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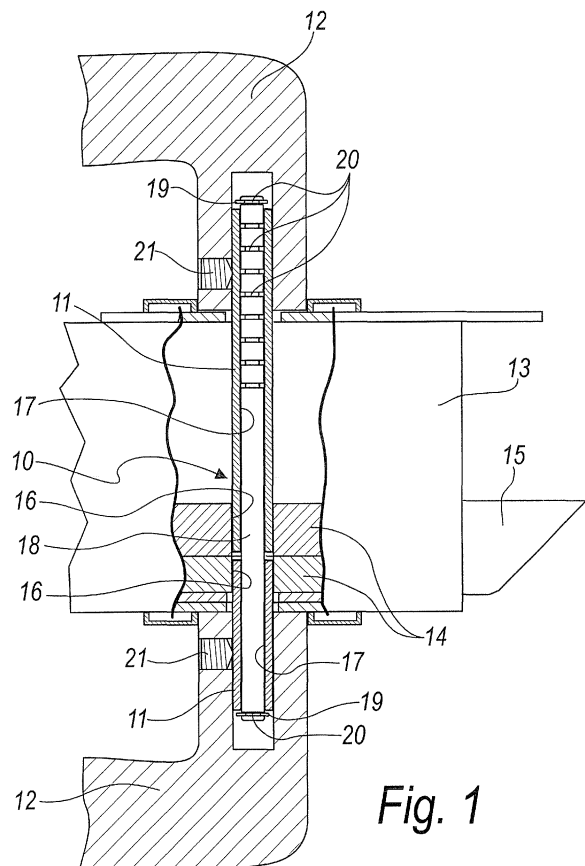
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(54) **Lock opening device, particularly for independently actuated locks**

(57) A lock opening device (10), particularly for independently actuated locks, comprising two square pins (11), each of which can be associated, at one of its ends, with one of the handles (12), which are provided correspondingly on opposite faces of a door (13). The square pins (11) being insertable, at their other end, in two corresponding bushes (14) for actuating the latch (15) which are adjacent and coaxial, each bush (14) being provided with a through hole (16) which has a square cross-section and is shaped to accommodate the corresponding square pin (11) for the actuation of the lock. Each one of the two square pins (11) being provided with a longitudinal through hole (17) for the insertion of a rod (18) which can slide and rotate within said longitudinal through hole (17) substantially coaxially. The rod (18) having, at least at its ends, means for contrasting the extraction of the square pins (11), each fitted on the rod (18) at the corresponding longitudinal hole (17).



Description

[0001] The present invention relates to a lock opening device, particularly for independently actuated locks.

[0002] Locks are currently known which are actuated by a handle by means of an element shaped like a right parallelepiped with a square base, known as square pin, which when fixed to the handle, generally by means of a grub screw, and inserted in the rotatable bush for actuating the latch of the lock, transmits the rotation of the handle to the bush, which accordingly actuates the lock.

[0003] The bush in fact has a through hole with a square cross-section which is shaped complementarily to the square pin, so as to accommodate it and so that it can be turned by it simultaneously with the handle.

[0004] Locks actuated by a square pin which is inserted in their actuation bush and is fixed at its opposite ends to two handles arranged at the opposite faces of the door are currently widespread.

[0005] These locks can be actuated equivalently by one handle or the other, since they both act on the same single square pin.

[0006] In another type of lock, of the independently actuated type, one of the two handles always actuates the lock, while the other one can be disabled, for example by means of a key, so as to not actuate the lock.

[0007] In general, locks of this type are provided for doors that allow the free flow of users in one direction, the one faced by the handle that always actuates the lock, while in the other direction the flow of users can be prevented, by disabling the corresponding handle to actuate the lock to open the door, or can be limited to users who have the key for enabling the lock.

[0008] In particular, such locks are used for so-called antipanic doors, in which, as is known, a push bar is connected to the lock so as to always actuate the lock, while on the opposite face of the door there is a handle which can be disabled to actuate the lock.

[0009] To provide this type of lock, there are two square pins, each connected to a handle.

[0010] Likewise, the lock has two latch actuation bushes which are mutually adjacent and coaxial and are both provided with holes for the insertion of the corresponding square pins.

[0011] In this structure, therefore, each handle is connected to a corresponding actuation bush by means of a square pin and the action of one handle is therefore substantially independent of the action of the other one.

