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(54) Safety lock device for doors of dwellings and the like, with a cylinder lock

(57) A safety lock device for doors of dwellings and the like, comprises a cylinder lock (8) for driving its bolt (5). To one side of the body (9) of the cylinder lock (8) there is screwed a screw (12) having a portion projecting laterally of the body (9), which is received within a cavity (13) of the casing (2) of the device, in which it is secured by means of a stud (14) projecting from a stop plate (15) which is screwed to the casing (2).

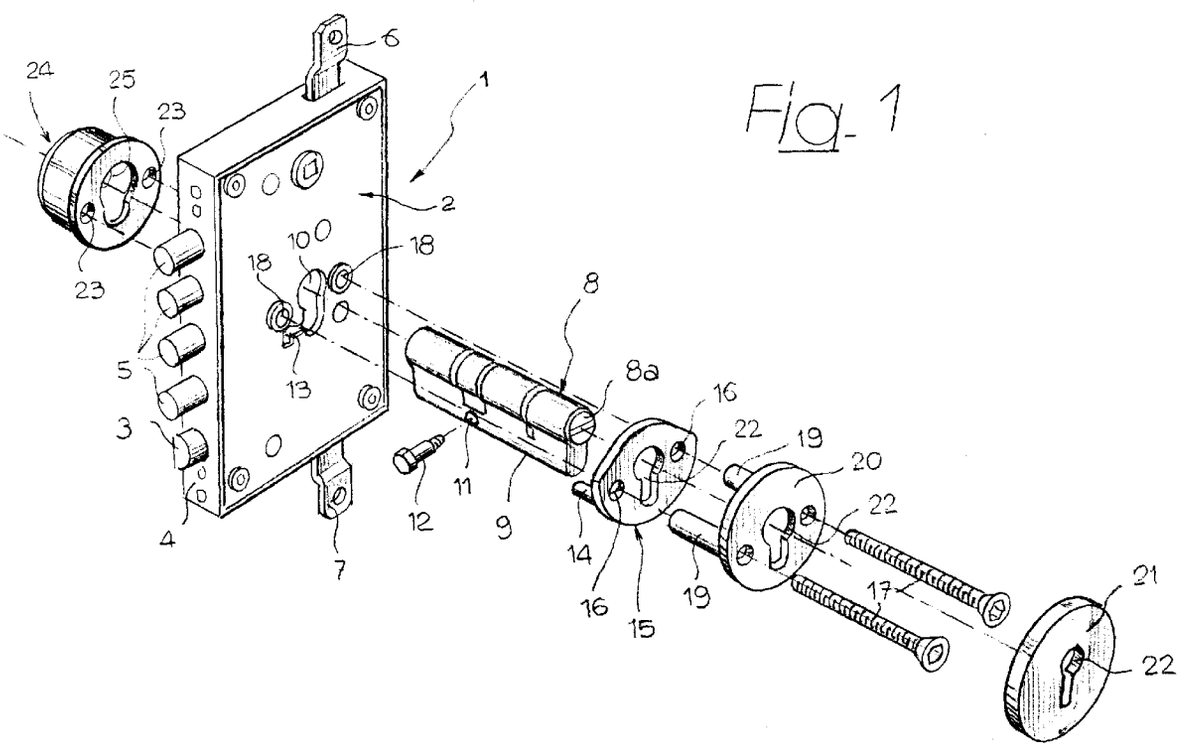

Fig. 1

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Description

The present invention relates to safety lock devices for doors of dwellings and the like, of the known type comprising a casing, which is to be fixed to the door, a bolt slidably mounted within the casing between a locking projecting position and an unlocking position retracted within the casing, a mechanism for driving the bolt, and a cylinder lock for controlling the bolt driving mechanism, said cylinder lock having a body which is received within a passage of complementar shape formed through the casing.

The object of the present invention is that of providing a safety lock device of the above indicated type which has particularly simple and inexpensive means for securing the body of the cylinder lock within said casing, which can be mounted and disassembled with easy and rapid operations and which provides a high level of safety.

In view of achieving this object, the invention provides a safety lock device having the features indicated at the beginning of the present description and further characterized in that the body of the cylinder lock a member projecting transversally from one side thereof and in that said casing has a cavity provided for receiving said projecting member, said devoce further comprising a securing element screwed to said casing and having a portion for securing said projecting member within said cavity.

Preferably, the device according to the invention is of the type in which, according to a technique conventional per se, the body of the cylender lock is secured within said casing by means of a transverse screw having one end screwed into one side of said body and is further characterized in that said screw constitutes said projecting member, so that said screw can be screwed into the body of the cylinder lock before said body is introduced into said passage formed through the casing, the portion of the screw which projects transversally from one side of said body being received into said cavity when said body is introduced into said passage.

Due to the above indicated features, the device according to the invention may use a transverse screw for locking the body of the cylinder lock which is relatively short, this screw being screwed, as indicated above, into the body of the cylinder lock before this body is introduced within the casing, differently from the conventional solutions, wherein said screw has a greater length and is introduced from one side of the casing so as to pass therethrough and engage the body of the cylinder lock after that this body has been introduced into its seat within the casing.

Therefore, the device according to the invention is characterized by simpler and easier mounting and dismantling operations of the body of the cylinder lock.

