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(71) Applicant: **Scricciolo, Franco**
52100 Arezzo (IT)

(72) Inventor: **Scricciolo, Franco**
52100 Arezzo (IT)

(54) Lock with sliding joints and extractable punched operating card

(57) The invention deals with a lock made up of a box-like structure (1) whose frontal face brings a slot (2) for the insertion of an actuating plaque (3). A set of holes (4) is made on the plaque the function of which is the different sliding of the pins (18), when the plate is inserted. The pins (18) are hosted into the hollows of an internal dowel (12). From the body of the pins (18) teeth (20) jut out. The height from which they stick out is not the same. But when the plaque (3) inserted is the right one, it pushes the heads (19) of the pins (18) each one of the needed quantity to make the teeth (20) align. This way the teeth (20) can slide into the longitudinal groove (10) and this makes possible the movement of the dowel (12). Since the dowel (12) is linked with a bar (14) that juts out from the box (1), through a rectangular opening (7) on the rear side, this bar (14) slides, dragged by the single movement of the plaque (3), pins (18) and dowel (12) and it makes the lock change its state from open to closed and vice versa.

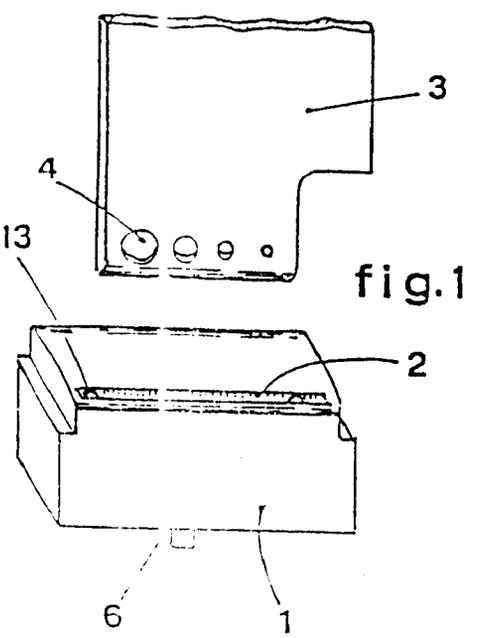

fig.1

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Description

The invention is a lock with sliding pins put into action by a removable plate. It can be applied to doors, furniture panels and objects with panels that are opened by a special device.

We know that already exist locks with sliding pins which are being moved by keys, the introduction of which causes the translation of the sliding pins, pushed from behind by springs. The pins put themselves in position in such a way as to allow the rotation of the cylinder into which the key has been introduced. And so, by means of a tooth, which juts out from the cylinder, it causes the movement of a latch. Or, in a more sophisticated type of locks, it puts into action mechanical articulations. These latest make the lock change its state from open to closed and vice versa.

The known locks have a fairly deep structure, at least as deep as the length of the key. In some cases they could be not suitable for a particular application and could give rise to problems. Another disadvantage of the known kind of locks is that they need springy auxiliary devices to prevent the latches from sliding when the tooth, jutting out from the cylinder, is in the off position. In this position is possible the insertion and the extraction of the key.

The aim of the present invention is to remove the inconveniences of the so far known techniques and to create a new kind of lock, thought and structured in such a way as to take up the minimum space, with regard to the thickness. This way, the new kind of lock can be used into devices or organs quite thin. In addition, the new lock makes possible not to require auxiliary devices to hold the latch in the reached position, when the actuating plaque is extracted from the slot and anyhow the hosting device is off.

The lock which allows to achieve the above results is a box-like structure, whit a slot in the front for the insertion of a metal plaque on which have been made holes or marks following well defined patterns to allow, when the plaque is inserted into the slot, different interactions with the heads of the pins, hosted into an internal dowel.

In the off phase, the different combinations of the teeth emerging from the pins, which align themselves on an internal groove when the metal plaque inserted is the right one, will allow the dowel to move back and forth. The dowel is firmly coupled through a rectangular slit, with a little bar. When the plaque makes the dowel move to and fro, the bar, linked with the dowel, opens and closes the lock.

The extraction of the metal plaque lets the pins to return to their normal position. The teeth of the pins, which slide into transversal grooves, don't allow the dowel to move, when the plaque is off the lock.. So the bar can't change position. And all this is achieved without any auxiliary device.

