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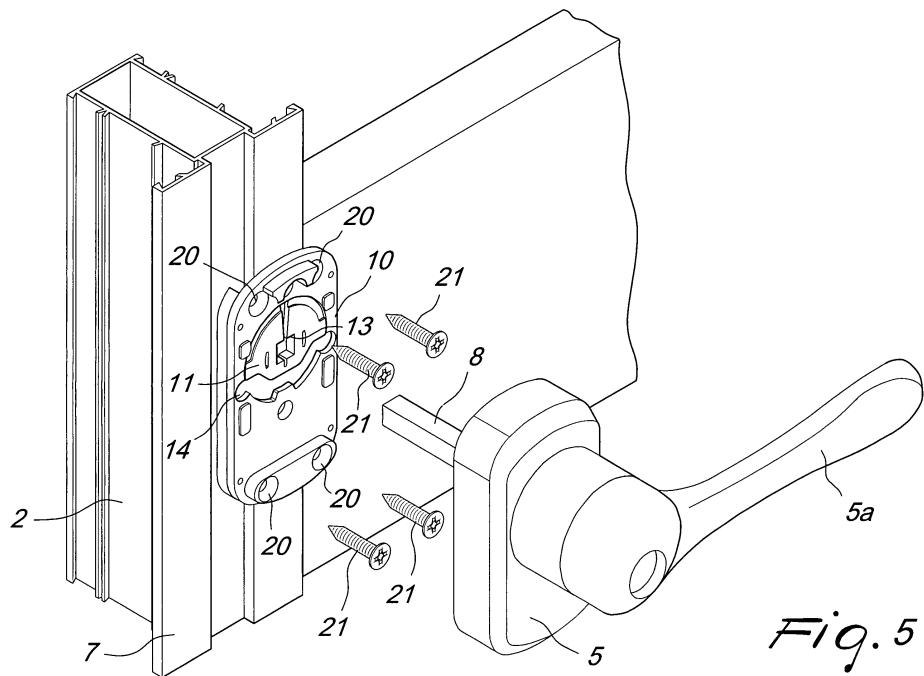
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(54) Mechanical alignment element for mutually opposite lock actuation assemblies

(57) A mechanical alignment element (1) for mutually opposite lock actuation assemblies, of the type which comprises an opening device (3) which has an antipanic function on a first side (4) of a door (2) and an opening unit (5) with a handle (5a), with a corresponding closing key (6), on the second side (7) of the door (2) which lies opposite the first one. The device (3) and the unit (5) are interconnected by means of a through shaft (8) which is rigidly coupled to the unit (5) and is adapted to engage stably within a seat (9) which is shaped complementarily with respect to the end of the shaft (8). The element (1)

comprises a laminar member (10) which is interposed between the device (3) and the unit (5) and is provided with a disk (11) which can rotate within a respective receptacle (12) of the laminar member (10) and with respective cavities (14) for means (15) for locking even partially the rotation of the disk (11). The disk (11) comprises a passage (13) whose shape and dimensions are complementary to those of the shaft (8) in order to stably accommodate the shaft, rotations of the shaft (8) forcing identical rotations of the disk (11) on the laminar member (10).



Description

[0001] The present invention relates to a mechanical alignment element for mutually opposite lock actuation assemblies.

[0002] Antipanic doors are constituted generally by an elongated element which is arranged transversely with respect to the door and constitutes the handle; such element controls the movements of the latches and bolts (which can be arranged both along the lateral surfaces of the door and along the lower and upper surfaces).

[0003] The elongated element can be a bar which is accommodated so that it can yield inside a box-like body, so that it can perform a translational motion parallel to itself within the box-like body (until it is completely accommodated inside it): the insertion of the bar within the box-like body entails the actuation of the lever systems which actuate the retraction of latches and bolts.

[0004] Likewise, the elongated element can be an oscillating handle which is arranged transversely with respect to the door and whose ends are engaged within a respective shell: the oscillation of the handle toward the door (as a consequence of pushing against said handle) entails the actuation of the lever systems which actuate the retraction of latches and bolts.

[0005] The antipanic function is generally required only according to one of the two possible directions in which the installation door can be crossed: the antipanic handle (or "panic bar") is fitted on only one side of the door, and a traditional handle is installed on the opposite side and is functionally associated with the means for moving the latch and the bolts contained inside the panic bar.

[0006] The handle of the traditional type and the panic bar are mutually connected by means of a pivot which is arranged transversely with respect to the door.

[0007] The operation of the panic bar provides for the mutual interaction of a plurality of components which are functionally associated with each other.

