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(54) CYLINDER LOCK ASSEMBLY, CYLINDER LOCK SYSTEM, DOOR, BUILDING AND METHOD FOR ACCESS CONTROL

ZYLINDERSCHLOSSEINHEIT, ZYLINDERSCHLOSSSYSTEM, TÜR, GEBÄUDE UND VERFAHREN ZUR ZUGANGSKONTROLLE

ENSEMBLE ET SYSTÈME DE SERRURE A CYLINDRE, PORTE, BÂTIMENT ET PROCÉDÉ DE CONTRÔLE D'ACCÈSS

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Description

SUBJECT

[0001] The invention relates to a cylinder lock assembly comprising a housing and a cylinder placed in the housing, which cylinder extends along a cylinder axis and is rotatable relative to the housing from an initial position around the cylinder axis only when a fitting key is placed in the cylinder,

wherein the housing along the cylinder axis is provided with a series of driver pin channels which extend in respective axial driver pin planes radially with respect to the cylinder axis from the cylinder, in the housing, which axial driver pin planes are perpendicular to the cylinder axis,
wherein the cylinder along the cylinder axis is provided with a series of key pin channels which in the initial position are in line with the driver pin channels such that between the housing and the cylinder respective pin passages are formed,
wherein the cylinder is provided with a blocking bar which extends along the cylinder axis and which is configured in the absence of a fitting key in the initial position to engage the housing to counteract rotation of the cylinder relative to the housing, and to engage the housing less or not when a fitting key is placed in the cylinder, wherein the housing is provided with an engagement structure which is configured to have the blocking bar in the initial position engage the engagement structure.

[0002] Such a blocking bar and an engagement structure which extends in the direction of the axis in the housing are known from US4723427A1, EP3321454A1 and WO2013159003A1.

[0003] The invention further relates to a cylinder lock system, a door, a building and a method for access control.

BACKGROUND

[0004] A cylinder lock assembly as described above is known. An example of such an assembly is shown in an animation which can be found on https://m-c.eu/product/condor-cilinder/. On the wayback machine a copy of this web page has been stored on 3 April 2019 and can be retrieved via this link: http://web.archive.org/web/20190403131134/https://m-c.eu/product/condor-cilinder/. The animation shows that this lock is relatively safe, being in particular relatively well resistant to sabotage by so-called lock picking and hammering. Nonetheless, there is an ongoing need for further improvement of the safety of cylinder lock assemblies.

[0005] Such a cylinder lock assembly may for instance be used in a so-called locking plan, whereby several cylinder locks are so configured that for instance with one key all locks can be operated while with other keys only one or a few respective locks can be operated. To accomplish this, generally one or more closing plates are arranged between driver pins and key pins of the cylinder lock assembly. A thickness of the closing plates may then be chosen such that by several keys a straight break line between the pins may be caused. A disadvantage of such closing plates, in particular thinner closing plates, is that upon rotation of the cylinder they may relatively easily get caught or get stuck, for instance at the above-mentioned engagement structure of a blocking bar. Precisely that problem can also occur at the engagement structures that are shown in US4723427 *(cam groove 36 in the shell),* EP3321454A1 *(a tapered first longitudinal groove 33)* and WO2013159003A1 *(longitudinal V-shaped groove 108),* certainly when between the driver pins and key pins one or more closing plates were used. It is noted that the use of such closing plates is not known from these publications. If this is insufficiently taken into account in the design of the cylinder lock assembly, this can lead to a jamming or otherwise poor functioning of the assembly.

SUMMARY

[0006] An object of the invention is to provide a still safer cylinder lock assembly which, in particular, is still more difficult to open without fitting key, for instance by so-called lock picking and/or hammering. An object is to provide a cylinder lock assembly which is well resistant to the above described jamming. An object is to provide a versatile cylinder lock assembly which, in particular, is suitable for use in a locking plan. An object is to provide a strong cylinder lock. An object is to solve at least partly at least one of the above-mentioned disadvantages or a related disadvantage.

[0007] With that aim, according to an aspect of the invention, a cylinder lock assembly according to claim 1 is provided. The cylinder lock of the type described in the background section is, to that end, characterized in that the engagement structure at the axial driver pin planes is provided with respective guiding structures which are configured to counteract engagement between key pins and/or closing plates of the cylinder on the one hand and the engagement structure on the other hand, wherein the blocking bar is provided with one or more cams which face the housing and which are configured to engage the engagement structure, wherein the one or more cams are arranged in a manner axially staggered with respect to each of the axial driver pin planes, and wherein the engagement structure comprises a series of openings in a cylinder guiding inner surface of the housing, which openings are arranged in a manner axially staggered with respect to each of the axial driver pin planes.

[0008] The guiding structures counteract pins such as key pins of the cylinder and/or closing plates engaging the engagement structure and thus, for instance, causing the lock to jam. Moreover, this allows the engagement

structure to be configured for a stronger engagement of the blocking bar without this entailing a higher risk of jamming.

[0009] In known cylinder lock assemblies, the engagement structure in its operation cannot distinguish between the blocking bar and other elements such as key pins and closing plates. To counteract jamming nonetheless, generally the overall engageability of the engagement structure is limited. In general, to that end, the known engagement structure is formed by an axial slot, which, to prevent jamming of cylinder pins and closing plates, is provided with chamfered edges adjacent the transition between the slot and the cylinder-shaped chamber in which the slot is provided. This has as an adverse consequence that, due to this, also engagement by the blocking bar in the slot, and hence protection from sabotage, is limited.

[0010] The cylinder lock assembly according to the invention, by contrast, enables both a stronger engagement of the blocking bar and a more effective counteracting of jamming.

[0011] A further aspect provides a cylinder lock system comprising a cylinder lock assembly such as described herein and a fitting key with which the cylinder lock assembly can be operated, which key is provided with a meandering slot for reduction or removal of the blocking bar's engagement of the housing.

[0012] Such a meandering slot is known per se for operation of a blocking bar in a cylinder lock assembly and may be advantageously applied within the framework of the current invention.

[0013] Further aspects provide a door provided with a cylinder lock assembly described herein and a building provided with a cylinder lock assembly described herein. The door is for instance an entrance door of the building, for instance an outside door or an inside door.

[0014] A further aspect provides a method for access control, which comprises providing a cylinder lock system described herein, wherein the cylinder lock assembly is mounted in an entrance door and wherein the fitting key is kept by an authorized person and/or an authorized system.

[0015] With such a door and such a building, the abovementioned advantages can be provided, in particular in the context of such a method for access control.

[0016] Further advantageous elaborations of the invention are apparent from the dependent claims and the detailed description following below.

DETAILED DESCRIPTION

[0017] In the following, the invention is further explained on the basis of examples of embodiments and drawings. The drawings are schematic and merely show examples. In the drawings, corresponding elements are denoted with corresponding reference signs. In the drawings:

Fig. 1A shows a semitransparent perspective view of a known cylinder lock assembly;

Fig. 1B shows a semitransparent perspective view of the cylinder lock assembly of Fig. 1A with a fitting key;

Fig. 2A shows an isometric view of a housing of a cylinder lock assembly according to an embodiment of the invention;

Fig. 2B shows a front view of the housing of Fig. 2A;

Fig. 2C shows a cross-sectional view of the housing of Figs. 2A and 2B along the line II-II in Fig. 2B;

Fig. 3 shows a partial cross-sectional view of a cylinder lock assembly according to an embodiment;

Fig. 4 shows an isometric view of a blocking bar of a cylinder lock assembly according to an embodiment;

Fig. 5 shows a perspective view of a key; and

Fig. 6 shows a front view of a building.

[0018] Figs. 1A-B, 2A-C, 3 and 4 show examples of a cylinder lock assembly 2, at least, parts thereof. Figs. 1A-B show a known cylinder lock assembly 2, while Figs. 2A-C, 3 and 4 show examples of an embodiment of the current invention. From the drawings and the description, it will be clear that elements of the known cylinder lock assembly 2 of Figs. 1A-B may be advantageously used in a cylinder lock assembly 2 according to the invention, for instance in the examples of Figs. 2A-C, 3 and 4.