[0012] Further, a first one of these bushes always actuates the lock, while the second one can be disabled to this function, and therefore the corresponding handle does not allow to open the lock, which in any case can be actuated by the other handle.

[0013] In this type of lock, in order to retain the handles to the lock, contrasting their extraction, the square pins are generally connected to each other at their ends that face each other when they are inserted in the corresponding holes of the actuation bushes.

[0014] In this case, usually one square pin has a threaded longitudinal tab which can mate with a corresponding threaded hole provided at the end of the other square pin, so that if the square pins are not fastened to each other they can rotate with respect to each other, with the tab rotating within the hole, remaining coupled longitudinally by means of the thread which prevents their mutual extraction.

[0015] This solution is preferred with respect to a structure in which the square pins are not mutually connected, since it obviates a drawback that occurs in the latter structure and is constituted by the risk of extraction of the square pins from the actuation bushes.

[0016] Nevertheless, even this solution has drawbacks, which include the wear of the tab and of the corresponding threaded mating hole due to their mutual rotation every time the handles are actuated.

[0017] The effect of this wear can lead to mutual friction between these two elements, such as to allow the transmission of rotation from one square pin to the other, with the consequent effect that the lock can always be actuated by both handles regardless of the disabling of one of the two handles.

[0018] The aim of the present invention is to provide a lock opening device, particularly for independently actuated locks, which avoids extraction of the square pins from the actuation bushes.

[0019] Within this aim, an object of the invention is to provide a lock opening device which allows easy mutual rotation of the square pins, avoiding the risk of their mutual coupling and ensuring their coaxial arrangement.

[0020] Another object of the invention is to provide a lock opening device which is easy to adjust so that it can be adapted easily to the thickness of the door to which the lock is applied.

[0021] Another object of the invention is to propose a lock opening device which is structurally simple and easy to use and can be manufactured with low costs.

[0022] This aim and these and other objects, which will become better apparent hereinafter, are achieved by a lock opening device, particularly for independently actuated locks, which comprises two square pins, each of which can be associated, at one of its ends, with one of the handles, which are provided correspondingly on opposite faces of a door, said square pins being insertable, at their other end, in two corresponding bushes for actuating the latch which are adjacent and coaxial, each bush being provided with a through hole which has a square cross-section and is shaped to accommodate the corresponding square pin for the actuation of the lock, characterized in that each one of said square pins has a longitudinal through hole for the insertion of a rod which can slide and rotate within said longitudinal hole, substantially coaxially, said rod having, at least at its ends, means for contrasting the extraction of said square pins, each of said means being fitted on said rod at the corresponding said longitudinal hole.

[0023] Further characteristics and advantages of the

invention will become better apparent from the following detailed description of a preferred but not exclusive embodiment of the opening device for locks according to the invention, illustrated by way of non-limiting example in the accompanying drawings, wherein:

Figure 1 is a partially sectional enlarged-scale view of a detail of the lock of a door, of the type shown in Figure 3, provided with a lock opening device, according to the invention;

Figure 2 is an exploded perspective view of a lock opening device according to the invention;

Figure 3 is a view of a door of the type of which a detail is shown in enlarged scale and in a partially sectional view in Figure 1.

[0024] 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.

[0025] With reference to the cited figures, the reference numeral 10 generally designates a lock opening device, particularly for independently actuated locks, which comprises two elements shaped like right parallelepipeds with a square base, known as square pins 11, each of which can be associated, at one of its ends, with one of the two handles 12 provided correspondingly on opposite faces of a door 13.

[0026] At their other end, the square pins 11 can be inserted in two corresponding adjacent and coaxial bushes 14 for actuating a latch 15, each provided with a through hole 16 which has a square cross-section and is shaped to accommodate the corresponding square pin 11 to actuate the lock.

[0027] A particularity of the opening device 10 according to the invention is that each one of the two square pins 11 has a longitudinal through hole 17 for the insertion of a rod 18 which can slide and rotate therein substantially coaxially.

[0028] Further, the rod 18 has, at least at its ends, means for contrasting the extraction of the square pins 11, which are adapted to prevent the extraction of the square pins 11 from the rod 18 once such rod has been inserted therein at the longitudinal holes 17.

[0029] Advantageously, such extraction contrasting means comprise snap rings 19, which can be inserted in grooves 20 which are formed perimetrically on the rod 18, at least at its ends.

[0030] In this manner, the snap rings 19 can be engaged by abutment by the square pins 11 fitted on the rod 18, so as to contrast their mutual extraction.

