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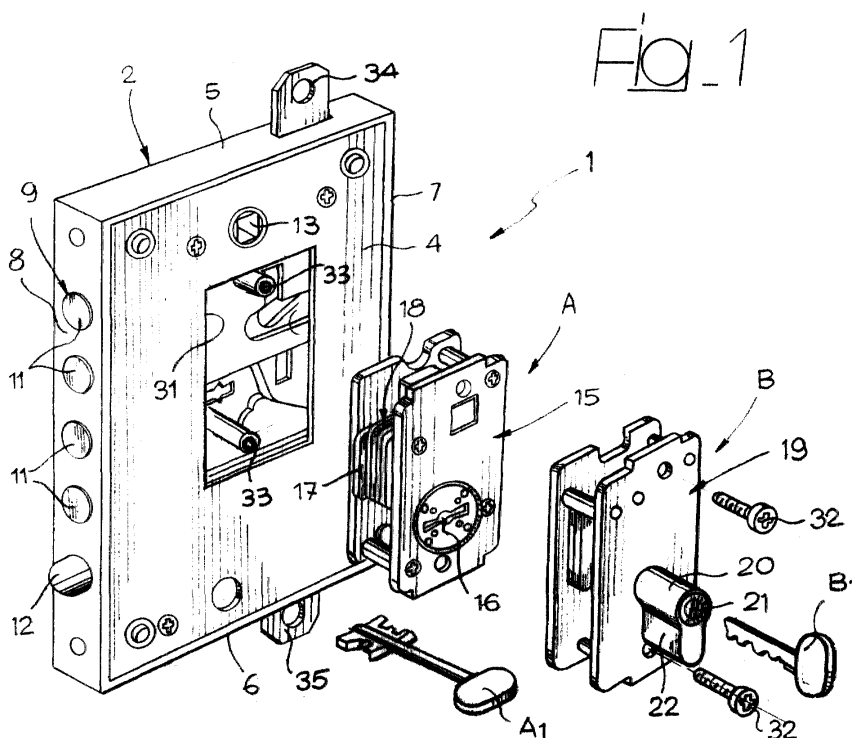
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(54) Safety Lock for doors of dwellings or the like

(57) A safety lock includes an interchangeable lock core unit which may indifferently be of the type comprising a double-bit mechanism or of the type comprising a cylinder-lock mechanism. Provided on the outer face of the casing of the lock is a member (38) for protecting the area where the key is introduced, said protective

member comprising a fixed body (39) permanently connected to the rigid casing, and an interchangeable internal element (A2, B2) which has a different conformation according to whether the core installed in the lock is of the double-bit mechanism type or of the cylinder-lock mechanism type.



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Description

[0001] The present invention relates to safety locks for doors of dwellings or the like.

[0002] In particular, the invention relates to a safety lock of the type comprising:

- a rigid casing designed to be mounted on a door;
- at least one bolt slidably mounted in the rigid casing between an opening position of the lock, in which the bolt is retracted within the rigid casing, and a closing position of the lock, in which the bolt is at least partially pulled out from the rigid casing to be received in a corresponding seat of a receiving element designed to be rigidly secured to the fixed frame of the door; and
- a lock core unit containing a lock mechanism that can be operated using a key, for controlling the movement of the bolt, said core being mounted in such a way that it may be uncoupled within the rigid casing so as to be interchangeable with a lock core that can be operated by means of a key other than the one authorized to open the core originally installed in the lock.

[0003] Locks of the type referred to above are, for instance, described and illustrated in the Italian Model of Utility No. 210 493 and in the Italian Patent No. 1 295 464; both in the name of the present applicant. The above locks present the advantage of being adaptable to operate with a different key by means of simple replacement of the aforesaid interchangeable lock core unit, and hence without any need to replace the entire lock. The above characteristic is particularly advantageous for the user, for example in the case where he mislays the key, or else when it is intended to re-establish complete security of the lock after the key has been entrusted to otherwise non-authorized persons who could have provided themselves with a duplicate.

[0004] As an obvious consequence of the arrangement of an interchangeable lock core unit, in the past locks of the type specified above have also been devised, in which the interchangeable lock core unit may also be replaced with a lock core unit of a completely different type. In particular, although the above-mentioned patent documents indicate a lock core unit including a mechanism of the type that can be operated with a double-bit key designed to co-operate with a pack of safety plates that position themselves in such a way as to enable free sliding of the bolt and rotation of the key only in the presence of a key having a pre-determined profile, it is also possible to envisage, in an altogether obvious way, replacement of a core having a double-bit mechanism with a core comprising a cylinder-lock mechanism. Of course, replacement of a double-bit mechanism with a cylinder-lock mechanism may involve additional problems on account of the different make-up of the said mechanisms. In particular, the body of a cyl-

inder-type lock has a standard length which is usually greater than the corresponding dimension of the rigid casing of the safety lock, so that, once mounted, it has a part that protrudes from the rigid casing of the lock which must be adequately protected against breaking-in. For this purpose, the known locks produced by the present applicant which have a cylinder-lock mechanism are provided with a protection member commercialized under the trademark "Defender", which, in practice, is made up of a hard metal block that surrounds the protruding part of the body of the cylinder lock. Of course, in the case where a safety lock with an interchangeable core is provided, in which it is possible to use, indifferently, a core with a double-bit mechanism and a core with a cylinder-lock mechanism, it is necessary to take into account also the need to mount the aforesaid "Defender", should a core with a cylinder-lock mechanism be installed. Obviously, this renders the operations of replacement of the lock core more complicated and laborious. In fact, should the safety lock be installed in an armoured door which includes a panel covering the lock, the opening to be made in the door panel in the area corresponding to the area of access of the key is larger in the case of a cylinder-lock mechanism, in so far as the entire "Defender" must project from the said access area. This evidently creates additional problems in converting a lock with a double-bit mechanism into a lock with a cylinder mechanism, and vice versa.

[0005] The purpose of the present invention is to overcome all the drawbacks referred to above by providing a safety lock with an interchangeable core, in which a core with a double-bit mechanism or a core with a cylinder-lock mechanism can be mounted indifferently, in which, in the event of a core with a cylinder-lock mechanism being mounted, there is in any case provided a "Defender" to protect the part of the body of the cylinder mechanism that projects from the casing of the safety lock, and in which the operations for adapting the lock to operate with a different mechanism are relatively simple and fast.

[0006] With a view to achieving the said purpose, the subject of the invention is a safety lock of the type referred to at the beginning of the present description, characterized in that, mounted on one face of the rigid casing of the lock, typically the face designed to be on the outer side of the door, is a member for protecting the area where the key is inserted, the said member comprising a body permanently fixed to the rigid casing of the lock and having a seat, as well as an internal element mounted in an uncoupleable way within the seat of the fixed body of the protective member, in such a way as to be interchangeable with an internal element having a different conformation, according to the type of core installed in the lock. In accordance with the invention, in the case where the core is of the cylinder-mechanism type, the internal element of the aforesaid protective member is made with a seat having a shape comple-

mentary to that of the body of the cylinder-lock mechanism, in such a way that the fixed body, together with its internal element, defines a member similar to the traditional "Defender" provided in cylinder-mechanism safety locks. In the case, instead, where the core installed in the lock has a double-bit mechanism, the aforesaid fixed body of the protection member remains always fixed to the rigid casing of the lock, whilst inside it an element is mounted that completely closes the aforesaid seat of the fixed body and only has a through hole having a profile corresponding to the front profile of the double-bit key.

