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(54) Security device for a European cylinder lock, particularly of modular type

(57) The present invention refers to a security device connectable to a European cylinder lock. The device comprises a security escutcheon (105; 205) that includes an opening (110; 210) suitable to allow the passage of the cylinder (101; 201; 301) and a security complementary body (106; 206; 306) suitable to be made integral with the cylinder (101; 201; 301). The security complementary body (106; 206; 306) is couplable to the security escutcheon (105; 205), jointly with the cylinder (101; 201; 301), in a recessed housing (107; 207) having a shape complementary to the security complementary body (106; 206; 306).

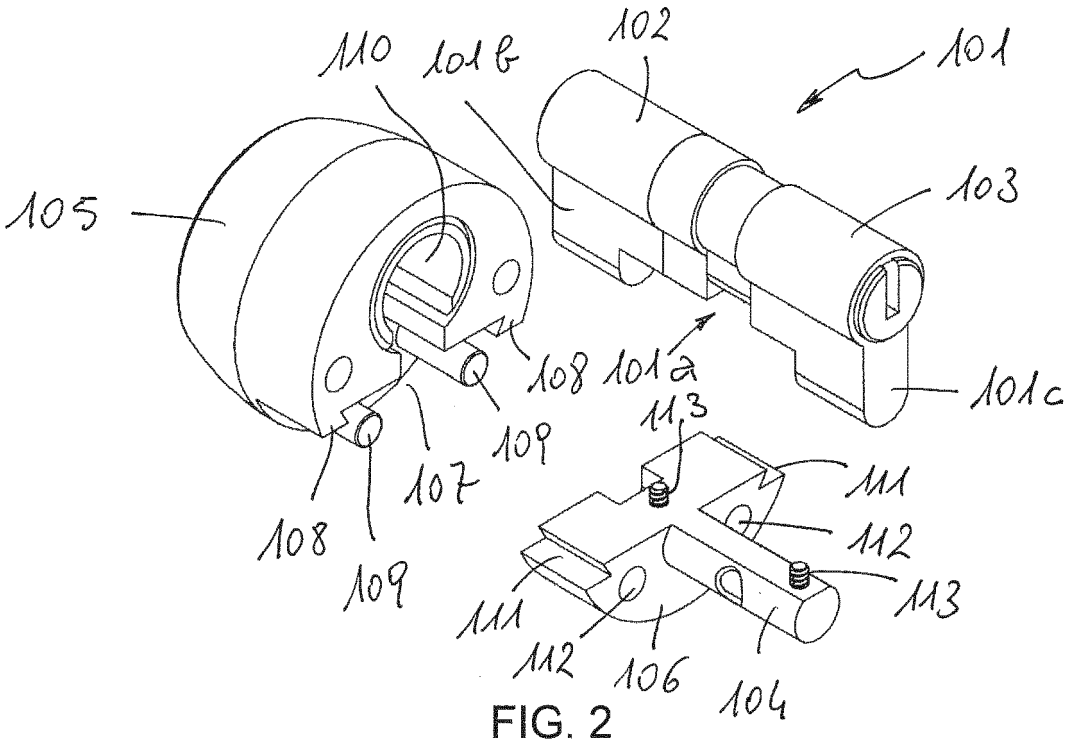

FIG. 2

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Description

TECHNICAL FIELD OF INVENTION

[0001] The present invention refers to a security device couplable to European cylinder locks, in particular of modular type, for the purpose of preventing the forced wrenching of the cylinder if it subjected to acts of tampering, break-in or vandalism.

PRIOR ART

[0002] The European cylinder locks are the natural evolution of the double-sided locks. Compared to the latter, the European cylinder locks have the advantage of working with a key of extremely small size and of being easy to replace, in addition to offering a higher degree of security against acts of tampering, break-in or vandalism.

[0003] In fact, the European-type cylinders are generally provided with anti-probing pins, a body and rotor with anti-drilling protection and anti-ripping central bar.

[0004] In the scope of cylinders of European type are known the cylinders of modular type, made up of a plurality of parts that can be assembled to each other so as to be adapted to the thickness of the door on which the lock is to be installed. By way of example, figures 1 and 1 a illustrate a modular cylinder 1 comprising a first module 2 and a second module 3 mutually linked by a connecting bar 4.

