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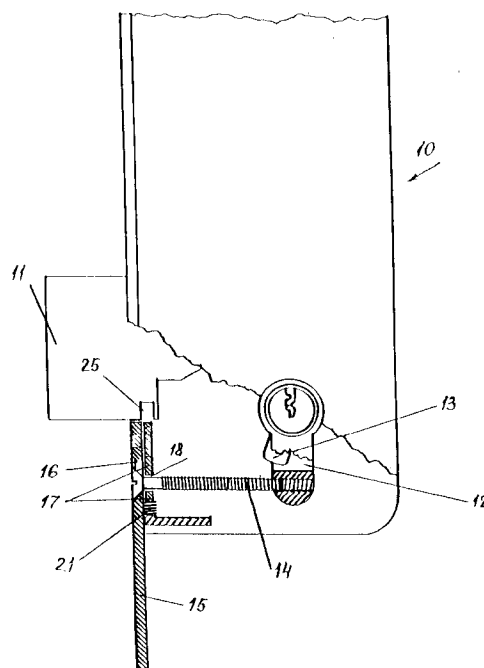
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(54) **Protection latch for mortise cylindrical lock.**

(57) A protection latch mechanism for mortise cylindrical locks, comprising a supporting screw (14), secured between the front wall (15) of the lock and the lock's cylinder (12). The supporting screw (14) is preliminarily weakened; for instance it is shorter than regular screws. Blocking means connect the weakened supporting screw (14) to the main latch (11) of the lock. The blocking means comprise a sprung sliding plate (17), engaged onto the supporting screw (14) and engageable to the latch of the lock. When the intruder manipulates the lock's cylinder, trying to brake it (thus resulting in a change of the cylinder's position), the weakened supporting screw will not resist this action and thus rotate and change its position. That will activate the blocking means to secure and block the main latch of the lock.

FIG. 1



The present invention relates to security means for mechanical locks, most particularly to a protection element for mortise cylindrical locks.

BACKGROUND OF THE INVENTION

Different systems for protection of the cylindrical locks are known in the prior art.

DE 38 00 298 describes a protecting system for cylinder locks, comprising a ratchet, positioned above the cylinder and attached to the main latch of the lock; the system comprises also a fork and a hook. The ratchet is capable to go down, when the cylinder is broken or removed. The ratchet when in its lower position, causes the hook to come into contact with the fork, to press the fork down, thus engaging the ratchet and blocking the latch.

The main disadvantage of this construction is its low reliability, because the ratchet goes down only when all the cylinder or its central part is removed from the lock. Such a condition can be easily overcome by the experienced intruder. The other disadvantage is the fact, that in order to reactivate the lock which was blocked by mistake during its installation, all manipulation must take place from the face of the lock by means of a special tool.

DE 26 57 802 discloses a protection system for the Mortise lock, comprising a composition of levers and latches to be triggered by breaking or removing of the lock's cylinder. One of the levers penetrates into a space, appearing after removing the cylinder, and causes activation of the other elements of the protection system. The latch is provided for blocking the reverse movement of the protective elements of the system.

The same disadvantage (i.e. the breaking of the cylinder or the part thereof as a condition of blocking the latch mechanism) can be noticed. The mechanism is also very complicated in its construction.

DE 33 31 584 describes a protection assembly for the cylinder locks, where a screw, going through the cylinder, acts as a trigger causing blockage of the main latch of the lock in the case of intervention into the cylinder. When the screw is released by breaking the cylinder, it activates a spring assembly, which turns an eccentric, which blocks the main latch. However, the experienced intruder can remove only an external part of the cylinder, leaving the screw in its initial position (being kept in place by the remaining elements of the thread), thus overcoming the blockage, and then penetrate the lock. Moreover, the mechanical force moving the released broken screw is directed horizontally and due to that fact the protective mechanism needs quite a lot of elements for transformation of that force into the blocking action of the eccentric. Thirdly, the intruder may even return the blocking eccentric into its neutral position by means of pressing onto the free end of the broken screw, after

the cylinder is broken (the screw is quite long and thus can be reached), and thus neutralize the blocking mechanism.

DE G 89 14 390.6 describes a blocking mechanism for the main latch of cylinder locks. This mechanism is based on a deviation of the position of a screw, supporting the cylinder, which deviation can appear as a result of the cylinder's complete breaking or removing.

An originally shaped hook is provided, mounted on the head of the screw. The hook blocks the main latch whenever its feet slides from the head of the screw to its body. It can happen only if the screw is released by the intruder and moves horizontally out of the cylinder.

All the disadvantages of the previous three references could be mentioned also for this case:

1. The experienced intruder can remove only an external part of the cylinder, leaving the screw in its initial position and thus overcoming the blockage.
2. The mechanical force moving the released broken screw is directed horizontally and due to that fact the protective mechanism needs quite a lot of precise elements for transformation of that force into the blocking action of the hook.
3. The intruder may even return the blocking eccentric into its neutral position by means of pulling back the free end of the broken screw, after the cylinder is broken (the screw is quite long and thus can be reached). If the blocking eccentric is returned into its initial position, the blockage will be taken out.

