(11) Application No. AU 2006201505 B2

(19) AUSTRALIAN PATENT OFFICE

(54) Title

Flat key as well as an associated cylinder lock

(51)[6] International Patent Classification(s)

E05B 19/06 (2006.01) 20060101AFI2006042

E05B 19/06 6BHAU

(21) Application No: 2006201505 (22) Application Date: 2006.04.11

(30) Priority Data

(31) Number	(32) Date	(33) Country
A 614/2005	2005.04.12	**AT**

(43) Publication Date : 2006.10.26

(43) Publication Journal Date : 2006.10.26

(71) Applicant(s)

EVVA-WERK Spezialerzeugung von Zylinder- und Sicherheitsschlossern Gesellschaft m.b.H & Co. Kommanditgesellschaft

(72) Inventor(s)

Baumhauer, Walter

(74) Agent/Attorney

FB Rice, Level 23 44 Market Street, Sydney, NSW, 2000

(56) Related Art

AT 389559 (B)

US 4977767 A

2006201505 11 Apr 2006

Abstract

The invention concerns a flat key for cylinder locks, wherein at least one of the two lateral sides has three control grooves and at least one of the control grooves is deeper than the other control grooves and the two shallow control grooves extend approximately parallel to one another and the flat key may have further control elements, like indentations on the key bit for pin tumblers, control surfaces on the back of the key, longitudinal ribs and grooves in the direction of insertion of the key and milled slots on the lateral surfaces, characterised in that from the tip of the key both shallow grooves are wider up to at least to the first control position, than the further progress of the shallow grooves.

Fig.1

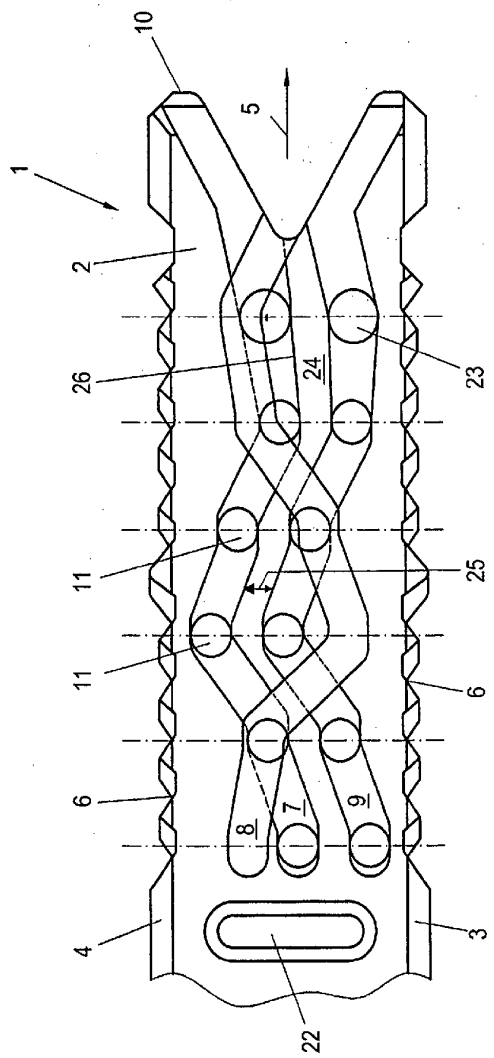

Fig. 1

2006201505 11 Apr 2006

AUSTRALIA

Patents Act 1990

EVVA-WERK SPEZIALERZEUGUNG VON ZYLINDER- UND SICHERHEITSSCHLÖSSERN GESELLSCHAFT M.B.H. & CO. KOMMANDITGESELLSCHAFT

COMPLETE SPECIFICATION
STANDARD PATENT

Invention Title:

Flat key as well as an associated cylinder lock

The following statement is a full description of this invention including the best method of performing it known to us:-

2006201505 24 May 2011

The invention concerns a flat key for cylinder locks, wherein at least one of the two lateral sides has three control grooves and at least one of the control grooves is deeper than the other control grooves and the two shallow control grooves extend approximately parallel to one another and the flat key may have further control elements, like indentations on the key bit for pin tumblers, control surfaces on the back of the key, longitudinal ribs and grooves in the direction of insertion of the key and milled slots on the lateral surfaces.