[0005] Despite the security devices introduced, there remain some destructive techniques aimed at putting into effect attempts to externally attack and tamper with the cylinder lock, including the forceful extraction of the cylinder and the cloning/copying technique known as "pongata".

[0006] This last technique makes it possible to break the cylinder in two by means of a tool consisting of a handle and a vice in the shape of the cylinder; the vice is tightened on the projecting part of the cylinder and, by prying with the handle, the cylinder is broken in two pieces.

[0007] To protect the cylinder from this type of breaking-in, the so-called "Defender" or "armour" devices have been introduced, consisting essentially of a cylindrical escutcheon plate in the form of a half shell, fastened by screws to the lock, which covers the projecting part of the cylinder, leaving accessible only the slit or keyhole into which the key is inserted.

[0008] To avoid the possibility of detaching the armour by inserting and forcing by prying an Innocenti Tube to shear the fastening screws, armours have been made in the shape of a truncated cone or a hemisphere, or in a shape suitable to prevent the Innocenti Tube from gripping the armours.

[0009] Although they guarantee an appropriate degree of security against the main tampering or break-in attempts, the security devices described above are not capable of withstanding external attacks in which a wrenching force is applied to the armour such as to shear the screws that fasten the armour to the lock; in this manner, the cylinder breaks and the door can be easily opened.

SUMMARY OF THE INVENTION

[0010] The main objective of the present invention is thus to devise a security device for European cylinder locks, in particular of modular type for reinforced doors, capable of overcoming the drawbacks of the prior art.

[0011] In the scope of the above objective, a purpose of the present invention is to design a security device capable of also withstanding, in addition to the various external attacks described above, break-in attempts made through the application of a torsional or flexural force or a combined flexo-torsional force on the device.

[0012] Another purpose of the present invention is to provide a security device capable of guaranteeing an improved level of security compared to the prior art devices.

[0013] One not least important purpose is to realize a security device for European cylinder locks, in particular of the modular type, that achieves the above-mentioned objective and purposes at competitive costs and that can be obtained with the usual known machinery, plants and equipment.

[0014] The above objective and purposes, and others that will become more evident in the description which follows, are achieved by a security device for European cylinder locks as defined in claim 1.

BRIEF DESCRIPTION OF THE FIGURES

[0015] Further characteristics and the advantages of the present invention will become more evident form the following description of a particular, but not exclusive, embodiment illustrated by way of non-limiting example with reference to the enclosed figures, wherein:

- figures 1 and 1 a illustrate a European modular cylinder of known type;
- figure 2 illustrates, in a rear perspective, an exploded view of a security device for European cylinder locks, in particular of modular type, according to the present invention;
- figure 3 is an exploded view partially in cross section of the device of figure 1 in a front perspective view;
- figure 4 shows a component of the device of the preceding figures mounted on the European modular cylinder;
- figure 5 illustrates, in a perspective view partially in cross section, the assembly of the security device applied to a European modular cylinder;
- figure 6 illustrates a perspective front exploded view of a second embodiment of one part of the security device according to the present invention;
- figure 7 shows the part of the device of the previous figure in the assembled state;

- figure 8 illustrates, in a rear perspective exploded view, the part of the device of the preceding figures before it is coupled to the remaining part of the device;
- figure 9 illustrates, in a front perspective view partially in cross section, the assembly of the security device applied to a European modular cylinder lock;
- figure 10 illustrates, in a front perspective exploded view, a third embodiment of one part of the security device according to the present invention;
- figure 11 illustrates the part of the device of the preceding figure in the assembled state;
- figure 12 illustrates, in a front perspective exploded view, the security device of figures 6 to 9 provided with a further and advantageous component element;
- figure 13 illustrates, in a front perspective view partially in cross section, the assembly of the security device of figure 12 applied to a European modular cylinder lock;
- figure 14 illustrates, in a cross-sectional view, the assembly of the security device of figures 12 and 13 applied to a lock, and
- figure 15 illustrates, in a front perspective exploded view, the security device of figures 10 and 11 provided with a further and advantageous component device.

DETAILED DESCRIPTION OF THE INVENTION

[0016] With reference to figures 2 to 5, number 101 indicates a modular European cylinder lock comprising a first module 102 and a second module 103 which, once joined to each other, form underneath them a central portion 101 a that is recessed with respect to the end portions 101 b and 101 c to receive a connecting bar 104.

