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(54) CYLINDER LOCK WITH VARIOUS TRANSVERSAL PINNING HOLES

(57) Cylinder lock (1; 21; 41), comprising several pinning holes (9; 29; 49) for attaching the cylinder lock to a door, and which comprises a bolt (7; 27; 47) capable of being mounted in different longitudinal positions of the cylinder lock in order to be aligned with a different pinning hole (9; 29; 49) depending on the installation needs, enabling the cylinder lock (1; 21; 41) to be adjusted to doors of different thicknesses, to doors that have been modified, or the like, without the need to replace the cylinder lock (1; 21; 41).

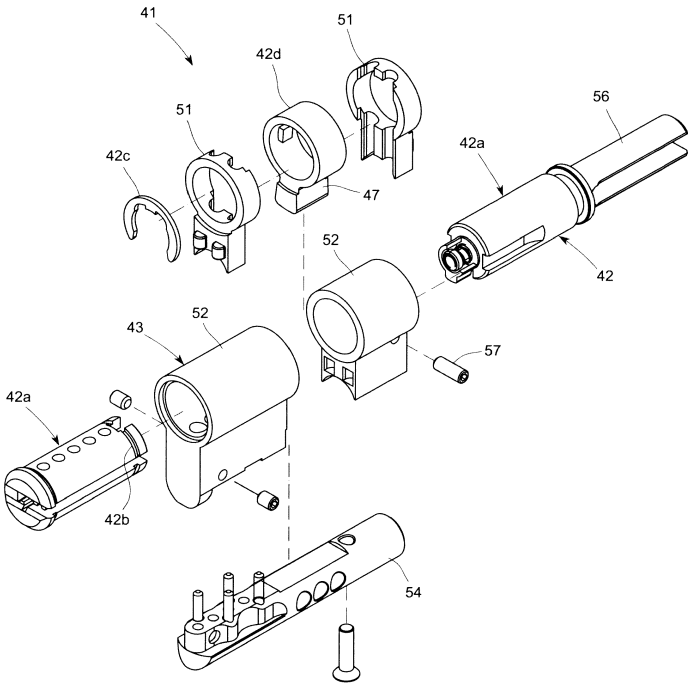

FIG.15

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Description

Field of the Invention

[0001] The invention relates to a cylinder lock that has a casing and an internal cylindrical core capable of rotating with respect to the casing when the correct key is inserted into the core, and particularly relates to a cylinder lock with various transversal holes for pinning to a door or other moving element, that enable the cylinder to be fixed to moving elements of a different thickness.

Prior Art

[0002] A lock is generally a metal device that is used to allow or prevent a door, drawer, cover, gate or other moving element from being opened, and thus allows or prevents this moving element from moving with respect to a corresponding fixed element, such as a door frame, a piece of furniture, a box or the like, to access a space protected by this moving element.

[0003] Diverse types of locks are known, among which cylinder locks can be highlighted due to their wide use on the market. A cylinder consists in a mechanism mainly made up of a cylindrical core placed inside a longitudinal casing, the core and the casing are generally made out of brass. The casing includes a rib that protrudes radially, normally along the entire length of the casing. When the correct key is inserted in a slot of the cylindrical core, the cylindrical core is capable of rotating around its longitudinal axis within the casing; a bolt rotates jointly with the cylindrical core, the bolt capable of adopting various positions with respect to the casing. For instance, the bolt can adopt a closed position inside the rib of the casing. The bolt can also adopt other positions in which it is moved outwards from the casing, normally by making full turns around the longitudinal axis of the cylindrical core; in these other positions, the bolt can act on the lock or on other type of mechanism.

[0004] Continuing with the example of a door, cylinder locks are generally installed on one side of the door, close to a lock that, when activated by the bolt, can engage with the door frame. Normally, the cylinder is placed transversally to the door, and thus the length of the cylinder and the thickness of the door are similar. Usually, the longitudinal casing of the cylinder has a transversal pinning hole for the insertion of a screw to secure the cylinder to the door leaf. The side of the door leaf closest to the frame has a hole that is positioned to be aligned with the transversal pinning hole of the cylinder. A screw is then inserted from the outer part of the side of a door leaf, passing through the hole of the door leaf and the lock, and is threaded to the transversal pinning hole of the cylinder. Since the longitudinal casing is secured to the door leaf, the cylinder does not slide out of the door leaf, and the cylinder core is enabled to rotate with respect to its longitudinal casing on turning the key.

[0005] It is well known in prior art that there are doors with many different dimensions, or in other words, with many widths, heights and/or thicknesses. Various solutions are known in the market for adapting cylinder locks to diverse door leaf thicknesses. On one hand, cylinder locks of different lengths are sold. On the other hand, "modular" cylinder locks are sold, which consist of cylinders made up of longitudinal pieces assembled in such a way that pieces can be added or removed to vary the length of the cylinder.

[0006] The present invention aims to increase the capacity of cylinder locks to adapt to variations in doors or other moving elements.

Brief Description of the Invention

[0007] The present invention consists of a cylinder lock that comprises a core unit, which is made up of a single piece or a set of several pieces, and a casing unit, which is also made up of a single piece or a set of several pieces. The casing unit comprises a rib that protrudes radially. The core unit is substantially cylindrical around a longitudinal axis and is rotationally arranged within the casing unit. The core unit further comprises a bolt that protrudes radially from the rest of the core unit; depending on the rotational position of the core unit with respect to the casing unit, the bolt can be housed in a space in the rib or, alternatively, can protrude from the cylinder.

[0008] In accordance with the invention, the cylinder further comprises two or more threaded pinning holes to secure the cylinder to the door or other moving element through any of the pinning holes. The pinning holes are placed parallel to each other and transversally crossing the cylinder in a perpendicular direction to the longitudinal axis. Furthermore, the pinning holes are placed one after the other along a direction that is parallel to the longitudinal axis, in other words, forming a row that is parallel to the longitudinal axis.

