock shown in figure 1 has been fitted to the inside of the door, and 4b is a side view of the figure 4a illustration; and

Figures 5a and 5b are plan views of the multipoint lock shown in figure 1 with certain parts omitted and in which the bolts are shown in their respective door open and door locked positions.

[0019] Referring to figures 1, 2a and 2b there is shown an embodiment of the inventive multipoint rim lock that comprises a cassette 1, a lock cylinder 2, a first bolt 3, two second bolts 4a, 4b and two bolt coupling rods 5a, 5b.

[0020] The cassette 1 comprises an extruded profiled element 10 of generally of U-shaped cross-section, which comprises a basic part of the cassette. The longitudinally extending wall that constitutes the bottom of the U-shaped cross-section forms the bottom wall 10a of the cassette 10. The side legs of the cross-sectional shape together form mutually opposing longitudinally extending cassette side-walls 10b, 10c (see also figure 3).

[0021] The cassette is closed generally by a longitudinally extending wall 11 opposite the bottom wall 10a and two mutually opposing end walls 12a, 12b (see also figure 3). The longitudinally extending wall 11 is comprised of an extruded profiled element which is inserted in a channel or groove disposed on the inside of the sidewalls 10b, 10c. The end walls 12a, 12b comprise plates that are fastened to the ends of the profiled element 10 by means of screws that extend through holes in the end walls and that are screwed into grooves disposed on the inside of respective sidewalls 12b, 12c. The axial position of the longitudinally extending wall 11 is fixed by abutment with the mutually opposing two end walls 12, 12b.

[0022] As will be seen from figure 3, the first bolt 3 and the two second bolts 4a, 4b are all hook bolts. The hook bolts 3, 4a, 4b are disposed in the cassette 1 and are rotatably fixed to the bottom wall 12a of the profiled element. In the locking state illustrated in figures 1-3, part of the hook bolts extend through a respective elongate opening 13 disposed in the cassette sidewall 10b. The first hook bolt 3 is fixed to a rotatable part of the lock cylinder 2 disposed within the cassette 1. In the cassette in the illustrated example, relative rotation between the first hook bolt 3 and the rotatable part of the lock cylinder 2 is prevented in a typical fashion, by shape engagement between a hole in the bolt 3 and a rotatable part of the lock cylinder 2 disposed in said hole.

[0023] Part of the lock cylinder 2 extends out through a penetrating opening disposed in the cassette bottom wall 10a.

[0024] The two second hook bolts 4a, 4b are fixed at shaft elements 5a, 5b which are rotatably fixed to the bottom wall 10a of the cassette by means of screws 6a, 6b (see figure 1). The two second bolts 4a, 4b are also connected to the first hook bolt by means of coupling rods 5a, 5b.

[0025] As will be clearly be seen from figure 5b, all

hook bolts 3, 4a, 4b are of similar design, which simplifies manufacture of the bolts and lowers manufacturing costs. To enable the two second bolts 4a, 4b to be rotated to mutually the same extent both second bolts 4a, 4b include lever-acting parts in which two coupling holes 6a, 6b are disposed at mutually different distances from respective rotational centres of the bolts. The coupling rod 5a is connected at both of its ends to and outer coupling hole of the first hook bolt 3 and the upper second hook bolt 4a in figure 5b, while the coupling rod 5b is coupled to the inner coupling holes 6a of the first hook bolt 3 and the lower second hook bolt 4b. Figure 3 also shows the manner in which the cassette is fixed to a two-wall door 20 by means of pop rivets 7 that extend through mounting openings 8 disposed in the bottom wall 10 of the cassette and through corresponding mounting holes in one door wall.