The invention further concerns a lock for the aforementioned key, wherein at least one control element with a control member engaging the shallow control groove of the flat key and at least one control element with a control member engaging the deep control groove of the flat key is provided on at least one side of the key channel approximately parallel to it, and that at least one locking element is provided, that in the relevant position of the control elements can be brought in the release position for the turning of the cylinder core relative the cylinder housing.

This invention is based on a key design as well as the associated cylinder lock, as disclosed in AT 389 559 B. It is a preferred aim of the invention is to increase the number of variations on the key and to ensure a greater safety of locking. Preferably, the same effect should also be achieved with regard to the new construction of the lock.

Any discussion of documents, acts, materials, devices, articles or the like which has been included in the present specification is not to be taken as an admission that any or all of these matters form part of the prior art base or were common general knowledge in the field relevant to the present invention as it existed before the priority date of each claim of this application.

Throughout this specification the word "comprise", or variations such as "comprises" or "comprising", will be understood to imply the inclusion of a stated element, integer or step, or group of elements, integers or steps, but not the exclusion of any other element, integer or step, or group of elements, integers or steps.

2006201505 27 May 2011

According to the present invention, there is provided a flat key defining a tip at one end and a cylinder lock, at least one of the two lateral surfaces having at least three control grooves, and at least one of the control grooves being formed more deeply than the other shallow control grooves, the two shallow control grooves extending approximately parallel to one another, apart from at the tip of the key, the shallow control grooves being designed to widen from the first control position towards the tip of the key and the cylinder lock being provided on at least one side of the key channel approximately parallel to the latter with at least one control element with a control component engaging in the shallower control groove of the flat key, and with at least one control element in a control component engaging in the deeper control groove of the flat key, and at least one blocking element being provided which with a corresponding position of the control elements can be brought into the release position for the rotation of the cylinder core in relation to the cylinder housing, wherein the two shallower control grooves of the flat key have a greater width from the key tip at least up to the control position than the further extension of the shallow control grooves, and wherein for detecting the wide grooves of the flat key at least the last control element of the cylinder lock has wider control components, the clearance between which corresponds to the width of the web between the shallow grooves, and that the position of the two wide control components is preferably offset by ½ a progress step in the same direction of the key channel height in relation to the position of the narrow control components, a progress step being the distance between two adjacent possible control heights of the control components.

A preferred feature of the invention is that the width of the web which can freely pass between the shallow grooves of the flat key is the same along the entire length of the key. The result of this is that at the control positions with widened shallow

COMS ID No: ARCS-322742 Received by IP Australia: Time (H:m) 11:55 Date (Y-M-d) 2011-05-27

2006201505 11 Apr 2006

grooves the grooves are widened upward and downward, whereas the distance, i.e. the width of the web between the two shallow grooves, remains the same.

The mere widening of the shallow grooves upward and downward allows that the control elements of the lock with narrow control members can be guided over the web having the same width, what is necessary to guide the narrow control members over the widened groove towards the control positions allocated to them during the insertion of the key. It becomes further apparent, that a key according to the invention with shallow grooves widened at least at one control position can be also inserted into a lock having a prior known construction with continuous narrow control members.

Therefore, to increase the number of variations, it is not desirable for the key according to the invention to lock a lock with a construction according to the state-of-the-art. Therefore it is a further feature of the invention, that the web between the grooves with greater width is offset at the control positions relative the arrangement with narrow grooves, preferably by ½ a progress step. By virtue of this it will be ensured, that when used in an "old" lock according to the state-of-the-art, the key according to the invention will intentionally incorrectly set the narrow control members at the corresponding control positions due to the offset web. By virtue of this an unauthorised locking of an "old" lock with a skeleton key, in which the narrow grooves were merely widened in accordance with the invention, is rendered impossible.

So that the narrow control members could be reliably guided in the region of the control positions of the wider grooves, according to a further feature of the invention the flanks of the web are constructed continuous at these positions.