[0009] The cylinder lock in accordance with the invention has the advantage that it can be assembled in different positions with respect to the through hole (intended to receive a securing screw from the cylinder) of a door leaf or other moving element. It is sufficient to align the cylinder bolt with the pinning hole that is going to be used so that the cylinder can be correctly installed.

[0010] The invention offers a cylinder that is valid for door leafs of different thicknesses, hence avoiding the need to replace the whole cylinder when the door is changed or when a protective shield is installed on one of the outer faces of the door leaf (increasing its thickness).

Brief Description of the Figures

[0011] The details of the invention can be seen in the accompanying figures, which do not intend to limit the scope of the invention:

- Figure 1 shows a perspective view of a cylinder lock

in accordance with a first embodiment of the invention.

- Figure 2 shows a top plan view of the cylinder of Figure 1.
- Figure 3 shows a left side elevation view of the cylinder of Figure 1.
- Figure 4 shows a front elevation view of the cylinder of Figure 1.
- Figure 5 shows an exploded perspective view of the cylinder of Figure 1.
- Figure 6 shows a perspective view of a cylinder lock in accordance with a second embodiment of the invention.
- Figure 7 shows a top plan view of the cylinder of Figure 6.
- Figure 8 shows a right side elevation view of the cylinder of Figure 6.
- Figure 9 shows a front elevation view of the cylinder of Figure 6.
- Figure 10 shows an exploded perspective view of the cylinder of Figure 6.
- Figure 11 shows a perspective view of a cylinder lock in accordance with a third embodiment of the invention.
- Figure 12 shows a top plan view of the cylinder of Figure 11.
- Figure 13 shows a right side elevation view of the cylinder of Figure 11.
- Figure 14 shows a front elevation view of the cylinder of Figure 11.
- Figure 15 shows an exploded perspective view of the cylinder of Figure 11.

Detailed Description of the invention

[0012] Figures 1 to 4 show four different views of a first embodiment of the invention, consisting in a cylinder lock (1) that has a fixed length. The cylinder lock (1) comprises a core unit (2) or rotor, placed generally inside a casing unit (3), for example of the "Europrofile" type. The core unit (2) is substantially cylindrical around a longitudinal axis (4), and can rotate with respect to the casing unit (3) and about the longitudinal axis (4). The casing unit (3) comprises a rib (5) that protrudes radially, housing the mechanisms that enable the core unit (2) to be rotated or not, depending on whether the correct key has been inserted in the slot (6) of the core unit (2), whereby these mechanisms are known in prior art and are irrelevant to the present invention. The cylinder lock (1) of the present embodiment comprises two slots (6), one at each end of the core unit (2). The core unit (2) also comprises a bolt (7) that protrudes radially from the generally cylindrical remaining part of the core unit (2). The bolt (7) is capable of rotating around the longitudinal axis (4) individually or with the rest of the core unit (2). Depending on the rotational position of the core unit (2) with respect to the casing unit (3), the bolt (7) can be housed in a space (8) in the rib (5) or it can protrude from the cylinder lock (1). When the bolt (7) protrudes from the cylinder lock (1), it activates a lock (not shown), causing the lock to alternate between an open or unlocked position and one or more closed or locked positions.

[0013] In accordance with the present invention, the cylinder lock (1) comprises at least two pinning holes (9) -three, in this embodiment-. The pinning holes (9) are threaded, preferably with an identical configuration or thread geometry in all of them so that a same screw -not shown- can be threaded to any of them. As shown in Figure 3, the pinning holes (9) are parallel to each other, or in other words, the pinning holes (9) are made along respective longitudinal axes (10) which are parallel to each other. Furthermore, the pinning holes (9) are positioned so that they cross the cylinder lock (1) transversally in a perpendicular direction to the longitudinal axis (4); in other words, the longitudinal axes (10) of the pinning holes (9) are perpendicular to the longitudinal axis (4) of the core unit (2). The pinning holes (9) are positioned one after the other, forming a parallel row to the longitudinal axis (4); in other words, the longitudinal axes (10) of the pinning holes (9) form a plane that is parallel to (i.e. not intersecting) the longitudinal axis (4) of the core unit (2). As shown in Figure 3, the pinning holes (9) are radially aligned with the space (8), and are arranged radially outwards from this space (8).

[0014] In accordance with the invention, the cylinder lock (1) further comprises at least one body supplement (11); in the present embodiment, there are specifically two body supplements (11) that are substantially cylindrical. The body supplements (11) are placed within the space (8) and are longitudinally exchangeable with the bolt (7). The bolt (7) and the body supplements (11) can be assembled in at least two relative positions. For example, in this embodiment, the bolt (7) and the two body supplements (11) can be assembled in accordance with six relative positions, in which the bolt (7) adopts three possible absolute positions: a leftmost position, in which the two body supplements (11) are to the right of the bolt (7); a central position, in which the bolt (7) is positioned between the body supplements (11) as shown in the figures; and a rightmost position, in which the two body supplements (11) are to the left of the bolt (7). Depending on the position of the bolt (7), the bolt is radially aligned with a different pinning hole (9): in the leftmost position, the bolt (7) is aligned with the leftmost pinning hole (9) as shown in Figures 1 and 3; in the central position, the bolt (7) is aligned with the central pinning hole (9); and in the rightmost position, the bolt (7) is aligned with the pinning hole (9) located on the right in accordance with the layout in Figures 1 and 3.

[0015] The ability of the bolt (7) and the body supplements (11) to be assembled in a longitudinally exchangeable position, along with the fact that the bolt (7) is radially aligned with a different pinning hole (9) depending on the longitudinal position in which the bolt (7) is assembled, enable the fitter or user to easily optimize the installation of the cylinder lock (1) depending on the characteristics

of the door on which it is going to be installed.

