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(54) **Cylinder lock**

(57) A cylinder lock (10), comprising:

- a stator (11),
- a cylindrical rotor (12) for the actuation of the bolt, which is accommodated rotatably within the stator (11) and in which a slot (13) for the insertion of a key (14) for the operation of the lock is formed,
- coding pins (15) and driver pins (16) for blocking the rotation of the rotor (12) within the stator (11), which can slide within radial holes (17a, 17b) provided correspondingly within the rotor (12) and within the stator (11),
- elastic means (18) for pushing the coding pins (15)

against an internal wall (19) of the slot (13), which faces the holes (17a, 17b), the elastic means (18) being further adapted to align the coding pins (15) and the driver pins (16) to allow the rotation of the rotor (12) within the stator (11) when one key (14) having a predefined profile for opening the lock is inserted in the slot (13),

- at least one pusher (20), which is accommodated in at least one first hole (21) of the holes (17a, 17b) and defines a safety position for at least one first pin (22) of the coding pins (15), in which the first coding pin (22) is spaced from the wall (19) even when no key (14) is inserted in the slot (13).

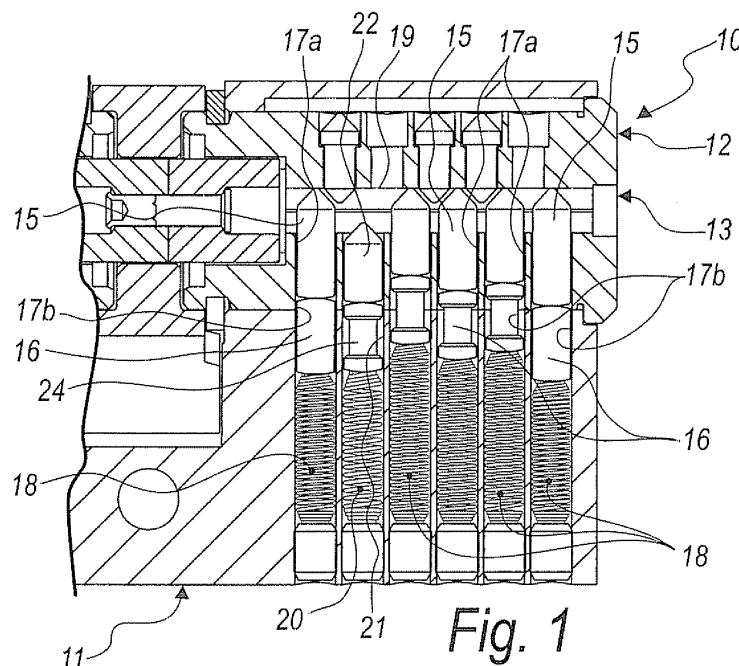


Fig. 1

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Description

[0001] The present invention relates to a cylinder lock.

[0002] Various models of cylinder lock are currently known which generally comprise:

- a stator
- a cylindrical rotor for actuation of the spring latch, which is accommodated rotatably within the stator and is provided with a slot for the insertion of a key for actuating the lock,
- coding pins and driver pins for blocking the rotation of the rotor within the stator, which can slide within radial holes provided correspondingly in the rotor and in the stator,
- springs for pushing the coding pins against a wall that lies inside the slot that faces the holes, such springs being further adapted to align the coding pins with respect to the driver pins in order to allow the rotation of the rotor within the stator when a key having a predefined profile for opening the lock is inserted in the slot.

[0003] When the predefined key for operating the lock is inserted in the slot, it in fact moves the coding pins away from the internal wall of the slot, aligning their end that abuts against the driver pins with the common surface of mutual rotation of the rotor and of the stator.

[0004] In this manner, by means of the key the user can turn the rotor, which moves the coding pins inside it with respect to the stator, which accommodates internally the driver pins and the springs.

[0005] Keys for this type of lock have flared seats, in which the conical tips of the coding pins abut, being pushed therein by the springs by means of the driver pins.

[0006] The depth of such seats determines the position of the coding pins when the key is inserted in the cylinder and therefore the key adapted to open the lock has seats having a coordinated depth, so as to align the coding pins and the driver pins with the rotor-stator sliding surface, as mentioned.

[0007] A method for opening this type of lock, known as "bumping", is currently known which consists in preparing a key that has a cross-section adapted to be inserted in the slot of the lock to be opened and has a profile in which all the seats are flared to the maximum depth.