[0007] The advantage of the solution described above lies in the fact that the safety lock may be converted, with easy and fast operations, from a lock designed to operate with a double-bit mechanism into a lock designed to operate with a cylinder mechanism, or vice versa, without it being necessary in any case to proceed to installing or removing completely the "Defender", and without it being necessary to arrange in a different way the lock-covering panel that forms part of the armoured door in which the lock is installed. In practice, the lock according to the invention remains always equipped with a "Defender", which, however, has an interchangeable internal element with a different conformation according to whether it is to operate with a cylinder-lock mechanism or with a double-bit mechanism.

[0008] The preferred embodiment of the lock according to the invention is moreover characterized in that it comprises an auxiliary safety mechanism which clicks into a position in which it prevents free movement of the lock bolt in the event of the core being removed when the lock is in the closed condition. Again in the case of the said embodiment, the lock according to the invention is further characterized in that it comprises an additional mechanism which clicks into a position in which it enables the bolt to shift starting from its completely retracted condition only for a limited length in the case where the core of the lock is removed with the lock in the open condition. This second mechanism is useful in that, when the interchangeable core of the lock is replaced, which can be done - as has been seen - only with the lock in its open condition, i.e., with the bolt completely retracted, it is necessary, on the one hand, to leave the movement of the bolt free in order to be able to replace the internal element of the "Defender" easily from the inside of the lock casing, whilst, on the other hand, it is necessary to provide a detent to prevent total extraction of the bolt during this phase, a fact that would render the operation of installing the new internal element of the "Defender", again, difficult.

[0009] Further characteristics and advantages of the present invention will emerge from the ensuing description, with reference to the attached drawings, which are provided purely as a non-limiting example, and in which:

- Figure 1 is an exploded perspective view of a preferred embodiment of the invention, on the side that

will be on the inside of a door, which also illustrates two lock cores, one of the double-bit type and the other of the cylinder type, that may alternatively be installed in the lock;

- 5 - Figure 2 is a perspective view of the lock of Figure 1 seen from the opposite side, namely, from the side that will be on the outside of the door, which also illustrates two interchangeable internal elements designed to be mounted alternatively within the fixed body of the "Defender" of the lock;
- 10 - Figures 3 and 4 are sectional views at an enlarged scale of the lock illustrated in Figures 1 and 2, in the lock-open position and in the lock-closed position, respectively;
- 15 - Figure 5 is a front view, from the inside of the lock, of the interchangeable internal element of the "Defender" suited for operation with the cylinder-lock mechanism;
- Figure 6 is a cross-sectional view according to the line VI-VI of Figure 5;
- 20 - Figure 7 is a view equivalent to the one of Figure 5, which illustrates the internal element of the "Defender" suited for the double-bit mechanism;
- Figure 8 is a cross-sectional view according to the line VIII-VIII of Figure 7;
- 25 - Figure 9 is a cross-sectional view, according to the line VIII-VIII, of the interchangeable internal element of the "Defender" which is illustrated in Figures 7 and 8;
- 30 - Figure 10 is a perspective view of the "Defender" from inside the lock, with the fixed body and the interchangeable internal elements that may alternatively be installed inside the fixed body; and
- 35 - Figure 11 is a front view of the core of the lock in the version designed to operate with the cylinder-lock mechanism.

[0010] In Figure 1, the reference number 1 designates, as a whole, a safety lock comprising a rigid casing 2 made of sheet metal, inside which there is mounted, in an uncoupleable way, a lock core, which may be of the type indicated by A, including a double-bit mechanism, or of the type indicated by B, including a rotating cylinder-lock mechanism.

45 **[0011]** The general configuration of the safety lock 1 and of the core A with double-bit mechanism may, for example, be of the type illustrated in the Italian Patent No. 1 295 464 of the present applicant. This general configuration will, however, be briefly described in what follows for the convenience of the reader.

50 **[0012]** With reference also to Figures 3 and 4, the rigid metal casing 2 comprises two main plane and parallel faces 3, 4, a top edge 5, a bottom edge 6, and two opposite sides 7, 8. Inside the rigid casing 2, a bolt 9 is slidably mounted (see Figures 3 and 4), and comprises a plate 10 having an edge 10a bent like an L to which are welded four cylindrical pins 11, which come out through corresponding circular holes made in the side

8 of the casing 2. The bolt 9 is displaceable between a condition of opening of the lock, illustrated in Figure 3, in which it is retracted inside the casing 2, and a condition of closing, illustrated in Figure 4, in which the cylindrical pins 11 come out from the side 8 of the rigid casing to be received in corresponding seats of a receiving element (not illustrated) designed to be fixed to the frame of a door. Typically, the rigid casing 2 is, instead, installed on an armoured door, the thickness of the casing 2 being smaller than the thickness of the door, so that the casing is hidden from sight on both faces of the door by a panel coating the door.

[0013] The lock moreover comprises, in a way of itself known, a spring latch or half-turn 12, which is also projecting from a circular hole in the side 8 of the rigid casing 2 and is elastically recalled towards its extracted position and which may be controlled in movement towards a retracted position both by means of the mechanism forming part of the extractable core of the lock and by means of a handle (not illustrated) designed to be received in a seat 13 (see Figure 1). These details of the structure of the lock will not, however, be described any further herein in so far as they are in themselves of a known type and, in any case, do not fall within the scope of the invention.

[0014] Movement of the bolt 9 may be controlled by means of the locking mechanism forming part of the extractable core A or of the extractable core B. Whatever may be the type of core (A or B) installed in the lock, rotation of the key actuating the core (i.e., the key A1 for the core A and the key B1. for the core B) determines, as also described in the aforementioned previous Italian patent of the present applicant, the oscillation of a lever set on the face of the core A or B, which is not shown in Figure 1. The said lever has a pin engaged in the slot 14 of the plate 10 of the bolt 9 (see Figures 3 and 4), so that the oscillation of the aforesaid lever determines the translation of the bolt between its two extreme positions illustrated in Figures 3 and 4. Again, the details of the aforesaid oscillating lever are not described herein in so far as they are known from the previous patent of the present applicant already referred to on more than one occasion above.

[0015] Again for convenience of the reader, the lock core A comprising a double-bit mechanism includes a frame 15 comprising two parallel plates set at a distance apart, each of which defines a keyhole 16 for insertion of the double-bit end of the key A1. In a way similar to what is described and illustrated in the prior patent of the present applicant, a plate 17 is slidably mounted in the sliding direction of the bolt 9, the said plate 17 having a bottom edge defining a toothing designed to co-operate with the active part of the key A1 in such a way that, when the key A1 is inserted into the core 15, rotation of the key causes advance of the plate 17. The said advance is multiplied and transmitted to the plate 10 of the bolt 9 by means of the oscillating lever which has been mentioned above and which is described in detail in the

prior patent of the present applicant. In practice, displacement of the plate 17 causes oscillation of the lever with respect to the frame 15, said lever being moreover connected to the bolt 9 by means of the pin previously mentioned, which engages the slot 14. Consequently, when the core A is installed in the lock, the bolt 9 can be controlled between its opening position and closing position by means of the key A1. Again according to the known art, inside the frame 15 there is moreover arranged a pack of safety plates 18 which are displaceable in a vertical direction orthogonal to the direction of sliding of the plate 17 and which co-operate with the double-bit end of the key A1 in such a way that each of them arranges itself in a position that enables sliding of the plate 17 only in the presence of a key with a given profile.