[0019] The cylinder lock assembly 2 comprises a housing 4 and a cylinder 6 placed in the housing 4, which cylinder 6 extends along a cylinder axis C and is rotatable relative to the housing 4 from an initial position around the cylinder axis C only when a fitting key 8 has been placed in the cylinder. In Figs. 1A-B and 3, the cylinder 6 is shown in the initial position mentioned.

[0020] The housing 4 is provided along the cylinder axis C with a series of driver pin channels 10 which extend in respective axial driver pin planes S radially with respect to the cylinder axis C, from the cylinder 6, in the housing 4. The axial driver pin planes S are perpendicular to the cylinder axis C (see Figs. 2C, 3).

[0021] The cylinder 6 is provided along the cylinder axis C with a series of key pin channels 12 which in the initial position are in line with the driver pin channels 10 such that between the housing 4 and the cylinder 6 respective pin passages are formed.

[0022] In Fig. 1A it can be seen that driver pins (in the driver pin channels 10) and key pins 20 located in line with each other can thus move through the pin passages mentioned, for instance under the influence of respective biasing means and/or by key operation. When a fitting key 8 has been placed in the cylinder 6 (see Fig. 1B), between the driver pins and key pins a break plane is formed at the interface between cylinder 6 and housing 4. Thus, it is only in the presence of a fitting key that cylinder rotation is not blocked by the driver pins, nor by the key pins 20.

[0023] The cylinder 6 is provided with a blocking bar

14 which extends along the cylinder axis C and which is configured in the absence of a fitting key 8 in the initial position to engage the housing 4 to counteract rotation of the cylinder 6 relative to the housing 4, and to engage the housing 4 less or not when a fitting key 8 has been placed in the cylinder 6. The housing 4 is provided with an engagement structure 16 which is configured to have the blocking bar 14 in the initial position engage the engagement structure 16.

[0024] In the known cylinder lock assembly 2 of Figs. 1A-B, this engagement structure (not shown here) is formed by a slot in the housing 4 that extends parallel to the blocking bar 14 and axis C.

[0025] In the examples of Figs. 2A-C and 3, the engagement structure 16 is provided at the axial driver pin planes S with respective guiding structures 18 which are configured to counteract engagement between key pins 20 and/or closing plates of the cylinder 6 on the one hand and the engagement structure 16 on the other hand.

[0026] Between the driver pins and the key pins 20, optionally, so-called closing plates (not shown) can be placed, so that in one and the same cylinder lock assembly, different ones of such break lines may be formed. Thus, with different keys the same cylinder lock assembly may be operated, for instance within the framework of a locking plan. Such use of closing plates is known per se and may be used with particular advantage in a cylinder lock assembly 2 according to the current invention, especially because the guiding structures 18 can counteract closing plates engaging the engagement structure 16.

[0027] In an embodiment, the guiding structures 18 form a continuous cylindrical surface with a cylinder guiding inner surface 30 of the housing 4.

[0028] Thus, during cylinder rotation, a particularly smooth guidance of cylinder elements such as key pins 20 and/or closing plates can be obtained.

[0029] In the examples shown, the guiding structures 18 have been placed as continuous parts 18 of the above-mentioned inner surface 30 between and/or next to openings 44 in the inner surface 30, which openings 44 here form the engagement structure 16. Elsewhere in this description, the openings 44 are further explained.

[0030] The blocking bar 14 is provided with one or more cams 22 (see Figs. 3 and 4) which face the housing 4 and which are configured to engage the engagement structure 16, the one or more cams 22 being arranged in a manner axially staggered with respect to each of the axial driver pin planes S.

[0031] In this manner, the blocking bar 14 can particularly well engage the engagement structure 16 which is provided with guiding structures 18, in particular by engagement between the cams 22 and the openings 44 mentioned.

[0032] When the cams 22 engage the openings 44, preferably, also axial displacement of the blocking bar 14 relative to the housing 4 is thereby counteracted, so that so-called lock snapping is made more difficult. Lock snapping is a generally known method for breaking open a cylinder lock assembly, whereby, for instance with a screw secured in the cylinder and a claw hammer, the cylinder is pulled out of the housing.

[0033] In an embodiment, the one or more cams 22 are tapered in the direction of the housing 4.

[0034] In this way, the cams 22, during use, are automatically centered with respect to the openings 44, so that the engagement mentioned is less sensitive to mutual shifting between the housing 4 and the blocking bar 14 while yet a strong engagement is obtained. Moreover, what is thus made possible is that the blocking bar 14, upon operation with a fitting key, may be guided out of the openings 44 by rotation of the cylinder 6 relative to the housing 4 around the cylinder axis C. With such an action, for instance, a bias (pre-tension) of the blocking bar 14 in the direction of the housing 4 is overcome. Such bias may be provided by a biasing (pre-tensioning) means 40 of the blocking bar 14, as is further explained elsewhere in this description.

[0035] In an embodiment, the housing 4 is provided with at least one further engagement structure 24 (see Figs. 2A-C) at a distance from the engagement structure 16, which further engagement structure 24 is configured to have the blocking bar 14 engage this further engagement structure 24 in a respective other cylinder position than the initial position.

[0036] In the example shown, two further engagement structures 24 are provided, each corresponding to a cylinder rotation of about 90 degrees relative to the initial position. Such a further engagement structure 24 makes lock picking of the cylinder lock assembly 2 still more difficult: after a possibly forced beginning of a cylinder rotation, the blocking bar 14 will engage the further engagement structure 24, as a result of which further cylinder rotation is yet counteracted.

[0037] In an embodiment, the at least one further engagement structure 24 comprises a series of side pin channels 26, or that further engagement structure 24 is formed by those side pin channels. In the absence of a fitting key 8, during use, the series of side pin channels 26 receives in the initial position a series of side pins 28 (see Fig. 1B) of the cylinder 6.

[0038] Side pins 28 and side pin channels 26 are known as such in a cylinder lock assembly 2. When a blocking bar 14 of the cylinder lock assembly 2 is for instance provided with cams 22 as described and shown, the side pin channels 26 may thus fulfil an extra function of having the blocking bar 14 engage in a cylinder position other than the initial position. In this way, a versatile and compact cylinder lock assembly is obtained.

[0039] The engagement structure 16 comprises a series of openings 44 in a cylinder guiding inner surface 30 of the housing 4, which openings 44 are arranged in a manner axially staggered with respect to each of the axial driver pin planes S (see Figs. 2C and 3).

[0040] By thus positioning the openings 44, at the axial driver pin planes S the guiding structures 18 can be disposed, while at the same time proper engagement by the

blocking bar 14 is enabled. Moreover, the housing 4 may thus be made of particularly strong design.

[0041] In the example shown, the openings 44 form passages through the housing 4, but this is not necessarily so. Alternatively or additionally, openings 44 may for instance be implemented as pits in the inner surface 30 mentioned. An advantage of openings 44 that form passages through the housing 4 is that, during use, through those openings, dirt present in the assembly 2 can be discharged. This can counteract the dirt accumulating in the assembly 2 and disturbing the operation of the assembly 2.

[0042] In an embodiment, one or more of the openings 44 have in the circumferential direction of the cylinder 6 one or more respective edges 46 (see Figs. 2B-C) which, with respect to the inner surface 30, are steeper than 30 degrees, preferably steeper than 45 degrees, more preferably steeper than 60 degrees, more preferably steeper than 75 degrees, for example about 90 degrees.

[0043] In Fig. 2C, at one of the openings 44, by way of example, two steep edges are indicated with reference numerals 46. It will be clear that such edges in this example are present in each of the openings 44.