Further advantageous features of the invention are indicated in the annexed Claims 2-8. In particular, due to the feature of Claim 6, the following further advantage is achieved. In the conventional art, the cylinder lock has at its end facing outwardly of the door a hole for the introduction of the key and at the opposite end, facing inwardly of the door, a hole for introduction of the key or, alternatively, a knob for operating the cylinder lock without the need of a key. In this latter case, again according to the conventional art, since the knob which is connected to the cylinder of the lock must be mounted adjacent to the inner surface of the door, it is necessary to provide for various axial dimensions of the cylinder lock as a function of the thickness of the door. The feature of Claim 6 solves this drawback.

Another particularly advantageous feature of the preferred embodiment of the present invention is that indicated in the annexed Claim 7. Due to this feature, the device according to the invention has a high level of safety against burglaries.

The invention will be now described with reference to the annexed drawings, given purely by way of non-limiting example, in which:

figure **1** is an exploded perspective view of a lock device according to the invention, and
figure **2** is a perspective view, according to a different angle of view, of the device of figure **1** in the assembled condition,
figure **3** is a cross-sectional view of the device of figure **1**
figure **4** is an exploded perspective view of one variant of the lock device according to the invention,
figure **5** is a cross-sectional view in a vertical plane of the lock of figure **4** in the mounted condition,
figure **6** is an exploded perspective view of a further variant of the lock according to the invention,
figure **7** is a front view at an enlarged scale and partially in cross-section of the lock of figure **1**, and
figure **8** is a perspective view at an enlarged scale of a detail of figure **7**.

In figures 1-3, reference numeral 1 generally designates a safety lock device for a dwelling door. According to a technique known per se, the device 1 comprises a casing of sheet metal 2 which is to be fixed to the door structure. Reference numeral 3 designates a latch element which is slidably mounted within a co-operating hole of a side wall 4 of the casing 2, between the projecting position shown in the figure, towards which it is elastically biased, and a position retracted within casing 2. Reference numeral 5 designates four fingers forming the bolt of the device, which are slidably mounted within respective apertures in the wall 4 of casing 2, between a locking projecting position, shown in figure 1, and an unlocking position, retracted within casing 2. Fingers 5 and latch element 3 are for cooperation with complementar seats provided in the fixed frame of the door. Also according to a technique known per se, inside casing 2 there is arranged a lever mechanism (not shown) for driving simultaneously the movement of the fingers 5 of

the bolt, and an upper plate 6 and a lower plate 7 which are respectively to be connected to a vertical upper rod and a vertical lower rod cooperating with seats provided above the door and in the floor. The details of construction of said mechanism inside the casing 2 are not shown in figures 1-3, since this mechanism can be made in any known way, and also because it does not fall, taken alone, within the scope of the present invention, and finally also because the deletion of these details from the drawings renders the latter simpler and easier to understand.

Said mechanism for driving the fingers 5 of the bolt and plates 6, 7 is controlled, in the device according to the invention, by a cylinder lock 8, of a type known per se, comprising a body 9 with a rotatable cylinder 8a which is for cooperation with a key (not shown). Also with regard to the cylinder lock, the details relating to the inner structure are not shown, since this lock can be made in any known way. Also in a way known per se, the body 9 of lock 8 is mounted within a passage 10 with a corresponding shape which is formed in the casing 2.

In the conventional solutions, in order to prevent dismantling of the cylinder lock from the casing 2 of the device, the body 9 of the cylinder has a transverse threaded hole 11 which receives the threaded end of a screw which is inserted through casing 2 from a hole formed in wall 4.

In the case of the present invention, however, the body 9 of the cylinder lock 8 is also provided with a threaded transverse hole 11, but the screw which engages this hole is a short screw 12 with an hexagonal head, which is screwed into body 9 before the body is inserted into passage 10 (and not after this insertion, as in the conventional solutions). The front wall of casing 2 is provided with a cavity 13 having a shape corresponding to the shape of the portion of the screw 12 which projects outwardly from body 9. Screw 12 is held within cavity 13 by a stud 14 projecting from a stop plate 15 having two holes 16 for engagement of two screws 17 which are screwed within corresponding seats 18 provided in casing 2. Preferably, screw 12 is in contact, inside casing 2, with a fixed stud 26 (figure 3) similar and opposite to stud 14. The screws 17 pass also through two spacer bushes 19, which are connected to a plate 20 which is thus fixed to the stop plate 15 at a distance therefrom (figure 2), this distance corresponding to the thickness of the door on which the device 1 is mounted. Plate 20 is further covered by a decorative plate 21 which, similarly to plate 20 and stop plate 15, has a central aperture 22 with a shape corresponding to the cross-section of body 9 of the cylinder lock 8, to enable this element to be mounted over body 9.

Screws 17 pass through the spacer bushes 19, holes 16 of the stop plate 15, the through seats 18 provided in casing 2 and are screwed within two threaded holes 23 formed in a cylindrical body 24 fixed on the side of the casing 2 facing outwardly of the dwelling and having a central seat 25 which receives the end of body 9 of the cylinder lock 8 which projects outwardly from casing 2, so as to act as a protection and a reinforcement therefor.

As clearly apparent from the foregoing description, the device according to the invention does not require the use of a transverse screw for securing the body of the cylinder lock which passes through casing 2 of the lock starting from its side wall 4. In the case of the present invention there is only provided a short screw 12 which is screwed to body 9 before the latter is inserted into passage 10 and is received in a corresponding cavity 13 of the casing 2 and locked within this cavity by fixing a stop plate 15 to casing 2 by screws. The mounting and dismantling operations of the body of the cylinder lock are particularly simple, easy and rapid.