[0026] The aforedescribed multipoint lock is fitted in the following extremely simple and time-saving fashion. Firstly, any existing lock cylinder located in a through-penetrating opening provided relative to the door to this end is removed. The cassette 1 is then inserted against the inside of the door and the lock cylinder 2 is fitted in the through-penetrating opening in the door. As will be seen clearly from figure 3, the lock cylinder has a cross-section that includes two mutually opposing curved portions that enables the cylinder to be rotated when accommodated in a circular hole, and two mutually opposing parallel straight portions which enable the direction of the lock cylinder to be controlled when accommodated in a standardized hole that has a corresponding configuration. In the case of the illustrated example, the multi-point lock is fitted to a door 20 in which the through-penetrating opening for accommodating a lock cylinder has such a direction-controlling standardized configuration that corresponds to the cross-sectional shape of the lock cylinder 2. When the lock cylinder 2 is fitted into the through-penetrating opening of the door, the rotational position of the lock cylinder and therewith the position of the entire cassette will be controlled or guided so that the cassette will automatically take its correct position.

[0027] When the through-passing hole in the door is circular, the position of the cassette is adjusted simply by rotating the cassette about the lock cylinder until the longitudinally extending side of the cassette is roughly parallel with the corresponding side of the door.

[0028] When the cassette is positioned correctly, the cassette is secured provisionally in position by securing the lock cylinder to the door, for instance by screwing a lock nut onto the lock cylinder from the side of the door opposite the cassette. When the cassette has been secured provisionally, the door can be readily provided with a mounting hole by using the mounting openings 8 provided in the cassette as a template for finding the correct positions at which mounting holes shall be made in the door. For example, a drill can be placed directly in the mounting openings 8, therewith enabling the mounting holes to be made in the door without removing the cassette 1. The cassette is then fixated permanently and safely in the door, for instance with the aid of pop rivets which are placed and tightened in the cassette mounting openings and the door mounting holes. When the cassette has been fixed in position, the cassette is closed by inserting the longitudinally extending wall 11 into a groove provided in the profiled element 10, and the two end walls 12a, 12b, or solely one or the other of said end wall are/ is pre-fitted and screwed firmly to the profiled element 12.

[0029] The multipoint lock may also be used for doors already provided with an existing lock cylinder. In such case the lock cylinder of the multipoint lock is removed. After having removed any hook bolt or the like from the existing lock cylinder this cylinder is inserted into the cylinder opening in the bottom wall of the cassette and the first hook bolt of the multipoint lock is removed from the removed lock cylinder and fixed to the existing lock cylinder. The remainder of the lock fitting process is then effected in the manner described above Although the invention has been described with reference to exemplifying embodiments thereof, it will be understood that the invention is not limited to this exemplifying description and that variations that can be made freely within the scope of the accompanying claims.

Claims

1. A multipoint rim lock, particularly such a lock that is fitted subsequently to a door, window, shutter or the like that has a through penetrating opening for accommodating a lock cylinder, wherein the multi-point lock includes a first bolt and at least a second bolt, and means for coupling the bolts to a lock cylinder disposed in the door opening for simultaneous manoeuvring of the lock bolts by activation of the lock cylinder, wherein the bolts (3, 4a, 4b) of the multipoint lock and the coupling means (5a, 5b) are disposed in a cassette (1) and a through-penetrating cylinder opening is disposed in one (10a) of the cassette walls, **characterized in that** the cassette (1) includes a lock cylinder (2) which projects out through the cylinder opening so as to be received by the door opening, wherein the lock cylinder (2) has a cross-sectional shape that includes two opposing curved edges and two opposing straight edges for guiding or controlling the position of the lock cylinder of the cassette when fitting the lock cylinder into a door opening that has a corresponding cross-sectional shape.

2. A multi-point lock according to claim 1 in which the cassette (1) has a number of through-penetrating mounting openings (8) disposed in that wall (10a) which includes said cylinder opening.

3. A multi-point lock according to any one of claims 1-2,

in which the cassette (1) comprises a profiled element (10).

4. A multi-point lock according to claim 3 in which the profiled element (10) has a generally U-shaped cross-section, and wherein the cassette also includes side-delimiting plates (11) and end-delimiting plates (12a, 12b) which are fixed to the profiled element such as to define a generally closed space inside the cassette.

5. A multi-point lock according to any one of claims 1-4, comprising two second bolts (4a, 4b) that are movably connected to the cassette (1) and placed one on each side of the lock cylinder (2).

6. A multi-point lock according to any one of claims 1-5 in which one or the other of said bolts (4a, 4b) is connected to the first bolt (3) by means of a respective connecting rod (5a, 5b).

