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⑤④ **Card controlling device for locking, alarm and similar lockable units.**

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Description

The present invention relates to a card controlling device for locking, alarm and similar units, comprising a supporting block in the inside thereof there is formed a sliding seat for a reciprocating drawer, effective to reciprocate from a first position corresponding to a locking condition of said unit to a second position corresponding to a releasing condition of said unit, said supporting block and drawer including a plurality of holes perpendicularly located with respect to said drawer sliding direction and resiliently housing a predetermined number of locking pins and back- or counterpins.

As it is known, in these last years, some devices have been broadly developed which use a key card for controlling locking units, such as locks and the like. These devices provide for the use, as locking pins, of magnetically responsive rods which are located, in such a way as to be able of reciprocating, between a code card and the aforesaid key card.

The devices of the above mentioned type, though they are satisfactory from a technical point of view, are nevertheless not devoid of drawbacks. In fact, because of an exclusively magnetic control of the locking pins, the relatively small forces causing the pins to move may be deleteriously affected by dust or other extraneous materials which can accidentally penetrate into the lock.

Another drawback related to the thereinabove mentioned devices is the possibility of a demagnetization of the key card over a period of time, so that it becomes ineffective to open the lock or other locking unit.

In order to eliminate the drawbacks associated with the magnetically operated controlling devices, a lock has been designed the controlling or driving device of which, while still providing for the use of a code card and a key card, is effective to displace the locking pins by means of an exclusively mechanic operation. This lock has been the subject matter of FR—A—2386668.

The lock of said French Patent substantially comprises a casing in the inside thereof a locking member is effective to slide, this latter being coupled, by means of a rod, to a spring latch of the lock. On the upper portion of the casing, there are formed two slots, respectively for housing a code card and a key card. Through the casing and locking member there are formed, as arranged according to a chess-board configuration, coaxially extending holes which, at the top thereof, merge with the code card housing slot. Locking means are resiliently housed, in each of the holes, such locking means consisting of a pin, a counter pin and a ball pair.

Through the code card there are provided a number of through holes arranged according to a given combination, and extending coaxially with respect to some of the holes formed in the

casing and locking member, whereas in the key card there are formed through holes which are complementary to the code card holes in order to complete the chess-board arrangement assumed by the holes of the casing and locking member.

The code card, as it is introduced into the device, will act on said balls in such a way that some of the underlying pins and counterpins will be located with the adjacent surfaces thereof in a coplanar relationship with respect to the sliding surface between the casing and locking member, while other pins will intersect said sliding surface thereby assuring the locking of said locking member.

As the key card is introduced, also these latter pins will be located with the mutually adjacent surfaces thereof in a coplanar relationship with respect to the sliding surface of the locking member, since a hole of said key card will correspond to each said pin.

Upon having obtained this condition, the locking member will be able of freely sliding in the casing to allow for the lock to be easily open or closed.

While the thereinabove described device is highly secure, it should however be pointed out that it is not devoid of drawbacks.

These drawbacks are mainly due to the fact that, under certain conditions, an ill-intentioned person may access the code card to easily copy it and then easily construct a key card.

For example, during a party, an ill-intentioned person having gained access to the home, will be able, in a period of seconds, to withdraw the code card, upon having inserted any plate-like member into the lock slot, copy it and introduce it again in the lock slot.

Another drawback of the thereinabove described device is the fact that, if a completely perforated code card is introduced, then any not perforated plate-like member will be effective to open the lock. Accordingly, by perforating the plastics material code card of the commercially available devices, by applying heat to it, or even dissolving said card by means of a suitable solvent as introduced from the outside, it is sufficient a not perforated plate for opening the door.

Accordingly, the main object of the present invention is to eliminate the thereinabove mentioned drawbacks by providing a card controlled device for locking, alarm and similar units where the code card is eliminated and which is effective to give an improved safety by increasing the locking possibilities of the locking member and decreasing the required volume by 50%.

Another object of the present invention is to prevent possible ill-intentioned persons from tampering the device even if they are able of precisely detecting the positions of the locking pins.