[0008] Moreover, the shoulders, which generally define the stop abutment for the insertion of the key in the slot, are filed slightly in order to allow an excess of insertion of the key in the slot.

[0009] Once such key has been inserted in the slot, by striking the key so as to push it into the slot by the insertion excess, it is possible to cause mutual jumping of the driver pins on the coding pins such as to allow, in a particular condition of uniform jumping of the coding pins and of the driver pins, the rotation of the rotor within the stator and therefore the opening of the lock.

[0010] The aim of the present invention is to provide a cylinder lock that cannot be opened with the described method.

5 [0011] Within this aim, an object of the invention is to provide a cylinder lock that contrasts the jumping of at least one of its coding pins on its corresponding driver pin.

[0012] Another object of the invention is to provide a cylinder lock that is simple and easy to use and can be manufactured with relatively low costs.

10 [0013] This aim and these and other objects, which will become better apparent hereinafter, are achieved by a cylinder lock, which comprises:

- a stator,
- 15 - a cylindrical rotor for the actuation of the spring latch, which is accommodated rotatably within said stator and within which a slot for the insertion of a key for operating said lock is formed,
- coding pins and driver pins for blocking the rotation of said rotor within said stator, which can slide within radial holes provided correspondingly in said rotor and in said stator,
- 20 - elastic means for pushing said coding pins against an internal wall of said slot, which faces said holes, said elastic means being further adapted to align said coding pins and said driver pins to allow the rotation of said rotor within said stator when a key having a predefined profile for opening said lock is inserted in said slot,
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said lock being **characterized in that** it comprises at least one pusher, which is accommodated in at least one first one of said holes and forms a safety position for at least one first one of said coding pins, in which said first coding pin is spaced from said wall even when no key is inserted in said slot.

[0014] Further characteristics and advantages of the invention will become better apparent from the following detailed description of a preferred but not exclusive embodiment of the lock according to the invention, illustrated by way of non-limiting example in the accompanying drawings, wherein:

Figure 1 is a longitudinal sectional view of a detail of a lock according to the invention;

Figure 2 is a longitudinal sectional view of the lock according to the invention, in which a bump key is inserted;

Figure 3 is an enlarged-scale sectional view, taken along the transverse line III-III of Figure 2, of a detail of the lock according to the invention, in which a bump key is inserted;

Figure 4 is a longitudinal sectional view of a detail of the lock according to the invention, in which a key designed to open it is inserted.

[0015] It is noted that anything found to be already known during the patenting process is understood not to

be claimed and to be the subject of a disclaimer.

[0016] With reference to the figures, the reference numeral 10 generally designates a cylinder lock, which comprises:

- a stator 11,
- a cylindrical rotor 12 for the actuation of the bolt, which is accommodated rotatably within the stator 11 and in which a slot 13 for the insertion of a key 14 for the operation of the lock is formed,
- coding pins 15 and driver pins 16 for blocking the rotation of the rotor 12 within the stator 11, which can slide within radial holes 17a and 17b provided correspondingly within the rotor 12 and within the stator 11,
- elastic means 18, conveniently springs, for pushing the coding pins 15 against an internal wall 19 of the slot 13, which faces the holes 17a and 17b, the elastic means 18 being further adapted to align the coding pins 15 and the driver pins 16 to allow the rotation of the rotor 12 within the stator 11 when one key 14 having a predefined profile for opening the lock, i.e., an opening key 14a, is inserted in the slot 13.

[0017] A particularity of the lock 10 according to the invention is that it comprises at least one pusher 20, which is accommodated in at least one first hole 21 of the holes 17a and 17b and defines a safety position for at least one first pin 22 of the coding pins 15, in such safety position the first coding pin 22 being spaced from the wall 19 even when the key 14 is inserted in the slot 13.

[0018] Conveniently, such safety position has the first coding pin 22 that faces the slot 13 and protrudes into it with one end.

[0019] By way of example, Figures 1 and 2 show the first coding pin 22 in such safety position.

[0020] In such safety position, the first coding pin 22 advantageously protrudes into the slot 13 substantially by seven tenths of a millimeter.

[0021] The pusher 20 conveniently comprises a spring for pushing the first coding pin 22 into the safety position, the elastic means 18 having a lower elastic constant than such pusher spring.

[0022] The operation of the cylinder lock 10 according to the invention is as follows.

[0023] When one bump key 14a is inserted in the lock 10, the first coding pin 22 is not moved from its safety position, since it does not engage a corresponding seat 23 of the bump key 14a.