Figures 4,5 show a variant of the device according to the invention which can be operated from inside the door by a knob. As shown in figure 5, the casing of the device is fitted between two panels D1 and D2 constituting the door. The body 9 of the cylinder lock has an axial length substantially corresponding to the overall thickness of the door. The portion of body 9 of the cylinder lock which projects from the sheet metal casing 2 on the outer side of the door is received within the cavity 25 of the cylindrical body 24 of hard material which on its turn is housed within an aperture 50 of panel D1. on the inner side of the door, the portion of body 9 of the cylinder lock which projects from casing 2 is received within an aperture 51 of panel D2. The spacer bushes 19 serve for positioning plate 20 at a distance from casing 2 and flush with the inner surface of the door.

Finally, on the rotatable stem 8b projecting from body 8 towards the inner side of the door there is rotatably connected, by means a radial pressing screw 52, a knob K serving for driving the cylinder lock from inside the door, without the need of a key.

As shown, in the device according to the invention, the body 9 of the cylinder lock 8 is provided with a rotatable stem 8b projecting axially from body 9. At the manufacturing plant, stem 8b is provided with a maximum standardized length. During the mounting operation of the lock on the door, the stem can be cut at any lower desired length, as a function of the door thickness. It is thus possible to provide a single lock model, without providing different variants as a function of the possible different thickness of the door on which the device must be mounted.

Figures 6-8 show a further embodiment of the lock device according to the present invention. In these figures, reference numeral 1 designates the sheet metal casing of the lock according to the invention, constituted by a rectangular box of sheet metal 2 closed on a front side by a lid 3. The casing 2 has an aperture 4 which enables the body 5 of a cylinder lock to be introduced therein, in the manner which has been described above. Therefore, also in this embodiment, into body 5 of the cylinder lock there is screwed a side screw 6 which is received and held in a respective seat within the casing

2 (see also figure 7) by a stud 7 (see figure 6) projecting from a plate 8 which is screwed into the body of casing 2 by screws 9, with the interposition of two spacer cylinders 10 carried by a plate 11 and with the addition of an outer decorative plate 12. on the outer side of the lock, i.e. on the side which is to be on the outer side of the door there is mounted a protective cylinder 13 with a passage 14 for receiving the key 15.

According to a technique conventional per se, the safety lock comprises a bolt generally designated by 16, comprising a plurality of cylindrical fingers 17 movable between a position projecting from casing 2 (shown in figures 6-8), in which these fingers 17 are received within cooperating seats (not shown) formed in a support fixed to the frame of the door, to lock the door in the closed condition, and a position retracted within casing 2. The fingers 17 are carried by a steel plate 18 which is slidably mounted inside casing 2 along the horizontal direction (with reference to figure 7) and is guided in its movement by pins 19 (one of which is visible in figure 7) carried by the casing 2 and engaged within horizontal slots 20 (one of which is visible in figure 7) formed in plate 18. The movement of plate 18 of the bolt 16 between said door locking and unlocking positions is driven by the key 15 through the cylinder lock 5. In a conventional way, this lock includes a rotatable tooth 21 able to engage a rack 22 formed on the upper horizontal edge of an aperture 28 formed in plate 18.

Also according to the conventional technique, the mechanism of the lock further includes a safety plate 23 which is slidably mounted inside the casing 2 along a direction perpendicular to the sliding direction of bolt 16, i.e. along a vertical direction, with reference to figure 7. The safety plate 23 is guided in this movement by the engagement of fixed pins 19 inside vertical slots 24 formed in safety plate 23.

Also according to the prior art, the safety plate 23 is biased by a spring 25 towards a position for locking the bolt 16. This locking effect is due to that a safety stud 26 carried by plate 18 of bolt 16 is locked within one of the vanes defined between the teeth 27 formed on one toothed edge of an aperture 28 formed in the safety plate 23.

When the key 15 is inserted into the cylinder lock 5, it is able to drive the rotation of tooth 21 which engages with its rotation both rack 22, as already indicated above, in order to cause the movement of bolt 16, and one edge 29 of the safety plate 23, in order to cause a movement of the safety plate 23 along the vertical direction upwardly (with reference to figure 7) towards a position in which the safety stud 26 reaches, with respect to safety plate 23, the position indicated by dotted lines in figure 7, where it finds a free passage in aperture 28 which enables movement of the bolt 16.

In case of an unauthorized attempt to break open the lock, when the latter is in the locked condition, with the bolt 16 projecting in the position shown in figure 7, a burglar could try to cause the movement of the safety plate 23, against the action of spring 25, in the position enabling movement of the bolt 16. In order to achieve a greater safety level against the risk of a break of this type, the lock according to the invention provides on safety plate 23 a pair of appendages 30, which project from one edge 31 of the safety plate 23 and are arranged on both sides of the body of the cylinder lock 5. It is also to be noted that the cylinder locks of the type commonly used in safety locks of the above indicated type, have the feature of having a driving tooth 21 which partially projects on one side of the body of the cylinder lock 5 (as shown in figure 7) when the lock is in its neutral condition. Therefore, due to the provision of the two appendages 30, one of these appendages (the one which is on the side of body 5 of the cylinder lock from which the driving tooth 21 projects, which side can be different from one lock to the other) comes to be immediately adjacent to tooth 21, so that the latter acts as stop element, cooperating with one of said appendages 30, to prevent an unauthorized movement of the safety plate 23 towards the position enabling movement of bolt 16.