[0031] Preferably, the rod 18 is provided with multiple perimetric grooves 20, which can be engaged by the snap rings 19 and are distributed along its longitudinal extension.

[0032] In this manner, the user can select the groove 20 into which the snap ring 19 is to be inserted in order to retain in abutment the square pins 11 in a manner which is adequate for the thickness of the door 13 on

which the lock is fitted, thus shortening the rod 18 by the extent that exceeds the portion comprised between the snap rings 19, for example by sawing it off.

[0033] The use of the opening device 10 according to the invention is as follows.

[0034] When the lock is fitted, the user inserts the square pins 11, which are suitable for the thickness of the door 13, in the respective bushes 14 and then inserts the rod 18 in the square pins 11.

[0035] In order to lock the sliding of the square pins 11 along the rod 18, the user engages with the snap rings 19 the grooves 20 that delimit the length of the rod that is suitable for the thickness of the door 13, i.e., the portion of the rod 18 that is engaged by the square pins 11.

[0036] The user then fixes the handles 12 to the corresponding square pins 11, conveniently by way of grub screws 21.

[0037] The operation of the opening device 10 according to the invention is as follows.

[0038] Each one of the handles 12 acts, by way of the corresponding square pin 11, on the corresponding bush 14 for actuating the latch 15.

[0039] According to the invention, the two square pins 11 can rotate independently on the rod 18, so that the two handles 12 likewise actuate independently the latch 15.

[0040] Further, the handles 12 are mutually retained by the respective square pins 11, to which they are fixed by way of the grub screws 21, since such square pins 11 are retained on each other by the rod 18 in abutment against the corresponding snap rings 19.

[0041] Advantageously, an opening device 10 according to the invention can be used for antipanic doors, with the panic bar connected, in a per se known manner, to one of the two square pins 11 of the lock, in order to open the door by pushing, while a handle, which can optionally be disabled to actuate the lock, is connected to the other square pin 11.

[0042] In practice it has been found that the invention achieves the proposed aim and objects, providing a lock opening device, particularly for independently actuated locks, which avoids extracting the square pins from the actuation bushes, retaining them together by means of the through rod, which acts as a retention element as well as a rotation pivot.

[0043] Further, an opening device for locks according to the invention allows easy mutual rotation of the square pins, avoiding the risk of their rigid coupling and simultaneously ensuring their coaxiality.

[0044] A lock opening device according to the invention is further easy to adjust so that it can be adapted easily to the thickness of the door to which the lock is applied.

[0045] The invention thus conceived is susceptible of numerous modifications and variations, all of which are within the scope of the appended claims; all the details may further be replaced with other technically equivalent elements.

[0046] In practice, the materials used, as well as the contingent shapes and dimensions, may be any according to requirements and to the state of the art.

[0047] The disclosures in Italian Patent Application No. PD2007A000244 from which this application claims priority are incorporated herein by reference. 5

[0048] 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. 10

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Claims

1. A lock opening device (10), particularly for independently actuated locks, comprising two square pins (11), each of which can be associated, at one of its ends, with one of the handles (12), which are provided correspondingly on opposite faces of a door (13), said square pins (11) being insertable, at their other end, in two corresponding bushes (14) for actuating the latch (15) which are adjacent and coaxial, each bush (14) being provided with a through hole (16) which has a square cross-section and is shaped to accommodate the corresponding square pin (11) for the actuation of the lock, **characterized in that** each one of said two square pins (11) has a longitudinal through hole (17) for the insertion of a rod (18) which can slide and rotate within said longitudinal hole (17), substantially coaxially, said rod (18) having, at least at its ends, means for contrasting the extraction of said square pins (11), each of said means being fitted on said rod (18) at the corresponding said longitudinal hole (17). 20 25 30 35
2. The lock opening device (10) according to claim 1, **characterized in that** said extraction means comprise snap rings (19), said rod (18) having, at least at its ends, perimetric grooves (20) for engagement with said snap rings (19), said snap rings (19) being engageable by abutment by said square pins (11), which are fitted on said rod (18), in contrast with the mutual extraction of said square pins (11) and said rod (18). 40 45
3. The lock opening device (10) according to the preceding claims, **characterized in that** said rod (18) is provided with multiple perimetric grooves (20), which can be engaged by snap rings (19) and are distributed along its longitudinal extension to adjust the useful length of said rod (18) according to the thickness of said door (13). 50 55