[0024] The seat 23 in fact has been provided at the maximum depth and therefore is unable to engage the first coding pin 22.

[0025] In this manner, by striking the bump key 14a, according to the described method, such key may cause the jumping of the coding pins 15 that abut against it, but not of the first coding pin 22, which by remaining in the safety position prevents the rotation of the rotor 12 within the stator 11 to open the lock.

[0026] Moreover, advantageously such pusher spring has a very high elastic constant, so that if one bump key 14a capable of engaging the first pin 22 in its safety position is inserted in the lock, the jumping of the first coding pin 22 on its corresponding driver pin 24 can be imparted by striking the bump key 14a so forcefully as to break the lock.

[0027] In practice it has been found that the invention achieves the proposed aim and objects, by providing a cylinder lock that cannot be opened by means of the method known as bumping, since ordinary bump keys do not engage all the opening coding pins and, if a bump key adapted for this purpose is used, the rigidity of the pusher spring is such as to induce the operator to impart such a blow impact to the bump key as to risk the breakage of the pins of the lock.

[0028] The invention thus conceived is susceptible of numerous modifications and variations, all of which are within the scope of the appended claims; all the details may further be replaced with other technically equivalent elements.

[0029] In practice, the materials used, as well as the contingent shapes and dimensions, may be any according to requirements and to the state of the art.

[0030] The disclosures in Italian Patent Application No. PD2008A000110 from which this application claims priority are incorporated herein by reference.

[0031] 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 interpretation of each element identified by way of example by such reference signs.

Claims

1. A cylinder lock (10), comprising:

- a stator (11),
- a cylindrical rotor (12) for the actuation of the bolt, which is accommodated rotatably within said stator (11) and in which a slot (13) for the insertion of a key (14) for the operation of said lock is formed,
- coding pins (15) and driver pins (16) for blocking the rotation of said rotor (12) within said stator (11), which can slide within radial holes (17a, 17b) provided correspondingly within said rotor (12) and within said stator (11),
- elastic means (18) for pushing said coding pins (15) against an internal wall (19) of said slot (13), which faces said holes (17a, 17b), said elastic means (18) being further adapted to align said coding pins (15) and said driver pins (16) to allow the rotation of said rotor (12) within said stator (11) when one key (14) having a predefined pro-

file for opening said lock is inserted in said slot (13),

said lock being **characterized in that** it comprises at least one pusher (20), which is accommodated in at least one first hole (21) of said holes (17a, 17b) and defines a safety position for at least one first pin (22) of said coding pins (15), in which said first coding pin (22) is spaced from said wall (19) even when no key (14) is inserted in said slot (13).

2. The cylinder lock according to claim 1, **characterized in that** said safety position has said first coding pin (22) that faces said slot (13) and protrudes into it with one end.
3. The cylinder lock according to one or more of the preceding claims, **characterized in that** said at least one pusher (20) comprises a spring for pushing said first coding pin (22) into said safety position, said elastic means (18) having an elastic constant that is lower than that of said pusher spring.
4. The cylinder lock according to one or more of the preceding claims, **characterized in that** in said safety position said first coding pin (22) protrudes into said slot (13) substantially by seven tenths of a millimeter.