[0044] Such steep edges 46 enable a relatively strong engagement between the blocking bar 14 and the engagement structure 16. Due to the presence of the guiding structures 18, the steep edges 46, meanwhile, will generally not hamper a smooth guidance of key pins 20 and/or closing plates along the engagement structure.

[0045] In an embodiment, the guiding structures 18 are placed at a distance from each other, while the blocking bar 14 is configured to engage, between the guiding structures 18, the engagement structure 16.

[0046] In this way, a firm engagement by the blocking bar 14 can be obtained, in particular with relatively efficient use of space.

[0047] In an embodiment, the engagement structure 16, with respect to the cylinder axis C, is positioned opposite the driver pin channels 10, while the blocking bar 14, with respect to the cylinder axis C, is positioned opposite the key pin channels 12.

[0048] In an embodiment, the cylinder 6 is provided, adjacent to the blocking bar 14, with a series of bar unlocking pins 32 (see Figs. 1A-1B) which are movable at right angles to the blocking bar 14 in a plane at a distance from the cylinder axis C, wherein the bar unlocking pins 32 are operated by a meandering slot 34 (see Fig. 5) in a fitting key 8 when that key 8 is placed in the cylinder 6, which operation moves the bar unlocking pins 32 such that the blocking bar 14 is free to reduce its engagement of the housing 4.

[0049] The bar unlocking pins 32 are for instance part of a bar unlocking mechanism 56 which is known per se, see Figs. 1A-1B. The place of such a bar unlocking mechanism 56 is roughly represented in Fig. 3 with a frame 56 drawn in broken lines.

[0050] In English, such a meandering key slot 34 is sometimes referred to as a "snake groove", such bar unlocking pins 56 are accordingly sometimes referred to as "snake pins", and the associated blocking bar 14 is accordingly sometimes referred to as a "snake bar". It will be clear that the current invention is not limited to such names in any way.

[0051] In an embodiment, each of the bar unlocking pins 32 is provided, on a side thereof proximal to the blocking bar 14, with a notch 36 for therein receiving the blocking bar 14 when a fitting key 8 is placed in the cylinder 6.

[0052] In an embodiment, each of the bar unlocking pins 32 is provided, on a side thereof remote from the blocking bar 14, with a protrusion 38 which upon placement of a fitting key 8 cooperates with the meandering slot 34 to move the bar unlocking pins 32.

[0053] In Fig. 1A, the respective notch 36 and the respective protrusion 38 are indicated, by way of example, for one of the bar unlocking pins 32.

[0054] In an embodiment, the blocking bar 14 is provided with a biasing means 40 to bias the blocking bar 14 in the direction of the housing 4 to have the blocking bar 14 engage the housing 4, wherein the bar unlocking pins 32 are provided with respective biasing means 42 to bias the bar unlocking pins 32 in the direction of a locking position in which the bar unlocking pins 32 force the blocking bar 14 to continue to engage the housing 4, at least, in the absence of a fitting key 8.

[0055] In Fig. 1A it can be seen that the blocking bar 14 at each of its axial ends is provided with a spring 40 as biasing means. It will be clear that such a biasing means may alternatively or additionally be positioned elsewhere, for instance at a distance from an axial end of the blocking bar 14.

[0056] In an embodiment, the number of cams 22 of the one or more cams 22 is in the range of 2 through 10, preferably in the range of 3 through 7, more preferably in the range of 4 through 6, for example 5.

[0057] Shown in Fig. 1B is a known cylinder lock system 48 comprising a cylinder lock assembly 2 and a fitting key 8 with which the cylinder lock assembly 2 can be operated, which key 8 is provided with a meandering slot 34 (see Fig. 5) for reduction or removal of the blocking bar's engagement of the housing 4. In Fig. 1B the key 8 is placed in the cylinder 6, so that the blocking bar 14 engages the housing 4 less or not, thereby blocking cylinder rotation less or not, with respect to the situation as shown in Fig. 1A without fitting key 8 in the cylinder 6.

[0058] A cylinder lock system 48 according to an example of an embodiment of the invention comprises a cylinder lock assembly 2 as shown in Figs. 2A-C, 3 and 4 and a fitting key 8 as shown in Fig. 5.

[0059] Fig. 6 shows an example of a door 50 provided with a cylinder lock assembly 2. Fig. 6 also shows an example of a building 52 provided with a cylinder lock assembly 2, the cylinder lock assembly 2 here being fitted in an entrance door 50 of the building 52.

[0060] An example of a method for access control comprises providing a cylinder lock system 48, wherein the

cylinder lock assembly 2 is mounted in an entrance door 50 and wherein the fitting key 8 is kept by an authorized person and/or an authorized system.

[0061] While the invention has been explained on the basis of examples of embodiments, these do not in any way constitute a limitation of the invention, which is defined by the claims. Many variations, combinations and expansions are possible, as will be clear to the skilled person. A blocking bar may for instance be operated in a way other than by a meandering slot of a key, for instance mechanically by a different key structure. A blocking bar may be placed, with respect to the cylinder axis, opposite the key pins and/or for instance in one or more other positions, for instance at the location of and/or opposite to side pins. An engagement structure that is provided with guiding structures may comprise one or more slots. A cylinder lock assembly may be free of side pins. Further examples are specified in the description.

LIST OF REFERENCE SIGNS

[0062]

2.	Cylinder lock assembly
4.	Housing
6.	Cylinder
8.	Fitting key
10.	Driver pin channel
12.	Key pin channels
14.	Blocking bar
16.	Engagement structure
18.	Guiding structure
20.	Key pin
22.	Cam
24.	Further engagement structure
26.	Side pin channel
28.	Side pin
30.	Cylinder guiding inner surface
32.	Bar unlocking pin
34.	Meandering slot
36.	Notch
38.	Protrusion
40.	Biasing means of blocking bar
42.	Biasing means of bar unlocking pin
44.	Opening in cylinder guiding inner surface
46.	Edge
48.	Cylinder lock system
50.	Door
52.	Building
56.	Bar unlocking mechanism
C.	Cylinder axis
S.	Axial driver pin plane

Claims

1. Cylinder lock assembly (2) comprising a housing (4) and a cylinder (6) placed in the housing (4), which cylinder (6) extends along a cylinder axis (C) and is rotatable relative to the housing (4) from an initial position around the cylinder axis (C) only when a fitting key (8) is placed in the cylinder (6),

wherein the housing (4) along the cylinder axis (C) is provided with a series of driver pin channels (10) which extend in respective axial driver pin planes (S) radially with respect to the cylinder axis (C) from the cylinder (6) in the housing (4), which axial driver pin planes (S) are perpendicular to the cylinder axis (C),
wherein the cylinder (6) along the cylinder axis (C) is provided with a series of key pin channels (12) which in the initial position are in line with the driver pin channels (10) such that between the housing (4) and the cylinder (6) respective pin passages are formed,
wherein the cylinder (6) is provided with a blocking bar (14) which extends along the cylinder axis (C) and which is configured in the absence of a fitting key (8) in the initial position to engage the housing (4) to counteract rotation of the cylinder (6) relative to the housing (4), and to engage the housing (4) less or not when a fitting key (8) is placed in the cylinder (6), wherein the housing (4) is provided with an engagement structure (16) which is configured to have the blocking bar (14) in the initial position engage the engagement structure (16),
wherein
the engagement structure (16) at the axial driver pin planes (S) is provided with respective guiding structures (18) which are configured to counteract engagement between key pins (20) and/or closing plates of the cylinder (6) on the one hand and the engagement structure (16) on the other hand,
wherein the blocking bar (14) is provided with one or more cams (22) which face the housing (4) and which are configured to engage the engagement structure (16), wherein the one or more cams (22) are arranged in a manner axially staggered with respect to each of the axial driver pin planes (S),
wherein the engagement structure (16) comprises a series of openings (44) in a cylinder guiding inner surface (30) of the housing (4), which openings (44) are arranged in a manner axially staggered with respect to each of the axial driver pin planes (S).