[0017] A modular European cylinder lock 101 is couplable to a security device according to the present invention, which hereafter will also be referred to as "armour", comprising a security escutcheon 105 and a security complementary body 106 cooperating with the escutcheon 105.

[0018] The security escutcheon 105, essentially of cylindrical shape and/or shaped as a truncated cone or in a shape suitable to prevent tampering attempts, is made in a single piece and has a recessed blind housing 107 provided, on its sides, with first guides 108, preferably of dovetail shape. The housing 107 is oriented toward the internal part of the escutcheon 105 while it is closed toward the external part, that is, toward the front part of the escutcheon 105 that protrudes, when in use, from the reinforced door and is accessible from the outside of the door. In the embodiment illustrated by way of example in the enclosed figures, the housing 107 has a half-moon shape. Advantageously, from the bottom of the housing 107 protrude, longitudinally to the escutcheon 105, centering means 109, such as a pair of pins.

[0019] The security escutcheon 105 is also provided with a through central opening 110, communicating with the housing 107 within the body of the escutcheon 105, to allow the insertion of the cylinder 101.

[0020] The security complementary body 106 is associable or associated, preferably by machining in one piece, to the end of the connecting bar 104 facing, when in use, the security escutcheon 105.

[0021] The complementary body 106 consists essentially of a head that is enlarged with respect to the connecting bar 104 to which the body 106 is associated or associable, and has a shape that is complementary to the recessed housing 107 of the escutcheon 105. On the sides of the complementary body 106 are also provided second guides 111 conjugately shaped to said first guides 108 so as to be able to couple with the housing 107.

[0022] The complementary body 106 is also advantageously provided with a first pair of holes 112 designed to engage, when the complementary body 106 is inserted into the housing 107 of the escutcheon 105, with the corresponding centering means 109 protruding from the latter.

[0023] In the embodiment illustrated by way of example in the enclosed figures, the complementary body 106 has a half-moon shape, complementary to the shape of the housing 107, so as to complete and cooperate with the armour when the complementary body 106 is inserted into the escutcheon 105 through the engagement of the first guides 108 with the second guides 111, and then by engaging the centering means 109 with the holes 112, as will be better explained herein.

[0024] The security complementary body 106 is made integral with the cylinder 101, jointly with the connecting bar 104 at the recessed central portion 101 a through suitable fastening means 113, such as for example screws, pins or other fastening devices; in this manner, the complementary body 106 is made to form a single piece with the cylinder 101 (arrow A, figure 3).

[0025] Once the complementary body 106 is joined to the cylinder 101, the assembly thus formed is coupled to the security escutcheon 105 by inserting the module 102 of the cylinder 101 inside the central opening 110 and the security complementary body 106 into the blind housing 107 through the engagement of the first guides 108 with the second guides 111, and by engaging the centering means 109 with the holes 112 (arrow B, figure 3).

[0026] This procedure produces an extremely rigid structure capable or resisting all tampering attempts, including forcing by wrenching or bending or a combined flexotorsional strain on the armour to break the cylinder, by effect of the mechanical junction between the security escutcheon and the cylinder achieved through the complementary body, which makes it possible to substantially form a single, mechanically resistant body. In other words, the resistant structure of the lock, currently provided only by the screws fastening the security escutcheon to the lock itself, is integrated and strengthened by the solid structure of the complementary body that solidly

joins the escutcheon and the cylinder in an integral unit.

[0027] In fact, the solid joining between the complementary body 106 and the cylinder 101, combined with the guided mounting of the assembly formed by the body 106 and the cylinder 101 onto the security escutcheon 105, is capable of exercising a high resistance to the twisting and/or bending moment applied on the armour, a force that is created principally by effect of the contact pressure between one of the first guides 108 and the respective one of the second guides 111, depending on the direction of the torque applied thereon.

[0028] From the above, it is therefore evident how the present invention achieves the purposes and advantages initially foreseen: in fact, it has been devised a security device for European cylinder locks, in particular of the modular type for reinforced doors, capable of withstanding attempts at breaking in through the application of a twisting or bending, or a combined flexing-twisting force, on the device itself, in addition to the other types of possible external attacks against a lock, guaranteeing in this manner a higher level of security compared with the prior art devices.