7. A multi-point lock according to any one of claims 1-6, wherein the first and the second bolts are swing bolts.

8. A multi-point lock according to any one of claims 1-7, in which the first bolt (3) is fixedly mounted to the lock cylinder (2).

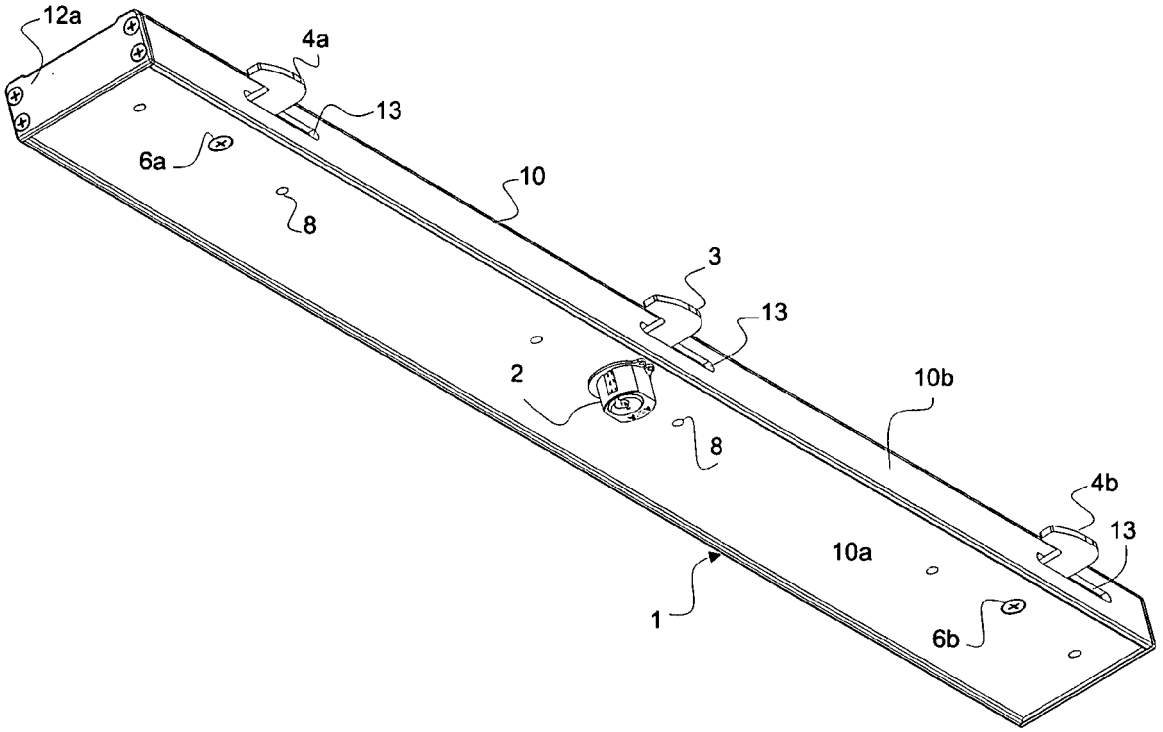
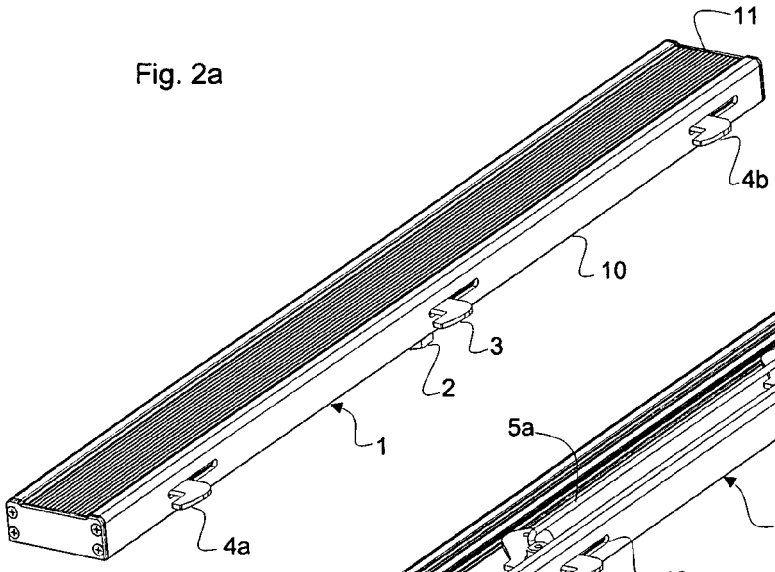