The metal plaque is frontally shaped in such a way that it can be inserted either when the dowel is in the on position or when it is off. The conformation of the metal plaque is such that, when it is inserted, it pushes the head of the pins to the position in which the hosting dowel can translate, moving from open to closed and vice versa.

That is, the lock change its state, from on to off, because the linear translation of the metal plaque and not for the rotation of a cylinder, as it happens in usual keys. Therefore, the invention consists in a combination of a specific lock with pins and a removable metal plaque, upon which has been made holes of different size and depth. Changing the size and the depth of the holes makes possible to produce a wide set of different combinations. This pattern of holes distinguishes the plaque from all the others of the same kind. Such plaque plays the role of the key, for the present kind of lock and it works sliding instead of rotating as it happens in the usual kind of key.

The lock, object of the present invention, is made up of a set of component, among which there are:

- a box-like structure, with a slot in the front for the insertion of a metal plaque;
- a sliding dowel, internal to the box-like structure;
- pins with teeth, pushed from behind by springs; the teeth jut out at different heights on the body of the pins;
- a box rear plate, upon which is made a rectangular slit;
- a bar, linked with the dowel; the bar sticks out through the mentioned slit and puts into action the latch;
- a set of marks and grooves made on the box rear plate, shaped in such a way as to allow or prevent the movement of the teeth.

The position of the grooves, on the box rear plate (or on another internal box surface), is such that the actuating metal plaque can be inserted and extracted either when the dowel is up or when it is down. At these two positions the bar makes the two state open/closed correspond.

The above described structure can be implemented as thin as we like and so it can be miniaturized. The number of the pins ad the different position of their teeth gives the possibility to have a wide set of combinations, each of which has one and only one corresponding actuating plaque. Other characteristics will be more evident following the description which refers to a particular shape, showed in the enclosed table at the end, only for convenience of explanation. This example doesn't restrict the field of the present patent.

In the table:

- the fig. 1 is the axonometric projection of the lock when the metal plaque is not inserted;
- the fig. 2 is the frontal view of the rear side when the

plaque is not inserted;

- the fig. 3 is the frontal view of the rear side when the plaque is inserted;
- the fig. 4 is the perspective view of the rear side when the back slab is removed and the dowel is outside;
- the fig. 5 is the frontal view of the base slab from the point of view of the grooves (inner view);
- the fig. 6 is the lateral view of the base slab;
- the fig. is a drawing, in different scale, of the pins pushed from behind by the springs, of the teeth which jut out from the pins, and of the removable plaque with holes.

It must be made clear, anyhow, that the pictures are given only for convenience of explanation and don't restrict in any way the invention.

In the drawings the components have been marked with arabic numerals:

with 1 the box-like structure;

with 2 the slot for the insertion of the metal plaque;

with 3 the metal actuating plaque;

with 4 the holes on the metal plaque; they are not usually of the same size;

with 5 the slab which is the base of the rear side;

with 6 the fixed bar which emerges from the above mentioned base;

with 7 the rectangular opening made on the slab;

with 8 the fastening screws;

with 9 the internal guides for the metal plaque (2);

with 10 the transversal grooves made on the base (5);

with 11 the longitudinal groove made on the base (5);

with 12 the internal dowel;

with 13 the two little bars that guide the dowel;

with 14 the bar sticking out from the dowel;

with 15 the hollows into the dowel;

with 16 the springs which are hosted into the hollows (15);

with 18 the pins;

with 19 the rounded heads of the pins;

with 20 the teeth jutting out from the pins;

with 21 the back guiding protrusion of the dowel.

The invention substantially consists in a lock made up of many interacting components. They are:

- a box-like containing structure (1) provide at least whit a slot through which is inserted and extracted the actuating plaque (3). Its length is sufficient to allow the grip, when inserted, and its width is sufficientto host the holes (4), which are normally aligned and anyway they are in a corresponding position with the actuating pins (18);
- a internal dowel (12) with some hollows (15) each of which hosts a pushing spring (16) ad a pin (18). On each pin juts out a tooth, the position of which isn't fixed at a specified height. In addition, the dowel is linked with the bar (14) which sticks out from the box-like structure and moves to and fro as the dowel;
- a slab with at least one longitudinal groove (11); it allows the teeth (20) to slide horizontally, when aligned. The transversal grooves (10) allow the teeth to slide vertically. This movement of the pins happens because the pushing action of the springs (16);
- a rectangular opening (7) on the slab of the base (5). Through it juts out the bar (14), linked with the dowel (12). Its movement can actuate one or more latches connected with the lock;
- a metal actuating plaque (3) capable to penetrate inside the box-like structure (1) through the slot(2).