As clearly shown in figure 8, in the example described herein, each appendage 30 is L-shaped, with a vertical portion and a horizontal portion which cooperates with said driving tooth 21.

From the foregoing description, it is clearly apparent that the lock according to this embodiment of the invention, due to the provision of the two appendages 30, provides a high degree of safety against burglaries, while avoiding excessive complication of the structure of the lock and with no substantial increase in the cost of manufacture.

Naturally, while the principle of the invention remains the same, the details of construction and the embodiments may widely vary with respect to what has been described and illustrated purely by way of example.

Claims

1. Safety lock device for doors of dwellings and the like, comprising:

   a casing (2) which is to be fixed to the door,
   a bolt (5) slidably mounted within the casing (2) between a locking projecting position and an unlocking position retracted within the casing (2),
   a mechanism for driving the bolt (5),
   a cylinder lock (8) for controlling the bolt driving mechanism (5), said cylinder lock (8) having a body (9) which is received within a passage (10) of complementar shape formed through the casing (2),
   characterized in that the body (9) of the cylinder lock (8) has a member (12) projecting transversally from one side thereof and in that said

casing (2) has a cavity (13) provided for receiving said projecting member (12), said device further comprising a stop element (15), screwed to said casing (2) and having a portion (14) for securing the projecting member (12) within said cavity (13).

2. Safety lock device according to Claim 1, in which the body (9) of the cylinder lock (8) is secured within said casing (2) by means of a transverse screw (12) having one end screwed into one side of this body (9), **characterized in that** said screw (12) constitutes said projecting member (12), so that it can be screwed into the body (9) of the cylinder lock (8) before that this body (9) is introduced into said passage (10) formed through the casing (2), the portion of the screw (12) which projects transversally from one side of the body (9) being received within said cavity (13), when said body (9) is introduced into said passage (10).

3. Safety lock device according to claim 2, **characterized in that** said transverse screw (12) has a length substantially lower than the distance between said passage (10) and the side of the casing (2) which is closer thereto.

4. Safety lock device according to claim 2, **characterized in that** said stop element (15) is constituted by a plate (16) provided with a stud (14) for locking the transverse screw (12) within said cavity (13).

5. Safety lock device according to claim 4, **characterized in that** said stop plate (15) has holes (16) for engagement of fixing screws (17) which pass through the casing (2) and are received within threaded holes (23) of a cylindrical body (24) fixed to the side of the casing (2) facing outwardly of the dwelling and having a central seat (25) for receiving and protecting the outer end of the body 9 of the cylinder lock (8).

6. Safety lock according to any of the preceding Claims, **characterized in that** the cylinder (8a) has a rotatable stem (8b) projecting axially from the body (9) of the cylinder lock (8), on which there is rigidly connected a knob (K) for driving the cylinder lock (8) from inside the door, said stem (8b) being provided with a maximum standardized length so that it can be cut at any lower desired length as a function of thethickness of the door on which the device is to be mounted.

7. Safety lock according to any of the preceding Claims, in which the cylinder lock (5) includes a driving tooth (21) projecting radially from the cylinder (5) and able to cooperate with a rack (22) carried by the bolt (16) to cause movement of the latter between the locking position and the unlocking position, said device further comprising a safety plate (23) slidably mounted within the casing (2) along a direction perpendicular to the direction of movement of the bolt (16), said safety plate being movable against the action of spring means (25) as a result of the engagement of the driving tooth (21) of the cylinder (5) against one edge (29) of said safety plate (23), towards a position enabling the movement of the bolt (16), in which said safety plate leaves a passage (28) free for a safety stud (26) carried by the bolt (16); said cylinder lock (5) being of the type in which, when the lock is in locked condition, said driving tooth (21) projects laterally from the body (5) of the cylinder lock,
characterized in that said safety plate (23) includes at least one appendage (30) arranged on one side of body (5) of the cylinder lock, so as to come in contact with said driving tooth (21) projecting from the body (5) of the cylinder lock when the lock is locked, so that said driving tooth (21) acts as a stop element able to prevent a movement of the safety plate (23) towards said position enabling the movement of the bolt (16) when the lock is locked.

8. Safety lock according to claim 7,
characterized in that said safety plate (23) has a pair of appendages (30) arranged on the two sides of body (5) of the cylinder lock.

