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(54) Title: Cylinder lock and flat key

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Cylinder lock and flat key

The invention relates to a cylinder lock with cylinder core rotatable therein, comprising a keyway for a flat key and probe elements for ward cuts and/or control surfaces of the key as well as locking elements, which block or release the cylinder core against rotating.

Furthermore the invention relates to a flat key for a cylinder lock mentioned above with ward cuts and/or control surfaces on the narrow sides and/or flat sides of the key as well as longitudinal profile grooves on the flat sides of the key.

Cylinder locks, which by means of different tumblers probe ward cuts or control surfaces on a corresponding flat key, are well-known. The main advantage of such locks and keys is the possibility of extremely economic manufacture as well as relatively high locking security. In order to improve the locking security of such locks it is desirable to increase the variation options of the ward cuts or control surfaces on the key. Also protection against illicit lock picking is increased. This usually means that the design of the locks becomes more and more complex, which can have a disadvantageous effect on the functional reliability of the locks, and leads to higher production costs.

An object of the present invention is therefore to create a cylinder lock, which eliminates the disadvantages mentioned above, permits an increase in the variation options and ensures better security against illicit lock picking. At the same time the lock design should be as simple as possible and be economic to produce. Another object of the invention is to provide a corresponding flat key for such a cylinder lock.

This object is achieved as a result that at least one locking element is designed as a control platelet, which can be moved in a groove in the cylinder core against the force of a spring, whereby the control platelet comprises at least one control extension protruding into the keyway, which can be meshed with corresponding control profile grooves on the key flat sides, and whereby in neutral position of the lock the core platelet is engaged with a securing recess in the cylinder housing, and with the correct key in the cylinder core can be moved to the release position, in order to release the

cylinder core for rotating. The control platelet can be arranged normally to the keyway and in neutral position of the lock can be moved perpendicularly.

As the result of creating a new locking element, which can be combined with conventional locking elements, split tumbler pins for example, the variation range of the lock can be substantially increased in a simple way.

In order to increase the protection against illicit lock picking the control platelet can be arranged in a groove between two pin tumblers. As a result of this arrangement illicit lock picking is made more difficult, since those pin tumblers, which lie deeper inside the lock behind the control platelet can no longer be easily reached with conventional lock picking tools.

The control platelet with its control extensions can only project on one side in the keyway or however can also comprise control extensions, which lie on both sides of the keyway and protrude therein and which can be meshed with control profile grooves on both flat sides of the key.

A further feature of a cylinder lock according to the invention is that a further control securing element is arranged in the cylinder core in such a manner that in neutral position of the lock it is arranged in a corresponding securing recess of the housing and blocks the cylinder core against rotating, and that with the correct key inserted it can be meshed with a control recess on the control platelet and releases the cylinder core against rotating.

Furthermore the object is achieved by a flat key according to the invention as a result that additional control profile grooves are provided on the key, running from the key tip toward the key bow and comprising at least one section, which is formed diagonally to the longitudinal profile grooves at an angle deviating from 0°. These control profile grooves are formed by removing material from the tip of the key, as a result of which at all points the control profile is equal or less than the profile formed by the longitudinal profile grooves.

A further feature of a flat key according to the invention is that in those places at which the control profile grooves are formed so as to run diagonally and at which intersections with the longitudinal profile grooves are present, at least one leading flank is always present for guiding at least one of the control extensions of the control platelet.

Further features of the invention will be evident from the claims, drawings as well as the description.

Fig. 1 shows a longitudinal section through a cylinder lock according to the invention with flat key inserted. Fig. 2 shows a schematic cross section through a cylinder lock with a possible embodiment of a control platelet in release position. Fig. 3 shows a schematic cross section of the cylinder lock from Fig. 2 with the control platelet in off position. Figs. 4a and 4b show a schematic cross section of a cylinder lock with a further embodiment of the control platelet. Fig. 5 shows a detailed view of a possible embodiment of a control platelet. Fig. 6 shows a detailed view of a further embodiment of a control platelet. Fig. 7 shows a side view of a flat key according to the invention. Fig. 8 shows a section through a flat key cut along line VIII-VIII in Fig. 7. Fig. 9 shows a section through a flat key according to the invention cut along line IX-IX from Fig. 7.