Each hole is made in such a way as to allow the pin to reach the proper height. This way each pin can slide the right length and, at last, all the teeth are aligned.

The favorite version of this project is made up of a box-like structure (1) with a frontal slot (2) through which can be inserted a metal plaque (3). The rear side bears a opening (7), through which juts out the bar (6) joined to the internal dowel (12). The latest, by means of two guides (13) (21), can slide inside the box (1). The two guides (13) and (21) are hosted into the grooves (9), made on the slab (5) with which the box structure (1) is closed.

From the frontal face the bars (13) work also as guides for the metal plaque (3), when it is being inserted in the frontal slot (2). They allow the holes (4) on the plaque to align correctly with the pins (18), with which they interact. The mentioned pins can axially slide but are constrained to follow the dowel (12) for the other movements. For this purpose the dowel is provided with many hollows each of which hosts either the sliding pin (18) and the pushing spring (16). These last are at least parallel among them and also normally aligned. In addi-

tion each pin has the head rounded to facilitate, in the insertion phase or in the extracting one, the interaction with the extractable actuating plaque (3). To define in an univocal way the closed or open state, the lock comprises within it also a surface or a plate with the face turned inside. This surface is provided with longitudinal (11) and transversal (10) grooves. They have the aim to guide the movement of the internal dowel (12) and to control, through the interaction of the mentioned grooves with the teeth (20), jutting out from the sliding pins (18), its movements, and so to define the open and the closed states, as well as the modalities for the passage from one state to the other.

The mentioned surface with grooves is obtained in the internal part of the plate (5) which constitutes the closing element of the rear side of the box-like structure (1). Along its borders it bears also two holes (22) at least and/or equivalent means for its fixing with screws (8) to the above box structure (1).

Lastly it bears, in the exemplified solution, the jutting bar (6) fit for the position of the lock in the seat assigned to contain it. This bar (6) is near the slot (7) through which the other bar (14) emerges, linked with the sliding dowel, by means of which the levers and/or articulations are moved. By h of them the lock transmits the translation of the movable dowel to the bolts of which the door, or other structure on which the lock has been applied, is equipped.

The movements of the dowel (12) are therefore driven by the removable plaque (3) when inserted in the lock. The actuation of which can happen only by a qualified plaque. That is, once the plaque is inserted between the fore parts that appear in sight of the actuating bars (13) and pushed to the bottom as far as it reaches the rabbet on the slab (5), or other landmarks, the plaque (3) is being pushed along the slot (2) moving in this way the sliding dowel (12) and the bar (14) with it.

The mentioned operating plaque bears, on the introducing side, a set of holes (4) or a corresponding set of marks, dimensioned and/or placed in such a way as to determine, when inserted, related axial sliding of the pins (18), with whose free extremities the mentioned holes or marks interact.

This causes the sliding of the same pins (18) in such a way as to align all the teeth (20) of the pins. When the teeth are aligned with the longitudinal groove (11) (or with the longitudinal mark made on the internal surface of the slab (5)), the dowel, which bears the pins, can slide horizontally with them, until it reaches the other allowed position, at which corresponds other grooves (10) for the teeth. So, if the metal plaque (3) is then extracted, the pins, pushed by the springs (16), go back at their original sides, locking the dowel (12) and the bar (14) in the reached position. This way the bar is prevented from sliding, the lock condition is satisfied, and all this is achieved without any other auxiliary device, instead of what happens in the known kind of locks.

The actuating plaque is rounded in the inserting side so to ease the interaction with the heads (19) of the pins. This characteristic, when the plaque is being inserted or removed, makes the pins slide along their side.