These and other objects, which will become

more apparent from the following description, are achieved, according to the present invention, by a card controlling device for locking, alarm and similar lockable units, comprising a supporting block wherein a sliding seat is formed effective to slidably receive a drawer member for reciprocation between a first position corresponding to a locking condition of said unit and a second position corresponding to a releasing condition of said unit, said supporting block and movable drawer including a plurality of holes perpendicularly disposed with respect to said drawer sliding direction and resiliently housing a predetermined number of locking pins and counterpins, characterized in that said movable drawer is provided with a central slot into which a key card can be inserted on the faces of which there are formed a plurality of recesses located at predetermined positions coinciding with the positions said pins assume in said respective holes, whereby when said key card has been introduced, the contacting surfaces between said pins and counterpins are coplanar with the respective sliding surfaces of the drawer in said block, in at least one of said holes there being housed a locking pin having a height less than that of the other pins, the contacting surface with the respective counterpin coinciding with the respective sliding surface of said drawer when, at said pin, there is located a solid portion of said key card, said drawer being associated with a releasing and controlling or driving means of said unit.

Further characteristics and advantages of the present invention will become more apparent from the following detailed description of a preferred, though not exclusive embodiment, of a card controlling device for locking, alarm and similar units, with reference to the accompanying drawings, given by way of an indicative and not limitative example only, and where:

Fig. 1 is a front view of the device according to the invention;

Fig. 2 is a cross-section view taken along the line II—II of Fig. 1;

Fig. 3 is a plan view of the frame supporting the device according to the invention;

Fig. 4 is a plan view of the key card stripped in its two plate-like portions;

Figs. 5 to 9 are longitudinal cross-section views illustrating the operative sequence related to the inserting of the key card and to the consequent releasing of the movable drawer;

Fig. 10 is a longitudinal cross-section view illustrating the situation occurring as an erroneous key card is inserted.

With reference to the figures, at 1 there is overall indicated a card controlling device for locking, alarm and similar lockable units, housed in a box-like portion 2 of a frame 3, this latter being effective to be fixed, by means of screws or similar means, to a fixed portion of

said unit. On the open side of the box-like portion 2 there is formed a sliding vertical guide pair 4, therewith a small plate 5 engages effective to close the device 1 in said box-like portion 2. The sliding limit of the plate 5 in the guides 4 is defined by a horizontally extending guide pair 6, which latter are disposed along the lower or bottom side of said box-like portion 2 and define an abutment for the lower edge 5a of the closure plate 5. This latter, finally, is provided at the central portion whereof, with a slot 7, adapted to receive a key card, which is generally indicated at 8, and which will be described in a more detailed way hereafter.

Referring now to Figs. 1 and 2, the controlling device 1 for locking, alarm and similar lockable units consists essentially of a supporting block 9 in which a sliding seat 10 is formed, this seat 10 being effective to be slidably engaged by a drawer member 11, this latter being driven with a reciprocating movement.

The movable drawer 11 is provided with a central slot 12 and a lug 13 provided for push-engaging a releasing or driving means of said unit.

The movable drawer 11 and the supporting block 9 further include a plurality of coaxially extending holes, indicated respectively at 11' and 9' (Figs. 6 and 10), effective to house resiliently a corresponding plurality of locking means. More specifically, the holes 9' related to the supporting block 9 are throughgoing and have a constant diameter, whereas the holes 11' of the movable drawer 11, while being also throughgoing, have a diameter variation effective to define an annular abutment 14.

Furthermore, said locking means include, for each coaxially extending hole pair 9' and 11', a pin 15 and a counter pin 16. These latter consist of constant diameter cylindrical elements, whereas the pins 15 have a diameter variation allowing for the pins 15 to abut against the annular abutment 14 of the hole 11'. Finally, in each hole 9' of the supporting block 9 there is received a pretensioned coil spring 17 effective to push the pin-counterpin assembly toward the slot of the movable drawer 11.

Referring now to Figs. 1 and 2, the supporting block 9 is provided, at the top and bottom portions thereof, with guiding slots 18 and 19, effective to engage with respective closure covers 20 and 21 of the supporting block 9.