[0016] As already illustrated in the preamble of the description of the present application, the arrangement of a lock with an interchangeable core has been proposed and used for some time by the same applicant. An obvious consequence of such a solution consists in the arrangement of a lock in which the extractable core A is also interchangeable with a core B that includes a mechanism of a completely different type, namely, a cylinder-type locking mechanism. The same applicant has for some time studied the interchangeability of a core of the double-bit type with a core including a cylinder-lock mechanism. As already illustrated in the preamble of the present description, such interchangeability involves, however, problems that have been successfully solved thanks to the present invention, as will emerge more clearly from what follows.

[0017] Again with reference to Figure 1, as well as to Figure 11, also the core B comprises a frame 19 consisting of two parallel plane metal plates set at a distance apart, which are traversed by the body 20 of a cylinder-lock mechanism comprising a rotatable cylinder 21 which can be operated by means of the key B1. The constructional details of the body 20 and of the cylinder-lock mechanism will not be illustrated herein in so far as they may be made in any known way. Typically, the body 20 of the lock takes the form of an elongated element made up of a cylindrical portion provided at the bottom with a flange portion 22. The body 20 is inserted through openings of corresponding profile, made in the two plates constituting the frame 19, and is secured in the axial direction to the frame 19 by means of engagement of a transverse screw (not shown in the drawings) which traverses one part of the frame 19 and is screwed into a threaded hole made in the central portion of the flange 22. Also in the case of the core B, a plate 17 is slidably mounted inside the frame 19 in the same direction of sliding as that of the bolt 9. The said plate 17 (see Figure 11) has a bottom edge defining a toothing 23 which co-operates with the revolving plug 24 of the cylinder lock 21. The revolving plug 24 is positioned between the two plates making up the frame 19, and consequently is not visible in Figure 1. It is, however, illustrated in Figure 11. The revolving plug 24 co-operates with the toothing 23

in such a way that rotation of the key B1 causes horizontal displacement of the plate 17. This displacement is then converted into a displacement of the bolt 9 by means of an oscillating lever which is altogether similar to the one mentioned with reference to the core A. Of course, in any case both for the core A and for the core B the means of transmission that connect the movable plate 17 to the bolt plate 10 may be made in any known way. In particular, it is also possible to envisage a direct connection of the plate 17 to the bolt 9 in such a way that displacement of the bolt 9 is not multiplied with respect to the displacement of the plate 17, but occurs instead at the same speed.

[0018] With reference again to the mechanism shown in Figure 11, also in this case operation of the bolt takes place only in the presence of an authorized key. In addition, the mechanism includes a plate 25 which is vertically movable, pushed by a spring 26 downwards and guided by means of the engagement of fixed pins 27 within corresponding slots 28 made in the plate 25. Rotation of the revolving plug 24, controlled by the key B1, also determines engagement of the revolving plug 24 against the bottom edge of the plate 25, with consequent temporary lifting of said plate by the action of the spring 26 at each turn of the key. Correspondingly, a pin 29 welded to the plate 25 engages in succession within the spaces 30 of a toothing made on the top edge of the plate 17 at each turn of the key B1 so as to define the corresponding operating positions of the bolt. The core A or the core B may be positioned within the rigid casing 2 through an opening 31 of corresponding size which is made on the face 4 of the casing 2, the said cores being fixable by means of a pair of screws 32 which engage bosses 33 rigidly connected to the rigid casing 2. In addition, in a way similar to what occurs with conventional locks, the lock according to the invention also includes a top rod 34 and a bottom rod 35 vertically slidable in synchronism with the bolt 9. Such a result is obtained in a way of itself known in that each of the rods 34, 35 has an oblique slot 36 (in Figures 3 and 4, the oblique slot 36 made in a plate rigidly connected to the rod 35 is visible) which is engaged by a respective pin 37 carried by the plate 10 of the bolt 9. Again according to the traditional technique, the two slidable rods 34, 35 are designed to be connected to sliding bars with which the armoured door is provided and which are designed to engage corresponding seats arranged at the top on the fixed frame of the door and at the bottom in the floor.

[0019] A first problem that is encountered in arranging a lock designed to operate indifferently with an extractable double-bit core of type A or a cylinder-lock core of type B lies in the fact that, when the cylinder-lock core B is installed, it is necessary to provide, on the outer face 3 of the rigid casing 2, a protective member 38 for protecting the portion of the body 20 of the cylinder-lock mechanism that projects from the casing 2. In fact, the standard length of the body 20 of a cylinder-lock mechanism is greater than the standard thickness of the cas-

ing 2. Consequently, it is necessary to provide the protective member 38 to prevent a possible burglar from gripping the body 20 with a tool and causing it to oscillate until unhinging of the structure is achieved. In known safety locks with cylinder-type mechanism that have so far been produced by the applicant, the protective member, commercialized under the trademark "Defender", is in practice a cylindrical block of hard metal which is fixed to the face 3 of the rigid casing 2 with screws screwed from the inside of the casing and which has a seat for receiving the body of the cylinder-lock mechanism having a profile of a corresponding shape.

[0020] In the case of the lock according to the present invention, instead, for the purpose of preventing the need to dismantle the "Defender" 38 completely in the case where the core B is replaced with a core A of the double-bit type, a protective member 38 is provided which comprises a fixed body 39 having a basically annular shape and which remains permanently fixed to the rigid casing 2, and the central opening 40 of which is designed to receive indifferently an internal element A2 or an internal element B2, which are respectively suited for operating jointly with a double-bit core A or a cylinder-lock core B. As illustrated in particular in Figure 10, the fixed body 39 of the "Defender" 38 includes a cylindrical portion 41 terminating, at one end, with a peripheral flange 42 for resting against the wall 3 of the casing. On the end face of the flange 42 there are made two threaded holes 43 for engagement of fixing screws 44 which are inserted from the inside of the front plate 3 of the casing of the lock (see Figures 5 and 7). Referring once more to Figure 10, the central opening 40 of the body 39 has a cylindrical configuration but is made in an eccentric position with respect to the cylindrical portion 41 to leave room for a bottom recess 45 designed to receive the flange 22 of the body of the cylinder-lock mechanism. Each of the two interchangeable internal elements A2, B2 (Figure 10) may be inserted in the opening 40 from the side of the flange 42 and stops against a bottom annular contrast surface 46. Each of the two internal elements A2, B2 is then blocked in that position by means of retention plates 47 (see Figures 5 and 7), which are fixed by means of screws to the inner surface of the front plate 3 of the rigid casing 2. Figures 5 and 7 illustrate the plates 47 in an inactive position. Starting from this position, the plates 47 may be rotated about the axes of the respective fixing screws in such a way as to project with their noses 47a inside the central opening 40, so as to prevent the element A2 or B2 installed in the opening 40 from being slid out.

[0021] As may be seen in Figure 10, the internal element B2 is in practice made up of a cylindrical skirt or shell 48 interrupted at the bottom by a recess 49 designed to occupy a position corresponding to the recess 45. Also the plate 3 obviously has a corresponding opening with a profile identical to that of the opening 40, with a recess 3a at a point corresponding to the recess 45.