It is therefore the purpose of the present invention to provide a simple and effective mechanism for protection of mortise locks from intruders, incorporated in the housing of the lock.

Moreover, the described devices can be sometimes overcome by the intruder who may succeed (by drilling of the lock case) to disconnect the main latch from any protective blocking mechanism.

The additional purpose of the present invention is to provide an improved, more reliable protection latch mechanism for the mortise cylindrical lock, which mechanism can stand against intruders trying to drill through the locking case of the door.

The protection latch mechanism for mortise cylindrical locks, herein provided, comprises a supporting screw, secured between the front wall of the lock and the lock's cylinder; and said supporting screw is preliminarily weakened; and said mechanism comprises blocking means connecting said supporting screw to the main latch of said lock;

so that when the intruder manipulates said lock's cylinder, trying to brake it, thus resulting in a change of said cylinder's position, said weakened supporting screw will not resist this action and thus rotate and change its position, hence activating said blocking

means to secure and block said main latch of said lock.

In the preferred embodiment said supporting screw goes through an orifice in said front wall of said lock and into said lock's cylinder; and said blocking means comprise a sprung sliding plate, engaged onto said supporting screw and engageable to said main latch of the lock;

so that when the intruder manipulates said cylinder, thus causing said weakened supporting screw to change its initial position, said sprung sliding plate will be released and will secure and block said main latch of said lock.

In the preferred embodiment said supporting screw is weakened by means of having a shorter length than the regular supporting screw; and by securing of said supporting screw to the front wall of said lock so that it could be movable; and by introducing said supporting screw into said cylinder to an extent less than half of said cylinder's width; so that, when said cylinder deviates its position or brakes, said weakened supporting screw changes its position and activates said blocking means.

In another embodiment said supporting screw can be weakened by means of providing it with a narrowed section; and securing of said supporting screw to said front wall so that it can be movable.

In the preferred embodiment said supporting screw is secured to the front wall of the lock by means of providing a widened orifice in said front wall for said supporting screw; and said orifice is widened in the vertical direction.

In one embodiment said sliding plate is placed along the front wall of the lock, and can be provided with an opening for said supporting screw to go through said sliding plate; and said screw is smooth at the place of contact with said sliding plate, and said screw has a smaller diameter at its smooth end, so as to prevent it from jutting out of the lock.

In one embodiment said sliding plate can be provided with a longitudinal slot and can be attached movably to the front wall of the lock by a pin, going through said slot.

In the preferred embodiment said sliding plate is provided with two protrusions on both sides of said sliding plate, movable into two correspondent longitudinal guiding slots, provided in the housing of said lock.

In one preferred embodiment said sliding plate is provided with a lower horizontal tooth in order to improve contact between said sliding plate and said spring.

In the preferred embodiment said main latch is provided with a recess for engaging of said latch to said sliding plate when it moves into its protecting position.

In different embodiments said sliding plate can be connected to a helical spring or to a leaf spring.

In the preferred embodiment said protection latch mechanism is covered by an additional cover to protect said mechanism from intervention by an intruder from the outside.

In one preferred embodiment said additional cover's upper part is provided with a vertical section in order to secure said sliding plate to said front wall of said lock and to block the bending of said sliding plate and thus the movement of said main latch.

In different embodiments said spring can be connected at its other end to the lower part of said additional cover, or to said lock's housing by means of any spring supporting element.

In the preferred embodiment said additional cover, said leaf spring and sliding plate form an integral protective assembly.

In an alternative embodiment said additional cover and said leaf spring form an integral spring assembly.

In another embodiment said sliding plate, positioned along the front wall of the lock, is provided with a groove, enabling said sliding plate to embrace said main latch; and said lock's housing is provided with a hook capable to engage said sliding plate, whenever said sliding plate is raised from its lower initial position; and said hook keeps said sliding plate in its upper protecting position, thus causing said sliding plate to block said main latch.

In the preferred embodiment said sliding plate is provided with a tooth intended to be engaged with said integral spring assembly; and said integral spring assembly is provided with a corresponding slot.

In the preferred embodiment the lower surface of said main latch is provided with an additional recess located near the front surface of said latch; so that during the lock's installation, when said cylinder is not yet secured by said supporting screw, said sliding plate will be pressed up by said spring and engaged with said additional recess, thus preventing said main latch from unintentional locking.

Optionally a protective cover in form of a hard metal plate can be provided, and attached to the outer side of said lock's housing opposite said latch protection mechanism.

BRIEF DESCRIPTION OF THE INVENTION

Fig.1 illustrates the cross section of a mortise cylinder lock, having a protection latch mechanism in its initial position.

Fig.2 illustrates the cross section of a supporting screw of the protection latch mechanism.