As it is also shown in Figs. 1 and 2, on the lower side of the box-like portion 2 of the frame 3 there are provided guides 22 with which a slide 23 slidably and resiliently engages, adapted to be pushed by the lug 13 of the movable drawer 11, against the biasing provided by a pretensioned spring pair 24, one only thereof has been represented in the figures.

The slide 23 is provided, at the lower portion thereof, with at least a foot 25 which, in the closed condition of the device 1, is latched or

engaged by a detent member 26 as resiliently pivoted at 27 to a snap member effective to release the lockable unit.

According to a variation of the present invention, the lug 13 of the movable drawer 11 may also act directly on any snap members, without necessarily providing for the use of the slide 23 with its foot 25 and of said detent member 26.

Referring now particularly to Figs. 6 to 10, and according to a further feature of the present invention, the key card 8 is provided, on both faces thereof, with a plurality of recesses 29 effective located at predetermined positions coinciding with the positions assumed by the pins 15 in their respective holes 11'. In this manner, as the key card is introduced, the contacting surfaces between the pins 15 and counterpins 16 are coplanar with the two sliding surfaces of the movable drawer 11 in said supporting block 9.

In order to easily form the recesses 29 in the key 8, the latter is formed by two plate-like portions 8a and 8b, provided with snap coupling means, for superimposing and joining said portions. In each said portion 8a and 8b there are provided a plurality of notches 30, of substantially circular shape, and disposed according to two mutually perpendicular directions, their axes coinciding, as the card key is inserted, with the axes of the holes 9' and 11'.

Each of the notches 30, accordingly, delimitates a disk 31 which is held rigid with the plate-like member 8a or 8b by means of spokes 32. By acting with the point of any suitable tools on the disks 31, these latter are perforated, thereby providing through holes which, as said plate-like portions are superimposed, coincide with the recesses 29 of the key card 8. Thus, it is possible to provide the key card 8 with the desired combination by taking care that, as said disks 31 are perforated, the holes formed through the plate-like portion 8a are not coincident with those formed on the other plate-like portion 8b, since, in this latter case, a through hole would be formed in the key card 8 susceptible to prevent the movable drawer 11 from being released.

It should be noted that, with the device according to the present invention, since the pins 15 and counterpins 16 act on two sliding surfaces, the occupied space is notably reduced (50%) for the same number of combinations.

Furthermore in order to prevent an ill-intentioned person able of locating the precise positions of the pins 15 from correctly falsifying the key card, according to a further feature of the present invention, at least one of the pins 15, indicated at 15a in the figures has a height less than that of the other pins 15. The height of the pin 15a has to be selected in such a way that the contacting surface thereof with the corresponding counterpin 16 be coincident with one of the sliding surfaces of the movable

drawer 11 only at a solid portion of the key card 8 (Figs. 6 to 9). Referring now to figures 5 to 9, as into the slot 12 there is introduced the key card 8, the pins 15a and 15 are displaced proportionately to the advancing of the key card in the slot 12. As the key card stops to advance (Fig. 8), due to the pushing action provided by the springs 17, the pins 15 penetrate the recesses 29 of the key card 8 and locate, with their contacting surfaces with the respective counterpins 16, in a coplanar relationship with respect to the sliding surfaces of the movable drawer 11.

Similarly, as at the lower height pin 15a a solid portion is provided on the key card 8, also this pin will locate in such a way that its surface contacting the respective counterpin 16 will be coplanar to one of the sliding surfaces of the movable drawer. At this time, the movable drawer 11 will be released and it can be pushed leftwards, as clearly shown in Fig. 9.

Referring now to Fig. 10, the case will be illustrated occurring as an improper key card 8' is introduced into the slot 12.

Three possible errors have been illustrated on this key card 8', which may occur as an ill-intentioned person attempts to falsify the key card. It should however be pointed out that a single error will be effective to prevent the movable drawer from sliding in the seat 10 therefore. As it is shown in figure 10, the pin 15a, as it is coincident with a recess 29, will locate in such a way that the lower sliding surface of the movable drawer 11 will interfere with the counterpin associated with the pin 15a.