[0022] In the condition in which the element B2 is installed inside the fixed body 39, the inner surface 48a of the cylindrical shell 48 receives the cylindrical end of the body 20 of the cylinder-type mechanism, whilst the recess 49 and the recess 45 receive the corresponding end of the flange 22 of the body of the cylinder-type lock. In practice, therefore, the set of the two elements 39, B2 comes to constitute a "Defender" similar to the one used with known safety locks which include a cylinder-type mechanism. Should the core B with the cylinder-type mechanism be replaced with a double-bit core A, the fixed body 39 remains installed (this fact provides the advantage that it is not necessary to make any modifications to the opening, made in the door panel, from which the body 39 projects), whilst the internal element B2 is replaced by the internal element A2. The latter element is in practice made up of a full body which obstructs the opening 40 and which has a through opening 50 with a profile corresponding to the front profile of the end of the key A1. In this way, the key A1 can be introduced through the opening 50 up to a position in which its active portion is inserted inside the core A. In this position, the cylindrical portion of the body of the key A1 is positioned inside the opening 50, so that, in this condition, the element A2 does not interfere with the free rotation of the key.

[0023] Both of the internal elements A2, B2 are provided with means against breaking-in. In the case of the element A2, the latter has a slot inside which two plates 51 made of hard metal are inserted (see Figure 9). Lugs 52 are provided, made on the body A2 on either side of the plates 51 (see also Figure 10), which are engaged in slots 52a in order to prevent rotation of the body A2.

[0024] In the case of the element B2, instead, in a way similar to that of the "Defenders" currently commercially available, a closing disk 53 is envisaged that is mounted so that it is free to turn inside the front end of the body B2 and is provided inside with hard-metal plates 54 held in position by a rivet, the ensemble of the disk 53 and plates 54 being held together axially by an elastic ring 56. The disk 53 and plates 54 are then traversed by a slit 55 for introduction of the key.

[0025] The lock according to the invention moreover includes a safety mechanism for preventing removal of the core (A or B) installed in the lock when the lock is in the closed condition, namely, with the bolt in the extracted position. For this purpose, inside the plate 4 of the casing, a plate 60 is mounted in such a way that it is free to slide vertically by means of engagement of pins 61 fixed to the casing of the lock inside corresponding slots 62 of the plate 60. When the core A or B is installed in the lock, the plate 60 is kept in a lowered, end-of-travel, position. This is obtained in that, in the case where a core A is installed, the bottom edge of the frame 15 of the core A engages a pin 63 projecting from the plate 60. In the case, instead, where a core B is installed, the plate 60 is kept in its end-of-travel lowered position in that the bottom edge of the flange 22 of the body 20 of

the cylinder-type lock mechanism engages against two cheeks 64 forming a V which project at the top from the plate 60.

[0026] of course, the safety mechanism described herein acts only in the case where the bolt is in the extracted position, in so far as it must instead be possible to remove the installed core for it to be replaced when the lock is open, namely, when the bolt is in the retracted condition illustrated in Figure 3. This result is obtained in that a pin 37 carried by the plate 10 of the bolt 9 engages in an L-shaped slot 65 made in the plate 60. When the bolt 9 is in the retracted position illustrated in Figure 3, the pin 37 is engaged at the right-hand side end of the L-shaped slot 65 (see Figure 3), so that, in the event of the core A or B installed in the lock being removed, the plate 60 is not displaced vertically, on account of the engagement of the pin 37 between the two sides of the right-hand end of the L-shaped slot 65. In the case, instead, where the bolt 9 is in the extracted condition illustrated in Figure 4, the pin 37 comes to occupy a position corresponding to the left-hand end of the L-shaped slot 65. In this condition, in the event of the core A or B installed in the lock being removed, so that the surface that contrasts the cheeks 64 or the pin 63 comes to be missing, the plate 60 is free to move upwards by an amount corresponding to the length of the short arm of the L-shaped slot 65. Displacement upwards of the plate 60 occurs in that the said plate is recalled upwards by a revolving plug 66 that is free to turn inside the rigid casing 2 about a pin 67 and is recalled by a spring clip 68. Consequently, whenever the bolt 9 is in the extracted position illustrated in Figure 4 and whenever the core installed in the lock is removed, the plate 60 clicks upwards into the position illustrated in Figure 4, in which the bolt 9 can no longer be displaced, in so far as the pin 37, which is integral with it, is imprisoned between the two sides of the short arm of the L-shaped slot 65.

[0027] Provided in the safety lock according to the invention is moreover a further safety mechanism that is useful in the stage of replacement of the core installed in the lock. In particular, inside the wall 4 of the casing is moreover mounted a further slidable plate 70 which is recalled vertically downwards by a spring 71. When the core A, B is installed in the lock, the plate 70 occupies an extreme top position, in so far as a flange 72 thereof is engaged against the top edge of the frame of the core A or B. If, when the lock is open, the core is removed, the flange 72 has no longer any contrasting surface, so that the plate 70 clicks into its lowered position illustrated in Figure 3 as a result of the return of the spring 71. In this condition, a pin 73 rigidly connected to the plate 70 operates as a limit stop for a protruding part 74 of the plate 10 of the lock, in such a way that, during operations of adjustment of the lock, the bolt 9 is free to move in the direction of its extracted position, but only for a limited travel, until the protruding part 74 engages against the pin 73. The possibility of displacing the bolt 9 in this stage is necessary in that the plate 10 must not

interfere with the opening 40 for access of the protective member 38, for assembly of the internal element A2 or B2. At the same time, the limitation of the free travel of the bolt is useful for preventing the bolt from reaching a completely extracted position, where the bolt would prevent free access to the opening 40 for introduction of the element A2 or B2.

[0028] From the foregoing description it emerges clearly that the lock according to the invention is able to resolve efficiently the problem of adapting a safety lock in such a way as to render it operative indifferently with a double-bit mechanism, or with a cylinder-lock mechanism, guaranteeing in any case the provision of a "Defender" for protecting the body of the cylinder lock in the case of installation of a core with a cylinder-type mechanism, without at the same time it being necessary to remove the "Defender" completely in the event of switching from a cylinder-mechanism core to a double-bit mechanism core. The structure of the lock is moreover such as to render the operations for adapting the lock particularly simple and fast. At the same time, security is guaranteed against breaking-in, both by means of an adequate armouring of the "Defender" in either version (i.e., either the cylinder-lock one or the double-bit one) and by providing a mechanism that blocks displacement of the bolt when the core of the lock is removed in the closed position of the lock itself. The additional mechanism provided for limiting the free travel of the bolt when the core is removed for replacement of the latter further facilitates installation of the internal element of the "Defender" and of the new core.

[0029] Of course, without prejudice to the principle of the invention, the details of construction and the embodiments may vary widely with respect to what is described and illustrated herein purely to provide a non-limiting example, without thereby departing from the scope of the present invention.