[0016] Figure 5 shows a disassembled or exploded view of the cylinder lock (1) of Figure 1. As can be seen, the core unit (2) comprises two rotors (2a), each fitted with a slot (2b) on the innermost side. Within each slot (2b) a respective ring (2c) is fitted which enables the rotor (2a) to be secured relatively to the casing unit (3). A bolt element (2d) comprises the bolt (7) of the cylinder lock. The rotors (2a), rings (2c) and bolt element (2d) make up the core unit (2), whereby the one or more elements that connect the rotors (2a) and the bolt element (2d) so that they are jointly rotatable are not shown here, as they are known by those skilled in the art. In the present embodiment, in order to exchange the position of the bolt element (2d) and the body supplements (11), the rings (2c) that secure the rotors (2a) are loosened; then, the rotors (2a) are withdrawn far enough to free the space (8) where the bolt element (2d) and the body supplements (11) are to be inserted; once this space (8) has been freed, the bolt element (2d) is placed in the desired position, filing the remaining gap with the body supplements (11); finally, the rotors (2a) are inserted again and the rings (2c) are ringed in the corresponding slots (2b) of the rotors (2a).

[0017] In the present embodiment, the pinning holes (9) are encompassed in the rib (5) of the casing unit (3). The casing unit (3) is a single piece, and the cylinder lock (1) has a single and invariable length, substantially equal to the length of the longer of the casing unit (3) and the core unit (2).

[0018] Figures 6 to 9 show four views of a second embodiment of the invention, consisting in a cylinder lock (21) that comprises a core unit (22) placed mainly inside a casing unit (23). As in conventional cylinders, the core unit (22) is substantially cylindrical, formed around a longitudinal axis (24) and can rotate with respect to the casing unit (23) and about the longitudinal axis (24). The casing unit (23) comprises a rib (25) that protrudes radially, housing the mechanisms that enable the core unit (22) to rotate or not depending on whether the correct key has been inserted into a slot (26) in the core unit (22). As in the previous embodiment, the cylinder lock (21) of the present embodiment comprises two slots (26), one on each end of the core unit (22). The core unit (22) further comprises a bolt (27) that protrudes radially from the generally cylindrical remaining part of the core unit (22). Depending on the rotational position of the core unit (22) with respect to the casing unit (23), the bolt (27) may be housed in a space (28) of the cylinder lock (21) or may protrude from the cylinder lock (21).

[0019] In accordance with the invention, the cylinder lock (21) comprises at least two (three, in particular) threaded pinning holes (29), placed parallel to each other, crossing the cylinder lock (21) transversally in a perpendicular direction to the longitudinal axis (24), and organised parallel to the longitudinal axis (24), i.e. in such a way that the respective longitudinal axes (30) of the pinning holes (29) form a parallel plane to the longitudinal axis (24). The pinning holes (29) are radially aligned with the space (28), are arranged radially outwards from this space (28). As in the previous embodiment, the cylinder lock (21) comprises at least one body supplement (31) -in the present embodiment, two body supplements (31)-. The body supplements (31) are placed within the space (28) and are longitudinally interchangeable with the bolt (27). The bolt (27) and the body supplements (31) can be assembled in at least two relative positions, in which the bolt (27) is aligned with a different pinning hole (29). This enables the user or fitter to select which pinning hole (29) is aligned with the bolt (27).

[0020] In the present embodiment, as shown in Figures 6 and 8, the casing unit (23) is made up of at least two casing portions (32) fitted with a respective rib portion (33). To provide the cylinder lock (21) with high resistance, a pry bar or connection bridge (34) is arranged longitudinally and secured to these rib portions (33). This connection bridge (34) is preferably made out of a material that is significantly more resistant than the rest of the cylinder lock (21), such as steel. In this embodiment, the pinning holes (29) are included in the connection bridge (34), which enables optimum resistance of the cylinder lock (21) to be maintained as the pinning holes (29) are located in a highly resistant element and therefore do not weaken the cylinder lock (21) as a whole. In the present embodiment, the body supplements (31) comprise a radial (35) portion that extends radially down to the connection bridge (34), so that the connection bridge (34) is not only seated and attached to the rib portions (33) of the casing portions (32), but is also seated against the radial (35) portions of the body supplements (31), which helps to increase the overall resistance of the cylinder lock (21).

[0021] Figure 10 shows a disassembled or exploded view of the cylinder lock (21) of Figure 6. As can be seen, the core unit (22) comprises two rotors (22a), each of which is fitted with a slot (22b), on their innermost end. A respective ring (22c) is assembled in each slot (22b), which enables the rotor (22a) to be secured in a relative position with respect to a respective casing portion (32) of the casing unit (23). A bolt element (22d), in turn, comprises the bolt (27) of the cylinder lock. Furthermore, a respective rotor supplement (22e) is assembled to each rotor (22a) using a tongue and groove connection; each rotor supplement (22e) is housed within a respective body supplement (31). The rotors (22a), rings (22c), rotor supplements (22e) and bolt element (22d) make up the core unit (22), whereby the one or more elements that connect the rotor supplements (22e) and the bolt element (22d) are not shown here, as they are known by those skilled in the art. In the present embodiment, in order to exchange the position of the bolt element (22d) and the body supplements (31), stud screws (36) are first unscrewed (the stud screws (36) securing the connection bridge (34) to the body unit (23) through holes (37) in the casing portions (32) and corresponding holes (38) in the connection bridge (34)); once the stud screws (36) have

been removed, the connection bridge (34) is separated from the casing portions (32); then, all of the small parts housed between the casing portions (32) can be removed, in other words, the bolt element (22d), body supplements (31) and rotor supplements (22e), among others, are removed; then, the bolt element (22d) is exchanged and placed in the appropriate position, filling the remaining gap with the body supplements (31) -inside which the rotor supplements (22e) are arranged-; finally, the connection bridge (34) is assembled once more, tightening the stud screws (36). In this embodiment, it is not necessary to loosen the rotors (22a) to change the position of the bolt element (22d), hence avoiding the risk of losing any internal pin of the rib portions (33) during handling.

