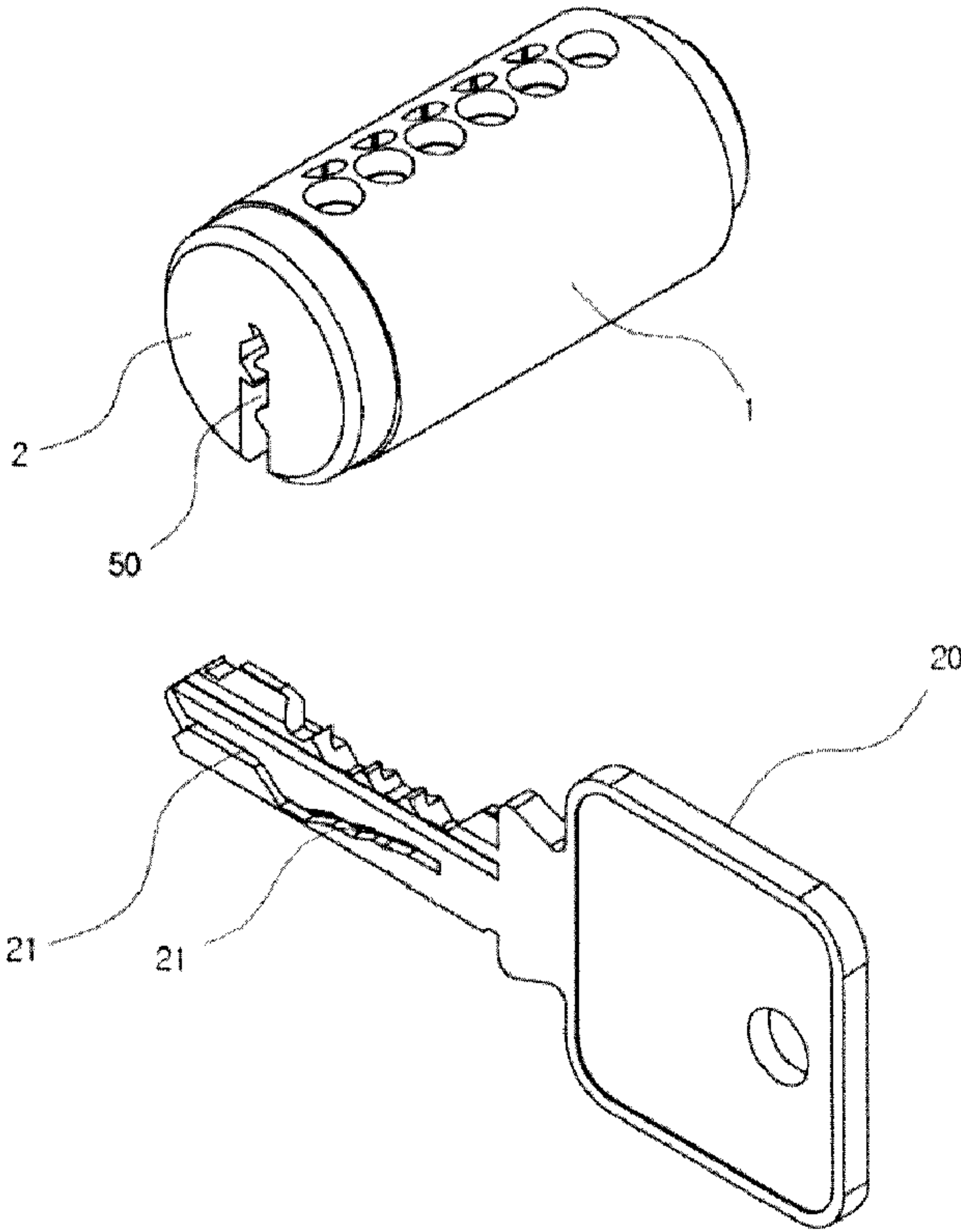




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(54) **Titre :** ENSEMBLE DE VERROU ET DE CLE
(54) **Title:** LOCK AND KEY ASSEMBLY