Claims

1. A safety lock for doors of dwellings and the like, comprising:

- a rigid casing (2) designed to be mounted on a door;
- at least one bolt (9) slidably mounted in the rigid casing (2) between an opening position of the lock, in which the bolt (9) is retracted within the rigid casing (2), and a closing position of the lock, in which the bolt (9) is at least partially pulled out from the rigid casing (2) to be received in a corresponding seat of a receiving element designed to be rigidly secured to the fixed frame of the door; and
- a lock core unit (A; B) containing a lock mechanism that can be operated using a key (A1, B1) for controlling the movement of the bolt (9),

said lock core (A; B) being mounted in such a way that it may be uncoupled within the rigid casing (2) so as to be interchangeable with a lock core (A; B) that can be operated by means of a key other than the one authorized to open the core originally installed in the lock,

characterized in that, mounted on a face (3) of the rigid casing (2) of the lock that is designed to be on the outer side of the door, is a protection member (38) for protecting the area where the key is inserted, the said protection member (38) including a body (39) permanently fixed to the rigid casing (2) and having a seat (40), and an internal element (A2, B2) mounted in an uncoupleable way within the seat of the fixed body (39) of the protection member (38), in such a way as to be interchangeable with an internal element (A2, B2) having a different conformation according to the type of core (A; B) installed in the lock.

2. A safety lock according to Claim 1, designed to operate both with a core (A) comprising a double-bit mechanism and with a core (B) comprising a cylinder-lock mechanism, **characterized in that** the aforesaid fixed body (39) of the protection member (38) is designed to receive both an internal element (A2) suitable for operation with a double-bit core (A), the said internal element (A2) consisting of a full body which completely obstructs a through opening (40) of the fixed body (39) constituting said seat, said full body (A2) having a through hole (50) with a profile corresponding to the front profile of a double-bit key, and an internal element (B2) suitable for operating with a cylinder-lock mechanism, which is received in the aforementioned seat in such a way as to define, together with the fixed body (39), a cavity having a profile corresponding to that of the body (20) of the cylinder-lock mechanism and designed to receive and protect the end of the body (20) of the cylinder-lock mechanism that projects outside said front face (3) of the rigid casing (2).

3. A safety lock according to Claim 2, **characterized in that** both the internal element (A2) suited for the double-bit mechanism and the internal element (B2) suited for the cylinder-lock mechanism have the form of cylindrical bodies, and **in that** the aforesaid seat designed to receive them consists of a through hole made in the aforesaid fixed body (39).

4. A safety lock according to Claim 3, **characterized in that** the internal element (A2, B2) is inserted into the aforesaid central opening (40) from the inside of the casing of the lock and stops against an annular contrast surface (46) formed at the front end of the opening (40), said internal element (A2, B2) being held in position by means of at least one re-

tention plate (47) screwed on the internal surface of the lock casing.

5. A safety lock according to Claim 3, **characterized in that** the internal element (A2) of the protection member (38) designed to operate with the double-bit mechanism has a transverse slot in which at least one plate (51) of hard metal is set. 5

6. A safety lock according to Claim 5, **characterized in that** the aforesaid internal element (A2) has at least one lug (52) engaged in a slot (52a) of the fixed body for preventing rotation of the internal element (A2). 10
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7. A safety lock according to Claim 2, **characterized in that** the internal element (B2) designed to operate with the cylinder-lock mechanism comprises a cylindrical shell (48) interrupted by a recess (49) designed to occupy a position corresponding to a recess (45) made in the fixed body (39) for defining the part of the seat of the protection member that receives the flange (22) of the body of the cylinder-lock mechanism. 20
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8. A safety lock according to Claim 7, **characterized in that** the aforesaid internal element (B2) designed to operate with the cylinder-lock mechanism has a disk (53) which is mounted in such a way that it is free to turn at one end of the aforesaid cylindrical shell (48) and is reinforced on its internal side with at least one hard-metal plate rigidly connected thereto, said disk (53) and said hard-metal plate (54) being traversed by a slit (55) for introduction of the key (B1). 30
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9. A safety lock according to any of the foregoing claims, **characterized in that** provided inside the rigid casing (2) is a safety device for blocking movement of the bolt (9) in the event of the core of the lock being removed with the bolt in its extracted closing position. 40

10. A safety lock according to any of the foregoing claims, **characterized in that** provided inside the rigid casing (2) is a safety device for limiting the free travel of the bolt towards its extracted position subsequent to removal of the lock core with the bolt in the retracted position. 45
50
55

Fig. 1

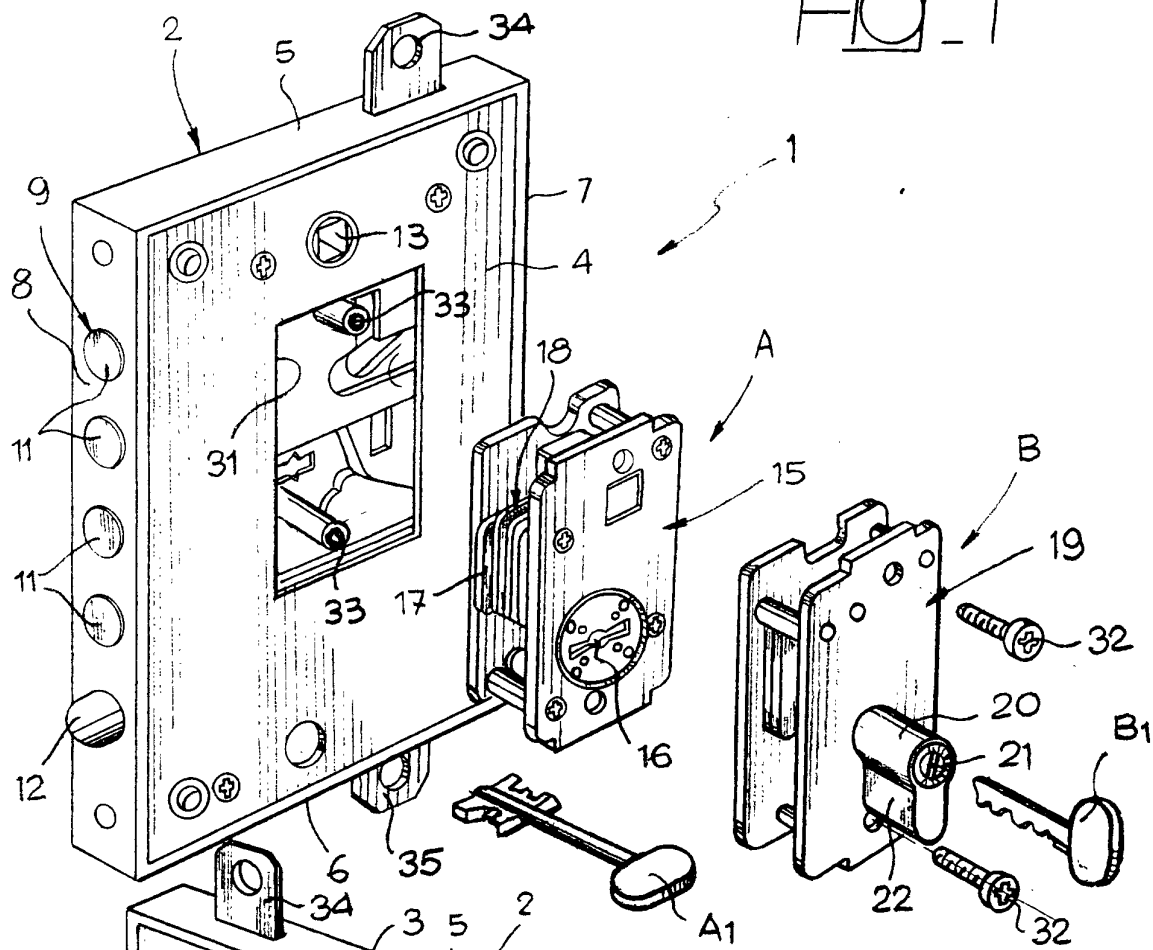
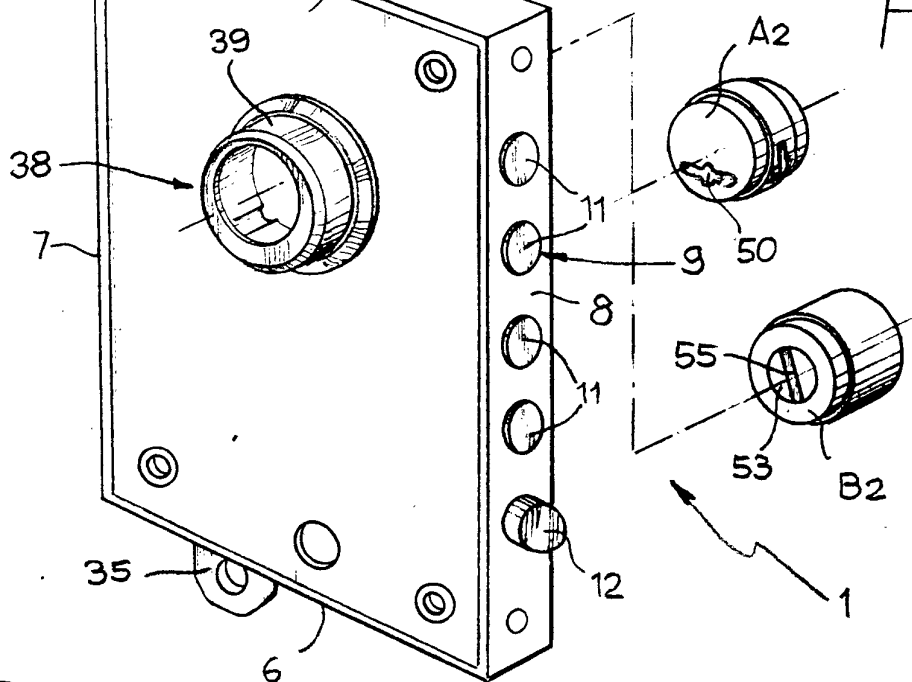