[0029] Naturally, the present invention is susceptible of numerous applications, modifications or variants without departing from the scope of patent protection as defined by the independent claim 1.

[0030] For example, with reference to figures 6 to 9, a second embodiment of the security device according to the present invention is shown, in which numeral 201 indicates a European modular cylinder, comprising a first module 202, a second module 203 and a connecting bar 204, couplable to a security device comprising a security escutcheon 205 and a security complementary body 206 cooperating with the escutcheon 205.

[0031] The security complementary body 206, formed with a head wider than the connecting bar 204 and having an essentially cylindrical or polygonal shape, is associated or associable to the connecting bar 204 or the cylinder 201 and is advantageously provided on the sides with a first pair of holes 212; once the connecting bar 204 is joined, at one end, to the first module 202 and, at the opposite end, to the second module 203, to assemble the cylinder 201, the complementary body 206 forms an integral piece with the cylinder 201.

[0032] Advantageously, the complementary body 206 can be made integral with the connecting bar 204, thus increasing the rigidity of the structure and therefore its capacity to withstand break-in attempts.

[0033] The security escutcheon 205, essentially of cylindrical shape and/or tapered in the shape of a truncated cone or in a shape suitable to prevent tampering attempts, is made in a single piece and has a recessed blind housing 207 having a shape complementary to the complementary body 206, on the sides of which are advantageously provided a second pair of holes 208. The housing 207 is oriented toward the internal part of the escutcheon 205 while it is closed toward the external part, that is, toward the front part of the escutcheon 205 that protrudes, when in use, from the reinforced door and is accessible from the outside of the door.

[0034] The security escutcheon 205 is also provided with a through central opening 210, communicating with the housing 207 within the body of the escutcheon 205, to allow the insertion of the cylinder 201.

[0035] Once the cylinder 201 is assembled with the complementary body 206, the assembly thus formed is coupled to the security escutcheon 205 by inserting the cylinder 201 inside the central opening 210 and the security complementary body 206 in the blind housing 207, and then engaging the first holes 212 and of the second holes 208 by means of respective centering means 209, such as pins or dowels.

[0036] Naturally, the centering means 209 can be formed integral with the escutcheon 205 and protrude from the housing 207, as described above for the first embodiment or, vice versa, they can be formed in a single piece and protrude from the complementary body 206.

[0037] In figures 10 and 11 is shown a third embodiment of the security device according to the present invention, in which the modular European cylinder 301 comprises a first module 302 and a second module 303 having respective slots 302a and 303a to receive a connecting bar 304 to which is associated, by coupling or formed in a single piece, a security complementary body 306 having an essentially cylindrical or polygonal shape to form a head that is wider than the connecting bar 304, which may be provided on the sides with a first pair of holes 312; once the connecting bar 304 is connected to the first module 302 and to the second module 303 at the slots 302a and 303a to assemble the cylinder 301, the complementary body 306 forms a piece integral with the cylinder 301.

[0038] The assembly thus formed is then coupled to a security escutcheon similar to the one in the second embodiment illustrated in figure 8 and indicated with reference numeral 205; the coupling methods, as well as the reference numbers, are the same as described in relation to the second embodiment.

[0039] An added advantage provided by the second and third embodiments described above lies in the fact that the security device is applicable to European cylinders of modular type already existing on the market, by simply applying the complementary body 206 or 306 to the connecting bar 204 or 304.

[0040] According to an advantageous characteristic of the present invention, a security device according to any one of the embodiments described above may also comprise a reinforcing body 213, itself also couplable to said cylinder 101, 201, 301 at the opposite side of the lock with respect to the one to which said security escutcheon 105, 205 is applied so as to avoid the "ripping out" of the cylinder, that is, the axial extraction of the same from the lock.

[0041] In the following description, said reinforcing body 213 will be described with reference to a security device in accordance with the second embodiment of the

invention; clearly, a person skilled in the field will have no problem transferring such teachings also to a security device in accordance with the other embodiments of the present invention.