2. Cylinder lock assembly according to claim 1, wherein the one or more cams (22) taper in the direction of the housing (4).

3. Cylinder lock assembly according to any one of the preceding claims, wherein the housing (4) is provid-

ed with at least one further engagement structure (24) at a distance from the engagement structure (16), which further engagement structure (24) is configured to have the blocking bar (14) engage the further engagement structure (24) in a respective other cylinder position than the initial position.

4. Cylinder lock assembly according to claim 4, wherein the at least one further engagement structure (24) comprises a series of side pin channels (26) or is formed thereby, which series of side pin channels (26) during use in the absence of a fitting key (8) in the initial position receives a series of side pins (28) of the cylinder (6).

5. Cylinder lock assembly according to any one of the preceding claims, wherein one or more of the openings (44) in the circumferential direction of the cylinder (6) have one or more respective edges (46) which with respect to the inner surface (30) are steeper than 30 degrees, preferably steeper than 45 degrees, more preferably steeper than 60 degrees, more preferably steeper than 75 degrees, for example approximately 90 degrees.

6. Cylinder lock assembly according to any one of the preceding claims, wherein the guiding structures (18) form a continuous cylindrical surface with a cylinder guiding inner surface (30) of the housing (4).

7. Cylinder lock assembly according to any one of the preceding claims, wherein the guiding structures (18) are placed at a distance from each other, wherein the blocking bar (14) is configured to engage, between the guiding structures (18), the engagement structure (16).

8. Cylinder lock assembly according to any one of the preceding claims, wherein the engagement structure (16) with respect to the cylinder axis (C) is positioned opposite the driver pin channels (10), wherein the blocking bar (14) with respect to the cylinder axis (C) is positioned opposite the key pin channels (12).

9. Cylinder lock assembly according to any one of the preceding claims, wherein the cylinder (6) adjacent to the blocking bar (14) is provided with a series of bar unlocking pins (32) which are movable at right angles to the blocking bar (14) in a plane that is at a distance from the cylinder axis (C), wherein the bar unlocking pins (32) are operated by a meandering slot (34) in a fitting key (8) when such key (8) is being placed in the cylinder (6), which operation moves the bar unlocking pins (32) such that the blocking bar (14) is free to reduce its engagement of the housing (4).

10. Cylinder lock assembly according to claim 9, wherein each of the bar unlocking pins (32) on a side thereof proximal to the blocking bar (14) is provided with a notch (36) for therein receiving the blocking bar (14) when a fitting key (8) is placed in the cylinder (6).

11. Cylinder lock assembly according to claim 9 or 10, wherein each of the bar unlocking pins (32) on a side thereof remote from the blocking bar (14) is provided with a protrusion (38) which upon placement of a fitting key (8) cooperates with the meandering slot (34) to move the bar unlocking pins (32).

12. Cylinder lock assembly according to any one of claims 9-11, wherein the blocking bar (14) is provided with a biasing means (40) to bias the blocking bar (14) in the direction of the housing (4) to have the blocking bar (14) engage the housing (4), wherein the bar unlocking pins (32) are provided with respective biasing means (42) to bias the bar unlocking pins (32) in the direction of a locking position in which the bar unlocking pins (32) force the blocking bar (14) to continue to engage the housing (4), at least, in the absence of a fitting key (8).

13. Cylinder lock assembly according to any one of the preceding claims, wherein the number of cams (22) of the one or more cams (22) is in the range of 2 through 10, preferably in the range of 3 through 7, more preferably in the range of 4 through 6, for example 5.

14. Cylinder lock system (48) comprising a cylinder lock assembly (2) according to any one of the preceding claims and a fitting key (8) with which the cylinder lock assembly (2) can be operated, which key (8) is provided with a meandering slot (34) for reduction or removal of the blocking bar's (14) engagement of the housing (4).

15. Door (50) provided with a cylinder lock assembly (2) according to any one of claims 1-13.

16. Building (52) provided with a cylinder lock assembly (2) according to any one of claims 1 - 13, for example in a door (50) according to claim 15.

17. Method for access control, which comprises providing a cylinder lock system (48) according to claim 14, wherein the cylinder lock assembly (2) is mounted in an entrance door (50) and wherein the fitting key (8) is kept by an authorized person and/or an authorized system.

Patentansprüche

1. Zylinderschlossbaugruppe (2) umfassend ein Gehäuse (4) und einem in das Gehäuse (4) eingesetz-

ten Zylinder (6), wobei sich der Zylinder (6) entlang einer Zylinderachse (C) erstreckt und nur dann relativ zu dem Gehäuse (4) aus einer Ausgangsposition um die Zylinderachse (C) drehbar ist, wenn ein Passschlüssel (8) in den Zylinder (6) eingesetzt ist,

wobei das Gehäuse (4) entlang der Zylinderachse (C) mit einer Reihe von Mitnehmerstiftkanälen (10) versehen ist, die sich in jeweiligen axialen Mitnehmerstiftebenen (S) radial in Bezug auf die Zylinderachse (C) von dem Zylinder (6) in das Gehäuse (4) erstrecken, wobei die axialen Mitnehmerstiftebenen (S) senkrecht zu der Zylinderachse (C) sind,
wobei der Zylinder (6) entlang der Zylinderachse (C) mit einer Reihe von Schlüsselstiftkanälen (12) versehen ist, die in der Ausgangsposition mit den Mitnehmerstiftkanälen (10) fluchten, so dass zwischen dem Gehäuse (4) und dem Zylinder (6) entsprechende Stiftdurchgänge gebildet werden,
wobei der Zylinder (6) mit einer Verriegelungsstange (14) versehen ist, die sich entlang der Zylinderachse (C) erstreckt und die dazu eingerichtet ist, ohne einen Passschlüssel (8) in der Ausgangsposition in das Gehäuse (4) einzugreifen, um einer Drehung des Zylinders (6) relativ zu dem Gehäuse (4) entgegenzuwirken, und weniger oder nicht in das Gehäuse (4) einzugreifen, wenn ein Passschlüssel (8) in den Zylinder (6) eingesetzt ist, wobei das Gehäuse (4) mit einer Eingriffsstruktur (16) versehen ist, die dazu eingerichtet ist, zu bewirken, dass die Verriegelungsstange (14) in der Ausgangsposition in die Eingriffsstruktur (16) eingreift,
wobei die Eingriffsstruktur (16) an den axialen Mitnehmerstiftebenen (S) mit entsprechenden Führungsstrukturen (18) versehen ist, die dazu eingerichtet sind, einem Eingriff zwischen Schlüsselstiften (20) und/oder Schließplatten des Zylinders (6) einerseits und der Eingriffsstruktur (16) andererseits entgegenwirken, wobei die Verriegelungsstange (14) mit einem oder mehreren Nocken (22) versehen ist, die dem Gehäuse (4) zugewandt und dazu eingerichtet sind, in die Eingriffsstruktur (16) einzugreifen, wobei der eine oder die mehreren Nocken (22) in Bezug auf jede der axialen Mitnehmerstiftebenen (S) axial versetzt angeordnet sind,
wobei die Eingriffsstruktur (16) eine Reihe von Öffnungen (44) in einer Zylinderführungsinnenfläche (30) des Gehäuses (4) umfasst, wobei die Öffnungen (44) in Bezug auf jede der axialen Mitnehmerstiftebenen (S) axial versetzt angeordnet sind.

2. Zylinderschlossbaugruppe nach Anspruch 1, wobei sich der eine oder die mehreren Nocken (22) in Richtung des Gehäuses (4) verjüngen.

3. Zylinderschlossbaugruppe nach einem der vorhergehenden Ansprüche, wobei das Gehäuse (4) mit wenigstens einer weiteren Eingriffsstruktur (24) in einem Abstand von der Eingriffsstruktur (16) versehen ist, wobei die weitere Eingriffsstruktur (24) dazu eingerichtet ist, zu bewirken, dass die Verriegelungsstange (14) in einer jeweiligen anderen Zylinderposition als der Ausgangsposition in die weitere Eingriffsstruktur (24) eingreift.