Fig.3 illustrates the alternative kind of a supporting screw.

Fig.4 illustrates the profile of the orifice of the front wall, provided for the head of the supporting screw.

Fig.5 illustrates a shape of the sliding plate, with

side protrusions.

Fig.6 illustrates a cross section of the lock, having the protection latch mechanism in its protecting position.

Fig.7 illustrates the further modification of the lock, having an integral protective assembly. The mechanism is in its protecting position.

Fig.8 illustrates another modification of the lock, having an integral spring assembly and a sliding plate, embracing the main latch. The mechanism is in its protecting position.

Fig.9 illustrates a three dimensional view of the sliding plate and the integral spring assembly, shown in Fig.8.

Fig.10 illustrates a cross section of the lock, having a modified main latch.

DETAILED DESCRIPTION OF THE INVENTION

In Fig.1 one can see a mortise cylindrical door lock 10, having a main latch 11, operated by a cylinder 12. The cylinder 12 has a narrow section under a tongue plate 13 which is likely to break by a skilled intruder. In order to secure the cylinder 12 in position a supporting screw 14, goes through the front wall 15 of the mortise lock 10 and into the narrowed section, under the tongue plate 13.

However, according to this invention, the front wall 15 has a widened orifice 16 for the screw's 14 passage, and the supporting screw 14 is preliminarily weakened (as shown in Fig.3).

The protection mechanism is provided with a sliding plate 17, positioned along the front wall 15 of the lock 10. The sliding plate 17 has an orifice 18 for the screw 14 passage. The sliding plate 17 is movably attached to the front wall 15 by means of two longitudinal protrusions (not seen) on both sides of the plate 17, to be moved in two correspondent slots in the lock's housing (not seen). The sliding plate 17 is sprung by a helical spring 21, attached to the lock's housing.

In Fig.2 one can see one possible shape of the supporting screw, providing its release action when the cylinder 12 is tampered with. The screw 14A has a narrowed section 23, breakable when the cylinder 12 is broken or forced from its original position.

Fig.3 illustrates another way of weakening of the screw. The screw 14B is shortened and inserted into the cylinder 12 to just enter the cylinder's tip. So when the cylinder 12 is broken or moved, the screw 14B will be released.

The supporting screw 14 is prevented from jutting out of the lock 10, when the lock 10 is tampered with, by having a smooth section 24 near the screw's 14 head, and the section 24 has a smaller diameter than the main section of the screw 14; and the smooth section 24 is engaged to the sliding plate 17.

Fig.4 illustrates a widened orifice 16, provided in

the front wall 15 of the lock. The orifice 16 enables the head of the screw 14 to move along it once the end of the screw is released; and the spring 21 pushes against the screw 14 and activates the sliding plate 17, which blocks the latch 11.

Fig.5 illustrates the preferred embodiment of the sliding plate. The sliding plate 57 has an opening 58 for the screw 14 passage and two longitudinal protrusions 59 on both sides to be moved in two correspondent slots in the lock's housing (not seen).

Fig.6 illustrates the lock 10 having its latch 11 in a protected position. The mechanism acts in the following way.

When the lock 10 is locked as shown in Fig.1, the main latch 11 is in its opened position out of the housing, the supporting screw 14 is in a perpendicular position to the front wall 15 secured to the cylinder 12 and presses down the spring 21, thus keeping the sliding plate 17 in its neutral position. When an intruder penetrates into the cylinder 12 by any mechanical means and brakes or moves the cylinder 12, the supporting screw 14 is broken or released from the cylinder 12, the spring 21 is then released, and moves the sliding plate 17 upwards, thus blocking the main latch 11, by penetrating into the recess 25 of the latch 11.

It should be noted, that the supporting screw 14, when released, is rotatable relative to its end, faced to the cylinder; thus creating not only horizontal, but also vertical forces, enabling to simplify the construction of the blocking mechanism.

In Fig.7 the protection mechanism is covered by an inner additional cover 70B to prevent the intruder from tampering with the protection mechanism. In that embodiment the additional cover 70B and the sliding plate 70A form one integral protective assembly 70. The additional cover 70B comprises a curved lower part 70C and an upper part 70D, provided with a short vertical section 70E. The upper vertical section 70E presses the sliding plate 70A towards the front wall 15, thus carrying out the protrusions' 59 function (see Fig.5). The lower curved part 70C of the assembly 70 acts itself as a leaf spring. The vertical part of the integral assembly 70 is a sliding plate 70A.

Even if the intruder knows the construction of the protection mechanism, he cannot tamper with it by any external mechanical instrument due to the protection provided by the additional cover 70B, positioned in the housing.

Figs.8 and 9 illustrate another modification of the lock. Fig.8 is a cross section of the lock, having an integral spring assembly 80 and a longer sliding plate 81. Fig.9 is a three dimensional view of the new sliding plate 81 and the integral spring assembly 80.