(57) **Abrégé/Abstract:**
A lock and key assembly having improved unlocking difficulty is provided. The lock has a cylindrical cylinder and a rotating body inserted therein. Slide pin holes and locking pin holes have slide pins and locking pins installed therein. Side bar recess grooves are

(57) Abrégé(suite)/Abstract(continued):

formed on the inner face of the cylindrical cylinder and side bar holes are formed on the rotating body as well. The side bar holes include a side bar coupled to a spring to allow for entry into the side bar recess grooves. The key has encrypted v-cut teeth to allow for unlocking of unlocking pins; a keyway having an encrypted curved section to align the slide pins for unlocking the side bars, and unlocking grooves provided on the side faces of the encrypted V-cut key teeth to allow projections formed on the side bars to enter thereto, unlocking the side bars.

ABSTRACT

A lock and key assembly having improved unlocking difficulty is provided. The lock has a
5 cylindrical cylinder and a rotating body inserted therein. Slide pin holes and locking pin
holes have slide pins and locking pins installed therein. Side bar recess grooves are
formed on the inner face of the cylindrical cylinder and side bar holes are formed on the
rotating body as well. The side bar holes include a side bar coupled to a spring to allow
for entry into the side bar recess grooves. The key has encrypted v-cut teeth to allow for
10 unlocking of unlocking pins; a keyway having an encrypted curved section to align the
slide pins for unlocking the side bars, and unlocking grooves provided on the side faces
of the encrypted V-cut key teeth to allow projections formed on the side bars to enter
thereto, unlocking the side bars.

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LOCK AND KEY ASSEMBLY

FIELD OF THE INVENTION

The present invention relates to a lock and key assembly having improved unlocking
5 difficulty. More specifically, the present invention relates to a lock and key assembly having improved unlocking difficulty which is configured to greatly increase the difficulty of unlocking the lock.

BACKGROUND

10 As is known, locks are categorized into digital locks and mechanical locks. Whereas the use of digital locks has been increasing in recent times, the preference for mechanical locks is higher, as digital locks are lacking in security.

Most of such mechanical locks are configured with locking pins in a cylindrical cylinder
15 and a rotating body, so that the rotating body may be rotated within the cylindrical cylinder by a key to unlock the lock.

Such locks are configured so that locking pins and locking pin supporting springs are installed in holes formed on the cylindrical cylinder and the rotating body, and the keys for
20 unlocking such locks are configured to allow them to be inserted into the keyhole, have encrypted v-cut key teeth. When the key is inserted into the lock, the encrypted v-cut key teeth raise or lower the locking pins, aligning the positions of the locking pins and thereby unlocking the lock.

25 Locks wherein encrypted v-cut key teeth have the disadvantage that, due to their extremely simple structure, inserting a different unlocking tool into the keyhole and manipulating the same easily unlocks the lock.

A prior art of the present applicant addresses such disadvantage by providing a side bar
30 between the cylindrical cylinder and the rotating body so that the side bar is recessed into

a side bar recess groove formed on the cylindrical cylinder and is released from the side grooves when the lock is unlocked by a key.

However, in the case of a lock embodying the prior art of the present application, whereas
5 the unlocking difficulty can be somewhat improved over a generic lock comprised of a cylindrical cylinder and rotating body, such difficulty fails to meet consumer expectations, and as a result confidence in mechanical locks is lost. Known to the Application are US 6,477,876 and Korean Registered Utility Model : No. 20-0329219 (Registered Sep. 8, 2003).

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SUMMARY OF THE INVENTION

The aim of the present invention, intended to address the problems described in the above, is to provide a lock and key assembly having greatly enhanced unlocking difficulty
 5 by providing a lock and key assembly with two side bars without increasing the respective sizes of the cylindrical cylinder and rotating body comprising the lock. The side bars can be unlocked without increasing the thickness of the key that is inserted into the key hole provided on the rotating body, and the side bars are configured to be recessed into recess grooves formed on the cylindrical cylinder.