Fig. 2



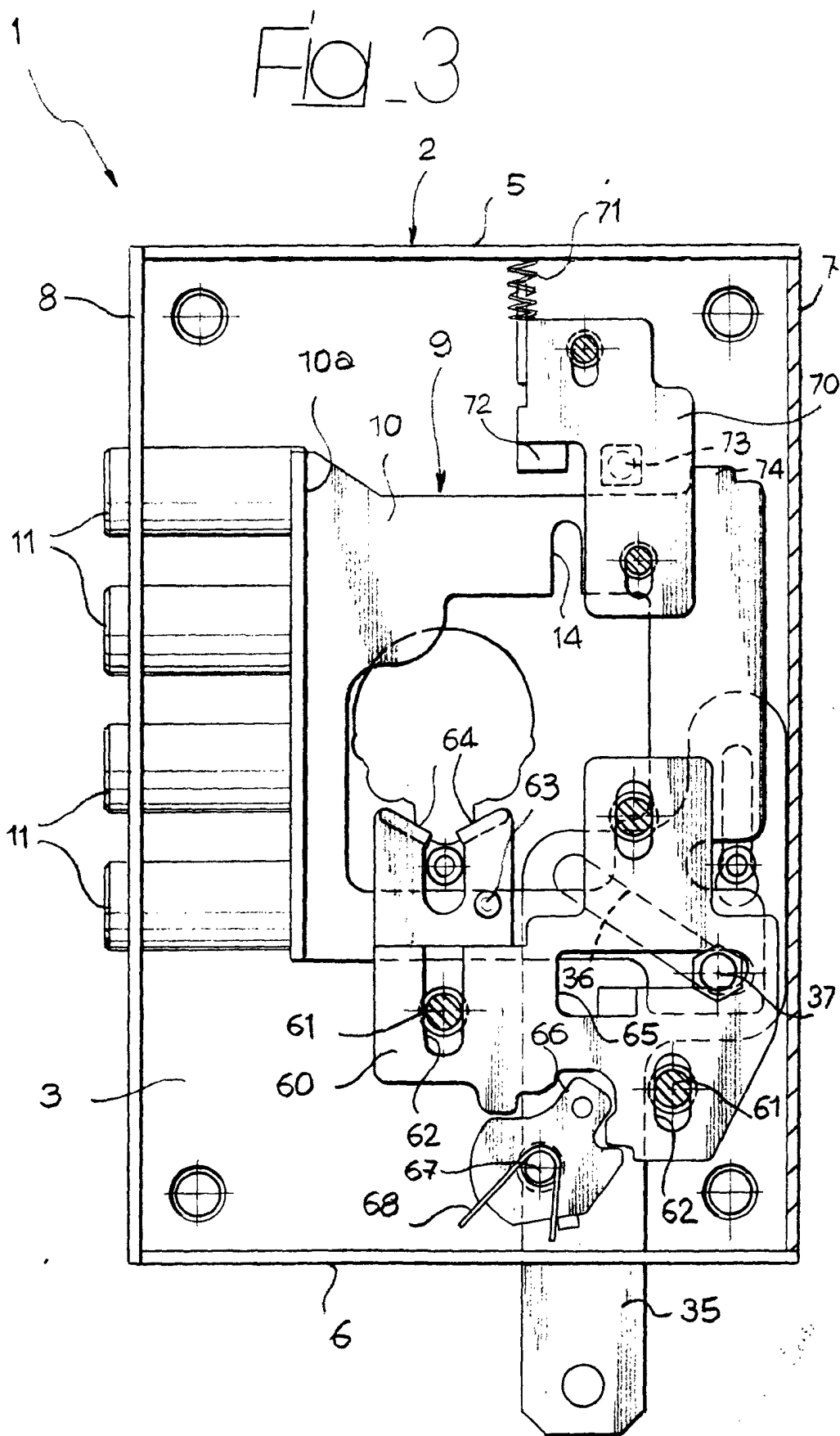


Fig. 4

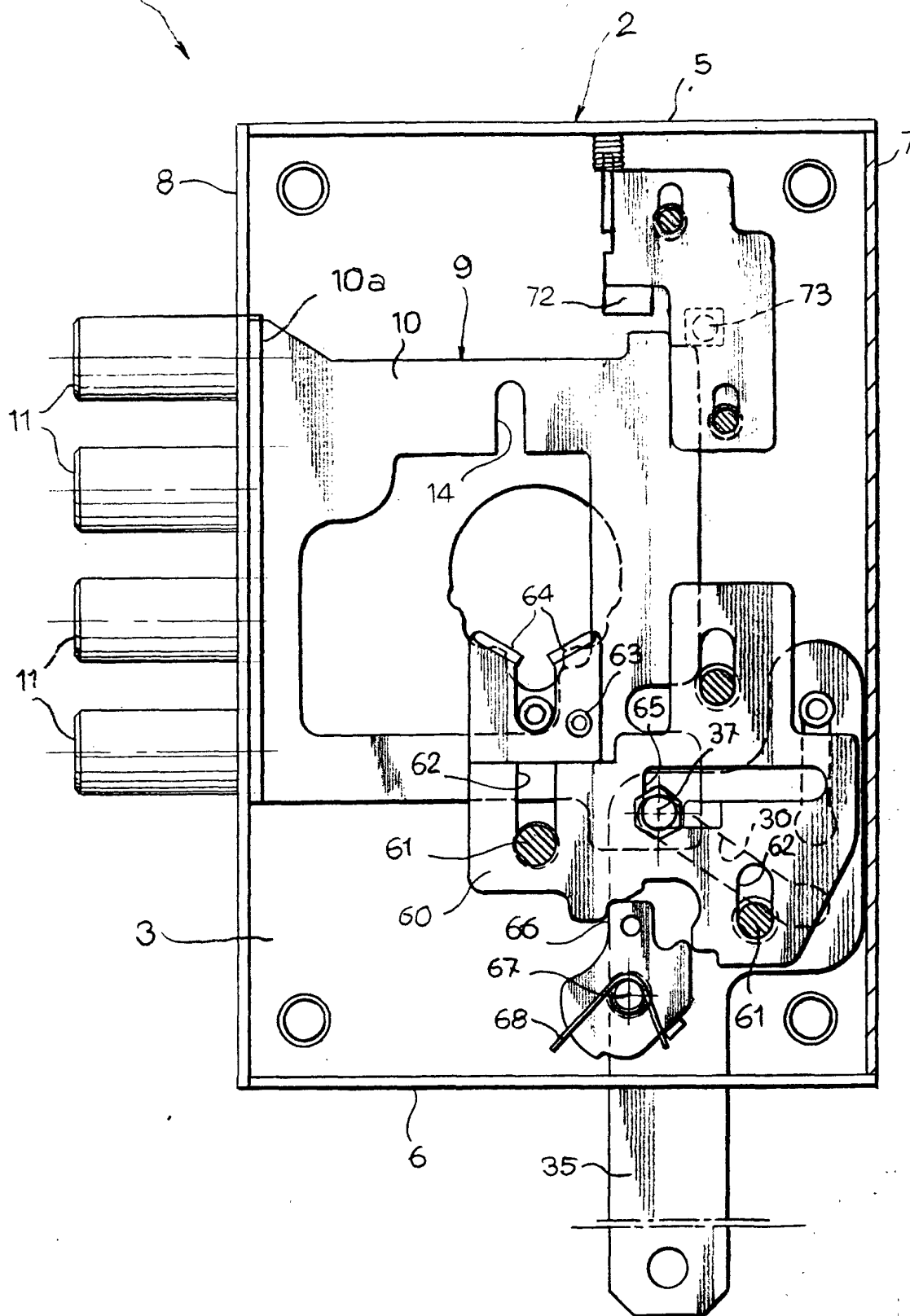


Fig 5