The cylinder lock 1 shown in Fig. 1 consists of a housing 3 with a cylinder 4 rotatable therein. Shown here as exemplary locking elements are split stop pins consisting of cylinder core pins 10, housing pins 9 as well as springs 8, which protrude through bores in the housing 3 and in the cylinder core 4 and serve to probe ward cuts 13 on the flat key 2. Furthermore a groove 6 in the cylinder core in which the movable control platelet 7 is arranged is located between the innermost stop pin and the one lying in front. Now the flat key 2 consisting of a key bow 11 and a key shank 12 is inserted into the keyway 5 such that first the key tip 16 strikes the control platelet 7. The control extensions 19 of the control platelet 7 in this case slide into the control profile grooves 16 and are guided thereby. When the key 2 is inserted further the control extensions 19 slide over the diagonal profiles of the control profile grooves 15 and guide in such a way that the control platelet 7 is displaced into the cylinder core against the force of the springs 17. So that the control platelet can be correctly guided it is necessary that at least one leading flank is always present in the entire region of the control profile grooves 15. This must be considered particularly in the case of intersections between the diagonal sections of the control profile grooves 15 and the continuous longitudinal profile grooves 14.

Figs. 2 and 3 in each case show a schematic cross section with a control platelet 7 which on both sides of the keyway has control extensions 19 protruding therein, as a result of which control profile grooves 15 can be probed on both flat sides 23 of the key. Fig. 3 in this case shows the neutral position in which the control platelet meshes with a

securing recess 18 in the housing 3 of the cylinder lock and blocks the cylinder core 4 against rotating. Fig. 2 shows the cylinder lock according to the invention in release position, wherein after the correct key was inserted the control platelet 7 has been moved into the cylinder core.

Figs. 4a and 4b show a further possible embodiment of a cylinder lock according to the invention in which a control platelet 7 is provided, which probes control profile grooves 15 on only one flat side 23 of the key by means of the control extensions 19. The spring 17 of the control platelet 7 is counter-supported on a ball 20, which is pressed into the corresponding core bore. Instead of a ball 20 a compacted stud can also be provided. Furthermore a control securing element 21 is provided, which in neutral position, as shown in Fig. 4a, meshes with a securing recess 18 in the housing 3. If a correct key is inserted in the keyway 5, as the result of the control profile grooves 15 the control platelet 7 is moved perpendicularly against the force of the spring 17, whereby the control securing element 21 meshes with a control recess 22 on the control platelet 7 and the cylinder is therefore released against rotating, as shown in Fig. 4b.

Figs. 5 and 6 in each case show detailed views of two possible embodiments of the control platelet 7. In Fig. 5 a control platelet 7 is shown with control extensions 19 on both sides of the keyway. Fig. 6 shows a control platelet 7 according to an embodiment as illustrated in Fig. 4.

Figs. 7 to 9 in each case shows views of an inventive flat key 2 with a key bow 11 and a key shank 12, ward cuts 13, continuous longitudinal profile grooves 14 as well as control profile grooves 15 running from the key tip 16 toward key bow 11. As evident in Fig. 7a section of the control profile grooves 15 runs diagonally to the continuous longitudinal profile grooves 14, at an angle deviating from 0°. The sectional illustration of the flat key from Fig. 7 shown in Fig. 8 shows the profile 25 in the region of the continuous longitudinal profile grooves 14. The sectional illustration shown in Fig. 9 shows the control profile 24 in the present region with continuous longitudinal profile grooves 14 as well as the control profile grooves 15. Since the control profile grooves 15 are formed by removing material from the key tip 16, the control profile 24 can be at maximum equal or less than the profile 25 without control profile grooves.