10

The lock comprises a cylindrical cylinder into which a rotating body is inserted. Slide pin holes and locking pin holes in which slide pins and locking pins are installed, and extend radially relative to the cylindrical cylinder and the rotating body. Side bar recess grooves are provided on either side of the inner face of the cylindrical cylinder in the longitudinal
 15 direction. Side bar holes are provided on either side of the rotating body, and first and second side bars installed together with springs in the side bar recess holes to allow the first and second side bars to enter the recess grooves. Protruding pieces or projections on the second side bar are sized and configured to enter the unlocking grooves formed on the side faces of the encrypted v-cut key teeth. The key preferably comprises encrypted
 20 v-cut teeth to allow for unlocking of corresponding unlocking pins, provided in the lock. The key also includes a keyway having an encrypted curved section to align with the slide pins, for unlocking the first side bar. The side faces of the encrypted v-cut key teeth have unlocking grooves to receive the projections formed on the second side bar so that the second side bar may be unlocked.

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According to the present invention, it is possible to install two side bars without increasing the size/dimension of the cylindrical cylinder and rotating body of a lock, and without increasing the thickness of the key inserted into the key hole provided on the rotating body. This has the benefit of providing a simple lock and key assembly. More particularly, as the
 30 locking pins and two side bars of the lock are locked inside side bar recess grooves, and the lock is configured so that it can be unlocked only if the locking pins and the two side bars are released at the same time, the security of the lock is improved, greatly improving confidence in mechanical locks.

BRIEF DESCRIPTION OF THE DRAWINGS

Other objects, advantages, and features will become more apparent upon reading the following non-restrictive description of the embodiments thereof, given for the purpose of exemplification only, with reference to the accompanying drawings in which:

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FIG. 1 is a perspective view of the lock and key assembly according a possible embodiment of the present invention.

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FIG. 2 is an exploded perspective view showing the internal structure of the lock according a possible embodiment of the present invention. The key is also shown from a different side than the one illustrated in FIG. 1.

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FIG. 3 is a side perspective view of the lock and key inserted therein, according a possible embodiment of the present invention when locked. FIG.3A is a cross-sectional side view a portion of the lock and key assembly shown in FIG. 3.

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FIG. 4 is a side perspective view showing the lock being unlocked by the key, according a possible embodiment of the present invention. FIG.4A is a cross-sectional side view of a portion of the lock and key assembly shown in FIG.4.

DETAILED DESCRIPTION

In the following description, the same numerical references refer to similar elements. The embodiments described in the present description are preferred embodiments only; they are given solely for exemplification purposes. Furthermore, for the sake of simplicity and clarity, namely to not unduly burden the figures with several references numbers, not all figures contain references to all the components and features, and references to some components and features may be found in only one figure, and components and features of the present disclosure which are illustrated in other figures can be easily inferred therefrom.

In addition, it will be appreciated that positional descriptions such as “top”, “side”, “lower”, and the like should, unless otherwise indicated, be taken in the context of the figures and should not be considered as limiting or as implying a required orientation during use.

Numerical references used in the Figures:

15	1: Cylindrical cylinder	2: Rotating body
	4: Slide pin	5: Locking pin
	10, 10': Side bar recess groove	11, 11': Side bar hole
	12, 12': Side bar	15: Lock
	14: projections/protruding pieces	20: Key
20	22: Unlocking groove	

The lock and key assembly having improved unlocking difficulty according to the present invention will be described in further detail, with reference to the attached FIGs. 1, 2, 3, 3A, 4 and 4A.

The lock (15) according to the present invention comprises a cylindrical cylinder (1) into which a rotating body (2) is inserted. The cylinder and body comprise slide pin holes (3) and locking pin holes (3') in which slide pins (4) and locking pins (5) are installed. The slide pins (4) and locking pins (5) are provided in the radial direction of the cylindrical cylinder (1) and the rotating body (2). Side bar recess grooves (10) (10') are provided on either side of the inner face of the cylindrical cylinder (1), longitudinally in the cylinder (1), i.e. in the longitudinal direction. Side bar recess grooves (11) (11') are provided on either side of the rotating body (2), also in the longitudinal direction, and first and second side bars (12) (12') are installed together with springs (13) in the side bar recess grooves (11)

(11') to allow the first and second side bars to enter the recess grooves. Protruding pieces or projections (14) are provided/extend on the second side bar (12') to allow for entry into the unlocking grooves (22) provided on the side faces of the encrypted v-cut key teeth (23).