[0022] Figures 11 to 14 show four different views of a third embodiment of the invention, consisting in a cylinder lock (41) that comprises a substantially cylindrical core unit (42) which can rotate with respect to a casing unit (43) about a longitudinal axis (44) of the core unit (42). The casing unit (43) comprises a radially-protruding rib (45), which houses the mechanisms that enable or prevent the core unit (42) from rotating depending on whether the correct key has been inserted into a slot (46) in the core unit (42). The cylinder lock (41) of the present embodiment, unlike the previous ones, comprises a single slot (46), located at one of the ends of the cylinder lock (41). At the opposite end, the core unit (42) ends in a fork or rod (56) whose function is to enable the cylinder lock (41) to be activated either manually or using an actuator (for example, a motor or similar) by this opposite end without the need for a key. The core unit (42) comprises a bolt (47), shown here inside a space (48) of the cylinder lock (41) and therefore in the unlocked position.

[0023] As the previous embodiments, the cylinder lock (41) comprises at least two (three, in particular) threaded pinning holes (49), placed parallel to each other, transversally crossing the cylinder lock (41) in a perpendicular direction to the longitudinal axis (44), and organised successively in parallel to this longitudinal axis (44), i.e. in such a way that the respective longitudinal axes (50) of the pinning holes (49) form a parallel plane to the longitudinal axis (44). Furthermore, the pinning holes (49) are radially aligned with the space (48), and arranged radially outward from the space (48). As in the previous embodiments, the cylinder lock (41) further comprises a body supplement (51) -in the present embodiment, there are two body supplements (51)-. The body supplements (51) are arranged within the space (48) and are longitudinally exchangeable with the bolt (47). The bolt (47) and the body supplements (51) can be assembled in at least two relative positions, in which the bolt (47) may be aligned with a different pinning hole (49). As in the previous embodiments, the casing unit (43) is made up of at least two casing portions (52) fitted with a respective rib portion (53). A pry bar or connection bridge (54) is arranged longitudinally and is secured to these rib portions (53). The pinning holes (49) are comprised in the connection bridge (54), and the connection bridge (54) is seated on radial portions (55) respectively comprised in the body supplements (51).

[0024] Figure 15 shows a disassembled or exploded view of the cylinder lock (41) of Figure 11. As can be seen, the core unit (42) comprises two rotors (42a); the rotor (42a) located on the left in the figure is fitted with a slot (42b) at the innermost end, within which a ring (42c) is assembled, which enables the rotor (42a) to be secured relatively to the corresponding casing portion (52) of the casing unit (43). A bolt element (42d) comprises the bolt (47) of the cylinder lock. The rotors (42a), ring (42c) and bolt element (42d) make up the core unit (42), whereby the one or more elements that connect the rotors (42a) and the bolt element (42d) are not shown here, as they are known by those skilled in the art. In the present embodiment, in order to exchange the position of the bolt element (42d) and the body supplements (51), first of all a stud screw (57) is loosened and the rotor (42a) comprising the rod (56) is removed; instead of completely removing the stud screw (57), it is sufficient to unthread the stud screw (57) only until the bolt element (42d) and the body supplements (51) are freed; then the bolt element (42d) can be exchanged and placed in the desired position, filling the remaining gap with the body supplements (51); finally, the rotor (42a) comprising the rod (56) is assembled again and the stud screw (57) is tightened. The present embodiment enables an easy exchange without any risk of losing any internal small part of the cylinder (brackets, springs etc.).

Claims

1. Cylinder lock (1; 21; 41), comprising a substantially cylindrical core unit (2; 22; 42) formed around a longitudinal axis (4; 24; 44) and arranged rotationally within a casing unit (3; 23; 43), wherein the casing unit (3; 23; 43) comprises a rib (5; 25; 45) that protrudes radially, wherein the core unit (2; 22; 42) comprises a bolt (7; 27; 47) that protrudes radially from a remaining part of the core unit (2; 22; 42), wherein depending on the rotational position of the core unit (2; 22; 42) with respect to the casing unit (3; 23; 43) the bolt (7; 27; 47) can be housed in a space (8; 28; 48) of the cylinder lock (1; 21; 41) or protrude from the cylinder lock (1; 21; 41), wherein the cylinder lock (1; 21; 41) is **characterised in that** it comprises:

    - at least two threaded pinning holes (9; 29; 49) arranged parallel to each other, transversally crossing the cylinder lock (1; 21; 41) in a perpendicular direction to the longitudinal axis (4; 24; 44), arranged in a row parallel to the longitudinal axis (4; 24; 44), and positioned radially aligned with and outward from the space (8; 28; 48) of the bolt (7; 27; 47) housing; and
    - at least one supplement, placed within the

space (8; 28; 48) and longitudinally interchangeable with the bolt (7; 27; 47) so that the bolt (7; 27; 47) and the at least one supplement can be assembled in at least two relative positions, whereby the bolt (7; 27; 47) is radially aligned with a different pinning hole (9; 29; 49) depending on the relative position of the bolt (7; 27; 47) and the at least one supplement.

2. Cylinder lock (1; 21; 41), according to claim 1, **characterised in that** the supplement is a body supplement (11; 31; 51), which is not rotatable jointly with the core unit (2; 22; 42).

3. Cylinder lock (1; 21; 41), according to claim 1, **characterised in that** all of the pinning holes (9; 29; 49) have an identical thread configuration.

4. Cylinder lock (1), according to claim 1, **characterised in that** the pinning holes (9) are comprised in the rib (5).

5. Cylinder lock (21; 41), according to claim 1, **characterised in that** the casing unit (23; 43) is made up of at least two casing portions (32; 52) fitted with a respective rib portion (33; 53), wherein the cylinder lock (21; 41) further comprises a longitudinal connection bridge (34; 54) secured to the rib portions (33; 53), wherein the pinning holes (29; 49) are included in the connection bridge (34; 54).

6. Cylinder lock (21; 41), according to claim **¡Error!** No se encuentra el origen de **la referencia.**, **characterised in that** the supplement is a body supplement (31; 51), which is not rotatable jointly with the core unit (22; 42), and the connection bridge (34; 54) is seated on a radial portion (35; 55) included in a body supplement (31; 51).