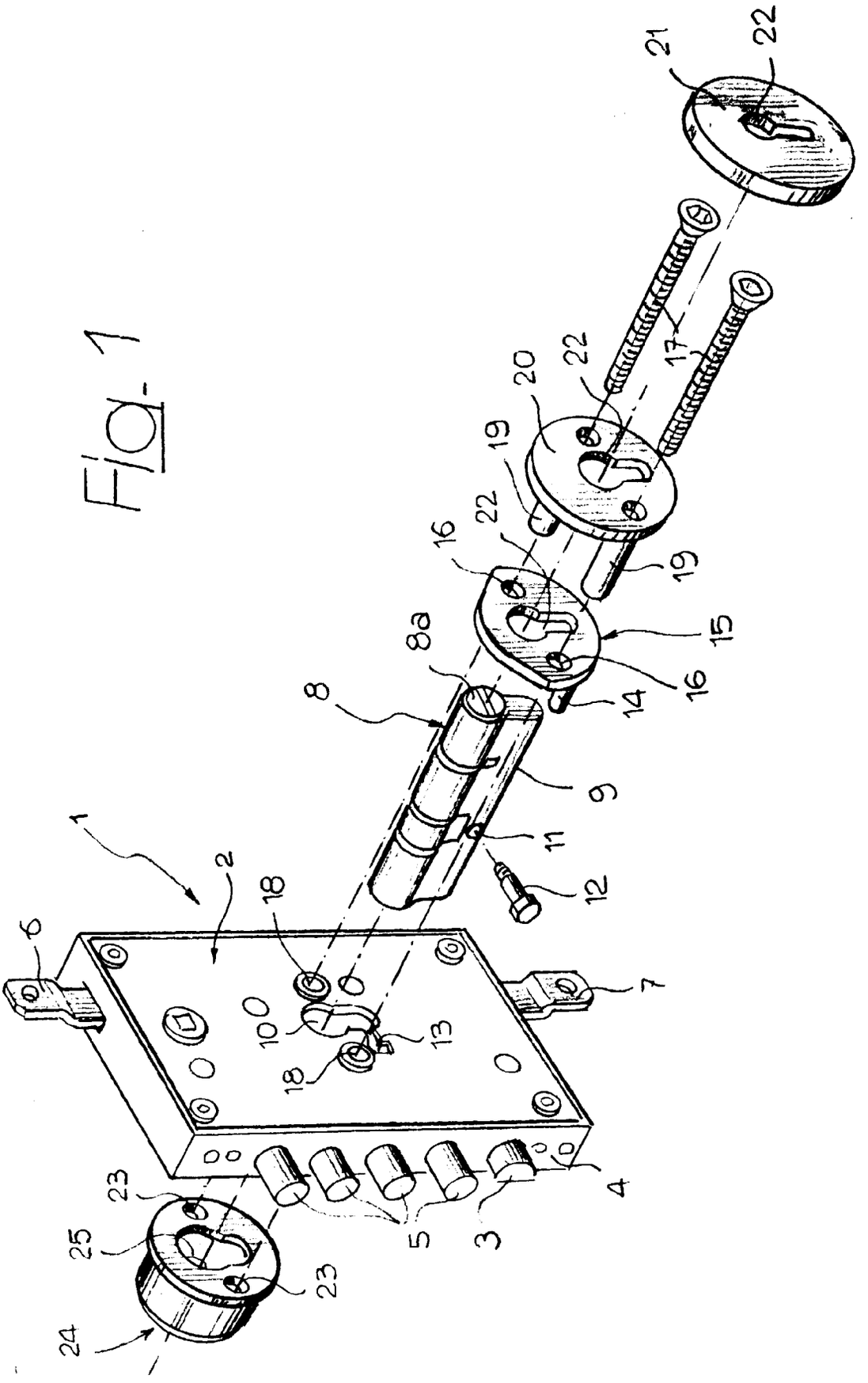

Fig. 1

Fig. 2

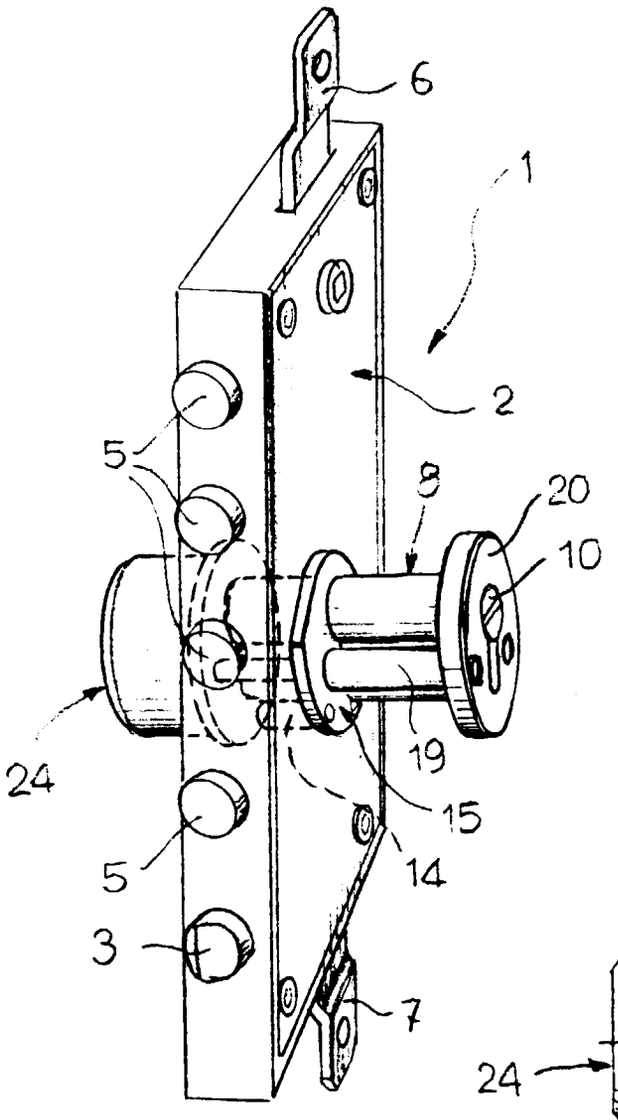

Fig. 3