[0042] As can be seen in figures 12, 13 and 14, said reinforcing body 213, essentially cylindrical in shape, has a central opening 214 to allow the insertion of said cylinder 201; in particular, as shown in the figures, if said security escutcheon 205 is associated to said first module 202, said reinforcing body 213 is coupled to said second module 203 of the cylinder 201.

[0043] The connection between said reinforcing body 213 and said cylinder 201 is achieved through a coupling means 216, advantageously formed by a screw having a threaded shaft 216a, that can be inserted into a through hole 218 provided on said reinforcing body 213 and suitable to cooperate with a blind axial opening 204b, threaded internally, formed on the connecting bar 204 of said cylinder 201, and in particular on an extension portion 204a associated or associable to it, having a projecting end with respect to the face of said second module 203.

[0044] Advantageously, said coupling screw 216 also comprises a countersunk head 216b that, when the stem 216a is threaded into the axial opening 204b, engages the through hole 218, and presses against the external surface of said reinforcing body 213; in this manner, the reinforcing body 213 is solidly joined to the cylinder 201 and prevents the latter from being extracted axially from the lock by acting from the side of the security escutcheon 205 during a break-in attempt.

[0045] If necessary, for a greater degree of security, said reinforcing body 213 may include a pair of through holes 215, arranged preferably on the sides of said opening 214, through which additional coupling means 217 are inserted into the lock to anchor themselves in a corresponding pair of holes 215a made on said security escutcheon 205 (figure 8).

[0046] Figure 15 illustrates a security device according to the third embodiment of the invention comprising a reinforcing body 213 associable to the cylinder 301 in a similar manner as described in relation to the second embodiment.

[0047] Naturally, the shape of the housing for coupling the complementary body with the cylinder, although it maintains the described characteristics, may vary so as to adapt to the different types of European cylinders present on the market.

[0048] Moreover, the materials and equipment used to carry out the present invention, as well as the shapes and dimensions of the individual components, may be the most suitable to meet the specific requirements.

Claims

1. Security device adapted to be coupled to a European cylinder lock, said device comprising a security escutcheon (105; 205) including an opening (110; 210) adapted to allow insertion of said cylinder lock (101; 201; 301), **characterized in that** it further comprises a security complementary body (106; 206; 306) adapted to be rendered integral with said cylinder lock (101; 201; 301), said security complementary body (106; 206; 306) being couplable, jointly with said cylinder lock (101; 201; 301), to said security escutcheon (105; 205) at a recessed housing (107; 207) having a complementary shape in respect to said security complementary body (106; 206; 306).

2. Security device as in claim 1, wherein said cylinder lock (101; 201; 301) comprises at least a first module (102; 202; 302) and a second module (103; 203; 303) mutually linked by a connecting bar (104; 204; 304), said security complementary body (106; 206; 306) being associable or associated to said connecting bar (104; 204; 304) such that, when said connecting bar (104; 204; 304) is joined to said first module (102; 202; 302) and said second module (103; 203; 303) to form said cylinder lock (101; 201; 301), said complementary body (106; 206; 306) becomes integral with said cylinder lock (101; 201; 301).

3. Security device as in claim 2, wherein the assembly resulting from joining said complementary body (106; 206; 306) to said cylinder lock (101; 201; 301) is couplable to said security escutcheon (105; 205) by inserting said first module (102; 202; 302) through said opening (110; 210) and said complementary body (106; 206; 306) into said housing (107; 207).

4. Security device as in claim 2, wherein said complementary body (106; 206; 306) is made integral in one piece with said connecting bar (104; 204; 304).

5. Security device as in claim 1, wherein said opening (110; 210) is communicating with said housing (107; 207).

6. Security device as in any of the preceding claims, wherein the sides of said recessed housing (107) are provided with first guides (108).

7. Security device as in claim 6, wherein the sides of said complementary body (106) are provided with second guides (111) conjugately-shaped to said first guides (108).

8. Security device as in claim 7, wherein insertion of said complementary body (106) into said housing (107) is carried out by engaging said first guides (108) with said second guides (111).

9. Security device as in any of the preceding claims, wherein centering means (109) are provided between said security escutcheon (105) and said complementary body (106) to insert said complementary

body (106) into said housing (107).

10. Security device as in any of the preceding claims, wherein said complementary body (106; 206; 306) mechanically joins said security escutcheon (105; 205) to said cylinder lock (101; 201; 301) so as to form a solid resistant assembly.