5

The key (20) has encrypted v-cut teeth (23) to allow for unlocking of unlocking pins (5) provided in the lock (15). The key (20) is provided with a keyway (21) having an encrypted curved section (21') to align the slide pins (4) for unlocking the first side bar (12), and unlocking grooves (22) on the side faces of the encrypted v-cut key teeth (23) to couple
10 with the protruding pieces/projections (14) provided on the second side bar (12') to unlock the second side bar (12').

The numeral 50 in the drawings denotes the key hole provided on the rotating body.

15 In the following, the action of the lock and key assembly having improved unlocking difficulty will be explained in more detail.

To unlock the lock (15) according to the present invention, the key (20) is inserted into a key hole (50) provided on the rotating body (2) inserted into the cylindrical cylinder (1).

20

When this is done, encrypted v-cut key teeth (23) formed on the key (20) align the locking pins (5), and the keyway (21) having an encrypted curved section (21') to unlock the first side bar (12) aligns the slide pins (4). Also, the unlocking grooves/holes (22) formed on the side faces of the encrypted v-cut key teeth (23) are aligned with the protruding
25 parts/projections (14) formed on the side bar (12'), so that the second side bar (12') may be unlocked. Of course, a different number of unlocking grooves (22)/projections (14) may be used.

When the key (20) is rotated in this state, the rotating body (20) inserted into the cylindrical
30 cylinder (1) rotates. Here, the second side bar (12') is coupled to the side bar hole (11'), and part thereof enters the side bar recess groove (10'). Rotation of the rotating body pushes the same inwards, causing the protruding parts (14) formed on the second side bar (12') to enter the unlocking grooves (22) formed on the side face of the encrypted v-

cut key teeth (23), causing the second side bar (12') to enter the side bar hole (11') formed on the rotating body (2) completely, at which point the lock is unlocked.

5 In order to lock the lock (15), the key (20) is rotated in a direction opposite the direction when unlocking. When it is returned to its initial position, the key is removed from the key hole (50).

10 When this happens, the first and second side bars (12) (12') are pushed out by action of springs (13) from the side bar holes (11) (11'), and part of the side bars enter the side bar recess grooves (10) (10'). The slide pin (4), by its own weight, moves to the bottom of the slide pin hole (3), and the locking pins (5) are also restored by spring action to their initial positions within the locking pins holes (3'), locking in place between the cylindrical cylinder (1) and rotating body (2) and thereby locking the lock.

15 As can be appreciated, it is possible to install two side bars without increasing the size of the cylindrical cylinder and rotating body of a lock, and without increasing the thickness of the key designed for insertion in the key hole provided on the rotating body. The present invention thereby provides a simple lock and key assembly.

20 The scope of the claims should not be limited by the preferred embodiments set forth in the examples but should be given the broadest interpretation consistent with the description as a whole.

CLAIM:

1. A lock and key assembly, comprising:

a lock (15) including a cylindrical cylinder (1) into which a rotating body (2) is inserted; and

slide pin holes (3) and locking pin holes (3') in which slide pins (4) and locking pins (5) are provided, extending radially relative to the cylindrical cylinder and the rotating body;

side bar recess grooves (10) (10') provided longitudinally on both sides of an inner face of the cylindrical cylinder;