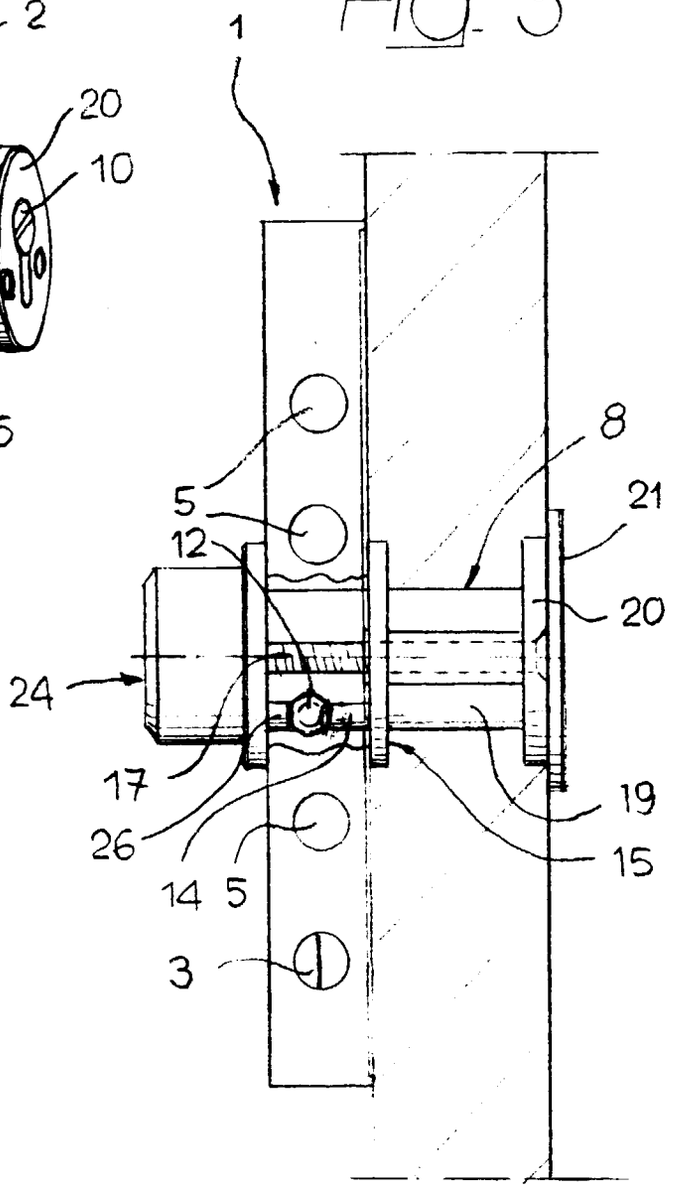

FIG. 4

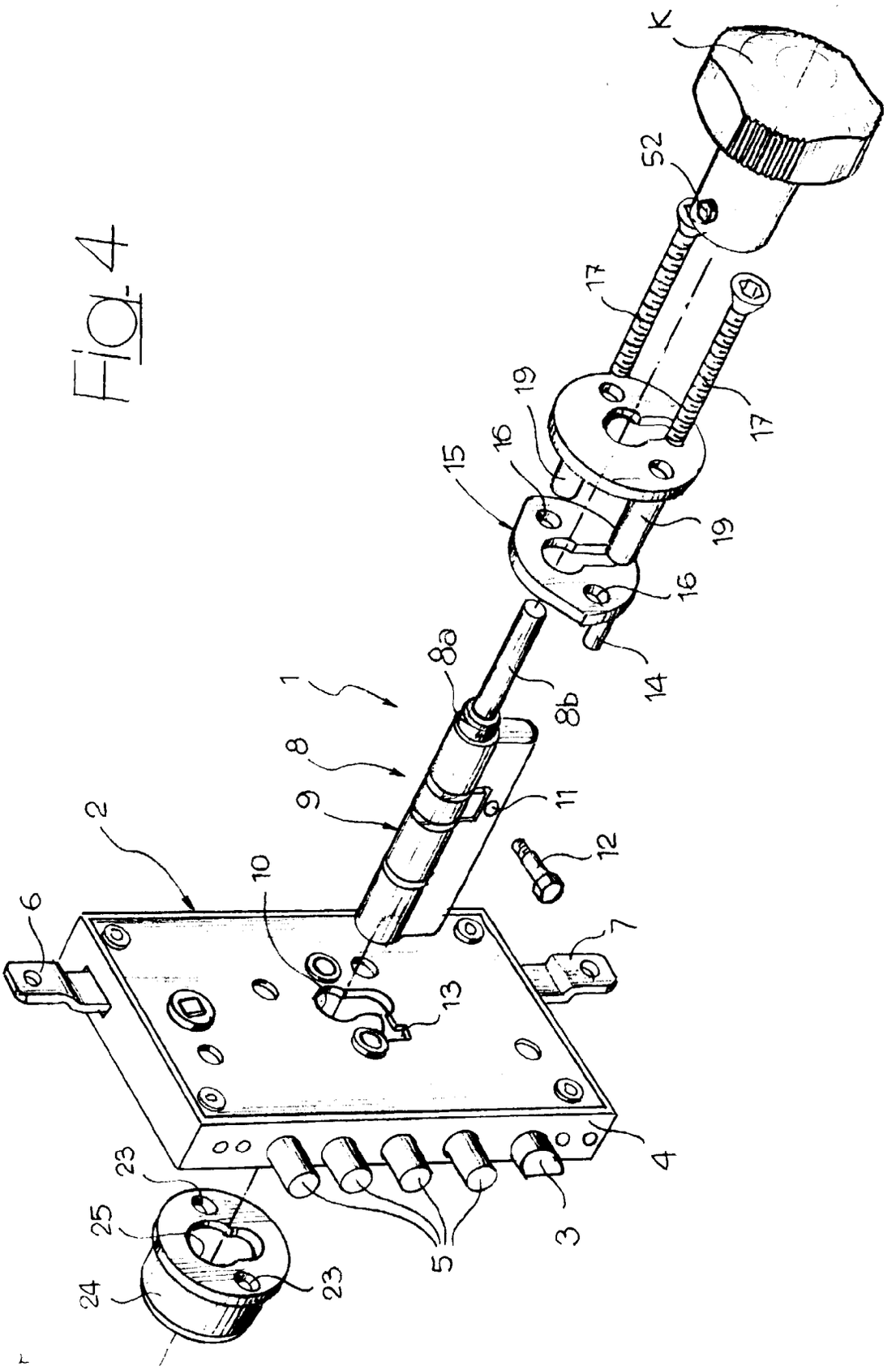

Fig. 5

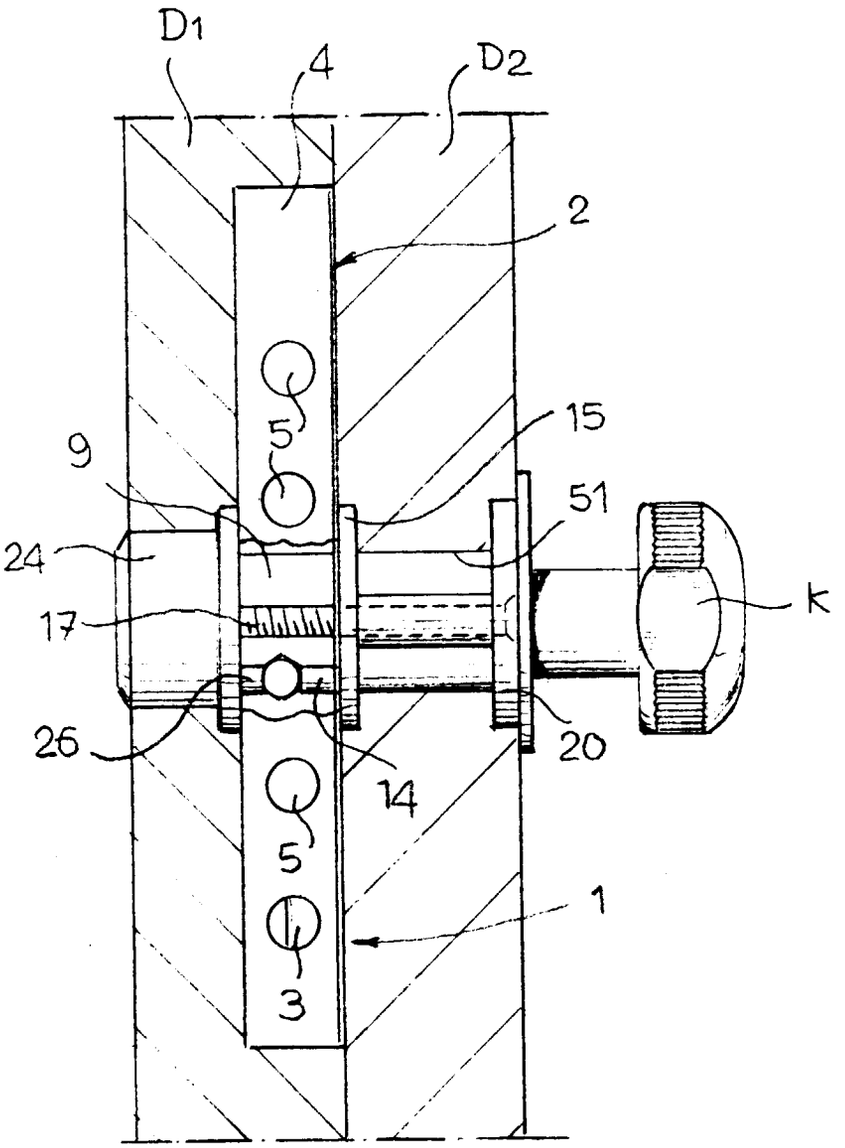