[0008] Any small variation of the mutual positions of these components can compromise severely the operation of the entire panic bar.

[0009] The traditional-type handle, associated with the panic bar, comprises a bit which is adapted to engage within the gear system for actuating the panic bar.

[0010] The movements of the handle therefore entail consequent movements of the bit and therefore of the entire actuation gear system.

[0011] Since the handle can perform rather extensive movements (with respect to the movements allowed to the panic bar) and since the handle can be of the reversible type (suitable for fitting both on doors with right-handed opening and on doors with left-handed opening), the movements imparted to the actuation gears by the bit of the handle of the traditional type are sufficient to cause severe misalignments of the components of the gear system.

[0012] These misalignments cause possible jamming of the entire lock, with a consequent loss of the function

for opening from the outside.

[0013] The aim of the present invention is to provide a mechanical alignment element for mutually opposite lock actuation assemblies in which misalignments which can cause malfunctions are avoided.

[0014] Within this aim, an object of the present invention is to provide a mechanical alignment element for mutually opposite lock actuation assemblies which is suitable for fitting both on "left-push" doors and on "right-push" doors.

[0015] Another object of the present invention is to provide a mechanical alignment element for mutually opposite lock actuation assemblies which has a low cost, is relatively simple to provide in practice and is safe in application.

[0016] This aim and these and other objects, which will become better apparent hereinafter, are achieved by the present mechanical alignment element for mutually opposite lock actuation assemblies, of the type which comprises an opening device which has an antipanic function

on a first side of a door and a handle-type opening unit, with a corresponding closing key, on the second side of the door which lies opposite the first one, said device and said unit being interconnected by means of a through

shaft which is rigidly coupled to said unit and is adapted to engage stably within a seat which is shaped complementarily with respect to the end of said shaft, characterized in that it comprises a laminar member which is interposed between said device and said unit and is pro-

vided with a disk which can rotate within a respective receptacle of the laminar member and with respective cavities for means for locking even partially the rotation of said disk, said disk comprising a passage whose shape and dimensions are complementary to those of said shaft

in order to stably accommodate said shaft, rotations of said shaft forcing identical rotations of said disk on said laminar member.

[0017] Further characteristics and advantages of the invention will become better apparent from the following detailed description of a preferred but not exclusive embodiment of a mechanical alignment element for mutually opposite lock actuation assemblies, illustrated by way of non-limiting example in the accompanying drawings, wherein:

Figure 1 is a perspective view of a mechanical alignment element according to the invention;

Figure 2 is an exploded perspective view of a mechanical alignment element according to the invention in the assembly configuration;

Figure 3 is a side view of a mechanical alignment element according to the invention, in a first assembly configuration;

Figure 4 is a side view of a mechanical alignment element according to the invention, in a second assembly configuration;

Figure 5 is a partially exploded perspective view of a mechanical alignment element according to the

invention during assembly.

[0018] With reference to the figures, the reference numeral 1 generally designates a mechanical alignment element for mutually opposite lock actuation assemblies.

[0019] The element 1 is adapted to be installed in doors 2 of the type comprising an opening device 3 which has an antipanic function on a first side 4 of the door 2 and an opening unit 5 with a handle 5a, with a corresponding closure key 6, on the second side 7 of the door 2 which lies opposite the first side 4.

[0020] The device 3 and the unit 5 are interconnected by means of a through shaft 8, which is rigidly coupled to the unit 5 and is adapted to engage stably within a seat 9 which is shaped complementarily with respect to the end of the shaft 8.

[0021] The element 1 comprises a laminar member 10, which is interposed between the device 3 and the unit 5 (which are separated by the door 2).

[0022] The laminar member 10 is provided with a rotating disk 11. For this purpose, the laminar member 10 comprises a respective receptacle 12, within which it is possible to arrange the rotating disk 11, which is retained so as to prevent its occasional escape but can rotate freely about its own axis rigidly with the shaft 8. The disk 11 in fact comprises a passage 13 whose shape and dimensions are complementary to those of the shaft 8 in order to accommodate it stably. The stable coupling of the shaft 8 in the passage 13 is intended to force identical rotations of the disk 11 on the laminar member 10 and of the shaft 8 with respect to the unit 5.

[0023] The laminar member 10 further comprises respective cavities 14 for means 15 for locking even partially the rotation of the disk 11.

[0024] The receptacle 12 for the rotating disk 11 has a shape and dimensions which are complementary to those of the disk 11.

[0025] In particular, the receptacle 12 comprises at least one stroke limit shoulder 16: this shoulder 16 is indeed designed to determine the extreme stroke limit configurations for the rotations of the rotating disk 11.