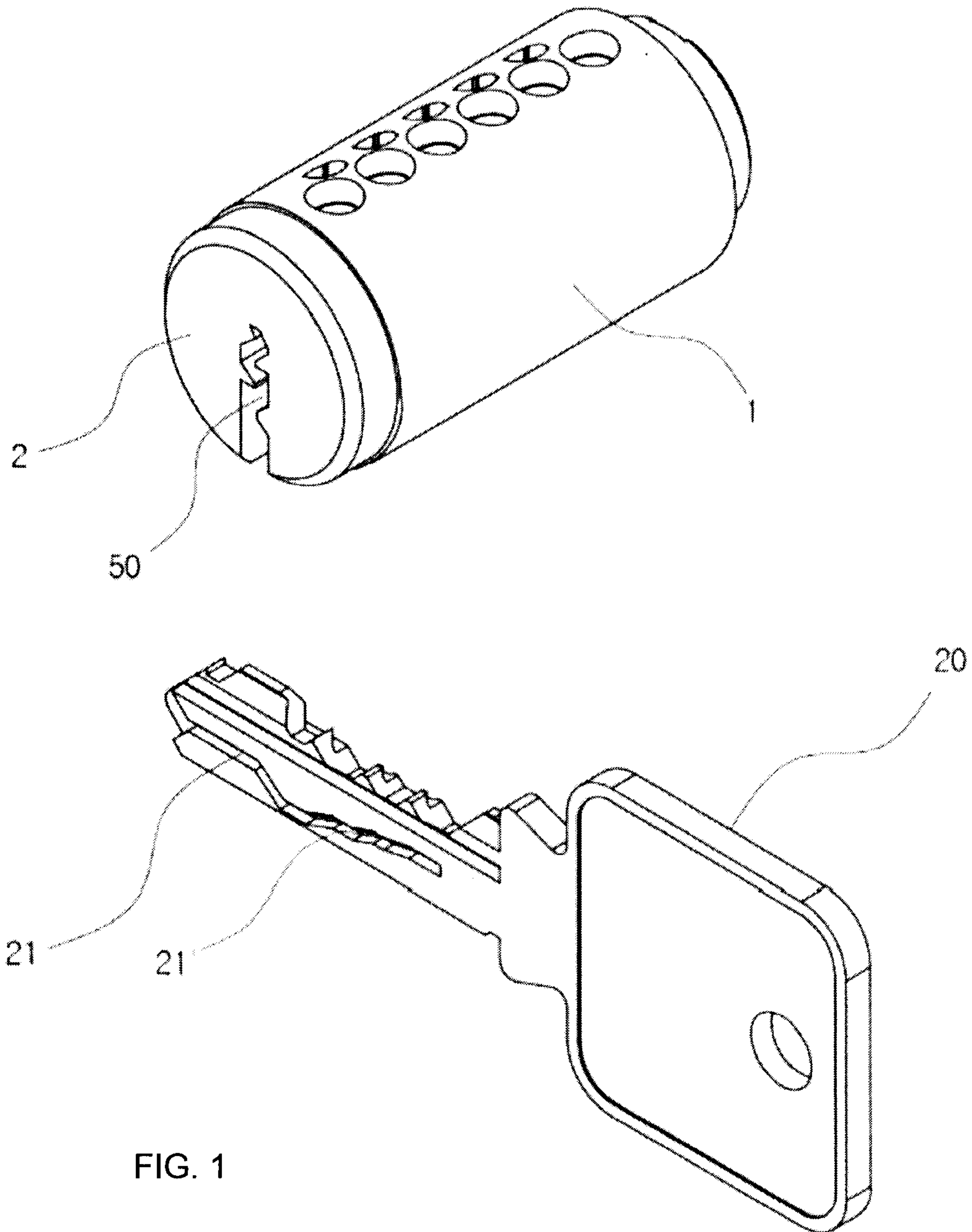
side bar recess holes (11) (11') provided longitudinally on both sides of the rotating body; and

first and second side bars (12) (12') installed with springs (13) in the side bar recess holes (11), (11') for entry in the side bar recess grooves (10), (10');

a key (20) having encrypted v-cut teeth (23) for cooperating and unlocking of the locking pins (5) provided in the lock (15), the key having a keyway (21) with an encrypted curved section (21'), to align the slide pins (4) for unlocking the first side bar (12), wherein:

projections (14) are provided on the second side bar (12'); and

the key (20) has unlocking grooves (22) provided on a side face of the encrypted v-cut teeth (23), the projections (14) being couplable with the unlocking grooves (22) so that the second side bar (12') may be unlocked.