CLAIMS

1. Cylinder lock with cylinder core rotatable therein, comprising a keyway for a flat key and probe elements for ward cuts and/or control surfaces of the key as well as locking elements, which lock or release the cylinder core against rotating, characterized in that at least one locking element is designed as a control platelet (7), which can be moved in a groove (6) in the cylinder core (4) against the force of a spring (17), the control platelet (7) comprising at least one control extension (19), which protrudes into the keyway (5) and can be meshed with corresponding control profile grooves (15) on the flat sides (23) of the key, and in neutral position of the lock (1), the control platelet (7) meshing with a securing recess (16) in the cylinder housing (3), and with the correct key (2) in the cylinder core (4) can be moved to the release position, in order to release the cylinder core (4) for rotating and wherein the control platelet (7) is arranged normally to the keyway (5) and in neutral position of the lock (1) so as to be movable perpendicularly and wherein the control platelet (7) is arranged in a groove (6) between two pin tumblers.

2. Cylinder lock according to Claim 1, characterized in that the control platelet (7) has control extensions (19), which lie on both sides of the keyway (5) and protrude therein, and which can be meshed with control profile grooves (15) on both flat sides (23) of the key.

3. Cylinder lock according to anyone of Claims 1 to 4, characterized in that a further control securing element (21) is arranged in the cylinder core (4) in such a manner that in neutral position of the lock (1) it is arranged in a corresponding securing recess (18) of the housing (3) and blocks the cylinder core (4) against rotating, and that with the correct key (2) inserted it can be meshed with a control recess (22) on the control platelet (7) and releases the cylinder core (4) for rotating.

4. Flat key for a cylinder lock according to one of Claims 1 to 3 with ward cuts and/or control surfaces on the narrow sides and/or key flat sides of the key as well as longitudinal profile grooves on the flat sides of the key, characterized in that additional control profile grooves (15) are provided, which are formed so as to run from the key tip (16) toward key bow (11) and exhibit at least one section,

which is formed diagonally to the longitudinal profile grooves (14) at an angle deviating from 0°.

5. Flat key according to Claim 4, characterized in that the control profile grooves (15) are formed by removing material from the tip (16) of the key (2), as a result of which at all points the control profile (24) is equal or less than the profile (25) formed solely by the longitudinal profile grooves (14) and that at each point where the control profile grooves (15) are formed so as to run diagonally and where intersections with the longitudinal profile grooves (14) are present, preferably at least one leading flank for guiding at least one of the control extensions (19) of the control platelet (7) is always present.