The upper elements 80D-80E and the lower element 80C form an integral spring assembly 80. The spring assembly is engaged with the longer sliding plate 81, embracing the main latch 11. Above the sliding plate

81 a hook 82 is placed, capable to grip the plate 81 when at its upper position. In order to obtain a safe contact between the spring assembly 80 and the sliding plate 81, the lower element 80C of the assembly 80 has fork-like endings 80E, extending upwards; correspondingly, the sliding plate 81 is provided with a tooth 83, insertable into a slot between the fork-like endings 80E. The integral spring assembly 80 is attached to the lock's housing by several protrusions 80F, being parts of the upper part 80D of the assembly. The sliding plate 81 should be wide and strong enough, thus it is movable into two guide slots (not seen), provided in the lock's housing.

In the front wall 15 an orifice 85 is made in order to block the hook 82 in its closed position.

This protection latch mechanism operates in the following way. When the intruder tries to brake the cylinder 12, the supporting screw 14 changes its position and releases the spring assembly 80, which immediately pushes the longer sliding plate 81 upwards, where the hook 82 catches the plate 81 and keeps it in its upper position due to the hook's 82 penetration into the orifice 85. As of this moment if the intruder tries to press downward the spring assembly 80, the main latch 11 is already blocked by the engaged sliding plate 81, and no movement of the spring assembly 80 can have any influence on the main latch's 11 position: the latch remains blocked.

It should be noted, that in other possible embodiments the longer sliding plate 81 can be used in combination with a single helical (or leaf) spring.

In Fig.10 the lock 10 is shown, ready for installation into the door. The main latch 11 is provided with the recess 25 described in the figures above, and an additional recess 125 is provided at the lower surface of the main latch 11 near its front surface. During the lock's installation, while the user does not yet secure the cylinder 12 by the supporting screw 14, the sliding plate 70A will be pressed up by the spring part 70C of the assembly 70 and engaged with the additional recess 125, thus preventing said main latch 11 from unintentional mistaken locking. When the user secures the cylinder 12 by the screw 14 (as seen in Figs. 10 or 1) so that the screw 14 is already in its initial horizontal position, the sliding plate 70A is pressed down and the latch 11 is released for the further proper operation.

While the invention has been described in the illustrations above, it should be appreciated, that several similar constructions of the same protection latch mechanism could be suggested; such embodiments should be part of the present invention.

Claims

1. A protection latch mechanism for mortise cylindrical locks, comprising a supporting screw, se-

cured between the front wall of the lock and the lock's cylinder; and said supporting screw is preliminarily weakened; and said mechanism comprises blocking means connecting said supporting screw to the main latch of said lock; so that when the intruder manipulates said lock's cylinder, trying to brake it, thus resulting in a change of said cylinder's position, said weakened supporting screw will not resist this action and thus rotate and change its position, hence activating said blocking means to secure and block said main latch of said lock.

2. The protection latch mechanism for mortise cylindrical locks, as in claim 1, wherein said supporting screw goes through an orifice in said front wall of said lock and into said lock's cylinder; and said blocking means comprise a sprung sliding plate, engaged onto said supporting screw and engageable to said main latch of the lock; so that when the intruder manipulates said cylinder, thus causing said weakened supporting screw to change its initial position, said sprung sliding plate will be released and will secure and block said main latch of said lock.
3. The protection latch mechanism for mortise cylindrical locks, as in claim 1, wherein said supporting screw is weakened by means of having a shorter length than the regular supporting screw; and by securing of said supporting screw to the front wall of said lock so that it could be movable; and by introducing said supporting screw into said cylinder to an extent less than half of said cylinder's width; so that, when said cylinder deviates its position or brakes, said weakened supporting screw changes its position and activates said blocking means.
4. The protection latch mechanism for mortise cylindrical locks, as in claim 1, wherein said supporting screw is weakened by means of providing it with a narrowed section; and securing of said supporting screw to said front wall so that it can be movable.
5. The protection latch mechanism for mortise cylindrical locks, as in claim 1, wherein said supporting screw is secured to the front wall of the lock by means of providing a widened orifice in said front wall for said supporting screw; and said orifice is widened in the vertical direction.
6. The protection latch mechanism for mortise cylindrical locks, as in claim 2, wherein said sliding plate is provided with two protrusions on both sides of said sliding plate, movable into two correspondent longitudinal guiding slots, provided in

the housing of said lock.