Fig. 6

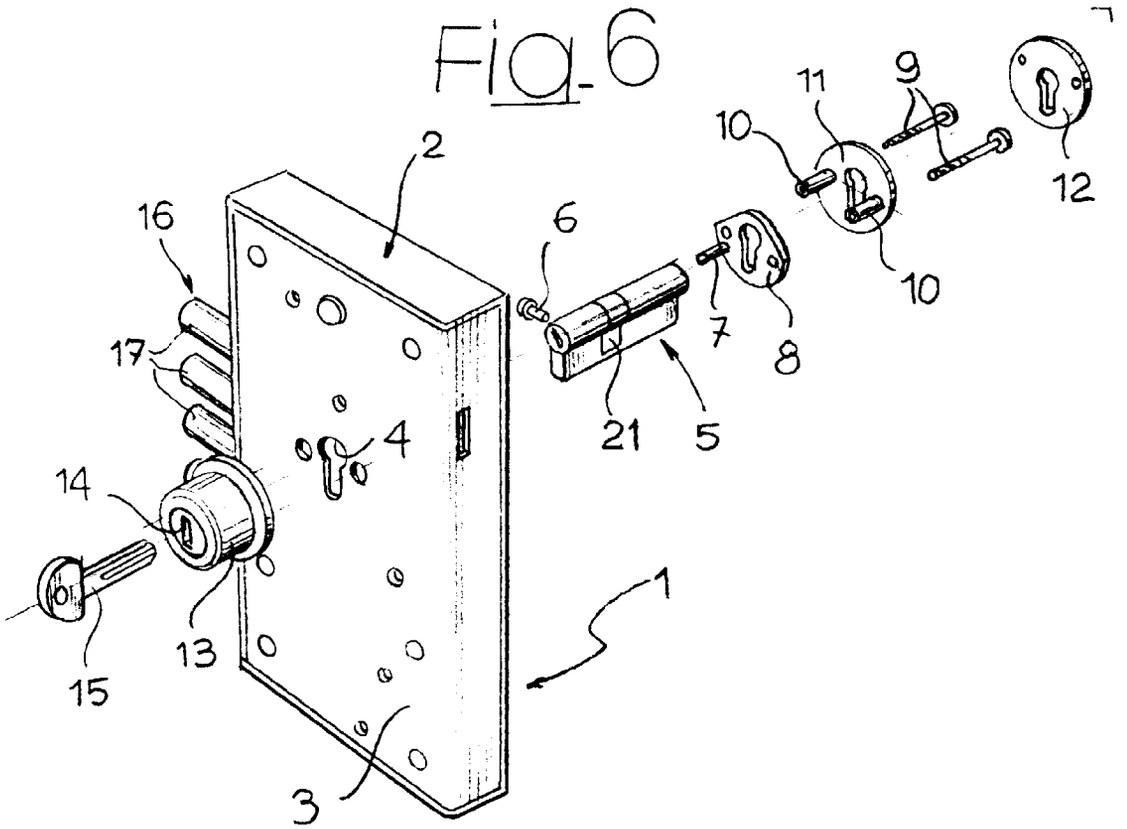
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Fig. 8