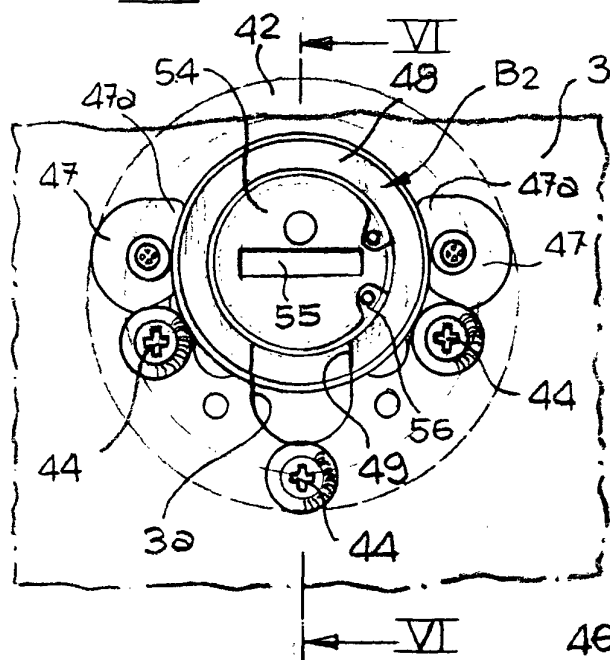


Fig 6

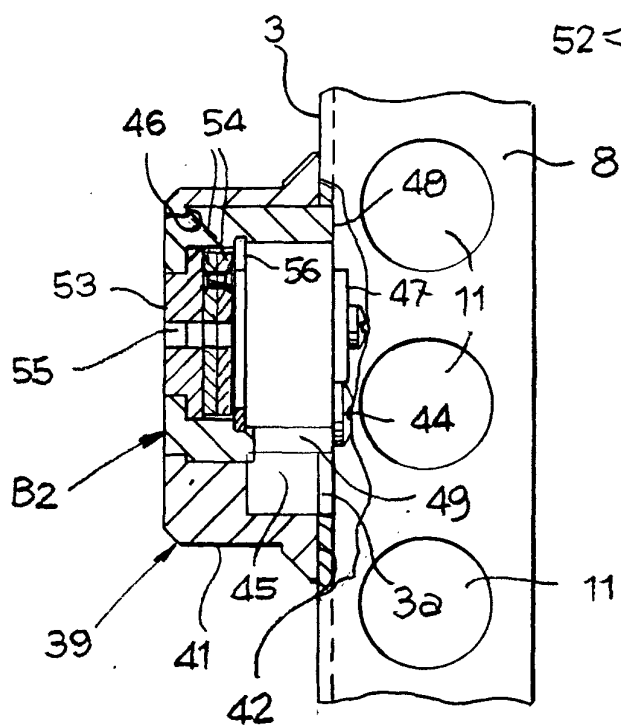
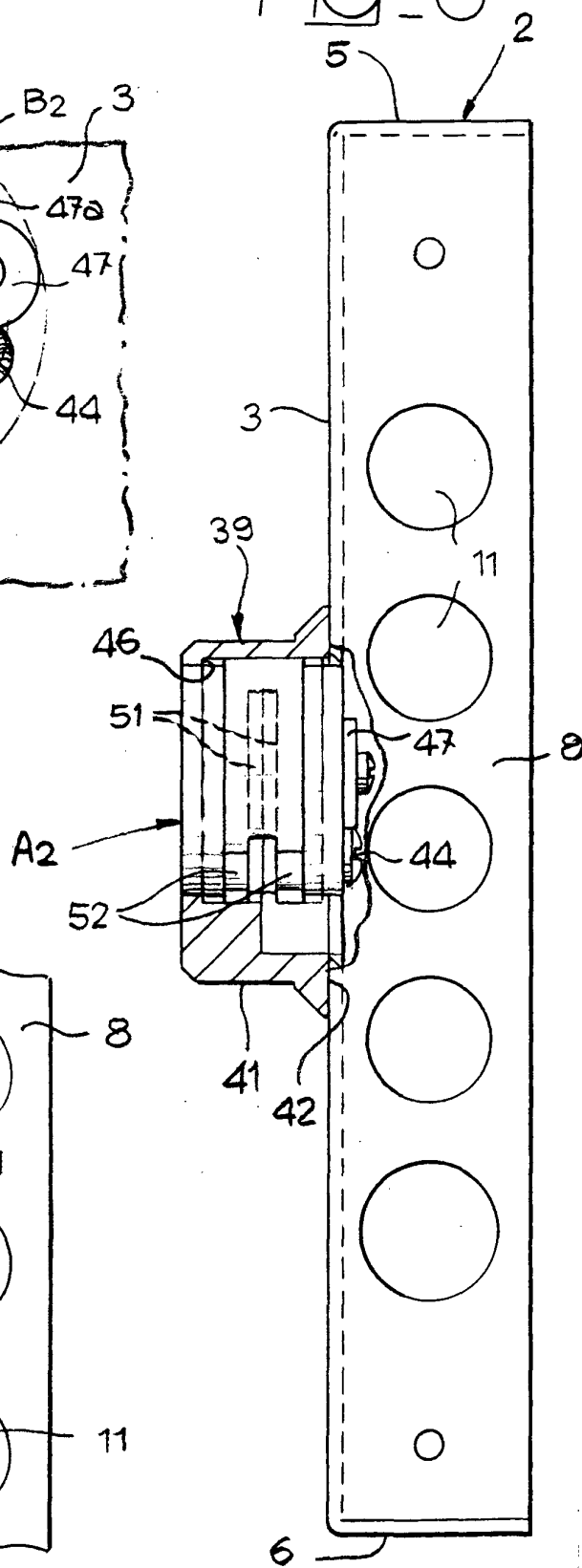