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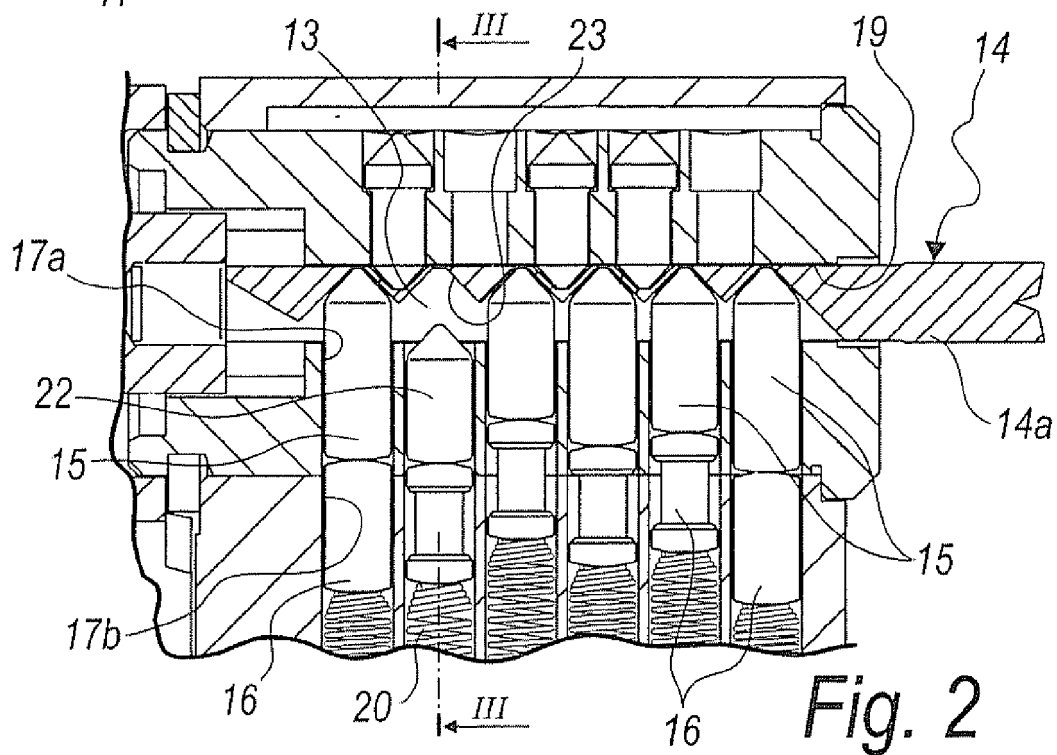
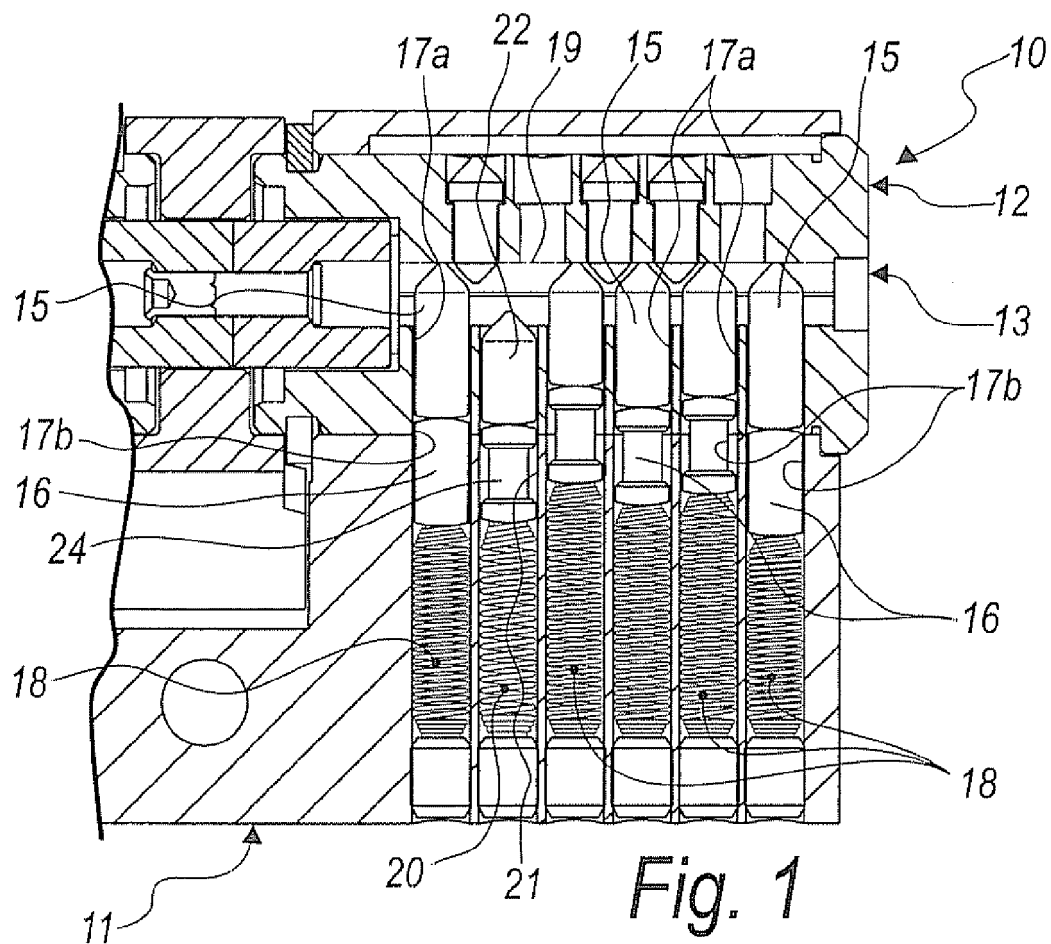
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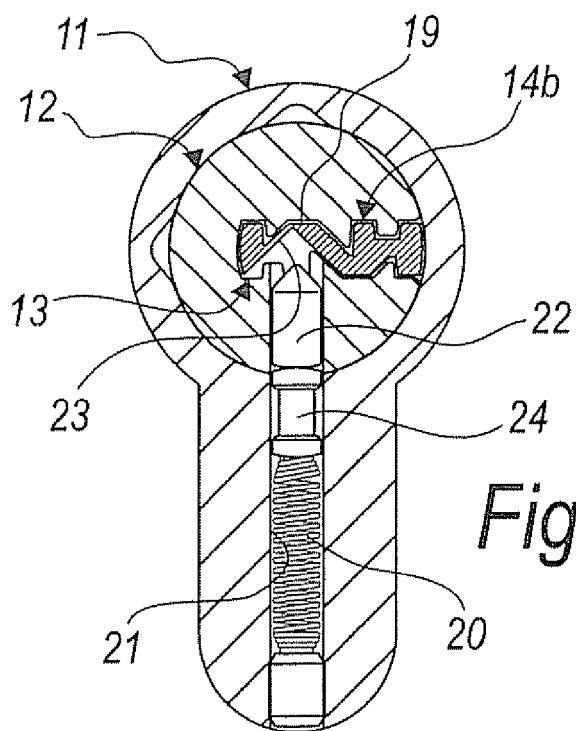


