Spring latch actuation device in locks operated by magnetic cards.

The spring latch actuation device in locks operated by magnetic cards comprises a plate-like element (6), which is constantly connected to the spring latch, and a disk-like element (17), which is connected to the spring latch actuation knob (33). The disk-like and plate-like elements are supported so as to be able to rotate coaxially with respect to one another. A rocker lever (21) is articulated on the disk-like element (17) and is suitable for engaging a notch (8) of the plate-like element (6). The lever (21) is retained, by spring means (10, 11) which are accommodated in the plate-like element (6), in a passive position which corresponds to the free rotation of the knob. When a magnetic card (42) is inserted in the reading device of the lock, an appropriately provided electromagnet (36) is activated so as to rotate the lever (21) into an active position in which the lever engages the notch (8) of the plate-like element (6) so as to provide the rotational coupling of the plate-like element (6) with the disk-like element (17) and allow the actuation of the spring latch when the knob (33) is acted on.
The present invention relates to a spring latch actuation device in electromagnetically operated locks, in particular for locks operated by magnetic cards.

In current electromagnetically operated locks, the spring latch is connected by means of lever systems to an element for coupling to the knob of the lock which can be actuated by the user from outside.

The disadvantage of said locks is constituted by the fact that the electromagnet, in order to overcome the internal resistances of the lock, must develop a considerable force and should have considerable dimensions, requiring a bulk which is rarely available in a lock.

The aim of the present invention is to obviate this disadvantage by providing a device which is suitable for actuating the spring latch of the respective lock and can be actuated by an electromagnet having smaller dimensions.

Within the scope of this aim, a further object of the invention is to provide a device which is simple in concept and safely reliable in operation.

This aim and this object are achieved, according to the invention, by a device which is characterized in that it comprises a first element, which is constantly operatively connected to the spring latch of the lock, and a second element, which is connected to the spring latch actuation knob, said elements being supported so as to be able to rotate coaxially with respect to one another and being suitable for being rotationally coupled to one another by means of a component which is mounted in one of said elements so as to be able to oscillate, said component being retained, by spring means which are accommodated in one of said elements, in a passive position which corresponds to the free rotation of the knob, an electromagnet being furthermore provided, said electromagnet being suitable for actuating said component from said passive position into an active position in which said component provides the rotational coupling of said first and second elements so as to allow the actuation of the spring latch when the knob is acted on.

The details of the invention will become apparent from the detailed description of a preferred embodiment of the device, illustrated only by way of non-limitative example in the accompanying drawings, wherein:

- figure 1 is a side view of a lock in which the covering container is shown raised with respect to the base plate on which the device is mounted;
- figure 2 is a plan view of the base plate on which the device is mounted; and
- figures 3 and 4 are enlarged-scale views of the right part of figures 1 and 2 respectively.

With reference to the above figures, the lock provided with the device according to the invention is composed of an elongated front shell or container 1 which is closed rearward by a base plate 2 on which the electric circuit and other components, which conventionally compose an electromagnetically operated lock and are not illustrated in the drawings, are mounted.

A bush 3 is rotatably supported in the front face of the shell and is traversed by a hole 4 which is coaxial to a hole 5 which is defined in the base plate 2 when the shell is associated with said base plate.

The device has an element 6 which is constituted by a plate which has a peripheral recess 7 and a rectangular recess or notch 8 in a position diametrically opposite to said recess 7 (see figure 4).

A radial seat 9 is defined at the recess 8 and in the thickness of the element 6, and a pin 10 is guided in said seat and is pushed outward by a helical spring 11 which is accommodated in the bottom of said seat.

The plate 6 is centrally provided with a tang 12 by means of which it can rotate in the hole 5 and in which a square recess 13 is defined axially for the engagement of means for actuating the spring latch, which is not illustrated. A ring bearing 14 is centered on the tang 12 and is interposed between the plate 6 and the base plate 2. A blind hole 15 with a circular cross section, and two notches 16 in the shape of a spherical dome, arranged diametrically with respect to the blind hole 15, are defined on the face of the plate which is opposite to the face provided with the tang 5 and are coaxial to said tang.

A substantially disk-shaped element 17 is pivoted to the plate 6 and has an expansion 18 which extends radially from the perimeter of the disk and ends with a sort of fork 19 between the arms whereof an articulation pivot 20 for a component 21 constituted by a rocker lever is supported.