The invention furthermore concerns a lock for the key described above, that is characterised in that at least the last control element to detect the wide grooves of the key has wider control members, the width of which corresponds to the width of the web and that the position of both control members is preferably offset by ½ a progress step each in the same direction of the height of the key channel.

2006201505 11 Apr 2006

Further features and properties of the invention become apparent from the drawings, the description and the claims.

Fig.1 shows a lateral view of a detail of the flat key according to the invention. Fig.2 shows a cross-section of a flat key according to the invention with associated control and locking elements. Fig.3 shows a further cross-section of a flat key according to the invention with associated control and locking elements. Fig.4 shows a cross-section of a lock according to the invention with an arrangement of the control and locking elements equivalent to that of Fig.2. Fig.5 shows a further cross-section of a lock according to the invention with an arrangement of the control and locking elements equivalent to that of Fig.3. Fig.6 shows a cross-section of a control element with a pin to detect the deep groove. Fig.7 shows a cross-section of a control element with two narrow pins to detect the shallow control grooves. Fig.8 shows a cross-section of a control element with two wide pins to detect the shallow control grooves.

Fig.1 shows a lateral view of the flat key 1 according to the invention, wherein in the direction of insertion 5 of the key the right lateral surface 2 is shown in detail. The key bit 3 as well as the back 4 of the key are provided in the usual manner with indentations 6 to interact with the pin tumblers of the lock. The key 1 also has a milled slot 22 on the lateral surface 2.

There are also three wavy control grooves 7, 8 and 9 provided on the lateral surface 2 of the key 1. The two control grooves 7 and 9 are relatively shallow, whereas the control groove 8 protrudes into the material of the key deeper than the two others. The two shallow control grooves 7, 9 extend basically parallel to one another and the deep control groove 8 is basically provided between the shallow control grooves 7, 9. For a better understanding, in the case of control groove 7 the unimpeded path of this control groove is shown in broken line, as if control groove 8 did not exist. The individual control positions 11, 23 show the position of the pins 21, 27 of the control element 17 when the key 1 is fully inserted. In the case of the example shown here five control elements 17 with narrow pins 21 are provided, as well as one control element 17 with wide pin 27 at the tip 10 of the key. Both control grooves 7, 9 of the flat key 1 are accordingly

2006201505 11 Apr 2006

widened towards the control position 23, while the width 25 of the web 24 which can freely pass between the two bolts of the control elements remains the same over the entire length of the key.

A flat key 1, that has no widening of the grooves 7, 9 at the control position 23, could not be fully inserted into the lock according to the invention.

Each of the Figs.2 and 3 show a cross-section through a flat key 1 according to the invention, where the section is shown at a control position 23 with widened shallow grooves 7, 9. For the sake of better clarity, the deep groove is not shown in the following illustrations. Arranged on the key, on the side of the, lock a control element 17 is shown, as well as a locking element 15. In Fig.2 the control element 17 has wide pins 27. In the case of a correct key the control element 17 is brought via the guide grooves 7, 9 at the control position 23 to an end position, in which the recesses 18 can accommodate the extensions 28 of the locking element 15, thus releasing the lock.

Fig.3 shows a situation, wherein the key 1 according to the invention is inserted into an "old" lock according to the state-of-the-art, with control elements 17 having narrow pins 21. The narrow pins 21 are guided by the web flanks 26 of the web 24. This guiding will prevent the free movement of the control element 17 in the widened control grooves 7, 9. Furthermore, at the control position 23 for wide pins 27 the web 24 is so constructed, that the narrow pins 21 are guided offset by ½ a progress step. A progress step describes the distance between two adjacent possible control heights of the pins 21 at a determined control position 11. Due to the fact, that the wide pins 27 are offset relative the narrow pins 21 by ½ a progress step, all narrow pins 21, which will abut against a wide control position for wide pins 27, will be intentionally incorrectly set.