Claims

1. Lock with sliding pins and removable actuating plate, suitable for being applied to doors, furniture panels and objects with panels that are opened by a special device. This lock includes:

   - a box-like structure (1) provided at least of one slot (2), through which it can be inserted and extracted a metal driving plaque (3). This plaque is long enough to allow a comfortable grip and it is wide enough to interact with all the pins (18);
   - an internal dowel (12) into which has been made a set of guiding grooves (15). Each of them hosts a spring (16) and a pin (18). Teeth (20) jut out, at different height, from the pins. Linked with the dowel and translating with it, a bar(14) sticks out from the box (1);
   - a slab (5) with, at least, one longitudinal groove (11), so that the teeth can slide along the groove, when they are aligned with it. In addition, the slab bears a set of transversal grooves (10), suitable to allow the movement of the teeth (20), so that the pins can slide up and down, under the action of their springs;
   - a rectangular opening (7) made on the slab. This opening allows the bar (6) joined with dowel (12) to emerge outside and to drag, in its movement, one or more latches.
   - an actuating plaque (3) suitable to penetrate inside the box-like structure (1) through the slot (2). On the plaque there are different holes (4), or other means that are appropriate to cause the translation of the pins (18), each one at its proper height.

2. Lock with sliding pins and removable actuating plate, as in the claim 1) characterized by the slot (2) in front of the box-like structure. This slot allows the insertion of the driving plaque (3). The rear side of the structure, through which is possible to put in the dowel (12), is closed by a slab (5).

3. Lock with sliding pins and removable actuating plate, as in the claim 1). The lock comprises an internal dowel (12) characterized by little bars (13) and (21), which will guide its movement inside the hosting box.

4. Lock with sliding pins and removable actuating plate, as in the claim 1).The lock comprises an

internal dowel (12) characterized by little bars (13). The frontal face of these will guide the actuating plaque (3), when it is being inserted, so to assure a proper positioning with respect to the holes.

5. Lock with sliding pins and removable actuating plate, as in the claim 1). The lock comprises an internal dowel (12) characterized by hollows, which host the pins (18). These pin can slide side by side.

6. Lock with sliding pins and removable actuating plate, as in the claim 1). The lock comprises a slab (5) with the treated face turned inside the box (1). The face of the slab bears longitudinal (11) and transversal (10) grooves, the goal of which is to guide the movement of the internal dowel and to control it through the interaction between corresponding means and/or shapes jutting out from the dowel and the teeth (20), protruding from the pins.

7. Lock with sliding pins and removable actuating plate, as in the claim 1). The lock comprises a slab (5) which bears at least two holes (22) for the screws; alternatively it bears equivalent devices for the closure of the rear side of the box.

8. Lock with sliding pins and removable actuating plate, as in the claim 1). The lock comprises a slab (5) with a rectangular opening, trough which a bar (6) juts out. The bar, linked with the dowel (6) causes the actuation of levers or other mechanical joints which close the lock.

9. Lock with sliding pins ad removable actuating plate, as in the claim 1). The lock comprises the actuating removable plate (3) characterized on the inserting side, by a set of holes or marks (4) whose position and size is such that the pins (18), thank to the interacting heads (19), will slide each of the needed quantity.

10. Lock with sliding pins and removable actuating plate, as in the claim 1). The lock comprises the actuating removable plate (3) characterized by the shape of the inserting side. In fact it is conformed in such a way as to ease the interaction with the heads (19) of the pins (18). So, under the action of the plaque, inserted or extracted, the pins slide.

11. Lock with sliding pins and removable actuating plate, as in the claim 1). The lock is characterized by a actuating plaque (3). After its insertion, the plaque have to be dragged to make change the state of the lock.