11. Security device as in claim 1, further comprising a reinforcing body (213) couplable to said cylinder (101; 201; 301) at the opposite side of said lock with respect to the side to which said security escutcheon (105; 205) is applied through a coupling means (216) to prevent the axial extraction of said cylinder (101; 201; 301) from the side of said security escutcheon (105; 205).

12. Security device as in claim 11, wherein said cylinder (101; 201; 301) comprises at least a first module (102; 202; 302) and a second module (103; 203; 303) mutually linked by a connecting bar (104; 204; 304), said reinforcing body (213) being associable to said connecting bar (104; 204; 304) so that, when said connecting bar (104; 204; 304) is joined to said first module (102; 202; 302) and second module (103; 202; 303) to form said cylinder (101; 201; 301), said reinforcing body (213) forms a solid unit with said cylinder (101; 201; 301).

13. Security device as in claim 12, wherein an extension portion (204a) is associable or associated to said connecting bar (104; 204; 304) and has an end protruding with respect to the face of the second module (203) of said cylinder (201), said extension portion (204a) being provided with a blind axial opening (204b) suitable to cooperate with said coupling means (216).

14. Security device as in claim 13, wherein said coupling means (216) is formed by a screw comprising a threaded shaft (216a) suitable to cooperate with said blind axial opening (204b) present on said extension portion (204a), said screw further comprising a countersunk head (216b) suitable to engage a through hole (218) present on said reinforcing body (213).

15. Security device as in any of the claims from 11 to 14, wherein said reinforcing body (213) comprises a pair of through holes (215) through which coupling means (217) are inserted into the lock to anchor themselves in a corresponding pair of holes (215a) present on said security escutcheon (105; 205).