Figs.4 and 5 show cross-sections of a lock according to the invention in arrangements that are equivalent to those of Figs.2 and 3. In these views only one half of the key and of the associated lock are shown. The key 1 is fully inserted into the key channel 19. By virtue of being guided by the control grooves 7, 9 in the recess 29 of the cylinder core 13, the control element 17 will move up

2006201505 11 Apr 2006

and down during the insertion of the key 1. In the end position of the key the pins 27 of the control element 17 are situated in the associated control position 23. If now, as is shown in Fig.4, the cylinder core 13 is rotated in the housing 12 of the lock, the locking element 15 will be moved out from the locking groove 14 situated in the housing 12, due to which the extensions 28 are accommodated in the recesses 18 and consequently the lock is released.

In the case of the lock shown in Fig.5, a control element 17 with narrow pins 21 is situated at the control position 23 of the flat key 1. By virtue of being guided via the web 24, the control element 17 is incorrectly positioned by ½ a step, due to which the extensions 28 cannot be accommodated in the recesses 18, resulting in the protrusion of the locking element 15 into the locking grooves 14 of the housing, and consequently the lock cannot be released.

Figs.6 to 8 show a cross-section each of the three versions of the locking elements 16, 17 of the lock according to the invention. The locking element 16, shown in Fig.6, has a pin 20 to detect the deeper control groove 8 as well as recesses 18 for the extensions 28 of the locking element 15.

The control element 17, shown in Fig.7, has, in addition to the recesses 18, narrow pins 21, that are at a distance of 30 from one another, this width corresponding to the width 25 of the web 24.

The control element 17, shown in Fig.18, has wide pins 27 to detect the shallow control grooves 7, 9 at the widened control positions 23. The distance 30 between the pins 27 corresponds also in the case of this control element 17 that of the width 25 of the web 24.

When mentioning in this conjunction the width 25 of the web 24 and the width 30 between the pins 21 or 27, it is understood that both sizes change depending on the angular arrangement of the web 24. The width 25 and the width 30 remain the same, although the width of the web 24, measured perpendicularly to the flanks 26 of the web, has to vary (see Fig.1).

2006201505 11 Apr 2006

The offset arrangement of the wide pins 27 by ½ a progress step relative to the arrangement of the narrow pins 21 is preferred, but can have another value.

This present key and lock construction is preferably provided for reversible keys and the locking parts described are provided in the lock on both sides of the key channel. It is also understood from the above description, that a key according to the state-of-the-art with control grooves having continuous small width cannot be fully inserted into a lock that is designed for the key according to the invention. Thus an erroneous, deadlocking of the various key/lock combinations is rendered impossible.

2006201505 24 May 2011

The claims defining the invention are as follows:

1. A flat key defining a tip at one end and a cylinder lock, at least one of the two lateral surfaces having at least three control grooves, and at least one of the control grooves being formed more deeply than the other shallow control grooves, the two shallow control grooves extending approximately parallel to one another, apart from at the tip of the key, the shallow control grooves being designed to widen from the first control position towards the tip of the key and the cylinder lock being provided on at least one side of the key channel approximately parallel to the latter with at least one control element with a control component engaging in the shallower control groove of the flat key, and with at least one control element in a control component engaging in the deeper control groove of the flat key, and at least one blocking element being provided which with a corresponding position of the control elements can be brought into the release position for the rotation of the cylinder core in relation to the cylinder housing, wherein the two shallower control grooves of the flat key have a greater width from the key tip at least up to the control position than the further extension of the shallow control grooves, and wherein for detecting the wide grooves of the flat key at least the last control element of the cylinder lock has wider control components, the clearance between which corresponds to the width of the web between the shallow grooves, and that the position of the two wide control components is preferably offset by ½ a progress step in the same direction of the key channel height in relation to the position of the narrow control components, a progress step being the distance between two adjacent possible control heights of the control components.

2. The flat key and cylinder lock according to Claim 1, wherein the width of the web between the shallow grooves is the same along the whole length of the key.

3. The flat key and the cylinder lock according to Claim 1 or 2, wherein in the region of the wide grooves the faces of the web are formed continuously at the control positions.