The upper pin 15, located laterally with respect to the pin 15a provides a further error possibility occurring as a through hole is formed in the key card 8'. In this case the full lowering of the pin 15 brings the counterpin 16 to interfere with the upper sliding surface of the movable drawer 11.

The other possible error occurs, finally, as a solid portion on the key card 8' is provided at a pin 15 (the lower one in Fig. 10). In this case, the related spring 17 is compressed and the pin 15 itself will locate at an interfering position with respect to one of the sliding surfaces of the movable drawer 11.

It should be noted that, with the device according to the present invention, the user himself will be able to form the desired combination, by removing the disk 31 at the selected positions and then locating the pin-counterpin-spring assembly in the holes 11' of the drawer 11 and 9' of the supporting block, corresponding to the recesses 29 previously formed by the user in the key card 8.

In an analogous manner, as the user desires to change the previously set combination, he will simply take two other plate-like portions 8a and 8b forming the key card 8, remove other disks 31 and again assemble two plate-like portions 8a, 8b of the key card 8. Upon having

attained to this operation and withdrawn the supporting block 9 from the box-like portion 2 of the frame 3, the user will alternatively remove the closure covers 20 and 21, and change the positions of the pins 15 and counterpins 16, according to the new combination set on the key card 8.

Obviously several modifications and variations can be made in the structure of the card controlling device for locking, alarm and similar units according to the present invention, without departing from the scope thereof, as it is defined in the accompanying claims.

Claims

1. Card controlling device for locking, alarm and similar lockable units, comprising a supporting block (9) wherein a sliding seat (10) is formed effective to slidably receive a drawer member (11) for reciprocation between a first position corresponding to a locking condition of said unit and a second position corresponding to a releasing condition of said unit, said supporting block (9) and movable drawer (11) including a plurality of holes (9', 11') perpendicularly disposed with respect to said drawer (9) sliding direction and resiliently housing a predetermined number of locking pins (15) and counterpins (16), characterized in that said movable drawer (11) is provided with a central slot (12) into which a key card (8) can be inserted, on the faces of which there are formed a plurality of recesses (29) located at predetermined positions coinciding with the positions said pins (15) assume in said respective holes (11'), whereby when said key card (8) has been introduced, the contacting surfaces between said pins (15) and counterpins (16) are coplanar with the respective sliding surfaces of the drawer (11) in said block (9), in at least one of said holes (11') there being housed a locking pin (15a) having a height less than that of the other pins (15), the contacting surface with the respective counterpin (16) coinciding with the respective sliding surface of said drawer when, at said pin (15a), there is located a solid portion of said key card (8), said drawer (11) being associated with a releasing and controlling or driving means of said unit.

2. A device according to claim 1, characterized in that said drawer (11) is provided with a lug (13) which, as said key card (8) is inserted, is brought to a pushing relationship on a slide (23) slidably engaged with guides (22) rigid with said supporting block (9), said slide (23) being effective to release, during the stroke thereof, a detent member (26) associated with a snap member.

3. A device according to claim 2, characterized in that said movable drawer lug (13) is effective to directly act on said snap member.

4. A device according to claim 1, characterized in that said supporting block (9) is provided with an upper cover member (20) and

a lower cover member (21) effective to be removably applied for the introducing of said pins (15) and counterpins (16).

5. A device according to claim 1, characterized in that said block (9) is housed in a box-like portion (2) of a frame (3) effective to be fixed to a wall of said unit.

6. A device according to claim 1, characterized in that said recesses (29) formed on the faces of said key card (8) correspond to a half of the thickness of said key card (8), said recesses (29) formed on a face being offset located with respect to the recesses (29) formed on the other face.

7. A device according to claim 1, characterized in that said key card (8) consists of two plate-like portions (8a—8b) effective to be superimposed onto one another and joined to one another by adhesion, in each said portion (8a—8b) there being formed a plurality of essentially circular notches (30) ordinately disposed according to two mutually perpendicular directions, each whereof encompasses a disk member (31) made rigid with said plate-like member (8a—8b) by means of spoke members (32), said disks (31) being effective to be perforated by a pointed member or the like in order to form holes located according to a predetermined combination.