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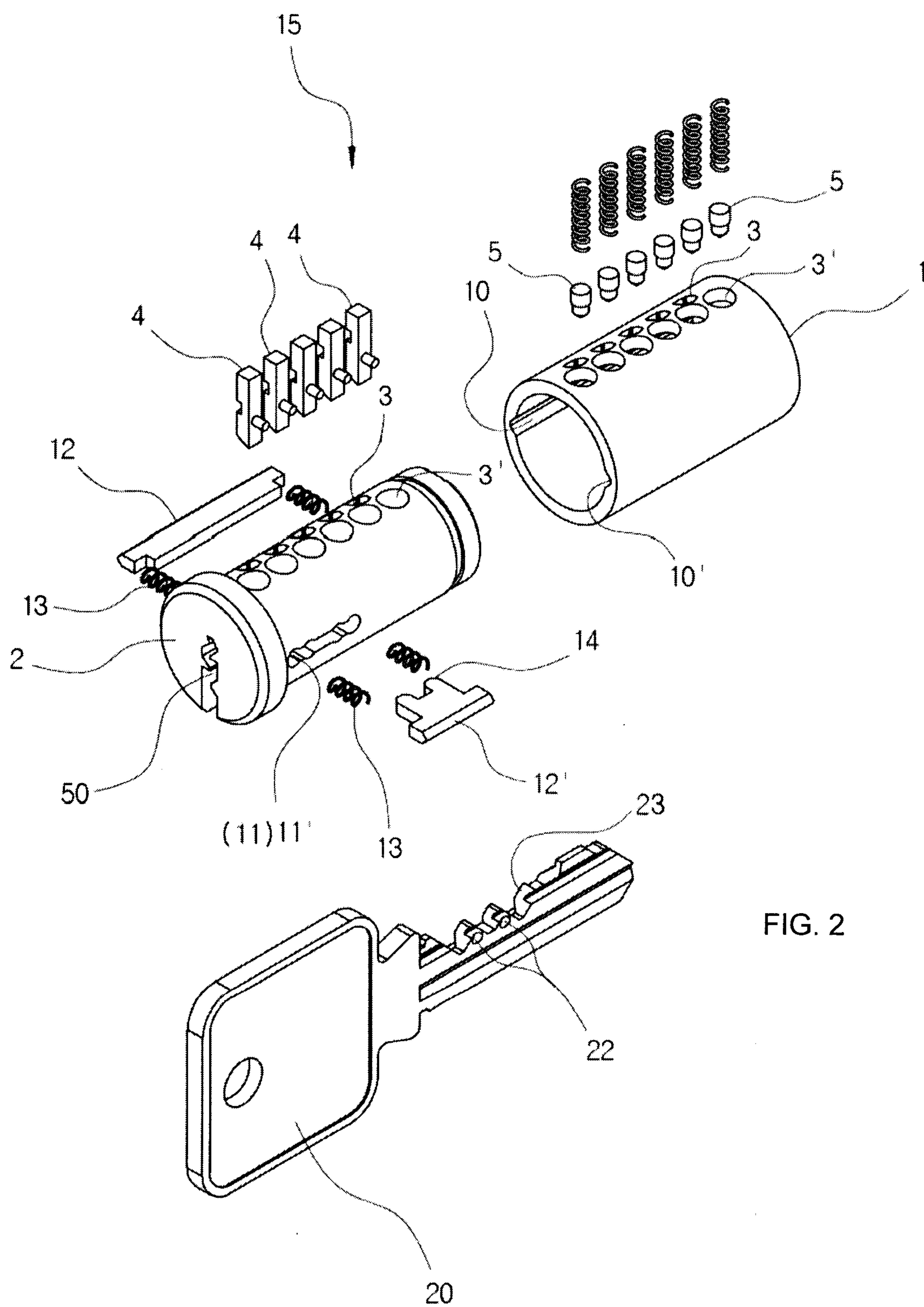


FIG. 2