[0026] The rotating disk 11, according to the embodiment shown in the accompanying figures, is substantially semicircular. It can rotate with respect to a central axis which coincides with the axis of the passage 13 for the shaft 8: this possibility of rotation is imposed geometrically by the shape of the receptacle 12.

[0027] End faces 17 of each semicircular disk 11 rest, in extreme configurations of the rotation of the disk 11, on one of the surfaces of the shoulder 16.

[0028] The cavities 14 for the means 15 for locking even partially the rotation of the disk 11 are arranged along the rotation stroke of the disk 11 within the respective receptacle 12: one of the end faces 17 of the disk 11 rests, in extreme configurations for the rotation of the disk 11, on one of the locking means 15 in order to ensure the locking of the rotation of the disk 11 along that direction of rotation. In practice, the presence of a means 15

within a respective cavity 14 constitutes a stroke limit for the rotation of the disk 11 in its receptacle 12, ensuring that excessive rotations (rotations through angles which are greater than the maximum rotation that can be allowed by the device 3) cannot occur and thus ensuring the optimum operation of the device 3 and of the unit 5.

[0029] According to a constructive solution of particular interest in practice and in application, the cavities 14 are circular and the locking means 15 are substantially cylindrical (they can be pins or screws depending on the type of embodiment of greatest interest).

[0030] The shaft 8 has a substantially square cross-section: for this reason, the seat 9 and the passage 13, by being shaped complementarily with respect to the shaft 8, also have a square cross-section.

[0031] In particular, according to the embodiment shown in the figure, it is possible to provide a tip 18 for connecting the shaft 8 to the seat 9 of the device 3.

[0032] If the seat 9 is shaped differently with respect to the simple square cross-section of the shaft 8, the arrangement of the tip 18 on the end of the shaft 8 ensures correct coupling between the end protrusion 19 of the tip 18 and the seat 9 which is shaped complementarily thereto.

[0033] In order to ensure simple and straightforward assembly, the laminar member 10 comprises a plurality of holes 20 for fixing on the respective side of the door 2 by means of suitable fixing screws 21.

[0034] Once assembled, the element 1 is interposed between the opening unit 5 with a handle 5a and the side 7 of the door 2.

[0035] During assembly, depending on the handedness of the door 2 (therefore, depending on whether the door 2 is of the type known as "left push" or "right push"), the handle 5a of the unit 5 has to be turned in one or the other of the possible directions.

[0036] Of course, transition from one configuration to the other forces a different assembly mode: the locking means 15 in one case must be inserted in one of the cavities 14 and in the other case must be inserted in the other cavity.

[0037] The presence of the means 15 in the respective cavity 14 (depending on the type of opening that has to be provided) prevents rotations through angles which exceed a certain limit value.

[0038] Excessive rotations can in fact lead to severe malfunctions of the device 3, since said device is particularly sophisticated and requires great precision between the couplings of its components.

[0039] By eliminating the possibility to perform excessive rotations, due for example to improper actuations performed by a user on the handle 5a, perfect operation of the device 3 is ensured and therefore the antipanic function is ensured to be always active.

[0040] It has thus been shown that the invention achieves the proposed aim and objects.

[0041] The invention thus conceived is susceptible of numerous modifications and variations, all of which are

within the scope of the appended claims.

[0042] All the details may further be replaced with other technically equivalent ones.

[0043] In the exemplary embodiments shown, individual characteristics, given in relation to specific examples, may actually be interchanged with other different characteristics that exist in other exemplary embodiments.

[0044] 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.

[0045] In practice, the materials used, as well as the shapes and the dimensions, may be any according to requirements without thereby abandoning the scope of the protection of the appended claims.

[0046] 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 mechanical alignment element for mutually opposite lock actuation assemblies, of the type comprising an opening device (3) which has an antipanic function on a first side (4) of a door (2) and an opening unit (5) with a handle (5a), with a corresponding closing key (6), on the second side (7) of the door (2) which lies opposite the first one, said device (3) and said unit (5) being interconnected by means of a through shaft (8) which is rigidly coupled to said unit (5) and is adapted to engage stably within a seat (9) which is shaped complementarily with respect to the end of said shaft (8), **characterized in that** it comprises a laminar member (10) which is interposed between said device (3) and said unit (5) and is provided with a disk (11) which can rotate within a respective receptacle (12) of the laminar member (10) and with respective cavities (14) for means (15) for locking even partially the rotation of said disk (11), said disk (11) comprising a passage (13) whose shape and dimensions are complementary to those of said shaft (8) in order to stably accommodate said shaft, rotations of said shaft (8) forcing identical rotations of said disk (11) on said laminar member (10).
2. The element according to claim 1, **characterized in that** said receptacle (12) for said rotating disk (11) has a shape and dimensions which are complementary to those of said disk (11).
3. The element according to claim 2, **characterized in that** said receptacle (12) comprises at least one stroke limiting shoulder (16) for said rotating disk

(11).