7. The protection latch mechanism for mortise cylindrical locks, as in claim 2, wherein said main latch is provided with a recess for engaging of said latch to said eliding plate when it moves into its protecting position. 5
8. The protection latch mechanism for mortise cylindrical locks, as in claim 1, wherein said protection latch mechanism is covered by an additional cover to protect said mechanism from intervention by an intruder from the outside. 10
9. The protection latch mechanism for mortise cylindrical locks, as in claim 8, wherein said additional cover's upper part is provided with a vertical section in order to secure said sliding plate to said front wall of said lock and to block the bending of said sliding plate and thus the movement of said main latch. 15
20
10. The protection latch mechanism for mortise cylindrical locks, as in claim 8, wherein said additional cover, said spring and said sliding plate form an integral protective assembly. 25
11. The protection latch mechanism for mortise cylindrical locks, as in claim 8, wherein said additional cover and said spring form an integral spring assembly. 30
12. The protection latch mechanism for mortise cylindrical locks, as in claim 1, wherein said sliding plate, positioned along the front wall of the lock, is provided with a groove, enabling said sliding plate to embrace said main latch; and said lock's housing is provided with a hook capable to engage said sliding plate, whenever said sliding plate is raised from its lower initial position; and said hook keeps said sliding plate in its upper protecting position, thus causing said sliding plate to block said main latch. 35
40
13. The protection latch mechanism for mortise cylindrical locks, as in claims 11, 12, wherein said sliding plate is provided with a tooth intended to be engaged with said integral spring assembly; and said integral spring assembly is provided with a corresponding slot. 45
50
14. The protection latch mechanism for mortise cylindrical locks, as in claim 2, wherein the lower surface of said main latch is provided with an additional recess located near the front surface of said latch; so that during the lock's installation, when said cylinder is not yet secured by said supporting screw, said sliding plate will be pressed 55

up by said spring and engaged with said additional recess, thus preventing said main latch from unintentional locking.