4. A flat key and cylinder lock according to any one of Claims 1 to 3, wherein the flat key has further control elements, such as notches on the teeth of the key for retaining pins,

2006201505 24 May 2011

control surfaces on the back of the key, longitudinal ribs and grooves in the key insertion direction and milled slots on the lateral surfaces.

5. A flat key and cylinder lock substantially as hereinbefore described with reference to the accompanying figures.

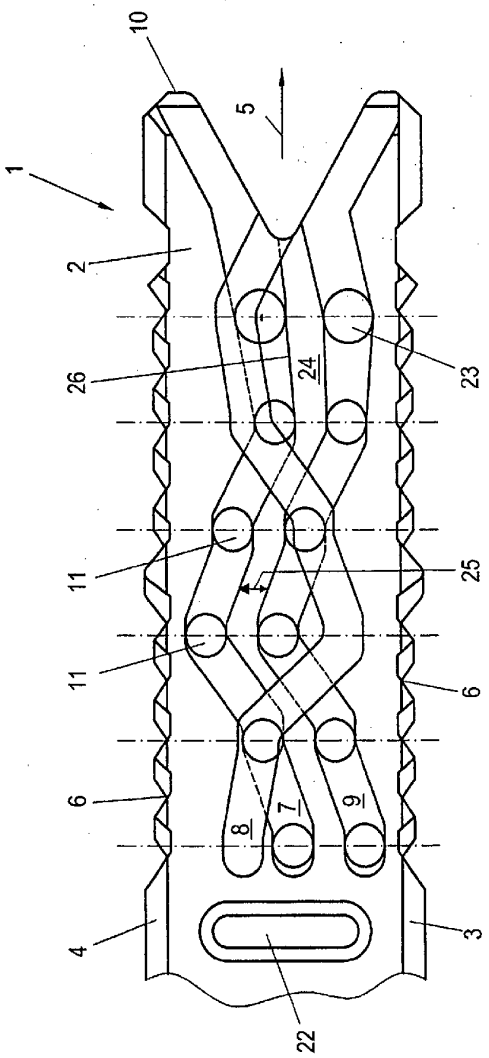

Fig. 1

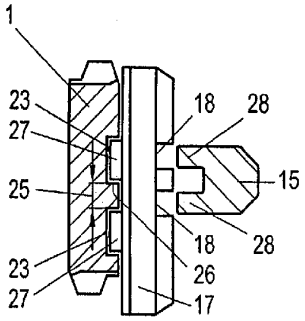

Fig. 2

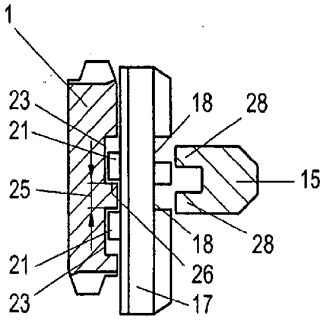

Fig. 3

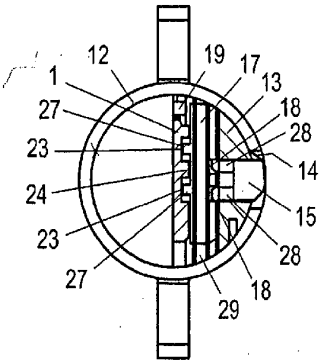

Fig. 4

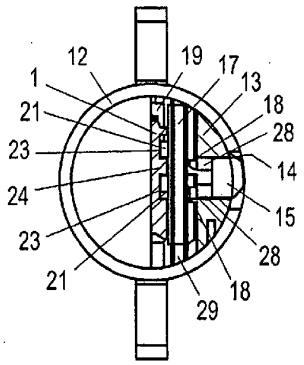

Fig. 5

Fig. 6

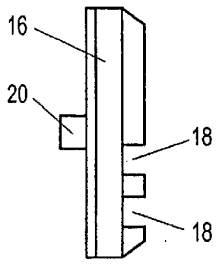

Fig. 7

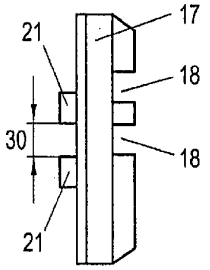

Fig. 8