4. Zylinderschlossbaugruppe nach Anspruch 4, wobei die wenigstens eine weitere Eingriffsstruktur (24) eine Reihe von Seitenstiftkanälen (26) umfasst oder dadurch gebildet wird, wobei die Reihe von Seitenstiftkanälen (26) während der Verwendung in Abwesenheit eines Passschlüssels (8) in der Ausgangsposition eine Reihe von Seitenstiften (28) des Zylinders (6) aufnimmt.

5. Zylinderschlossbaugruppe nach einem der vorhergehenden Ansprüche, wobei eine oder mehrere der Öffnungen (44) in Umfangsrichtung des Zylinders (6) jeweils eine oder mehrere Kanten (46) aufweisen, die in Bezug auf die Innenfläche (30) steiler als 30 Grad, vorzugsweise steiler als 45 Grad, bevorzugter steiler als 60 Grad, bevorzugter steiler als 75 Grad, zum Beispiel etwa 90 Grad, sind.

6. Zylinderschlossbaugruppe nach einem der vorhergehenden Ansprüche, wobei die Führungsstrukturen (18) eine durchgehende zylindrische Oberfläche mit einer Zylinderführungsinnenfläche (30) des Gehäuses (4) bilden.

7. Zylinderschlossbaugruppe nach einem der vorhergehenden Ansprüche, wobei die Führungsstrukturen (18) in einem Abstand zueinander eingesetzt sind, wobei die Verriegelungsstange (14) dazu eingerichtet ist, zwischen den Führungsstrukturen (18) in die Eingriffsstruktur (16) einzugreifen.

8. Zylinderschlossbaugruppe nach einem der vorhergehenden Ansprüche, wobei die Eingriffsstruktur (16) in Bezug auf die Zylinderachse (C) gegenüber den Mitnehmerstiftkanälen (10) positioniert ist, wobei die Verriegelungsstange (14) in Bezug auf die Zylinderachse (C) gegenüber den Schlüsselstiftkanälen (12) positioniert ist.

9. Zylinderschlossbaugruppe nach einem der vorhergehenden Ansprüche, wobei der Zylinder (6) neben der Verriegelungsstange (14) mit einer Reihe von Stangenentriegelungsstiften (32) versehen ist, die rechtwinklig zu der Verriegelungsstange (14) in einer Ebene beweglich sind, die sich in einem Abstand von der Zylinderachse (C) befindet, wobei die Stan-

genentriegelungsstifte (32) durch einen mäanderförmigen Schlitz (34) in einem Passschlüssel (8) betätigt werden, wenn ein solcher Schlüssel (8) in den Zylinder (6) eingesetzt wird, wobei die Betätigung die Stangenentriegelungsstifte (32) so bewegt, dass die Verriegelungsstange (14) frei ist, um ihren Eingriff in das Gehäuse (4) zu verringern.

10. Zylinderschlossbaugruppe nach Anspruch 9, wobei jeder der Stangenentriegelungsstifte (32) auf einer Seite davon proximal zu der Verriegelungsstange (14) mit einer Kerbe (36) versehen ist, um darin die Verriegelungsstange (14) aufzunehmen, wenn ein Passschlüssel (8) in den Zylinder (6) eingesetzt ist.

11. Zylinderschlossbaugruppe nach Anspruch 9 oder 10, wobei jeder der Stangenentriegelungsstifte (32) auf einer von der Verriegelungsstange (14) entfernten Seite davon mit einem Vorsprung (38) versehen ist, der beim Einsetzen eines Passschlüssels (8) mit dem mäanderförmigen Schlitz (34) zusammenwirkt, um die Stangenentriegelungsstifte (32) zu bewegen.

12. Zylinderschlossbaugruppe nach einem der Ansprüche 9 bis 11, wobei die Verriegelungsstange (14) mit einem Vorspannmittel (40) versehen ist, um die Verriegelungsstange (14) in Richtung des Gehäuses (4) vorzuspannen, um zu bewirken, dass die Verriegelungsstange (14) in das Gehäuse (4) eingreift, wobei die Stangenentriegelungsstifte (32) mit entsprechenden Vorspannmitteln (42) versehen sind, um die Stangenentriegelungsstifte (32) in Richtung einer Verriegelungsposition vorzuspannen, in der die Stangenentriegelungsstifte (32) die Verriegelungsstange (14) zwingen, wenigstens ohne einen Passschlüssel (8) weiterhin in das Gehäuse (4) einzugreifen.

13. Zylinderschlossbaugruppe nach einem der vorhergehenden Ansprüche, wobei die Anzahl der Nocken (22) des einen oder der mehreren Nocken (22) im Bereich von 2 bis 10, vorzugsweise im Bereich von 3 bis 7, bevorzugter im Bereich von 4 bis 6, zum Beispiel 5, liegt.

14. Zylinderschlosssystem (48) mit einer Zylinderschlossbaugruppe (2) nach einem der vorhergehenden Ansprüche und einem Passschlüssel (8), mit dem die Zylinderschlossbaugruppe (2) betätigt werden kann, wobei der Schlüssel (8) mit einem mäanderförmigen Schlitz (34) zum Verringern oder Entfernen des Eingriffs der Verriegelungsstange (14) in das Gehäuse (4) versehen ist.

15. Tür (50) mit einer Zylinderschlossbaugruppe (2) nach einem der Ansprüche 1 bis 13.

16. Gebäude (52) mit einer Zylinderschlossbaugruppe (2) nach einem der Ansprüche 1 bis 13, zum Beispiel in einer Tür (50) nach Anspruch 15.

17. Verfahren zur Zugangskontrolle, das das Bereitstellen eines Zylinderschlosssystems (48) nach Anspruch 14 umfasst, wobei die Zylinderschlossbaugruppe (2) in einer Eingangstür (50) montiert ist und wobei der passende Schlüssel (8) von einer autorisierten Person und/oder einem autorisierten System aufbewahrt wird.

Revendications

1. Ensemble serrure à barillet (2) comprenant un logement (4) et un barillet (6) placé dans le logement (4), lequel barillet (6) s'étend le long d'un axe de barillet (C), et peut tourner par rapport au logement (4) à partir d'une position initiale autour de l'axe de barillet (C) seulement quand une clé appropriée (8) est placée dans le barillet (6),

dans lequel le logement (4) le long de l'axe de barillet (C), est doté d'une série de canaux de broches d'entraînement (10) qui s'étendent dans des plans de broches d'entraînement axiales (S) radialement par rapport à l'axe de barillet (C) du barillet (6) dans le logement (4), lesquels plans de broches d'entraînement axiales (S) sont perpendiculaires à l'axe de barillet (C),
dans lequel le barillet (6), le long de l'axe de barillet (C), est doté d'une série de canaux de broches de clé (12) qui, dans la position initiale, sont alignés avec les canaux de broches d'entraînement (10), de telle sorte que soient formés des passages de broches respectifs entre le logement (4) et le barillet (6),
dans lequel le barillet (6) est doté d'une barre de blocage (14) qui s'étend le long de l'axe de barillet (C), et qui est configurée, en l'absence d'une clé appropriée (8) dans la position initiale, pour venir en prise avec le logement (4), afin de contrecarrer la rotation du barillet (6) par rapport au logement (4), et pour venir en prise avec le logement (4) moins ou pas du tout, quand une clé appropriée (8) est placée dans le barillet (6),
dans lequel le logement (4) est doté d'une structure de mise en prise (16) qui est configurée pour que la barre de blocage (14), dans la position initiale, vienne en prise avec la structure de mise en prise (16),
dans lequel la structure de mise en prise (16), au niveau des plans de broches d'entraînement axiales (S), est dotée de structures de guidage respectives (18) qui sont configurées afin de contrecarrer une mise en prise entre les broches de clé (20), et / ou de plaques de fermeture du barillet (6) d'une part, et la structure de mise en

prise (16) d'autre part,
dans lequel la barre de blocage (14) est dotée d'une ou de plusieurs cames (22) qui font face au logement (4), et qui sont configurées pour venir en prise avec la structure de mise en prise (16), dans lequel la ou les cames (22) sont agencées de manière axiale, échelonnées par rapport à chacun des plans de broches d'entraînement axiales (S),
dans lequel la structure de mise en prise (16) comprend une série d'ouvertures (44) dans une surface intérieure de guidage de barillet (30) du logement (4), lesquelles ouvertures (44) sont agencées de manière axiale, échelonnées par rapport à chacun des plans de broches d'entraînement axiales (S).