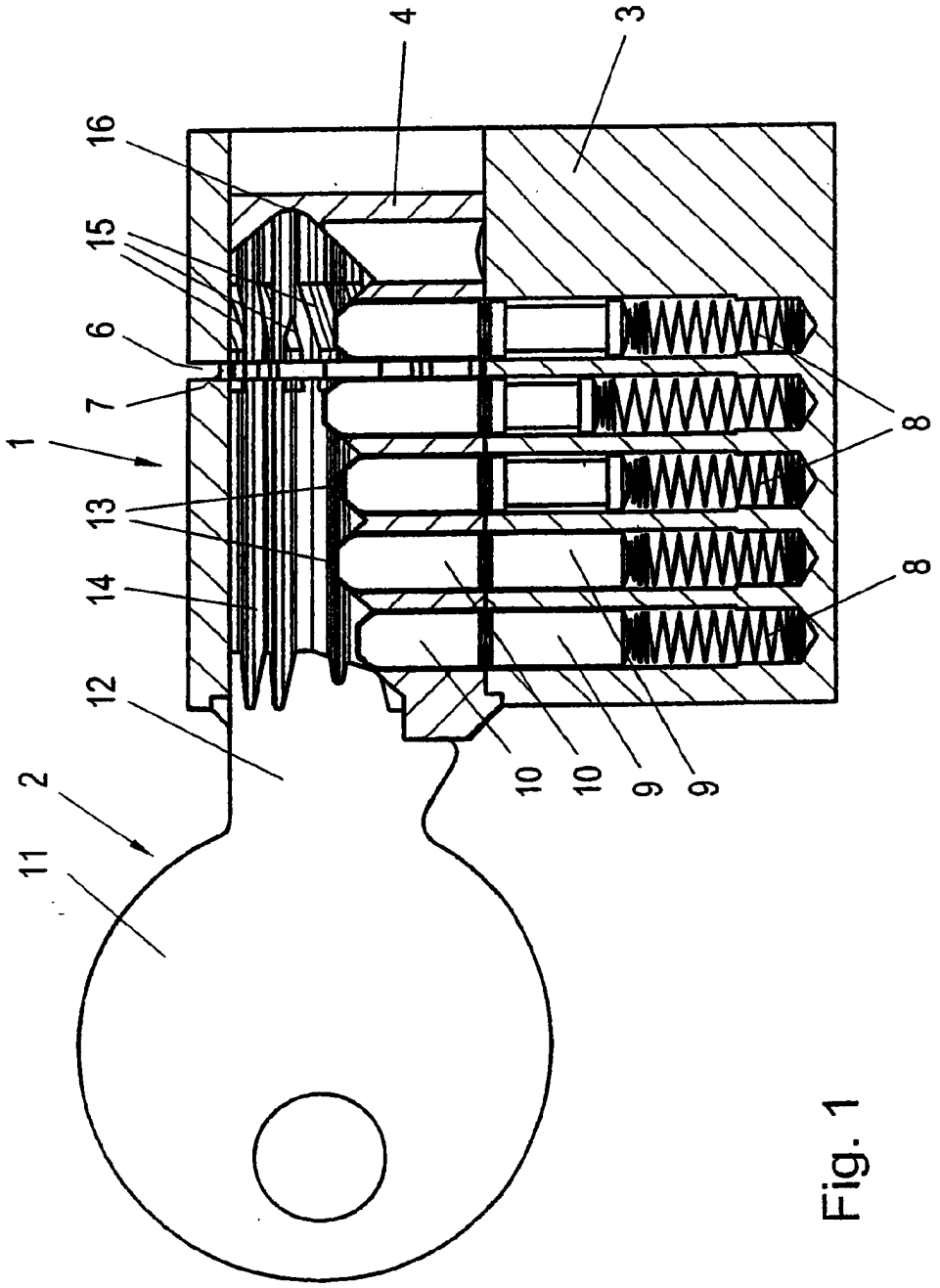


Fig. 1

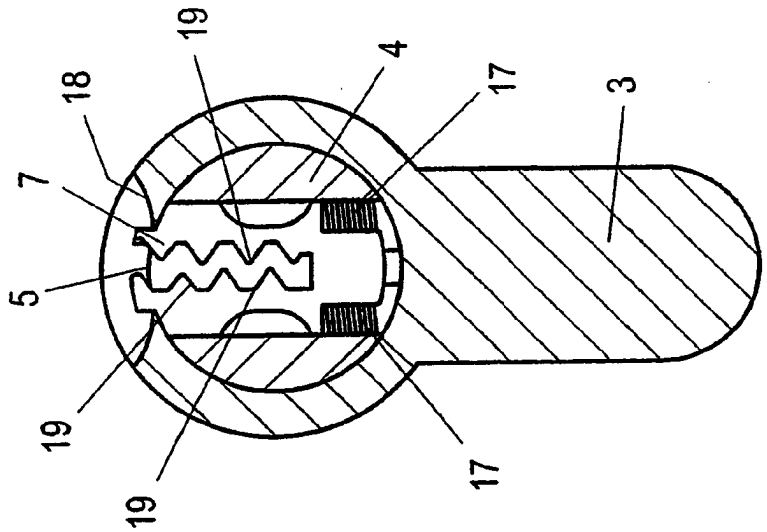


Fig. 3

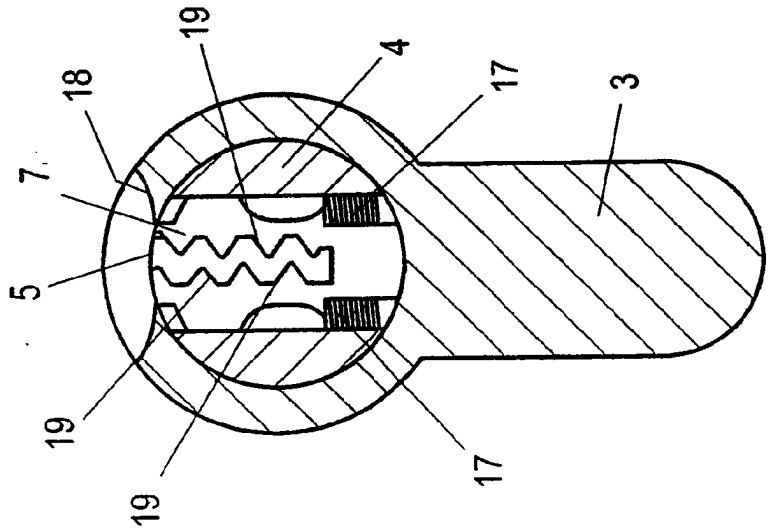


Fig. 2