Fig. 3

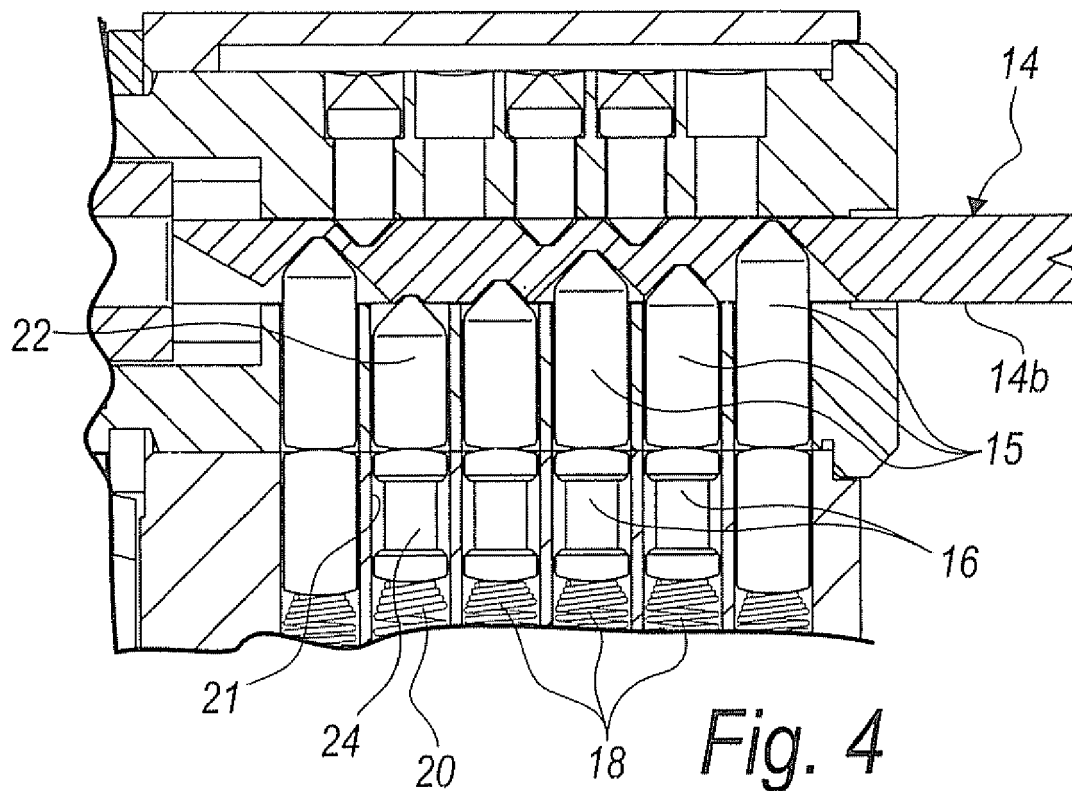


Fig. 4

REFERENCES CITED IN THE DESCRIPTION

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Patent documents cited in the description

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