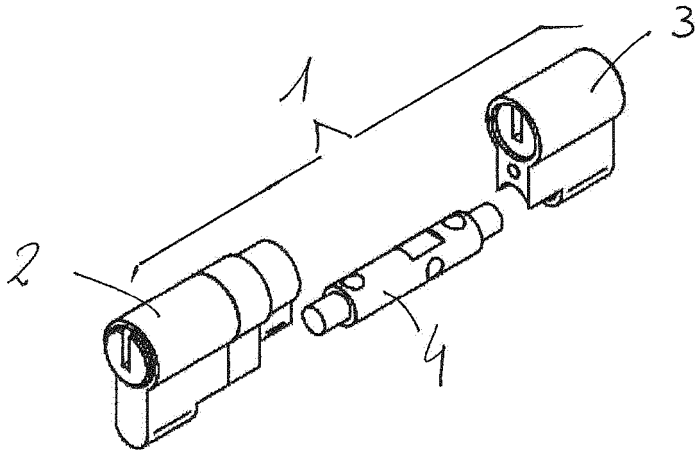


FIG. 1

PRIOR ART

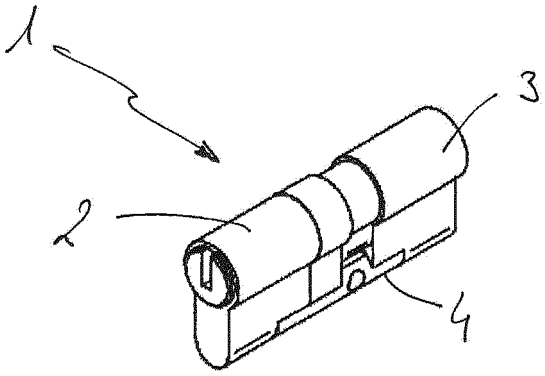


FIG. 1A

PRIOR ART

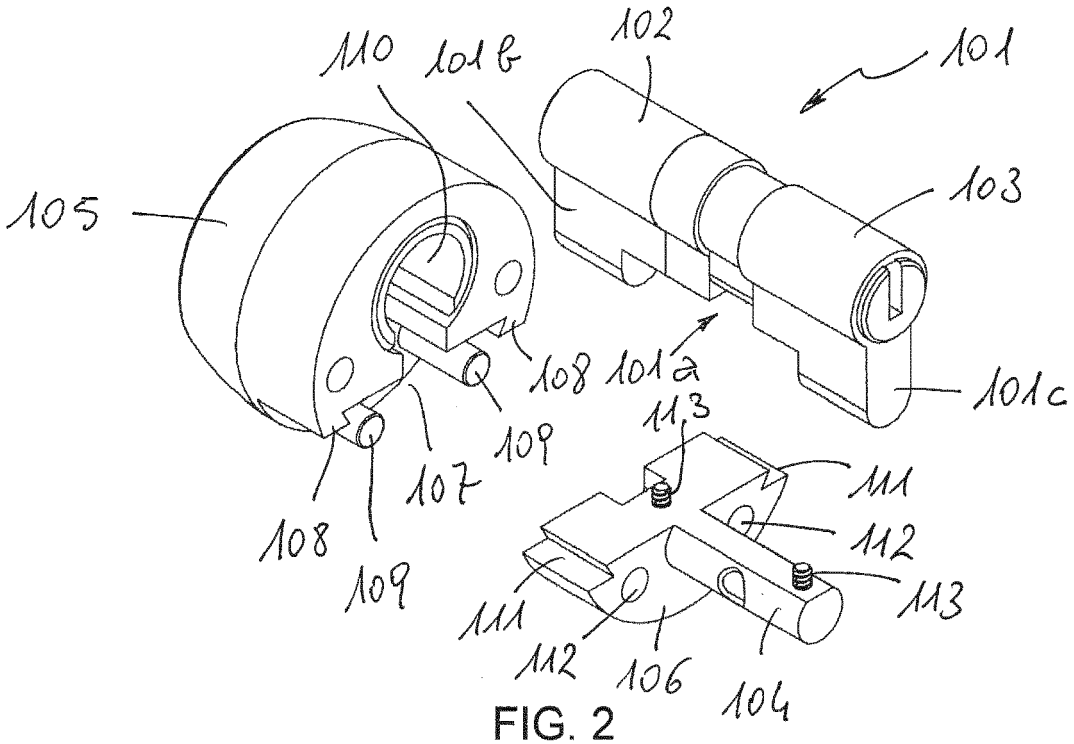
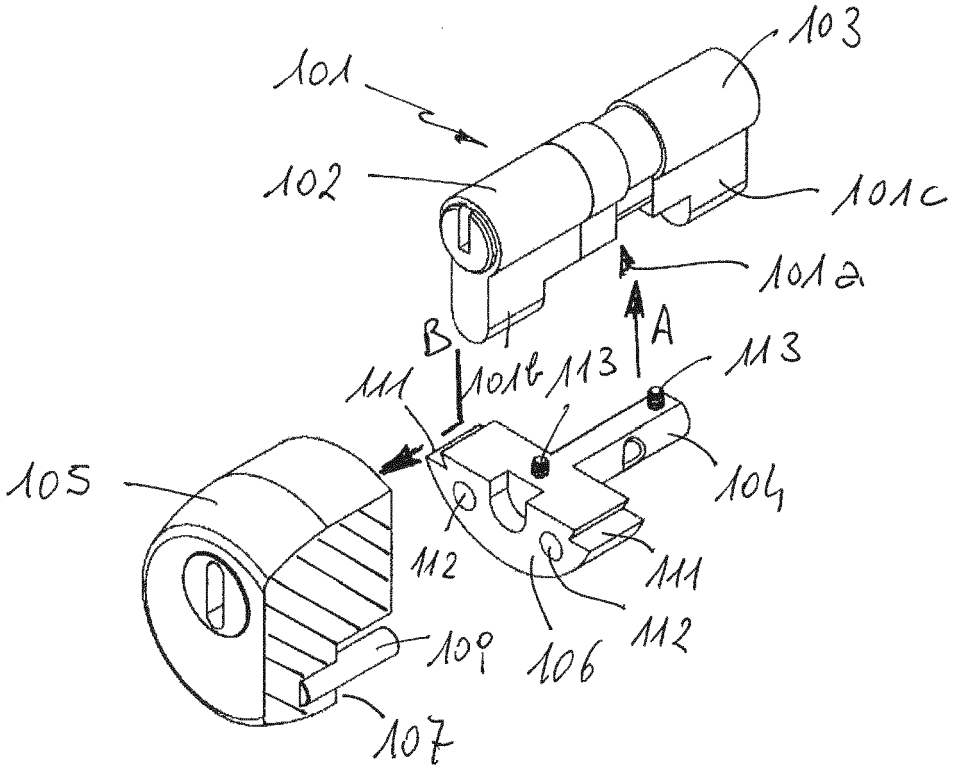