Fig 1

Fig. 2a



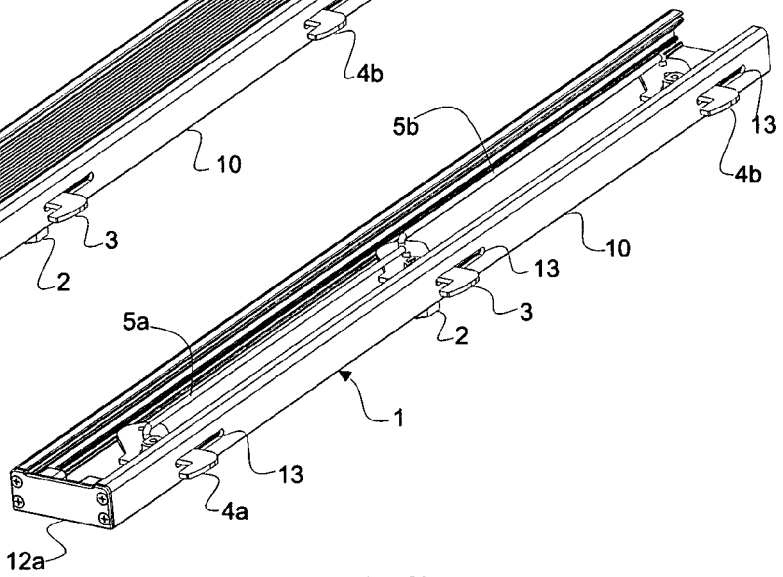


Fig. 2b

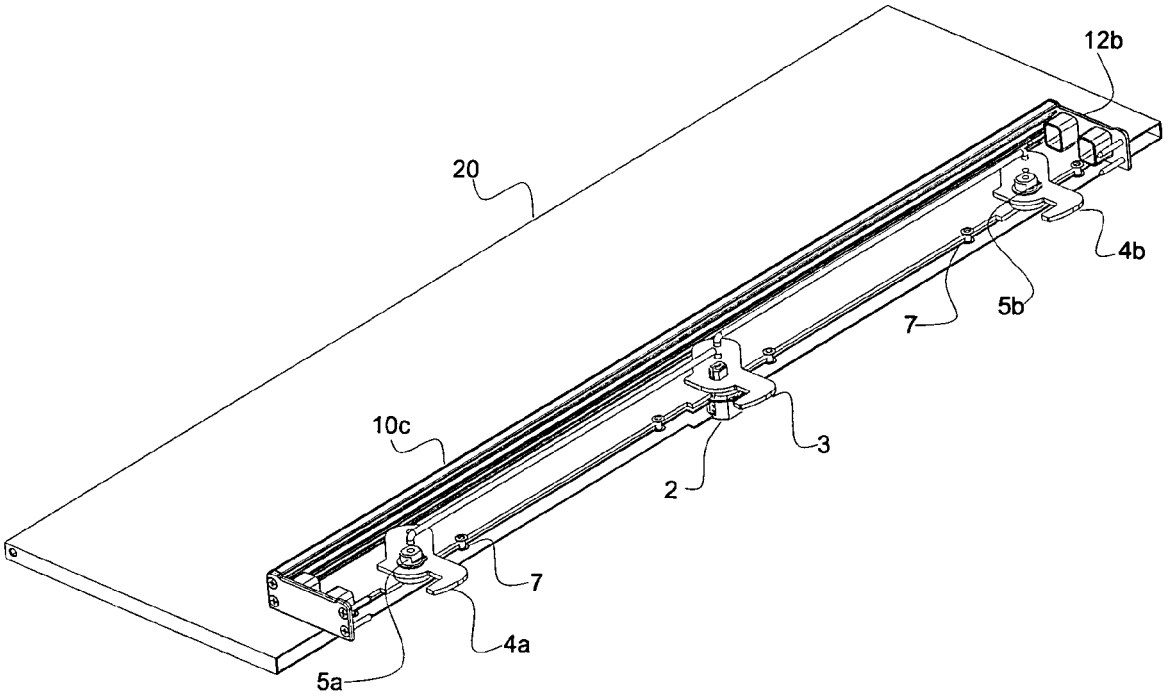