4. The element according to claim 1, **characterized in that** said rotating disk (11) is substantially semicircular and can rotate with respect to a central axis which coincides with the axis of said passage (13) whose shape and dimensions are complementary to those of said shaft (8).
5. The element according to one or more of the preceding claims, **characterized in that** said end faces (17) of said semicircular disk (11) rest, in extreme configurations for the rotation of said disk (11), on one of the surfaces of said shoulder (16).
10. The element according to one or more of the preceding claims, **characterized in that** said cavities (14) for said means (15) for locking even partially the rotation of said disk (11) are arranged along the rotary stroke of said disk (11) within the respective receptacle (12), one of said end faces (17) of said semicircular disk (11) resting, in extreme configurations of the rotation of said disk (11), on one of said means (15) for locking even partially the rotation of the disk (11).
15. The element according to one or more of the preceding claims, **characterized in that** said cavities (14) for said means (15) for locking even partially the rotation of said disk (11) are arranged along the rotary stroke of said disk (11) within the respective receptacle (12), one of said end faces (17) of said semicircular disk (11) resting, in extreme configurations of the rotation of said disk (11), on one of said means (15) for locking even partially the rotation of the disk (11).
20. The element according to one or more of the preceding claims, **characterized in that** said cavities (14) for said means (15) for locking even partially the rotation of said disk (11) are arranged along the rotary stroke of said disk (11) within the respective receptacle (12), one of said end faces (17) of said semicircular disk (11) resting, in extreme configurations of the rotation of said disk (11), on one of said means (15) for locking even partially the rotation of the disk (11).
25. The element according to claim 1, **characterized in that** said cavities (14) are circular and said locking means (15) are substantially cylindrical.
30. The element according to claim 1, **characterized in that** said shaft (8) has a substantially square cross-section, said seat (9) and said passage (13) being shaped complementarily with respect to said shaft (8).
35. The element according to one or more of the preceding claims, **characterized in that** said laminar member (10) comprises a plurality of holes (20) for fixing on the respective side (7) of the door (2), which is interposed between said unit (5) for opening with a handle (5a) and said side (7) of the door (2).
40. The element according to one or more of the preceding claims, **characterized in that** said laminar member (10) comprises a plurality of holes (20) for fixing on the respective side (7) of the door (2), which is interposed between said unit (5) for opening with a handle (5a) and said side (7) of the door (2).
45. The element according to one or more of the preceding claims, **characterized in that** said laminar member (10) comprises a plurality of holes (20) for fixing on the respective side (7) of the door (2), which is interposed between said unit (5) for opening with a handle (5a) and said side (7) of the door (2).