FIG. 1

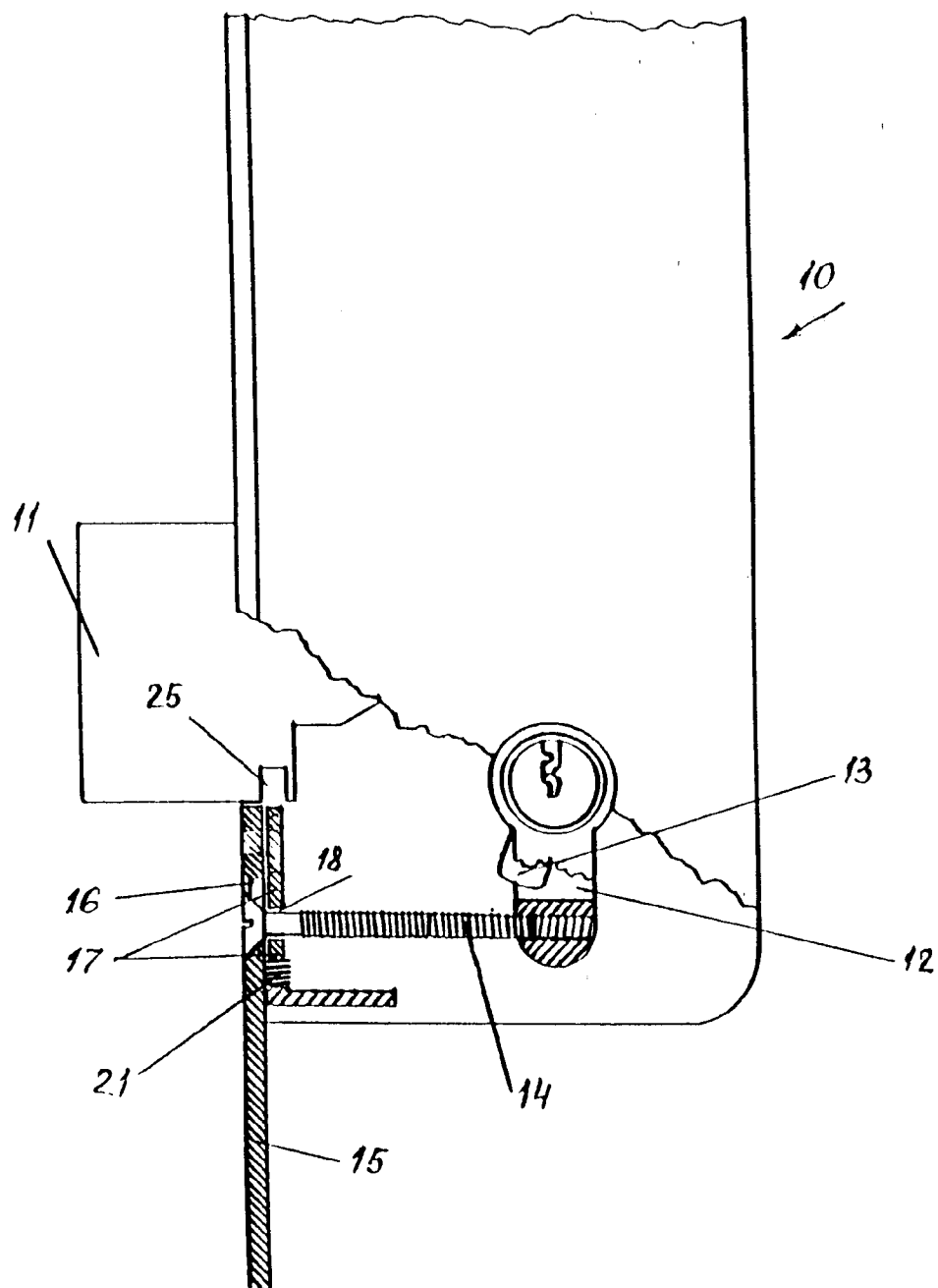


FIG. 2

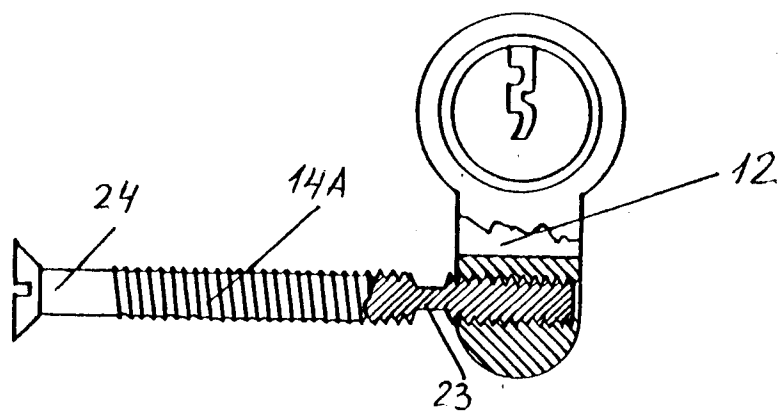


FIG. 3

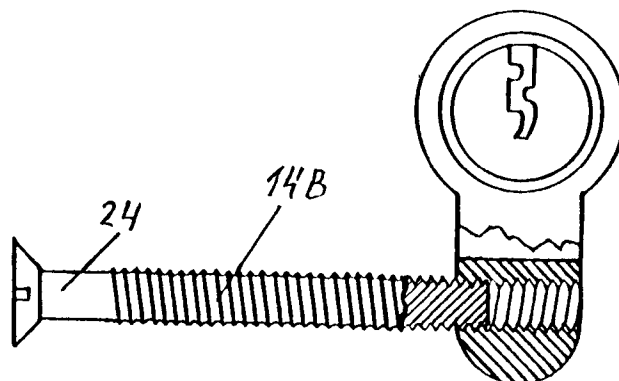


FIG. 4

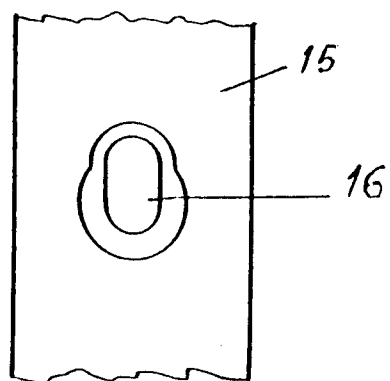


FIG. 5

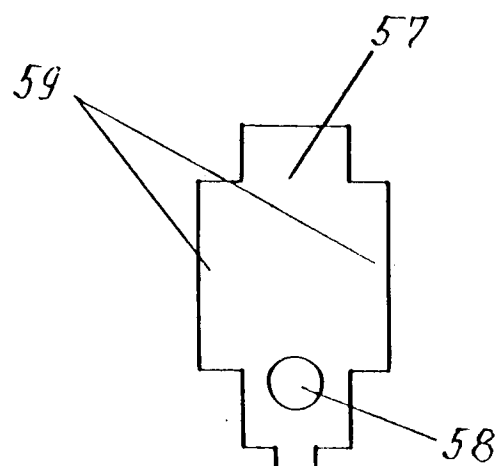


FIG. 6

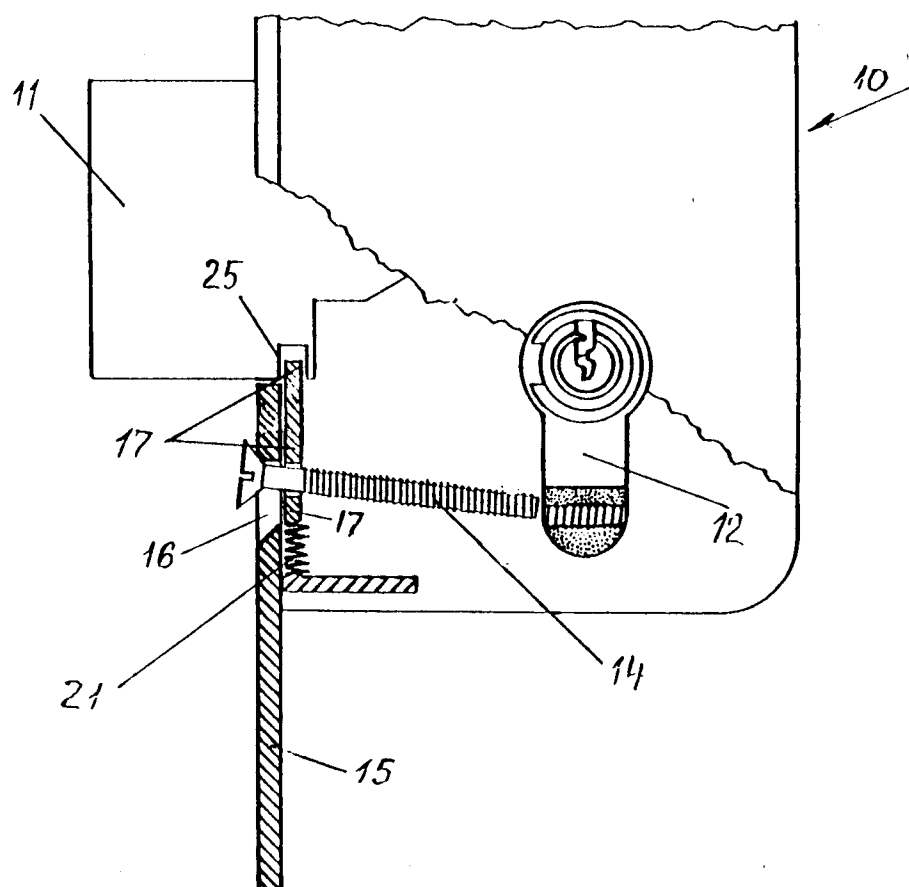


FIG. 7

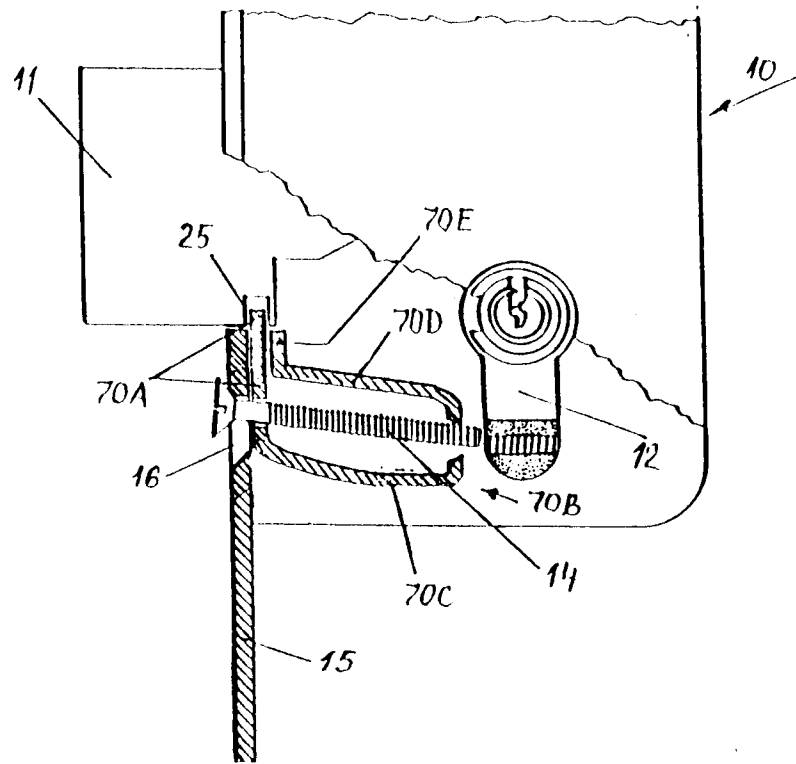