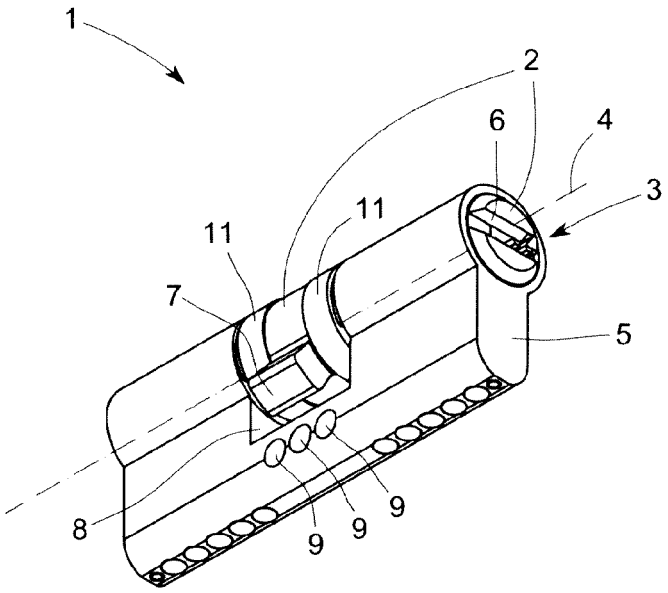


FIG.1

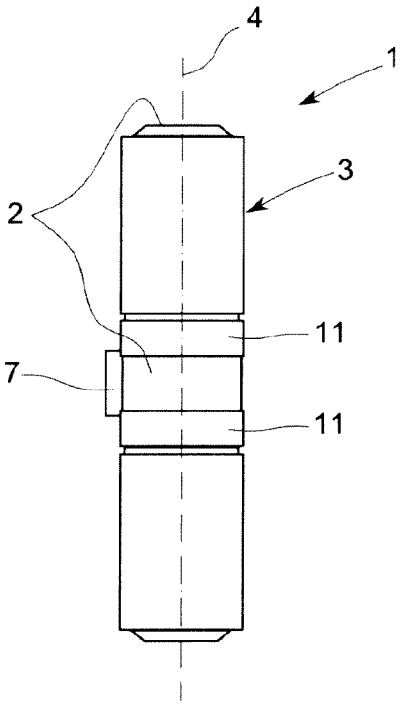


FIG.2

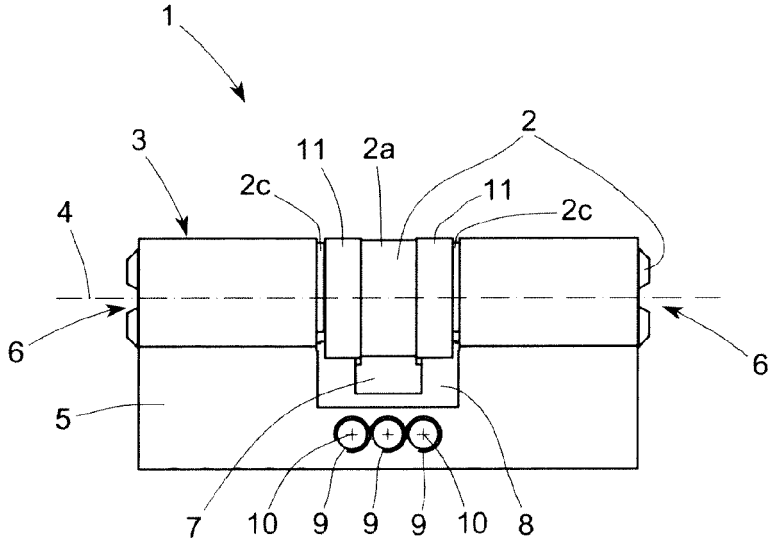


FIG.3

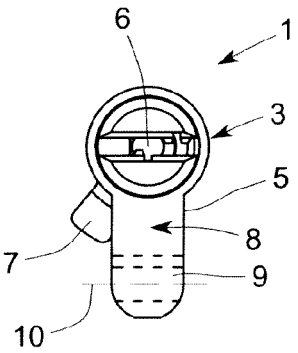


FIG.4

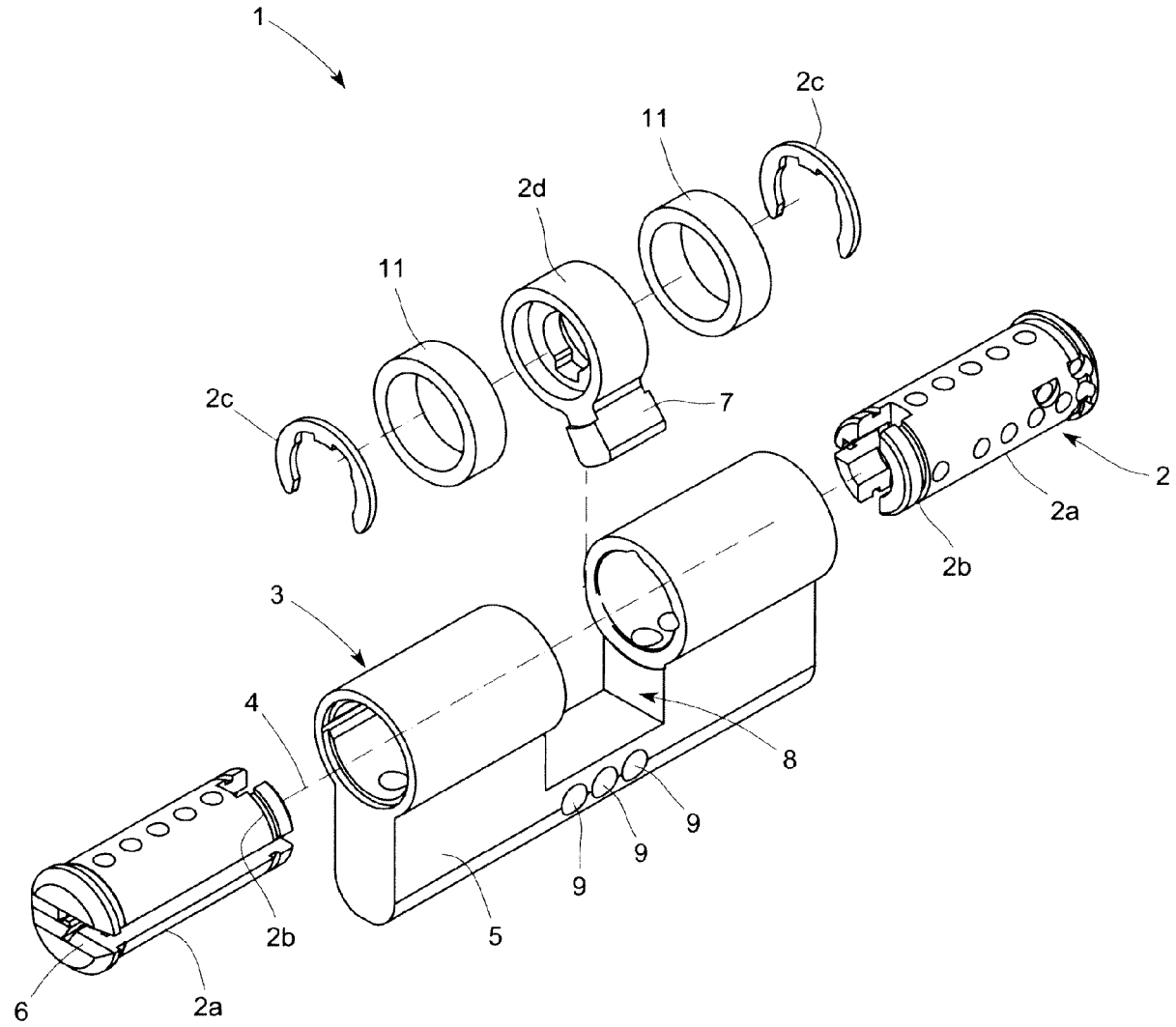