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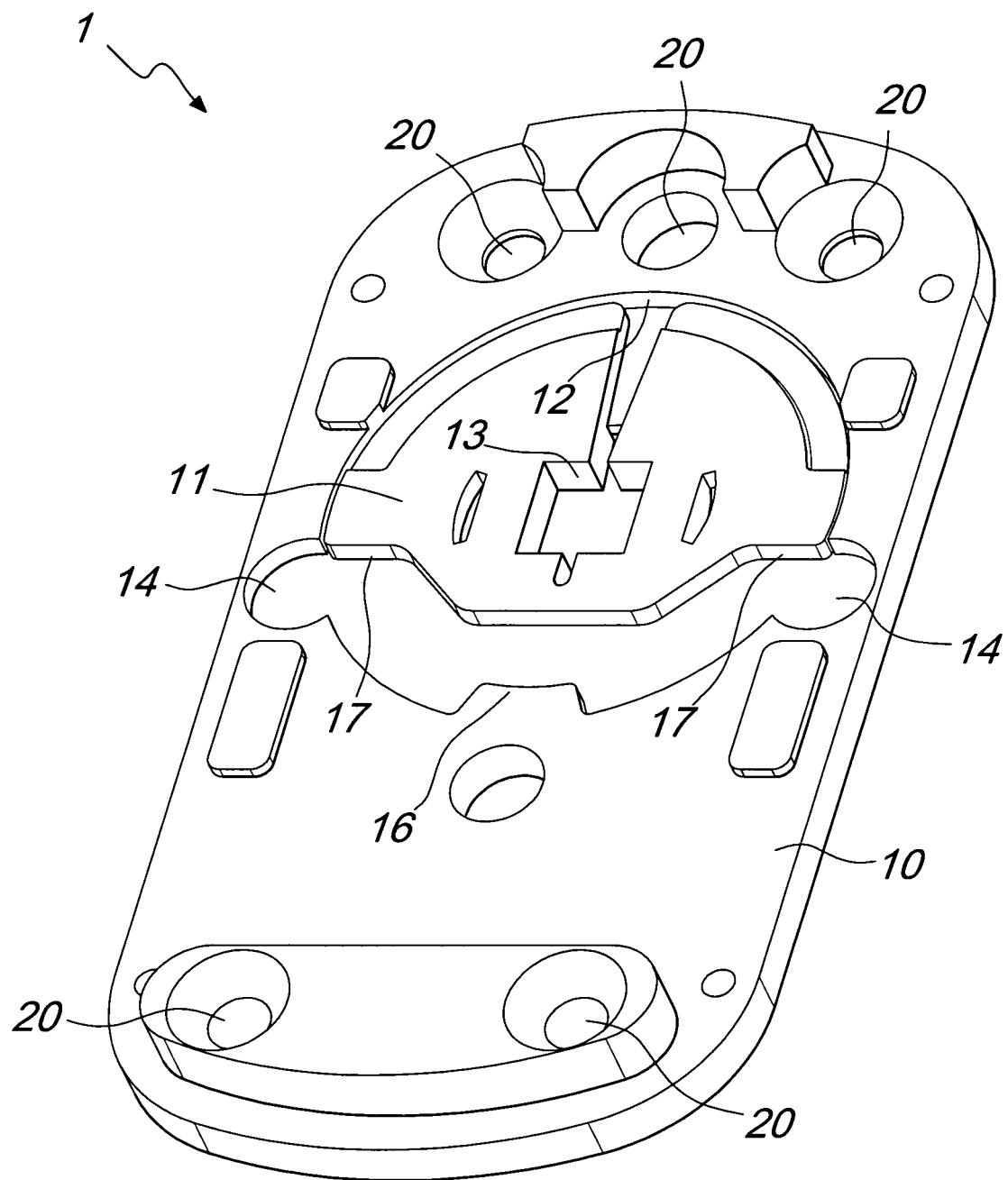
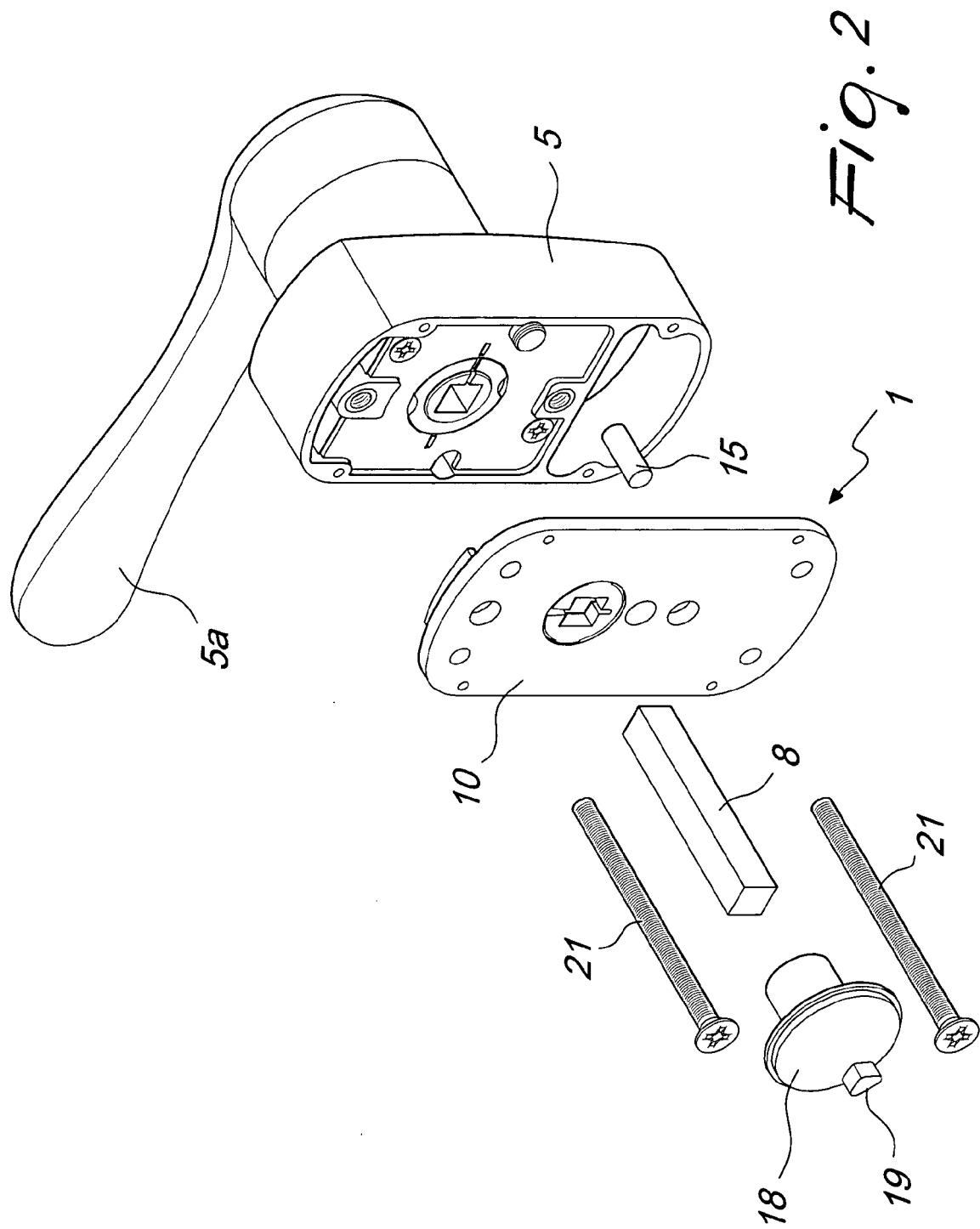
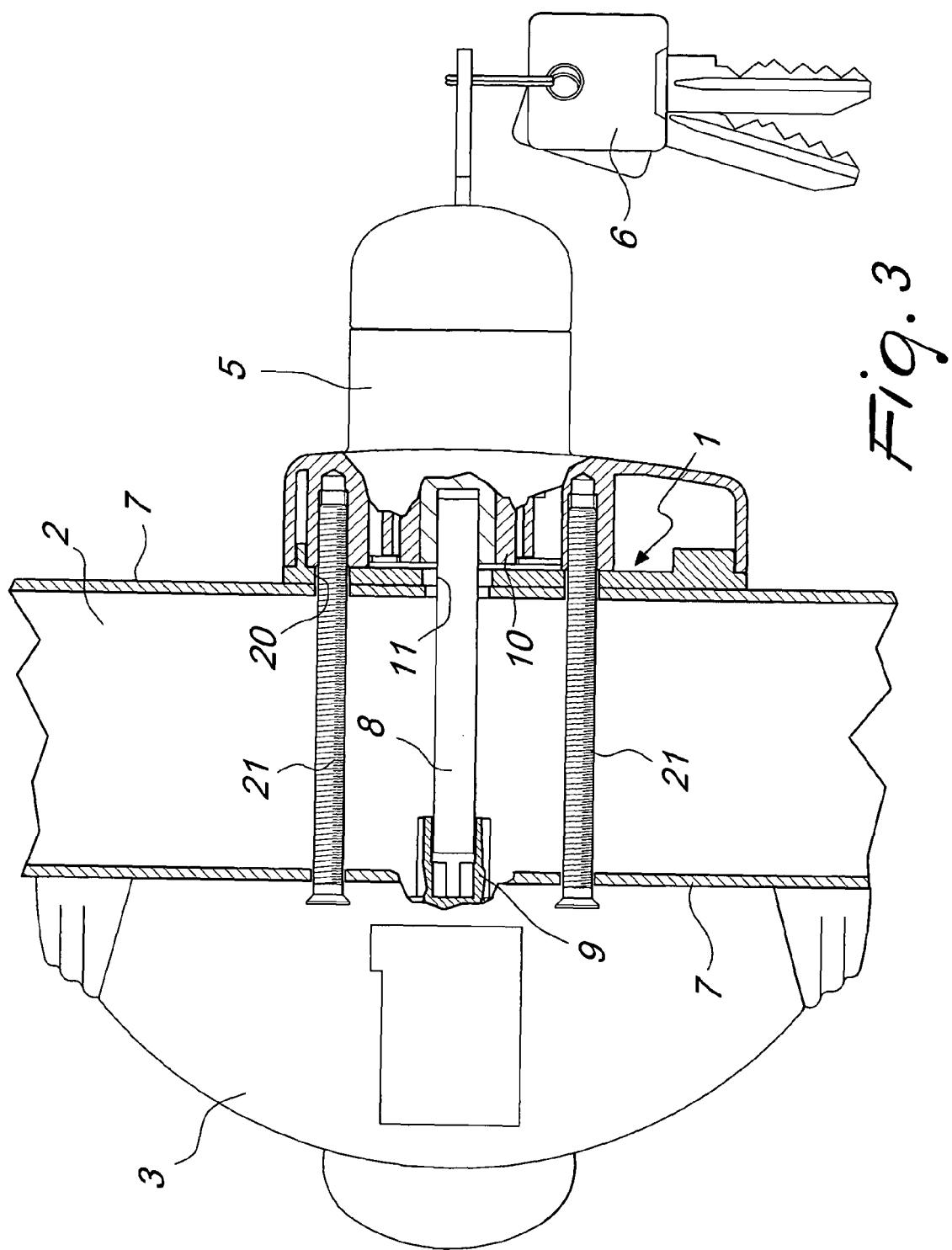
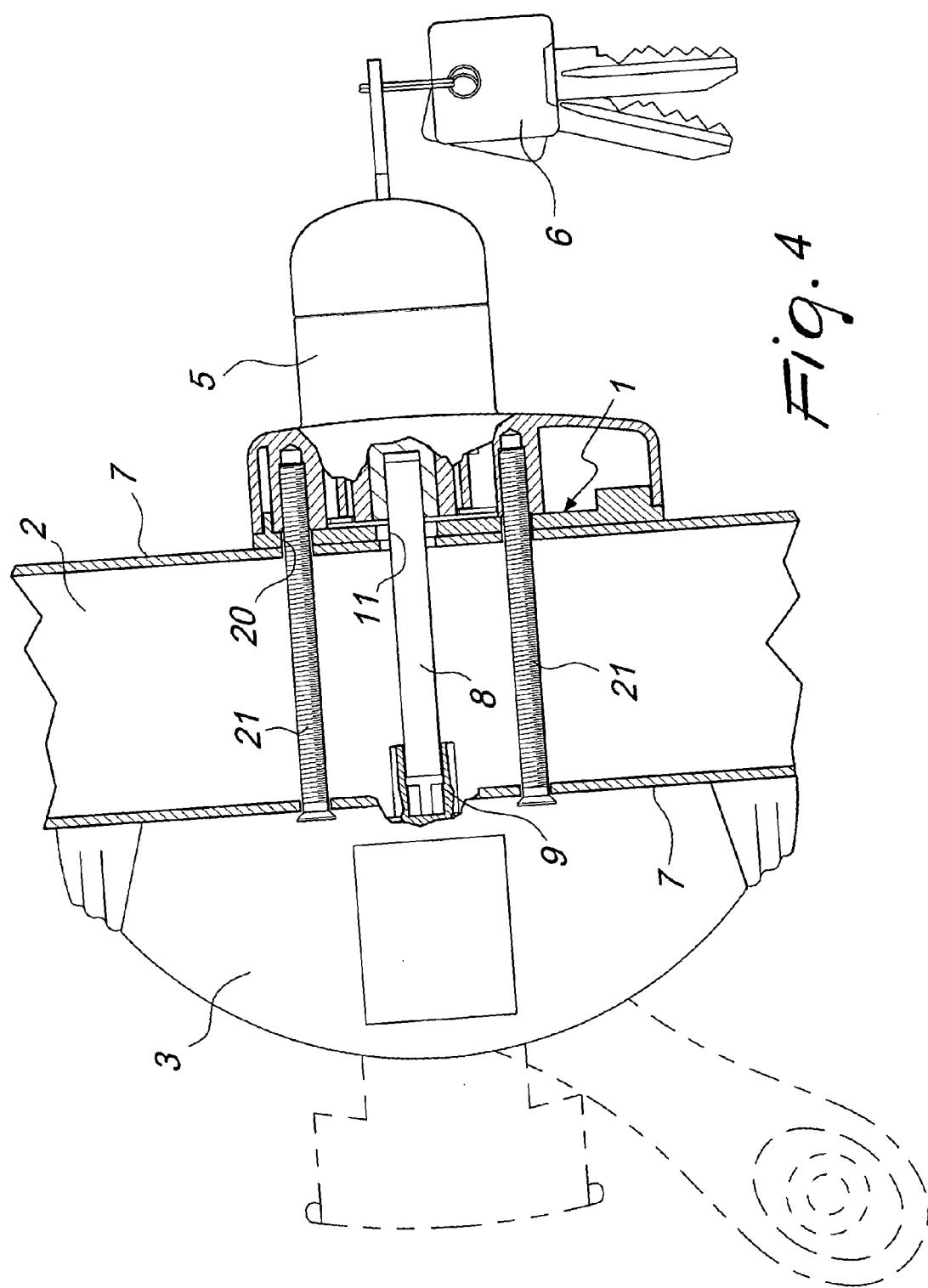