Fig 8



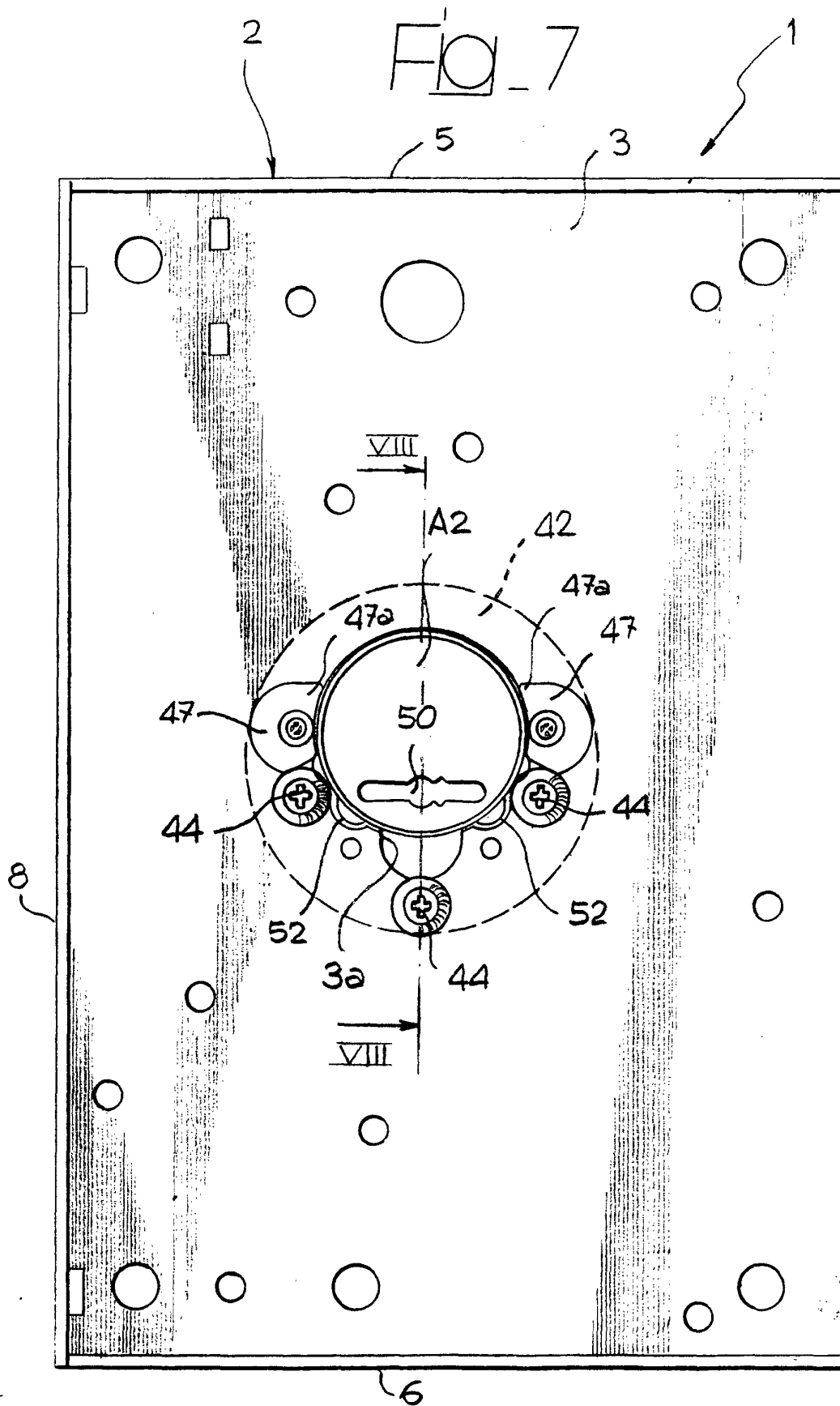


Fig. 11

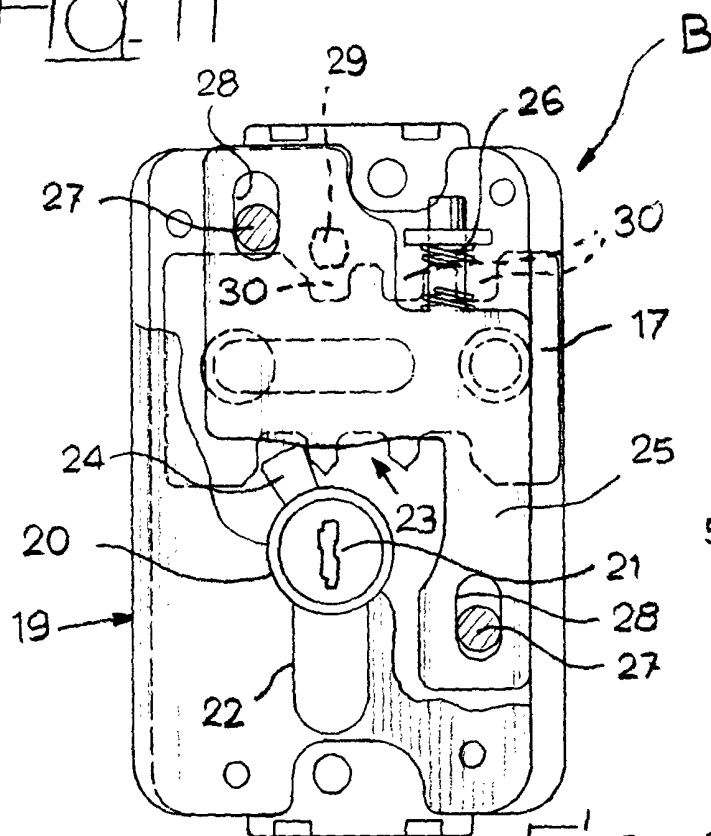


Fig. 9

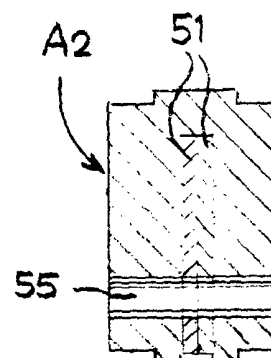


Fig. 10