Revendications

1. Equipement de commande par carte pour des dispositifs de verrouillage, d'alarme et similaires, comportant un bloc d'appui (9) à l'intérieur duquel un support à glissières (10) est constitué pour recevoir à coulissement un élément en tiroir (11) de façon à ce qu'il puisse effectuer un mouvement alternatif entre une première position correspondant à un état de verrouillage dudit dispositif et une seconde position correspondant à un état de déverrouillage de ce dispositif, le bloc d'appui (9) et le tiroir mobile (11) comportant un certain nombre de trous (9', 11') disposés perpendiculairement au sens de coulissement du tiroir (11) et logeant avec élasticité un nombre prédéterminé de broches de verrouillage (15) et de contre-broches (16), caractérisé en ce que le tiroir mobile (11) comporte une fente médiane (12), dans laquelle il est possible d'insérer une carte à clé (8), sur les faces de laquelle sont formés un certain nombre d'évidements (29) situés à des emplacements prédéterminés coïncidant avec les positions que les broches (15) occupent dans les trous respectifs (11'), de sorte que, lorsque la carte à clé (8) est introduite, les surfaces de contact entre les broches (15) et les contre-broches (16) soient coplanaires avec les surfaces de coulissement respectives du tiroir (11) dans le bloc d'appui (9), une broche de verrouillage (15a) d'une hauteur inférieure à celle des autres broches (15) étant logée dans au moins un des trous (11'), dont la surface de contact avec la contre-

broche respective (16) coïncide avec la surface de coulissement respective du tiroir quand une partie pleine de la carte à clé (8) se trouve au niveau de cette broche (15a), le tiroir (11) étant associé à un moyen de déverrouillage et de commande ou d'entraînement du dispositif.

2. Equipement conforme à la revendication 1, caractérisé en ce que le tiroir (11) comporte une patte 13 qui, lorsque la carte à clé (8) est insérée, se trouve poussée sur un coulisseau (23) en prise dans les glissières (22) solidaires du block d'appui (9) de façon à coulisser, ce coulisseau (23) pouvant déclencher pendant sa course un élément de détente (26) associé à un élément à action brusque.

3. Equipement conforme à la revendication 2, caractérisé en ce que la patte (13) du tiroir mobile peut agir directement sur l'élément à action brusque.

4. Equipement conforme à la revendication 1, caractérisé en ce que le block d'appui (9) est muni d'un couvercle supérieur (20) et d'un couvercle inférieur (21) qui sont amovibles pour permettre l'introduction des broches (15) et contre-broches (16).

5. Equipement conforme à la revendication 1, caractérisé en ce que le bloc d'appui (9) est logé dans une partie formant boîtier (2) d'un support (3) qui peut être fixé à une paroi du dispositif.

6. Equipement conforme à la revendication 1, caractérisé en ce que les évidements (29) pratiqués sur les faces de la carte à clé (8) correspondant à la moitié de l'épaisseur de cette carte à clé (8), les évidements (29) pratiqués sur une face étant décalés par rapport à ceux de l'autre face.

7. Equipement conforme à la revendication 1, caractérise en ce que la carte à clé (8) est composée de deux parties (8a, 8b) en forme de plaques qui peuvent être superposées l'une sur l'autre et liées entre elles par adhérence, chacune de ces parties comprenant des fentes généralement circulaires (30) disposées selon deux axes perpendiculaires entre eux, chacune de ces fentes délimitant un disque (31) maintenu solidaire de la partie en forme de plaque (8a, 8b) par des rayons (32), ces disques (31) pouvant être arrachés par un outil pointu ou un outil similaire de façon à former des trous disposés suivant une combinaison prédéterminée.