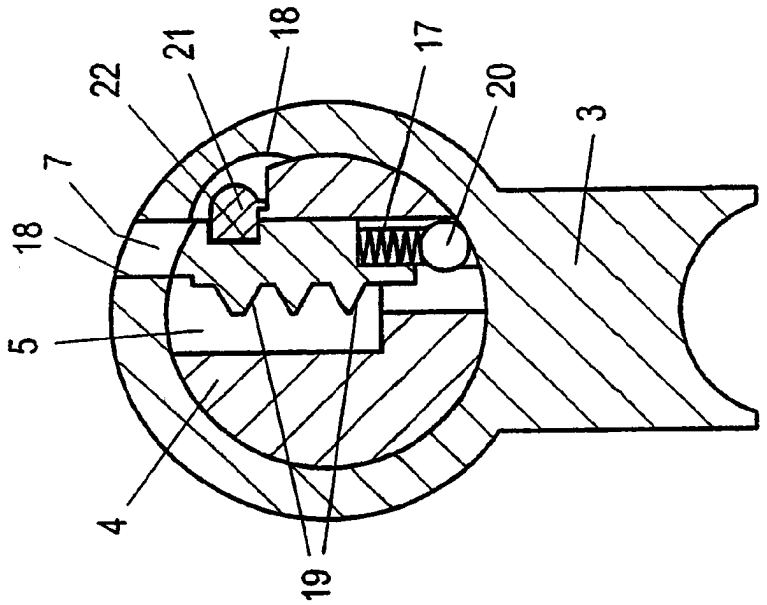


Fig. 4b

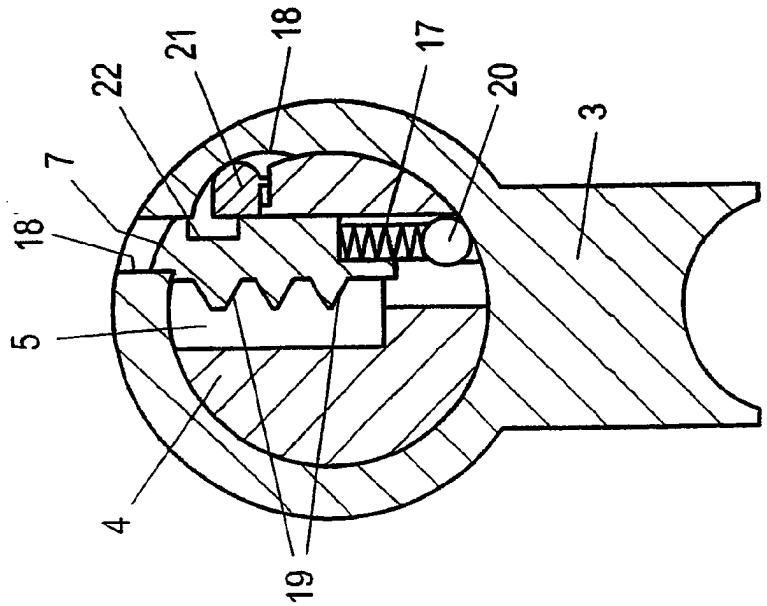


Fig. 4a

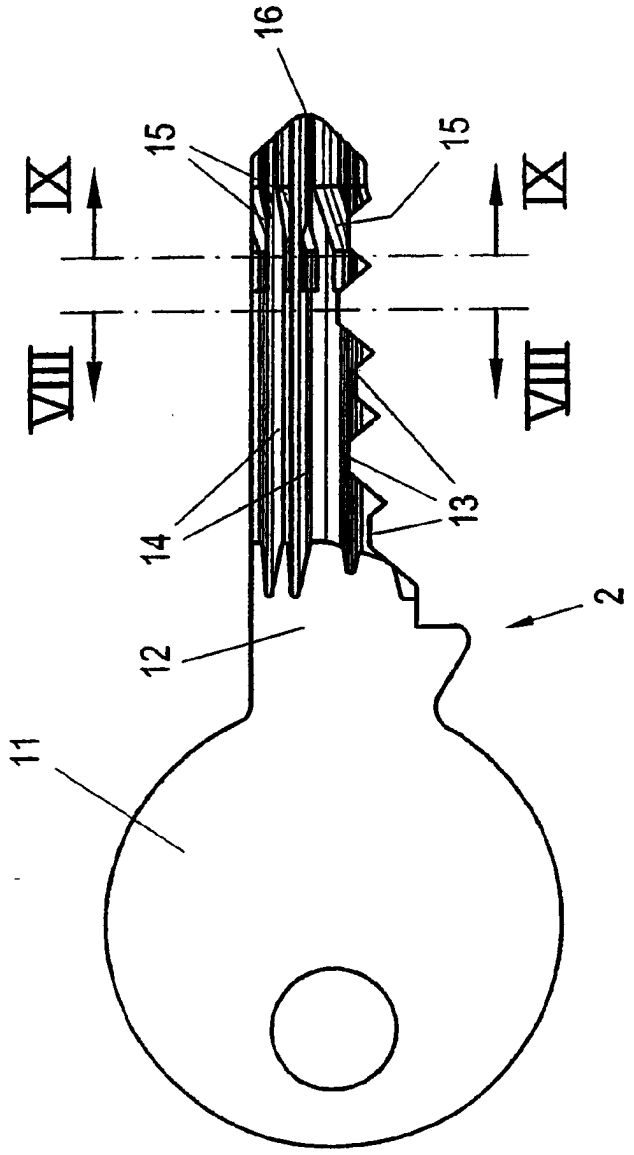


Fig. 7

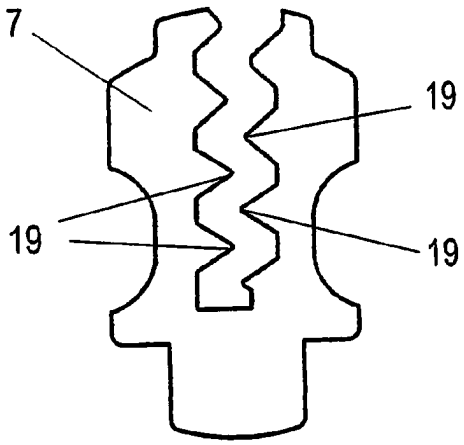