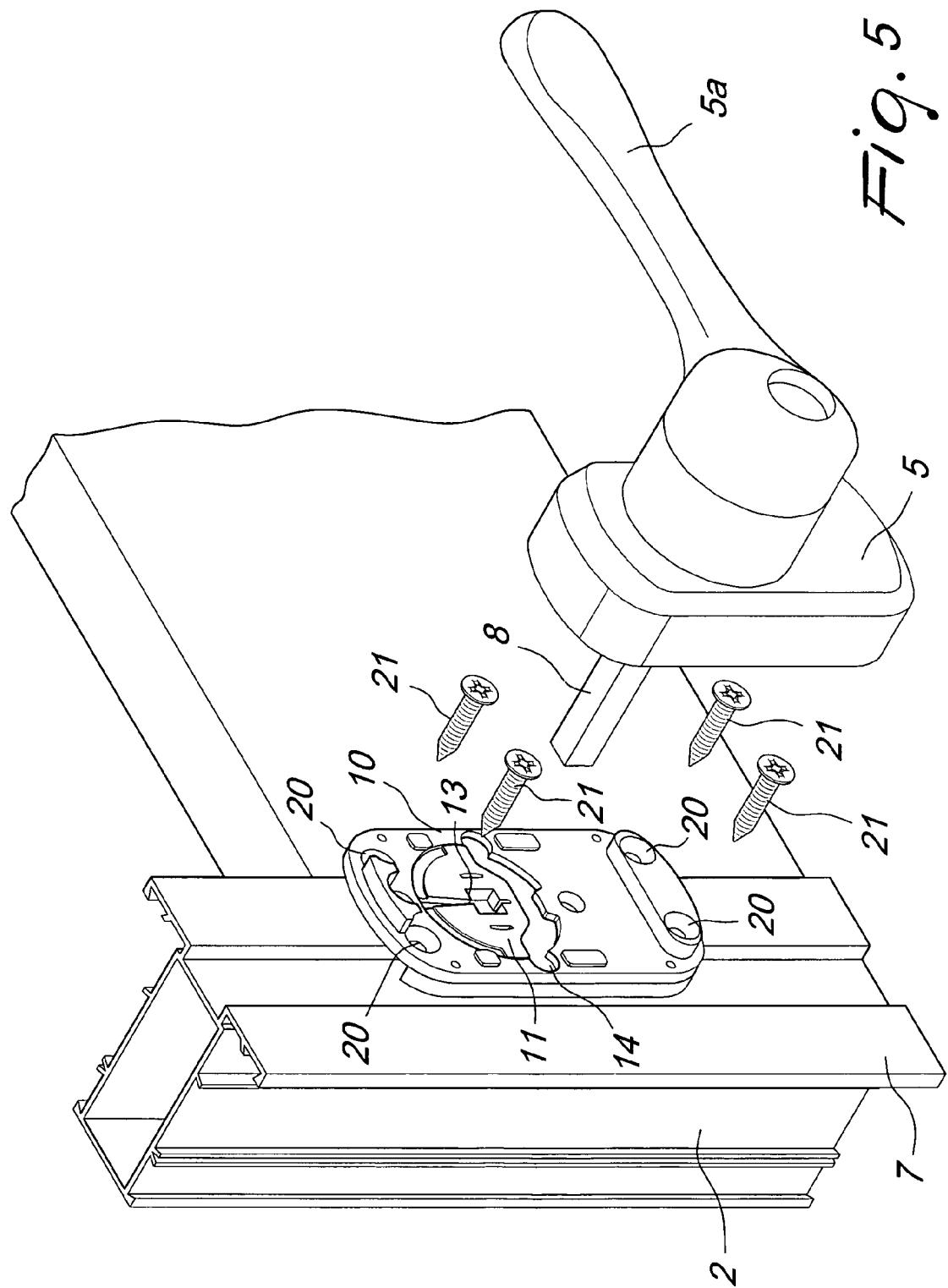


Fig. 1











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2 The present search report has been drawn up for all claims			
Place of search		Date of completion of the search	Examiner
The Hague		24 April 2008	Geerts, Arnold
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ANNEX TO THE EUROPEAN SEARCH REPORT
ON EUROPEAN PATENT APPLICATION NO.

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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. The European Patent Office is in no way liable for these particulars which are merely given for the purpose of information.

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