FIG.5

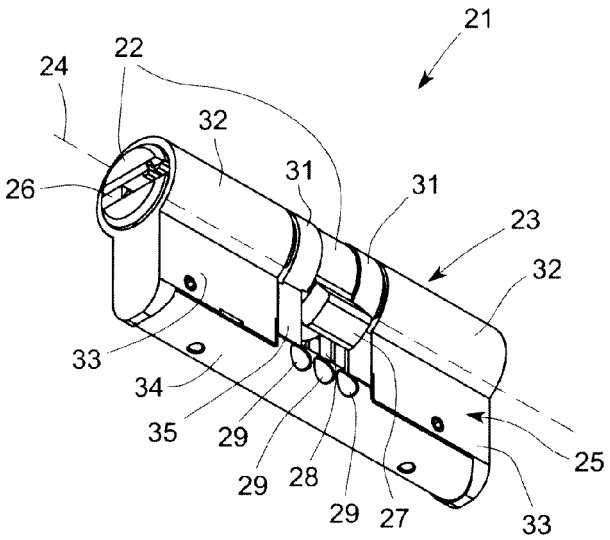


FIG.6

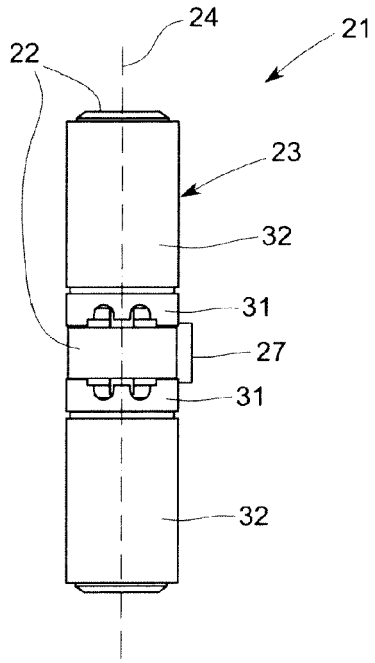


FIG.7

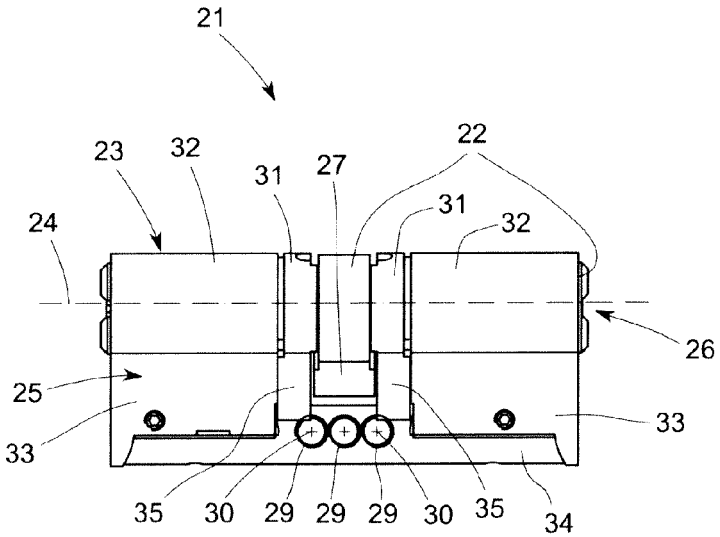


FIG.8

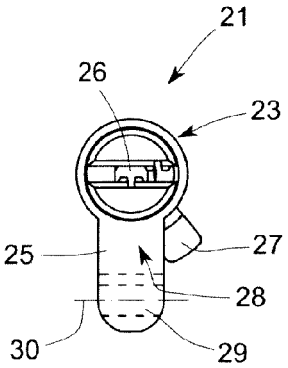