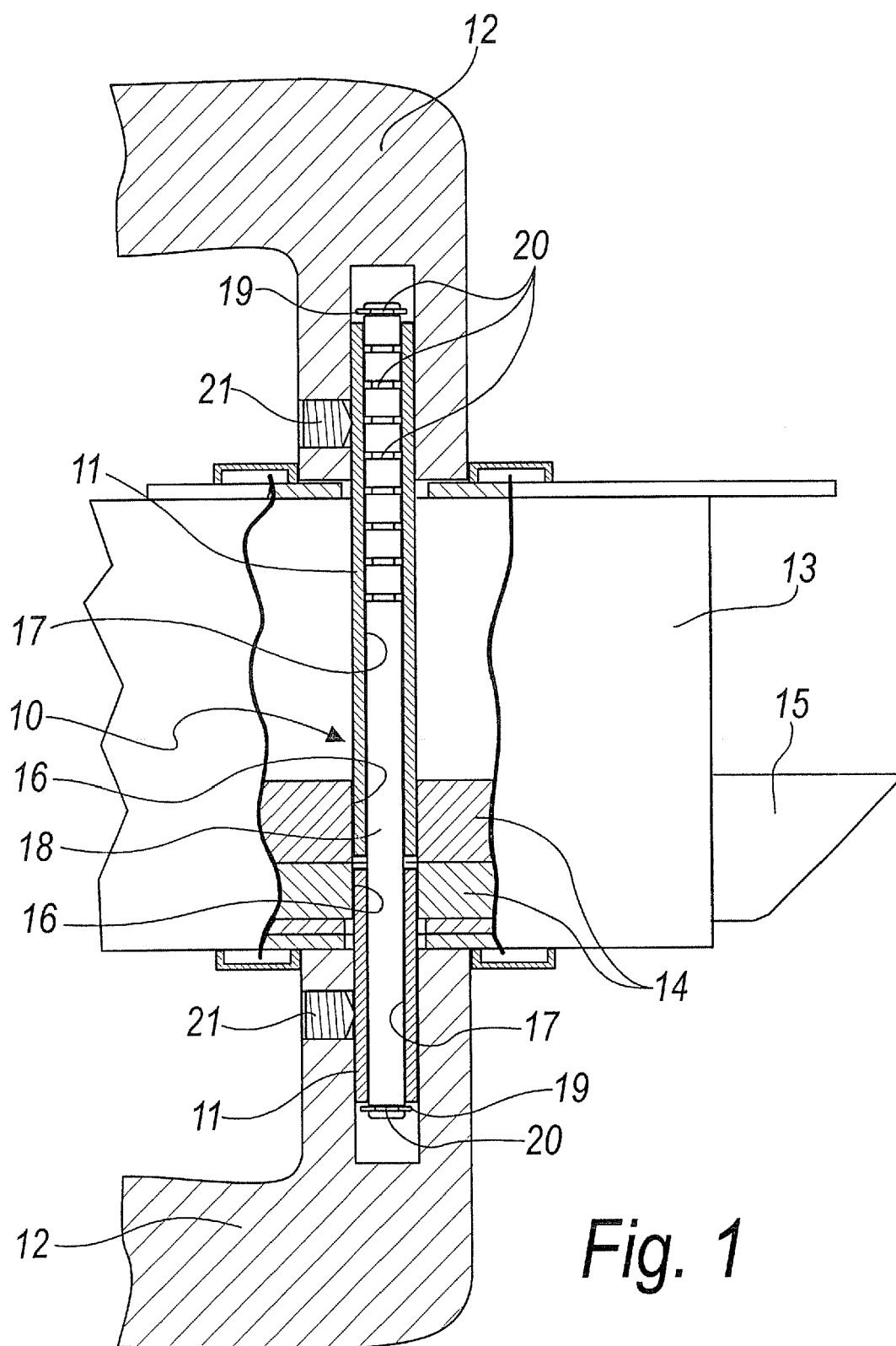


Fig. 1

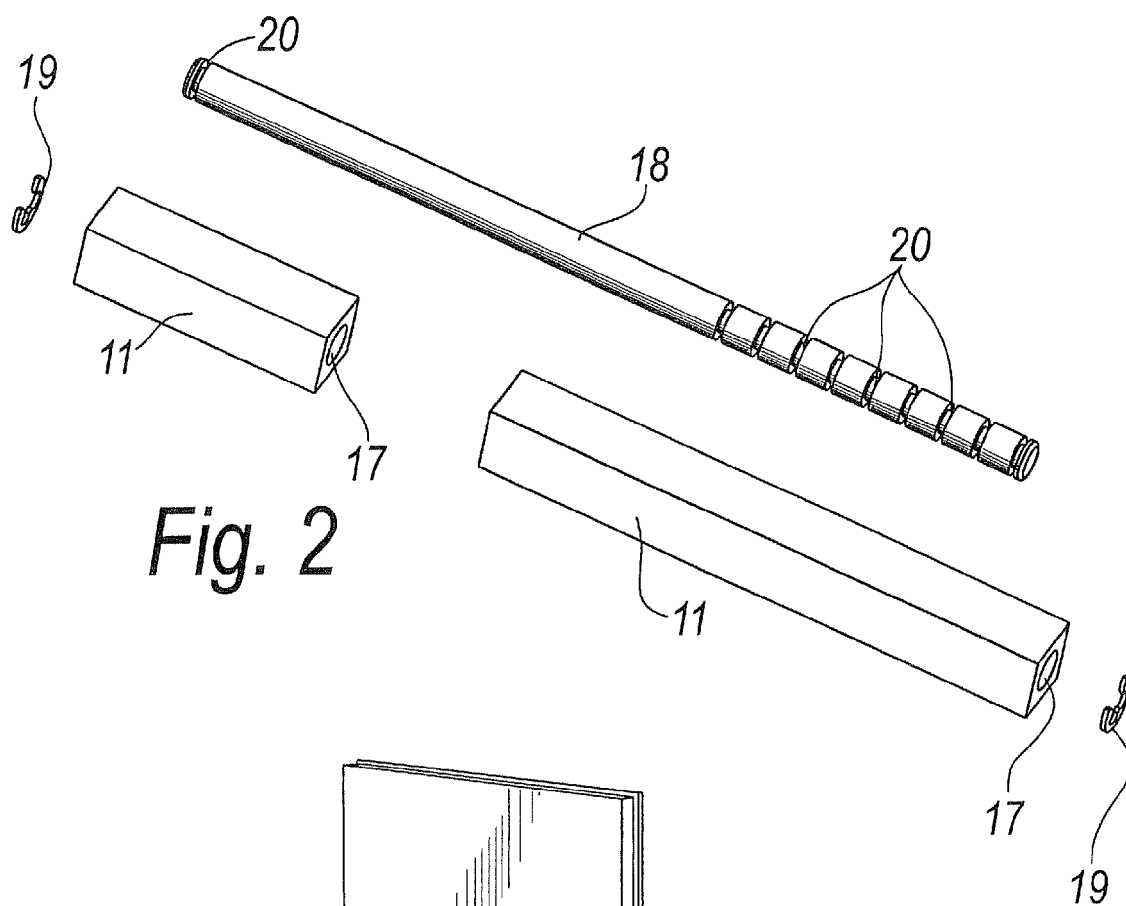


Fig. 2

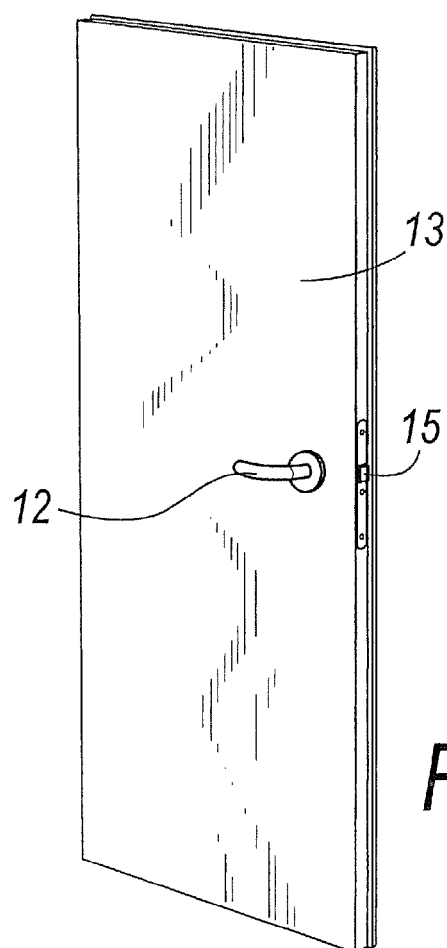


Fig. 3

REFERENCES CITED IN THE DESCRIPTION

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Patent documents cited in the description

- IT PD20070244 A [0047]