FIG. 10

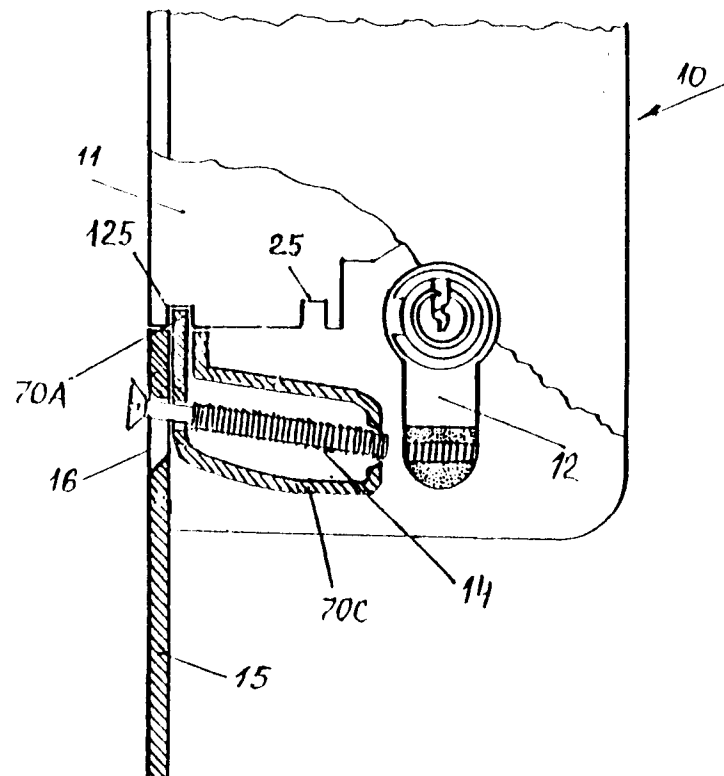


FIG. 8

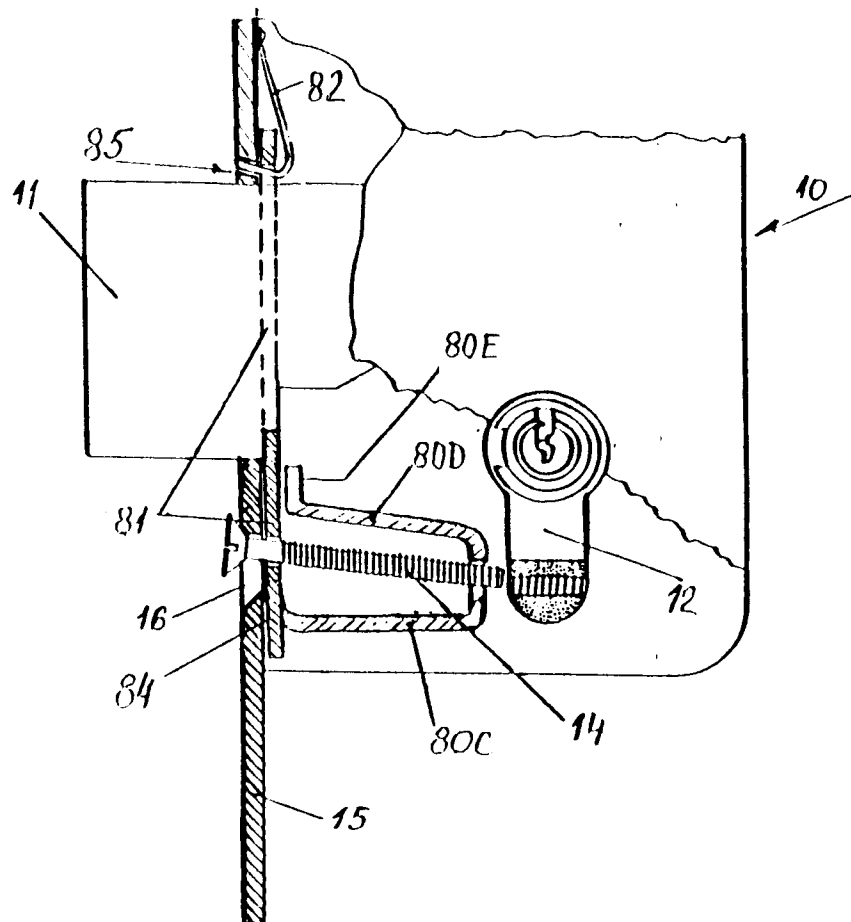
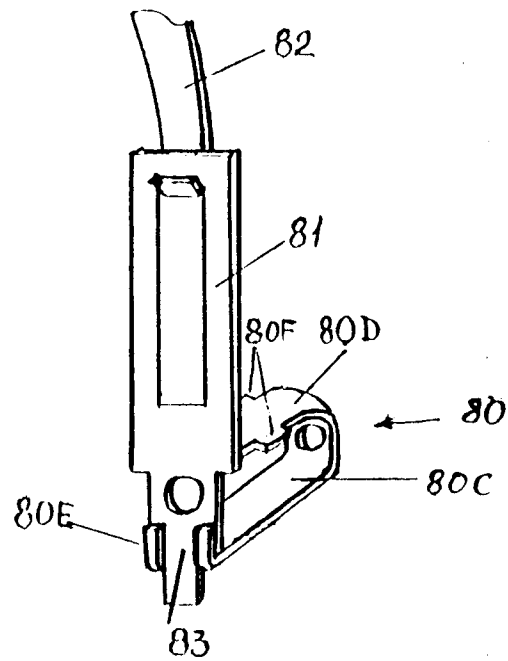


FIG. 9





European Patent
Office

EUROPEAN SEARCH REPORT

Application Number

EP 92 30 7102

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int. Cl.5)
D,A	DE-U-8 914 390 (KIRCHMANN-NIEDERDRENK KG) * page 9, line 12 - page 10, line 2 * * page 17, line 12 - page 18, line 2 * -----	1	E05B17/20
			TECHNICAL FIELDS SEARCHED (Int. Cl.5)
			E05B
The present search report has been drawn up for all claims			
Place of search THE HAGUE		Date of completion of the search 03 DECEMBER 1992	Examiner GERARD B.
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