Fig. 5

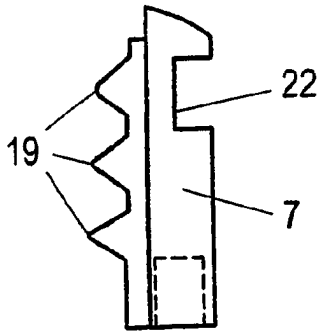


Fig. 6

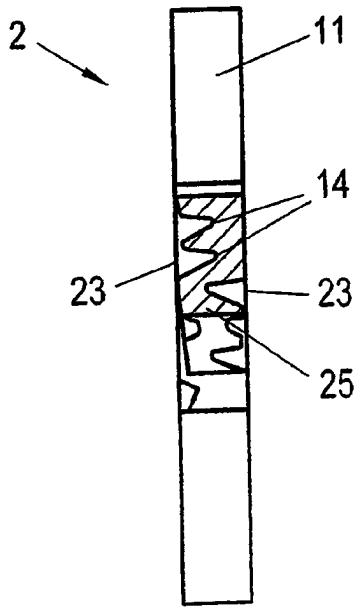


Fig. 8

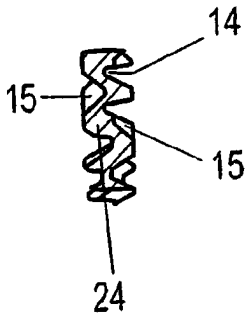


Fig. 9