Patentansprüche

1. Kartengesteuerte Vorrichtung für Schließ-, Alarm- und ähnliche Anlagen mit einem Führungsblock (9), der einen Gleitsitz (10) für einen Schieber (11) aufweist, der zwischen einer ersten, dem Schließzustand der Anlage entsprechenden, und einer zweiten, dem Freigabezustand der Anlage entsprechenden Stellung hin und her bewegbar ist, wobei Führungsblock (9) und Schieber (11) eine Anzahl senkrecht zur Schieberichtung stehende Löcher (9', 11') haben, in denen eine bestimmte

Anzahl Verriegelungsstifte (15) und Gegenstifte (16) federnd gelagert sind, dadurch gekennzeichnet, daß der Schieber (11) mit einem zentralen Schlitz (12) versehen ist, in den eine Schlüsselkarte (8) einführbar ist, deren Flächen eine Anzahl Vertiefungen (29) enthalten in Positionen, die mit denen der genannten Verriegelungsstifte (15) in den jeweiligen Löchern (11') übereinstimmen, wobei nach Einführung der Schlüsselkarte (8) die Kontaktflächen von Verriegelungsstiften (15) und Gegenstiften (16) in einer Ebene mit den Gleitflächen des Schiebers (11) im Führungsblock (9) liegen, daß in wenigstens einem der Löcher (11') ein Verriegelungsstift (15a) gelagert ist, dessen Höhe geringer als die der übrigen Verriegelungsstifte (15) ist und dessen Kontaktfläche mit dem entsprechenden Gegenstift (16) in der Ebene der entsprechenden Gleitfläche des Schiebers (11) liegt, wenn sich vor diesem Verriegelungsstift (15a) ein ungelochter Teil der Schlüsselkarte (8) befindet, und daß der Schieber (11) mit einem Freigabe- und Steuerungs- oder Antriebsmittel der Anlage verbunden ist.

2. Vorrichtung nach Anspruch 1, dadurch gekennzeichnet, daß der Schieber (11) mit einem Ansatz (13) versehen ist, der bei eingeschobener Schlüsselkarte (8) mit einem in Führungen (22) des Führungsblockes (9) gleitenden Schieber (23) in Eingriff steht, wobei der Schieber (23) ein mit einem Schnappelement verbundenes Rastglied (26) während einer Hubbewegung freigibt.

3. Vorrichtung nach Anspruch 2, dadurch gekennzeichnet, daß der Ansatz (13) des Schiebers (11) direkt auf das Schnappelement einwirkt.

4. Vorrichtung nach Anspruch 1, dadurch gekennzeichnet, daß der Führungsblock (9) mit einer oberen Abdeckplatte (20) und einer unteren Abdeckplatte (21) versehen ist, welche zum Einsetzen der Stifte (15) und Gegenstifte (16) abnehmbar sind.

5. Vorrichtung nach Anspruch 1, dadurch gekennzeichnet, daß sich der Führungsblock (9) in einem kastenförmigen Teil (2) eines Rahmens (3) befindet, der an einer Wand der Anlage befestigbar ist.

6. Vorrichtung nach Anspruch 1, dadurch gekennzeichnet, daß die in den Oberflächen der Schlüssekkarte (8) enthaltenen Vertiefungen (29) der halben Dicke der Schlüsselkarte (8) entsprechen, und daß die Vertiefungen (29) in der einen Oberfläche gegenüber den Vertiefungen (29) in der anderen Oberfläche versetzt angeordnet sind.

7. Vorrichtung nach Anspruch 1, dadurch gekennzeichnet, daß die Schlüsselkarte (8) aus zwei plattenartigen Teilen (8a, 8b) besteht, die übereinander angeordnet und miteinander durch Kleben verbunden sind, daß jedes dieser Teile (8a, 8b) mit einer Vielzahl von im wesentlichen kreisrunden Einkerbungen (30) versehen ist, die in den Koordinaten zweier senkrecht zu-

einander verlaufender Richtungen angeordnet sind, und von denen jede ein Scheibenteil (31) umschließt, das mittels Speichenteile (32) fest mit den plattenartigen Teilen (8a, 8b) ver-

bunden ist, so daß die Scheibenteile (31) mit einem spitzen Werkzeug oder dergleichen einem bestimmten Lochmuster entsprechend ausstechbar sind.

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