2. Ensemble serrure à barillet selon la revendication 1, dans lequel la ou les cames (22) s'amincissent dans la direction du logement (4).

3. Ensemble serrure à barillet selon l'une quelconque des revendications précédentes, dans lequel le logement (4) est doté d'au moins une autre structure de mise en prise (24) à une distance à partir de la structure de mise en prise (16), laquelle autre structure de mise en prise (24) est configurée afin que la barre de blocage (14) vienne en prise avec l'autre structure de mise en prise (24) dans une position de barillet respective, autre que la position initiale.

4. Ensemble serrure à barillet selon la revendication 4, dans lequel l'une au moins des autres structures de mise en prise (24), comprend une série de canaux de broches latérales (26), ou est formée de ce fait, laquelle série de canaux de broches latérales (26), en service en l'absence d'une clé appropriée (8) dans la position initiale, reçoit une série de broches latérales (28) du barillet (6).

5. Ensemble serrure à barillet selon l'une quelconque des revendications précédentes, dans lequel une ou plusieurs des ouvertures (44) dans la direction circonférentielle du barillet (6), présentent un ou plusieurs bords respectifs (46) qui, par rapport à la surface intérieure (30), sont plus raides que 30 degrés, de préférence plus raides que 45 degrés, mieux plus raides que 60 degrés, mieux encore plus raides que 75 degrés, par exemple approximativement égaux à 90 degrés.

6. Ensemble serrure à barillet selon l'une quelconque des revendications précédentes, dans lequel les structures de guidage (18) forment une surface cylindrique continue avec une surface intérieure de guidage de barillet (30) du logement (4).

7. Ensemble serrure à barillet selon l'une quelconque des revendications précédentes, dans lequel les structures de guidage (18) sont placées à une distance les unes des autres, dans lequel la barre de blocage (14) est configurée pour venir en prise, entre les structures de guidage (18), avec la structure de mise en prise (16).

8. Ensemble serrure à barillet selon l'une quelconque des revendications précédentes, dans lequel la structure de mise en prise (16), par rapport à l'axe de barillet (C), est positionnée à l'opposé des canaux de broches d'entraînement (10), dans lequel la barre de blocage (14), par rapport à l'axe de barillet (C), est positionnée à l'opposé des canaux de broches de clé (12).

9. Ensemble serrure à barillet selon l'une quelconque des revendications précédentes, dans lequel le barillet (6) adjacent à la barre de blocage (14), est doté d'une série de broches de déblocage de barre (32), qui sont mobiles perpendiculairement à la barre de blocage (14) dans un plan qui se situe à une distance de l'axe de barillet (C), dans lequel les broches de déblocage de barre (32) sont actionnées par une fente sinueuse (34) dans une clé appropriée (8), quand une telle clé (8) est placée dans le barillet (6), laquelle opération déplace les broches de déblocage de barre (32), de telle sorte que la barre de blocage (14) soit libre de réduire sa mise en prise avec le logement (4).

10. Ensemble serrure à barillet selon la revendication 9, dans lequel chacune des broches de déblocage de barre (32) de son côté proximal par rapport à la barre de blocage (14), est dotée d'une encoche (36) destinée à y recevoir la barre de blocage (14) quand une clé appropriée (8) est placée dans le barillet (6).

11. Ensemble serrure à barillet selon la revendication 9 ou 10, dans lequel chacune des broches de déblocage de barre (32), de son côté éloigné de la barre de blocage (14), est dotée d'une saillie (38) qui, lors du placement d'une clé appropriée (8), coopère avec la fente sinueuse (34), afin de déplacer les broches de déblocage de barre (32).

12. Ensemble serrure à barillet selon l'une quelconque des revendications 9 à 11, dans lequel la barre de blocage (14) est dotée de moyens de sollicitation (40), destinés à solliciter la barre de blocage (14) dans la direction du logement (4), afin que la barre de blocage (14) vienne en prise avec le logement (4), dans lequel les broches de déblocage de barre (32) sont dotées de moyens de sollicitation respectifs (42), afin de solliciter les broches de déblocage de barre (32) dans la direction d'une position de blocage dans laquelle les broches de déblocage de barre (32) forcent la barre de blocage (14) à continuer de venir

en prise avec le logement (4), au moins, en l'absence d'une clé appropriée (8).

13. Ensemble serrure à barillet selon l'une quelconque des revendications précédentes, dans lequel le nombre de cames (22) de l'une ou plusieurs cames (22), se situe dans une plage comprise entre 2 et 10, de préférence dans une plage comprise entre 3 et 7, mieux dans une plage comprise entre 4 et 6, par exemple égal à 5.

14. Système de serrure à barillet (48) comprenant un ensemble serrure à barillet (2) selon l'une quelconque des revendications précédentes, et une clé appropriée (8) qui permet d'actionner l'ensemble serrure à barillet (2), laquelle clé (8) est dotée d'une fente sinueuse (34) destinée à réduire ou à retirer la mise en prise de la barre de blocage (14) du logement (4).

15. Porte (50) dotée d'un ensemble serrure à barillet (2) selon l'une quelconque des revendications 1 à 13.

16. Bâtiment (52) doté d'un ensemble serrure à barillet (2) selon l'une quelconque des revendications 1 à 13, par exemple dans une porte (50) selon la revendication 15.

17. Procédé de contrôle d'accès, qui comprend une étape consistant à fournir un système de serrure à barillet (48) selon la revendication 14, dans lequel l'ensemble serrure à barillet (2) est monté dans une porte d'entrée (50), et dans lequel la clé appropriée (8) est détenue par une personne autorisée et / ou par un système autorisé.