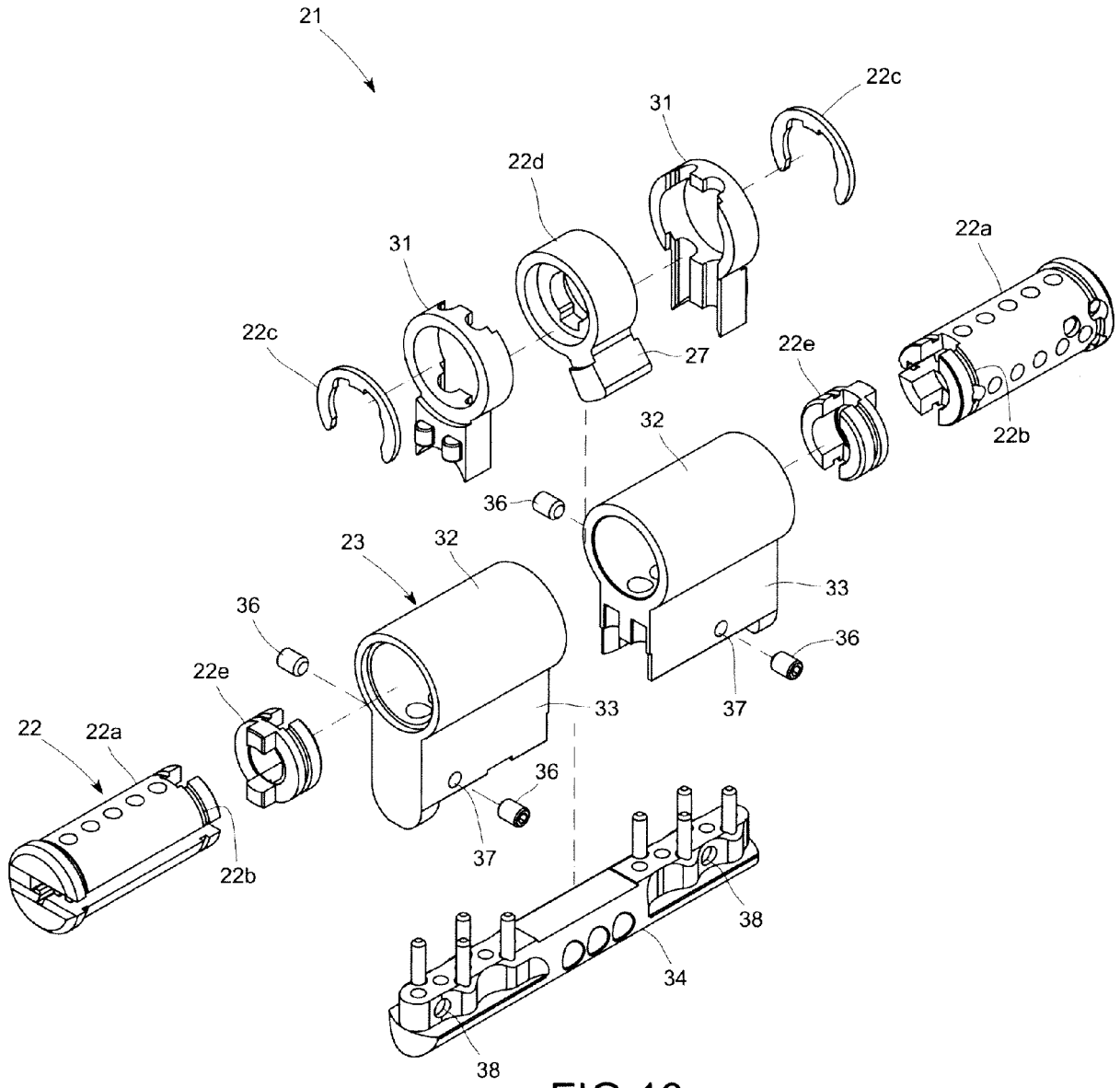


FIG.9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22
22a
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22b
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34
38