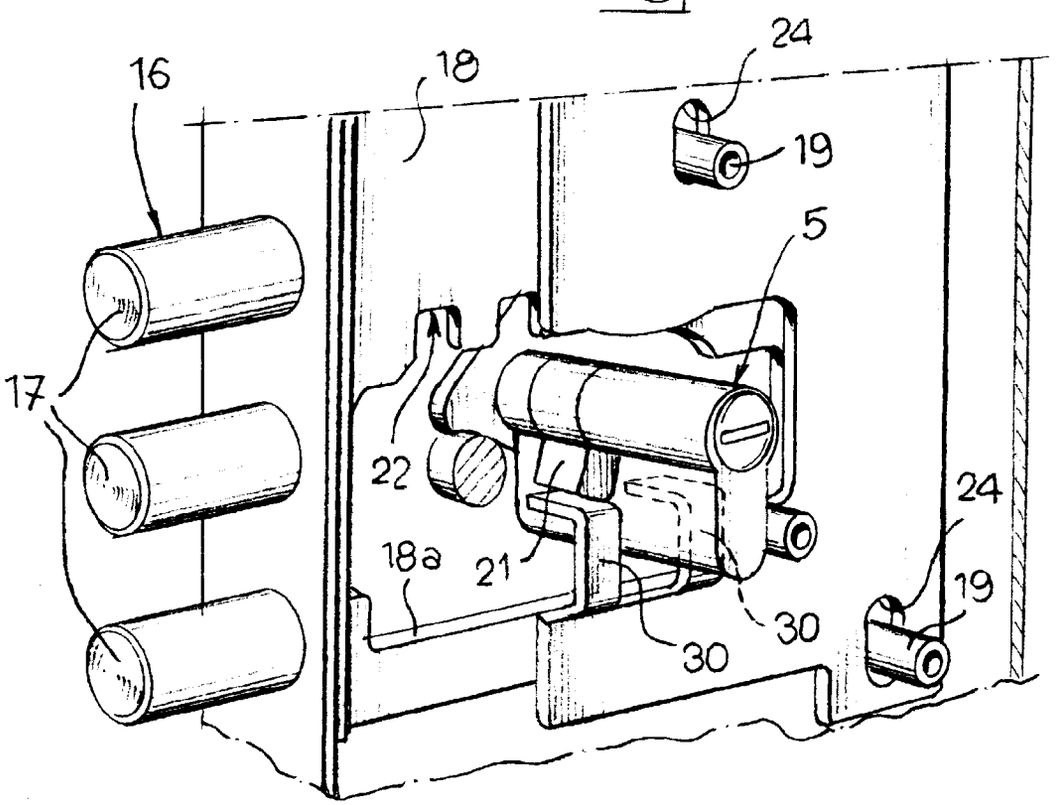
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Fig. 7