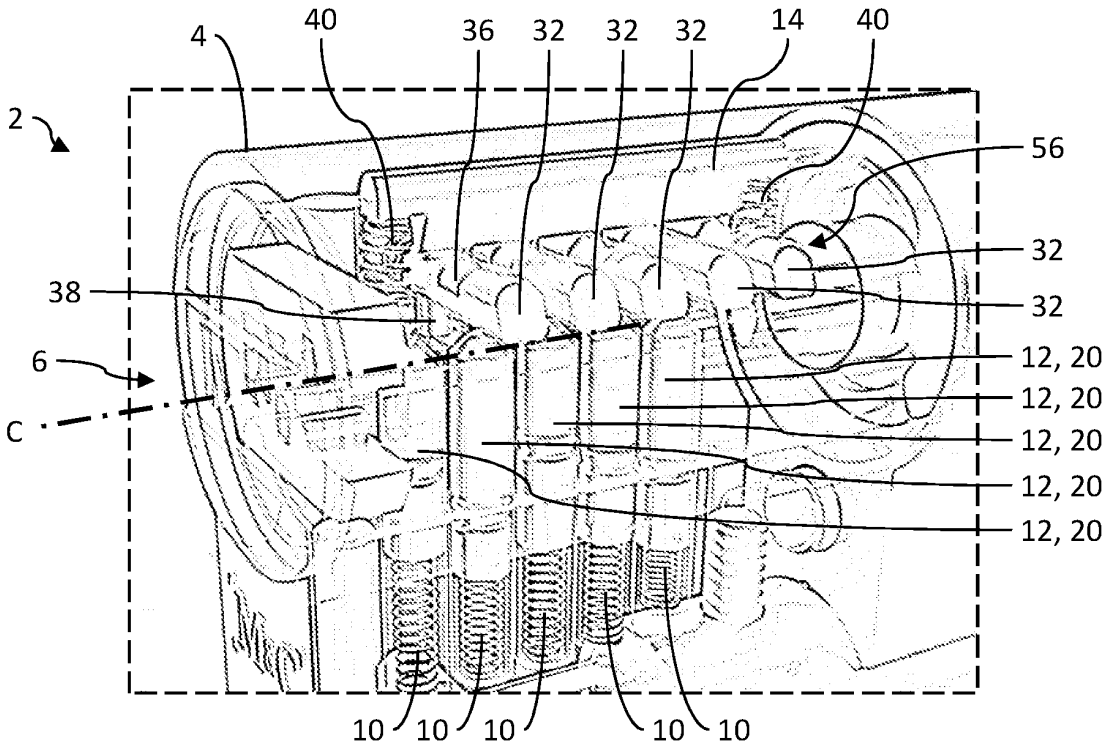

Fig. 1A
PRIOR ART

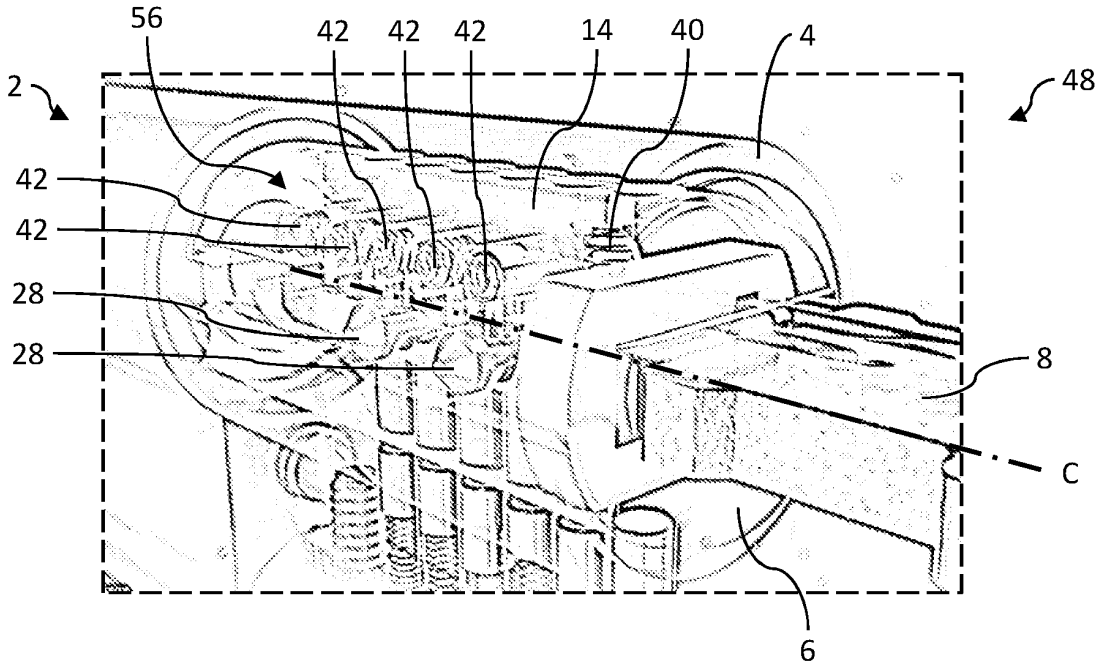

Fig. 1B
PRIOR ART

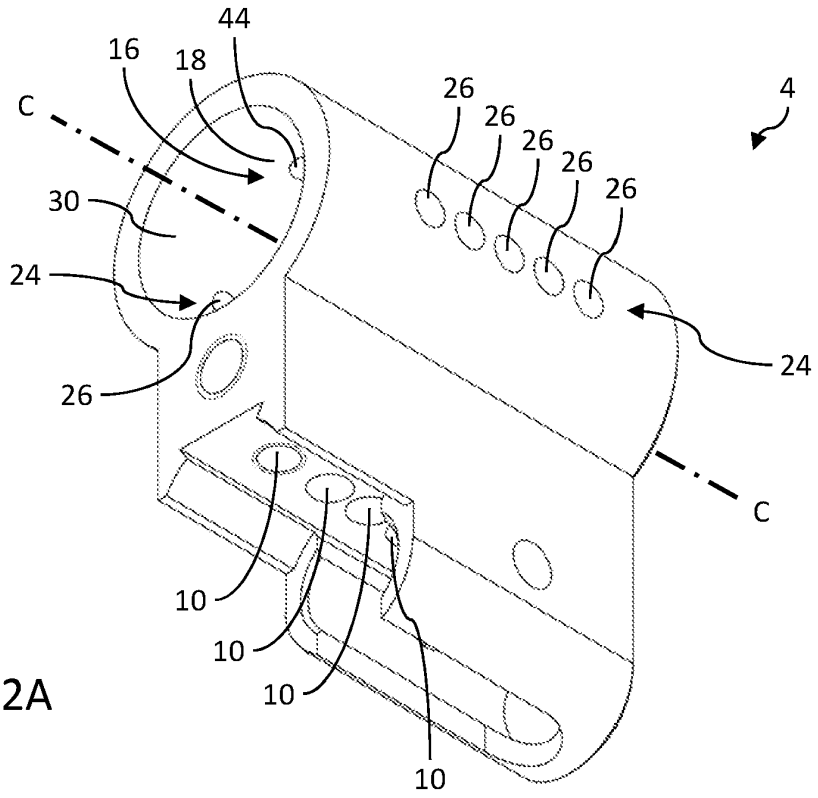

Fig. 2A

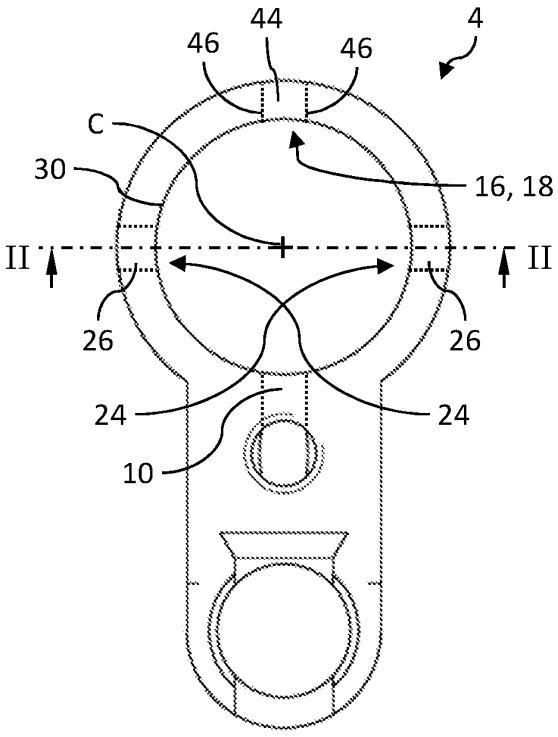

Fig. 2B

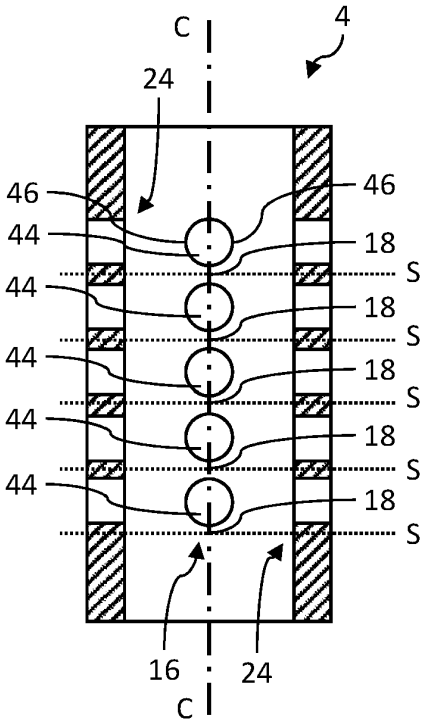

Fig. 2C

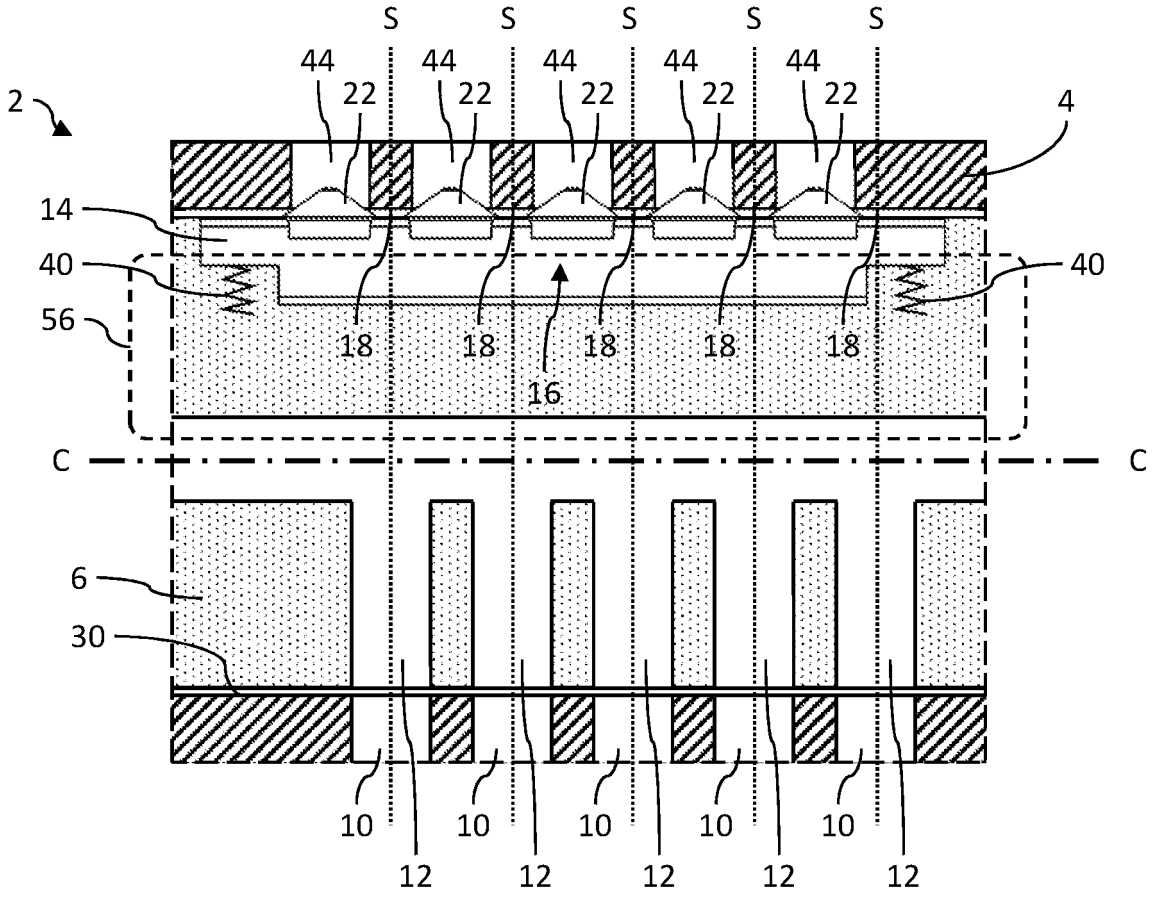