FIG.10

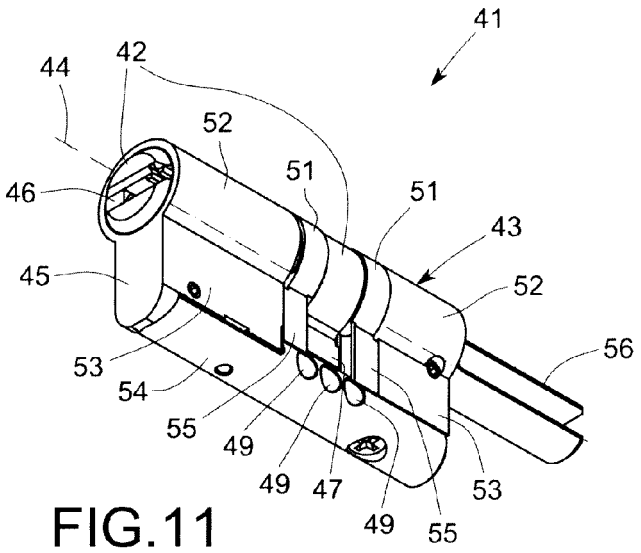

FIG.11

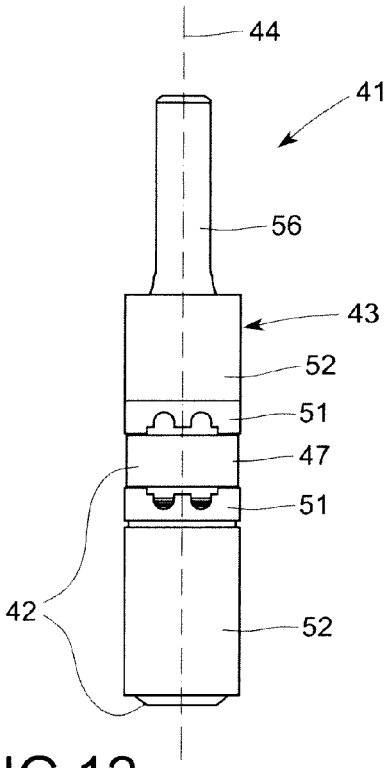

FIG.12

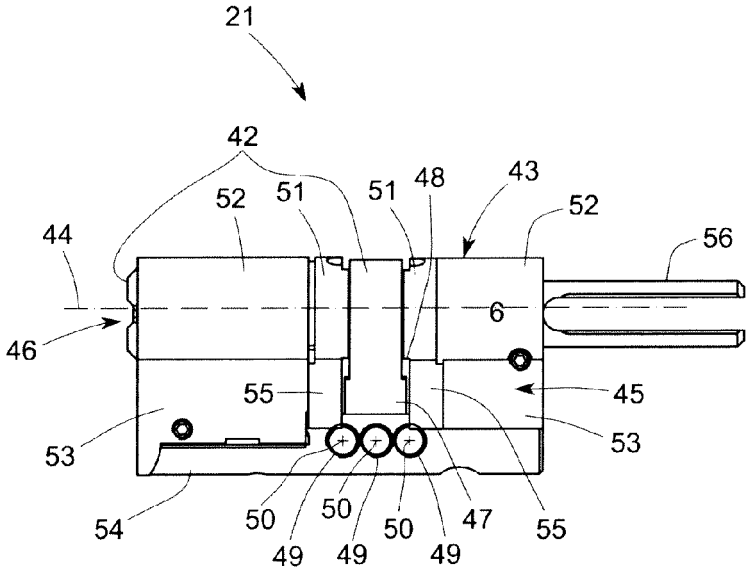

FIG.13

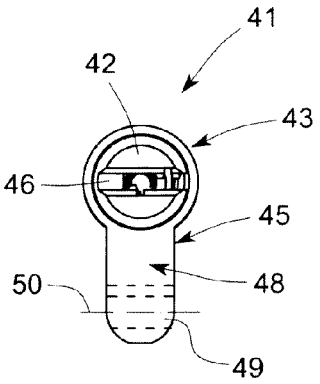

FIG.14

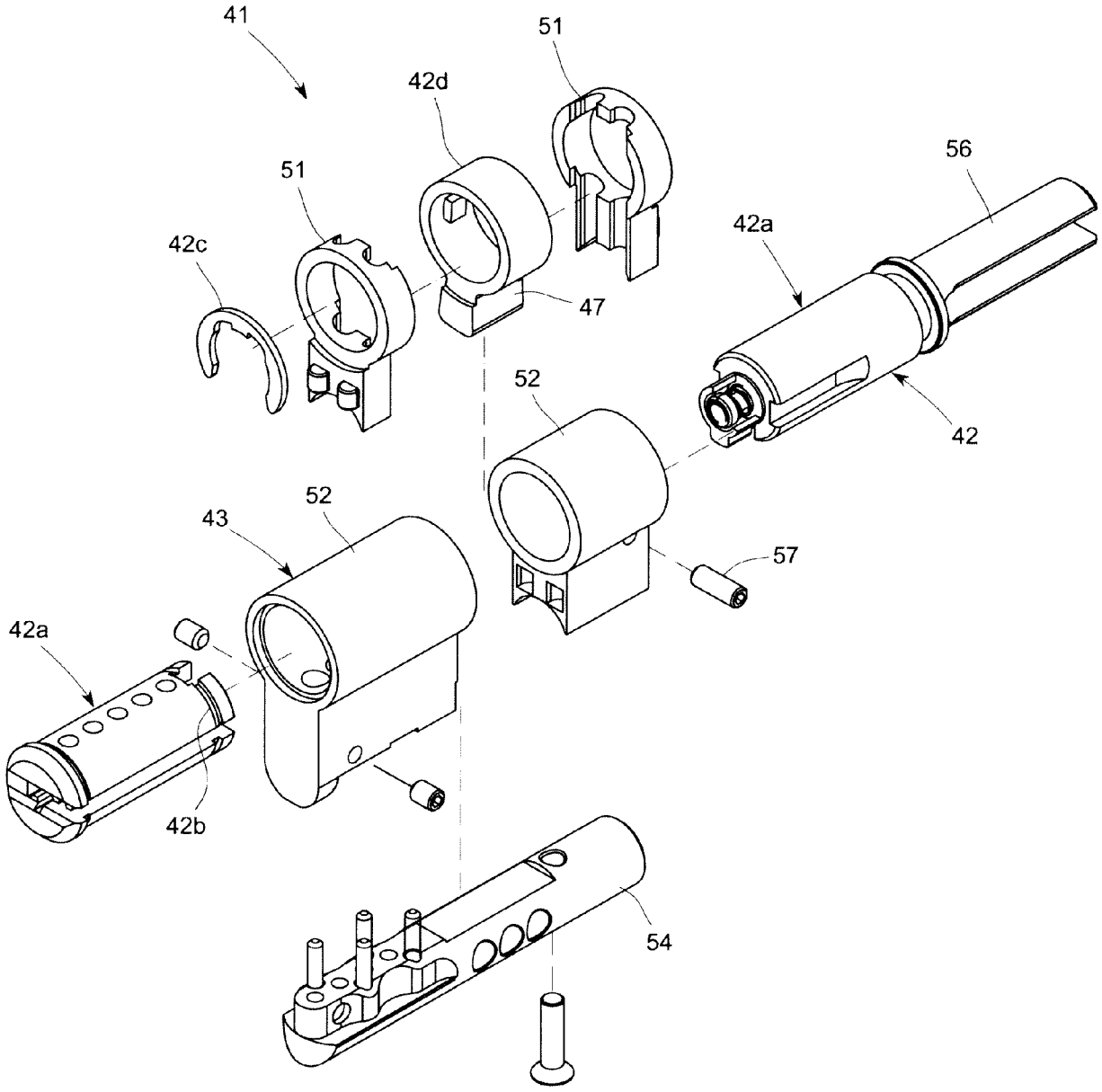

FIG.15

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EUROPEAN SEARCH REPORT

Application Number
EP 15 38 0046

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Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
A	US 3 293 892 A (FALK MYRON P) 27 December 1966 (1966-12-27) * column 1 - column 3; figures 1-4 * -----	1-6	INV. E05B9/04
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TECHNICAL FIELDS SEARCHED (IPC)

E05B

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
The Hague	11 March 2016	Ansel, Yannick

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