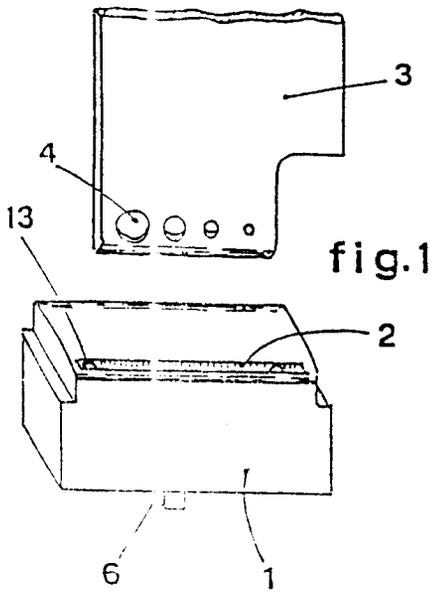

fig.1

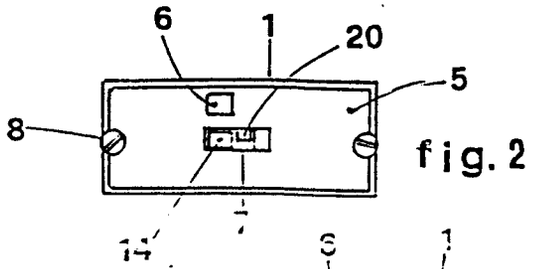

fig.2

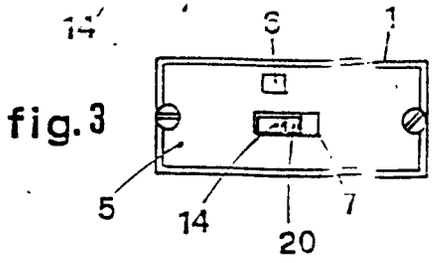

fig.3

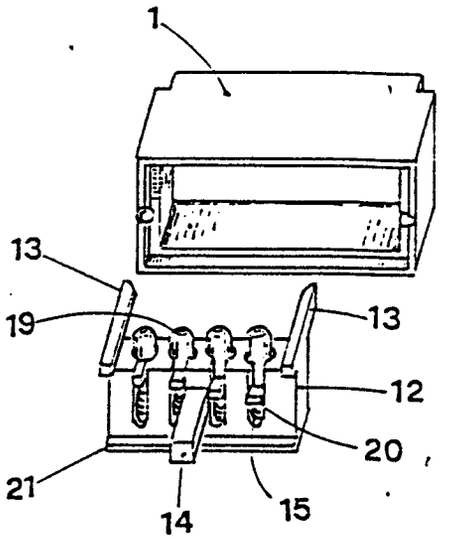

fig.4

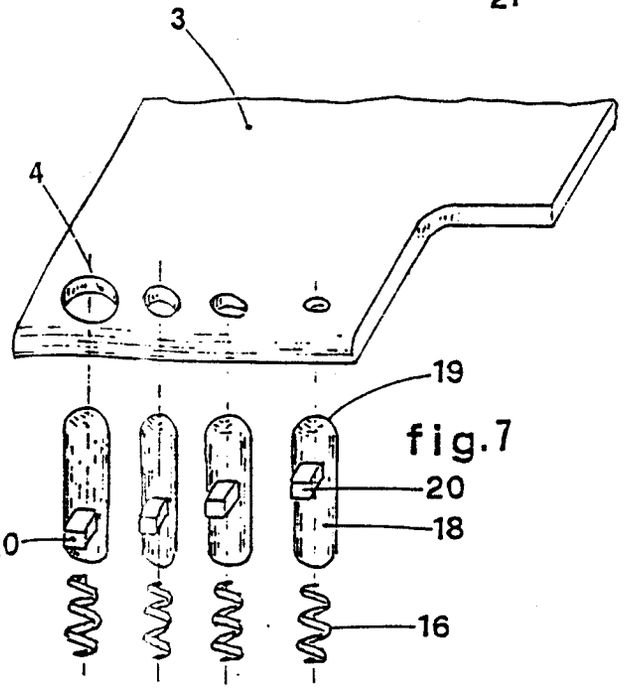

fig.7

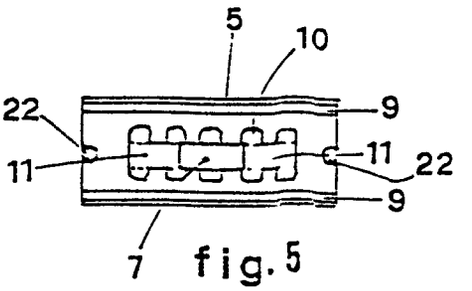

fig.5

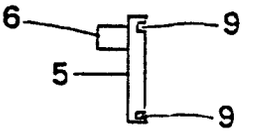

fig.6

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EUROPEAN SEARCH REPORT

Application Number
EP 96 83 0503

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.6)
A	FR 2 159 029 A (GLAVNA DIREKTSIA KBUMKP PRI SGNS) * the whole document *	1,2,9-11	E05B35/00
A	DE 265 825 C (P. OLSEN) * the whole document *	1,2,9-11	
A	EP 0 329 914 A (TECNICAS DE SEGURIDAD) * the whole document *	1,2,9-11	

TECHNICAL FIELDS SEARCHED (Int.Cl.6)

E05B

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
BERLIN	4 March 1997	Krabel, A

CATEGORY OF CITED DOCUMENTS

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