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Fig. 3

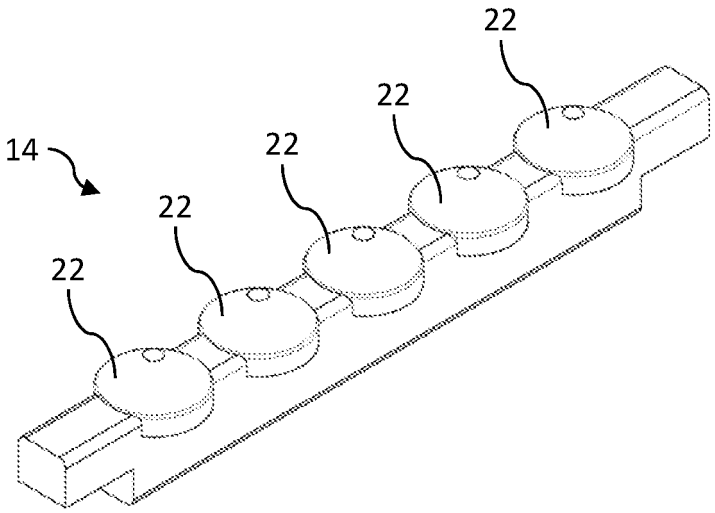
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Fig. 4

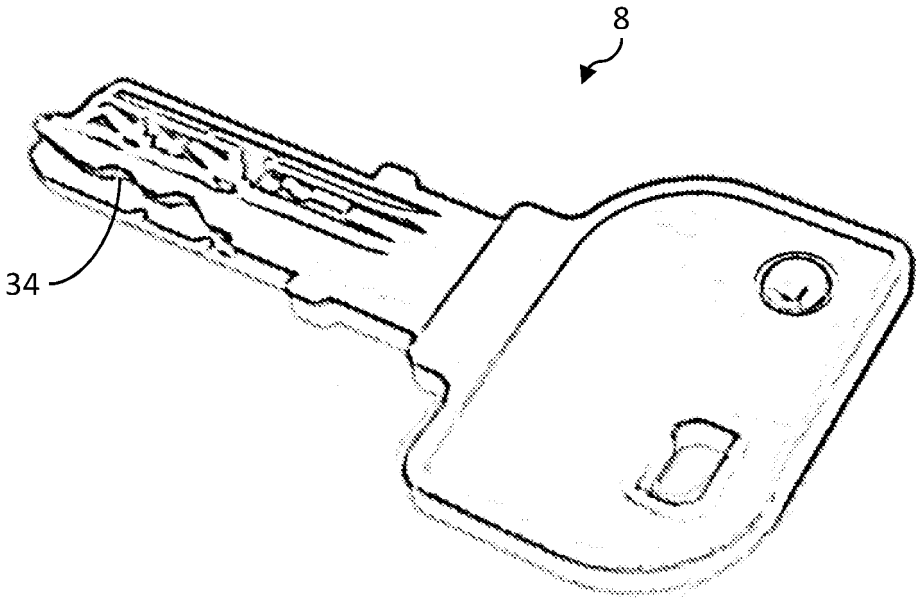

Fig. 5

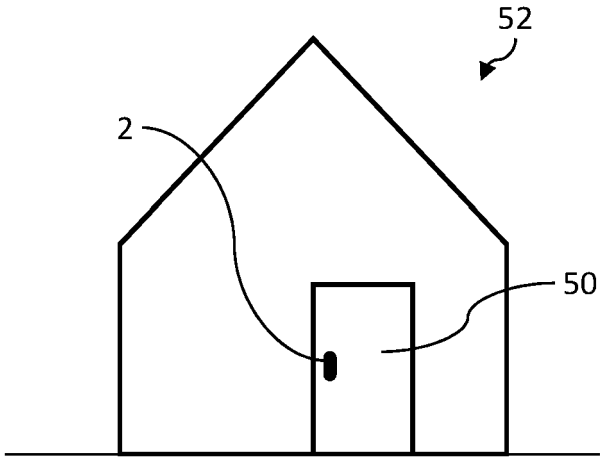

Fig. 6

REFERENCES CITED IN THE DESCRIPTION

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