Fig. 3

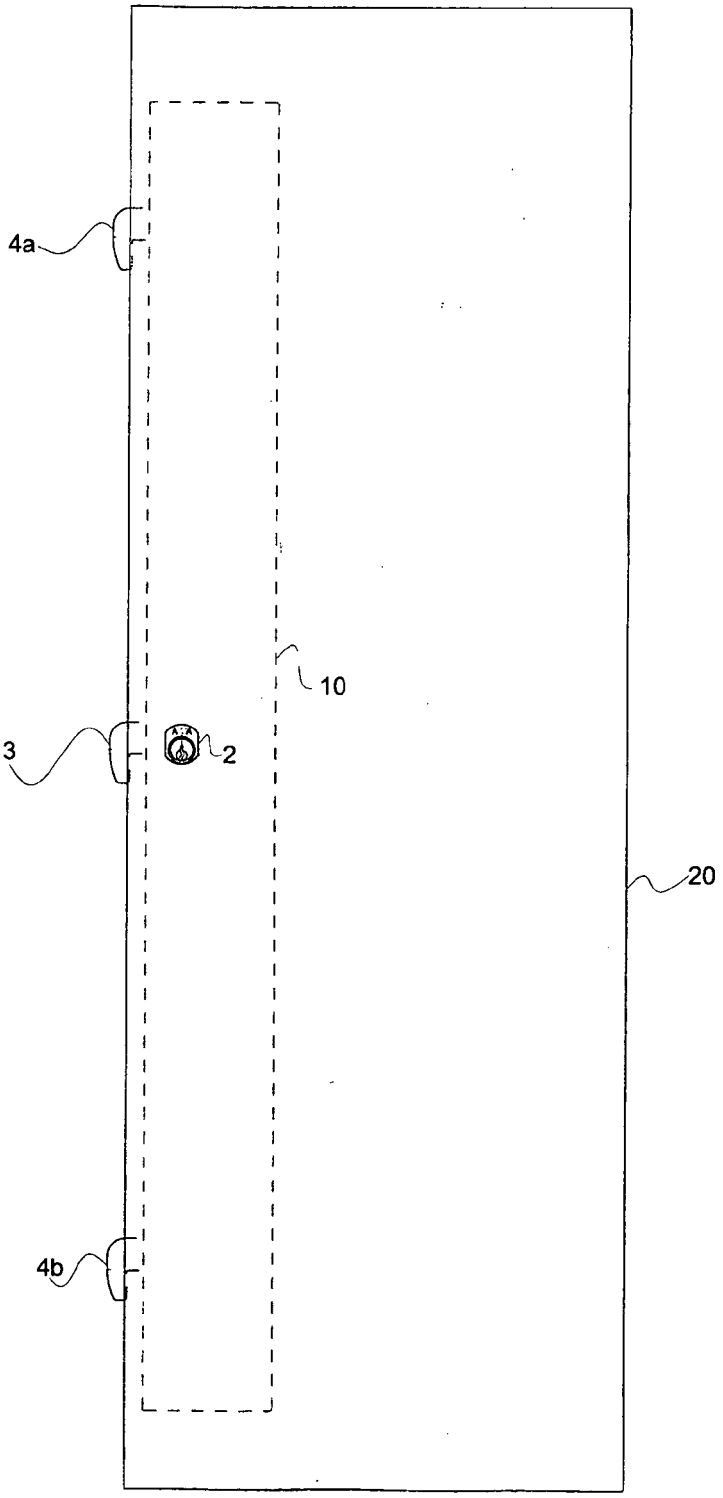


Fig. 4a

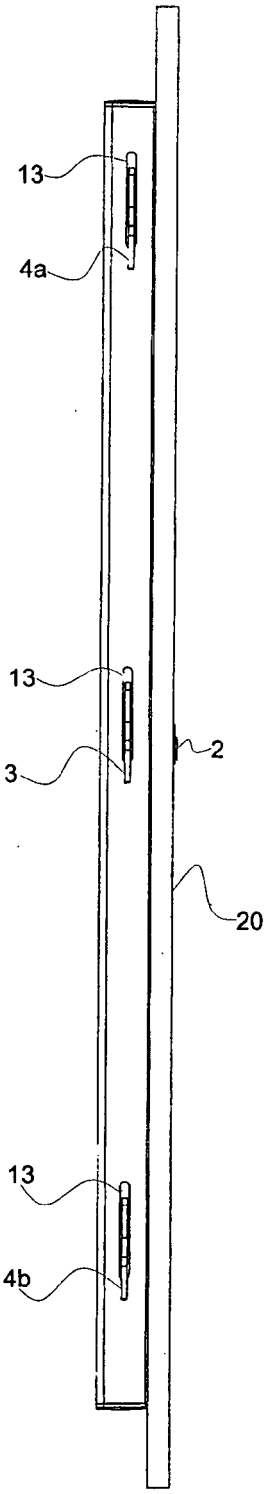