The disk 17 is pivoted to the plate 6 by means of a pivot 22 which is inserted in the blind hole 15. The disk 17 further has two raised portions 23, 24 which extend from the face thereof which is opposite to the face of contact with the plate 6.

The two raised portions 23, 24 are diametrical, and respective blind holes 25 are defined therein; a spring 26 is accommodated in each of said blind holes 25 and acts on a respective ball 27. The mutual distance of the holes 25 is equal to that of the notches 16, so that in a given angular position of the disk 17 the balls 27 can engage the respective notches 16 so as to set the angular position of the disk 17 with respect to the plate 6.

On the side opposite to the raised portions 23, 24, the disk 17 has a tooth 28 which extends into
the recess 7 of the plate 6 and occupies a median position thereof.

The end portions 29 of a ring-shaped spring 30, which is applied to a cylinder 31 which rises from the base plate 2, abut on the sides of the tooth 28.

The end portions 29 of the spring 30 are arranged not only on the tooth 28 but also astride a protrusion 32 which rises from the base plate 2 proximate to the cylinder 31. By means of this arrangement, when the disk 17 is rotated in one direction or the other, the spring 30 can in any case return said disk to the angular reference position illustrated in figure 4, in which the tooth 28 and the pivot 32 are aligned radially and the balls 27 engage the notches 16 of the plate 6.

A knob 33 is provided for the rotation of the disk 17 and has a tang which can rotate in the bush 3 and is axially traversed by a square hole 34. Said square hole 34 is suitable for engaging a square stem 35 which is rigidly rotationally associated with the disk 17 and is coaxial to the tang 12, so as to define a prismatic coupling which allows to rotate the disk 17 by acting on the knob 33.

The described device is completed by an electromagnet 36 which is fixed to the base plate 2 and has two polar expansions 37, 38 which extend laterally toward the rocker lever 21. More precisely, the polar expansion 38 extends toward the central enlarged region 39 of the lever 21, whereas the expansion 37 cooperates with an arm 40 of the lever 21, the other arm 41 being suitable for engaging the rectangular recess 8. As illustrated in figure 3, the arms 40 and 41 of the lever 21 are conveniently axially offset with respect to the articulation pivot 20 in order to allow the central region and the end of the arm 40 to optimally convey the lines of force of the electromagnet, increasing its efficiency.

The operation of the described device is as follows.

When the electromagnet 36 is not energized, as normally occurs when the door is closed, the spring 11, by means of the pin 10, acts on the arm 41, pushing it out of engagement in the recess 8 of the plate 6. In this situation, the plate 6 is rotationally disengaged from the disk 17, so that by acting on the knob 33 no traction occurs on the plate 6, which remains motionless in the position in which the spring latch is inserted in the corresponding selvage.

It should be noted that the lever systems which connect the plate 6 to the spring latch oppose a resistance which prevents any rotation of the plate arising from the traction exerted by the balls 27. If the disk 17 is rotated and the plate 6 is retained, the balls 27 in fact disengage from the notches 16, allowing the rotation of the disk with respect to the plate in contrast with the return action exerted by the spring 30, on the end portions 29 of which the tooth 28 acts.

By releasing the knob 33, the spring 30 returns the disk 17 to the angular position in which the lever 21 is aligned with the pin 10. This position is set by the engagement of the balls 27 in the notches 16.

In order to open the door, the electromagnet 36 is activated so as to cause, by virtue of the attraction of the arm 40 between the polar expansions 37, 38, the oscillation of the rocker lever 21.

The activation of the electromagnet 36 occurs by inserting a card 42, provided with a magnetic band, in which an encoded signal is stored, in a reading device 43 which, in cooperation with appropriate electronic circuits, processes the encoded signal, allowing the energization of the electromagnet only when the signal corresponds to the one provided for the lock.

Since the attraction force of the electromagnet 36 is such as to overcome the contrast thrust exerted by the pin 10 due to the spring 11, the arm 41 engages in the notch 8, producing a rotational coupling between the disk 17 and the plate 6 which allows, by acting on the knob 33, to rotate the tang 12 and actuate the spring latch opening lever systems.