Fig. 4b

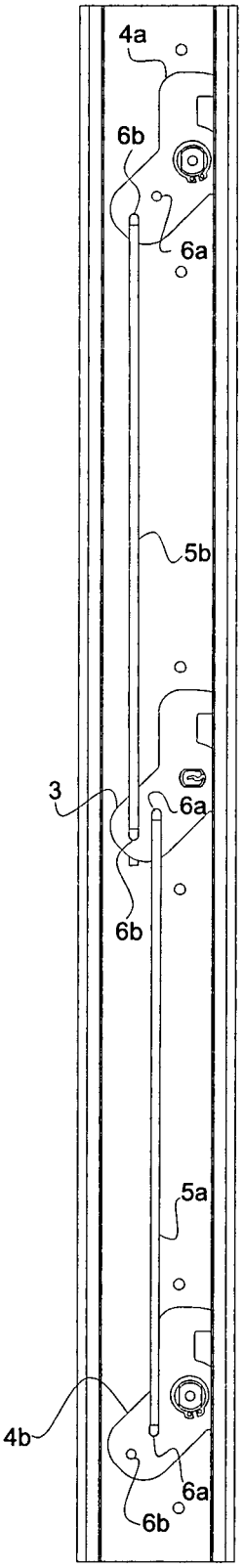


Fig. 5a

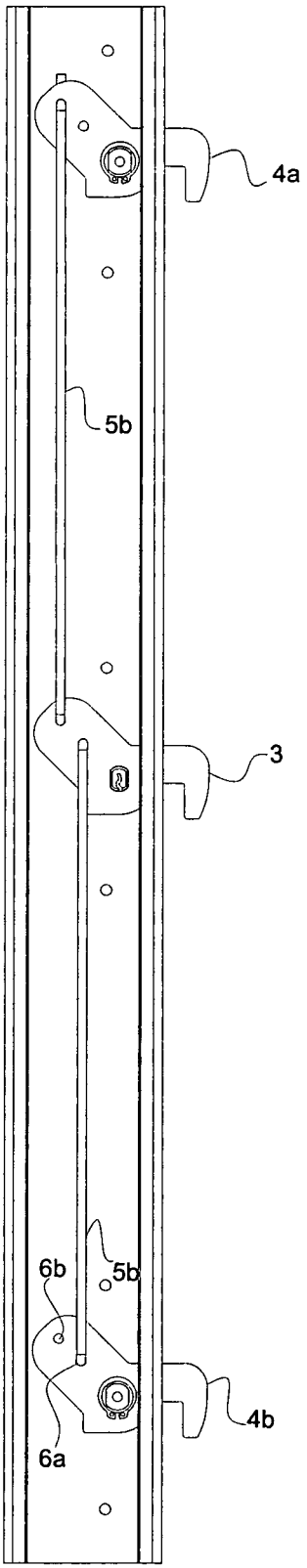


Fig. 5b