As soon as the attraction force exerted by the electromagnet is interrupted, the pin 10 pushes the arm 41 out of the recess 8 again, allowing the plate 6 to rotate in the spring latch closure position.

A substantial advantage of the present invention is constituted by the fact that when the electromagnet 36 is not energized, the lever 21, by virtue of the elastic thrust exerted by the pin 10, is positively kept in a non-interference condition, so that the knob 33 is disengaged from the plate 6 and thus from the spring latch. In this manner, attempts at forcing, performed on the knob, are not transmitted to the spring latch and greater safety against fraudulent tampering of the lock is thus obtained.

Where technical features mentioned in any claim are followed by reference signs, those reference signs have been included for the sole purpose of increasing the intelligibility of the claims and accordingly such reference signs do not have any limiting effect on the scope of each element identified by way of example by such reference signs.

Claims

1. Spring latch actuation device in locks operated by magnetic cards (42), characterized in that it comprises a first element (6), which is constantly operatively connected to the spring
latch of the lock, and a second element (17), which is connected to the spring latch actuation knob (33), said elements (6,17) being supported so as to be able to rotate coaxially with respect to one another and being suitable for being rotationally coupled to one another by means of a component (21) which is oscillatably mounted in one (6) of said elements, said component (21) being retained by spring means (10, 11), which are accommodated in said one (6) of said elements, in a passive position which corresponds to the free rotation of the knob (33), an electromagnet (36) being furthermore provided, said electromagnet being suitable for actuating said component (21) from said passive position into an active position in which said component provides the rotational coupling of said first and second elements (6, 17) so as to allow the actuation of the spring latch when the knob (33) is acted on.

2. Device according to claim 1, characterized in that said first element is constituted by a plate (6) which is rotatably supported and has a perimetric recess (8) at which a radial seat (9) is defined, a pin (10) being guided in said seat and being pushed by a spring (11) so as to protrude into said recess (8), and in that said second element is constituted by a disk (17) which is supported so as to be able to rotate coaxially to said plate (6) and has a square pivot (35) for the prismatic coupling of an actuation knob (33) and of a radial expansion (18,19) in which a rocker lever (21) is supported, said rocker lever oscillating in a plane which is normal to said disk (17), said lever (21) having a first arm (40) which is suitable for being attracted by said electromagnet (36) and a second arm (41) which is suitable for engaging in said recess (8) in contrast with said pin (10) when said electromagnet (36) is energized and for disengaging from said recess (8) as a consequence of the thrust of the pin (10) when the electromagnet is de-energized.

3. Device according to claim 2, characterized in that it comprises a spring (30) for elastically retaining said disk (17) in a position in which said rocker lever (21) is opposite to said electromagnet (36).

4. Device according to claim 2, characterized in that said electromagnet (36) has two polar expansions (37, 38) which protrude laterally from the winding and in that said first arm (40) is shaped so as to close the magnetic circuit when the electromagnet is energized.

5. Device according to claim 2, characterized in that two seats (25) are defined in said disk (17) and are diametrically opposite with respect to the axis of rotation of said disk, respective balls (27) being accommodated in said seats and being suitable for engaging, by means of springs (26), in notches (16) of the plate (6) in order to retain said plate in an angular position in which said rocker lever (21) is opposite to said recess (8) of said plate (6).

6. Device according to claim 2, characterized in that said disk (17) is pivoted coaxially to said plate (6) by means of a pivot (22) which is inserted in a hole (15) of the plate.
### DOCUMENTS CONSIDERED TO BE RELEVANT

<table>
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<tr>
<th>Category</th>
<th>Citation of document with indication, where appropriate, of relevant passages</th>
<th>Relevant to claim</th>
<th>CLASSIFICATION OF THE APPLICATION (Int. CL.5)</th>
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<td>EP - A1 - 0 276 444 (SCHULTE SCHLAGBAUM AKTIENGESELLSCHAFT) * Fig. 1-22; claims 1-33 *</td>
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<td>1-6</td>
<td></td>
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<td>1-6</td>
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The present search report has been drawn up for all claims

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<tr>
<th>Place of search</th>
<th>Date of completion of the search</th>
<th>Examiner</th>
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<td>VIENNA</td>
<td>12-06-1991</td>
<td>CZASTKA</td>
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