110
101b
102
101
105
103
108
101a
101c
109
107
113
111
108
112
109
113
111
112
106
104

FIG. 2


103
101
102
101c
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B
A
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104
112
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109
106
107

FIG. 3

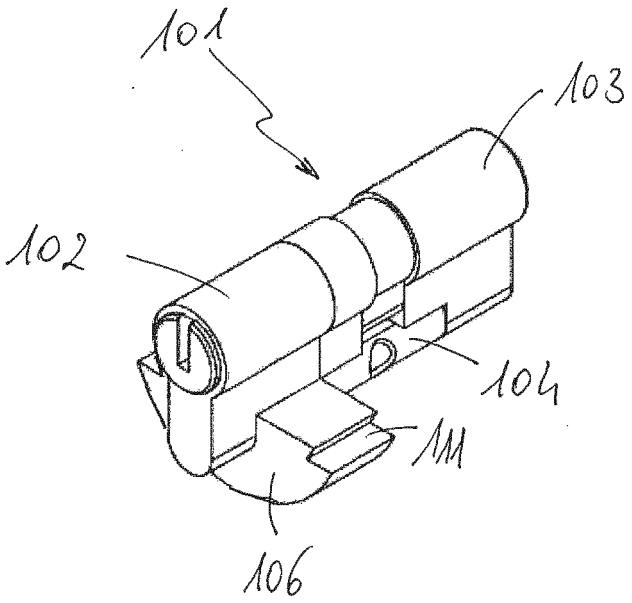

101
103
102
104
111
106

FIG. 4

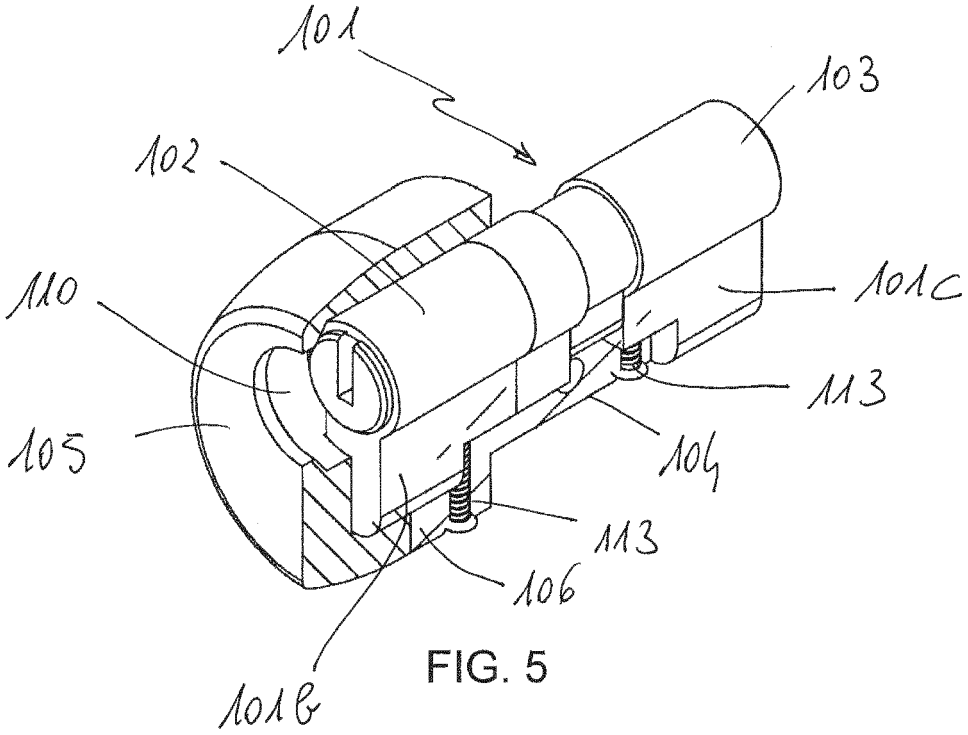

101
103
102
101C
110
113
105
104
113
106
101B

FIG. 5

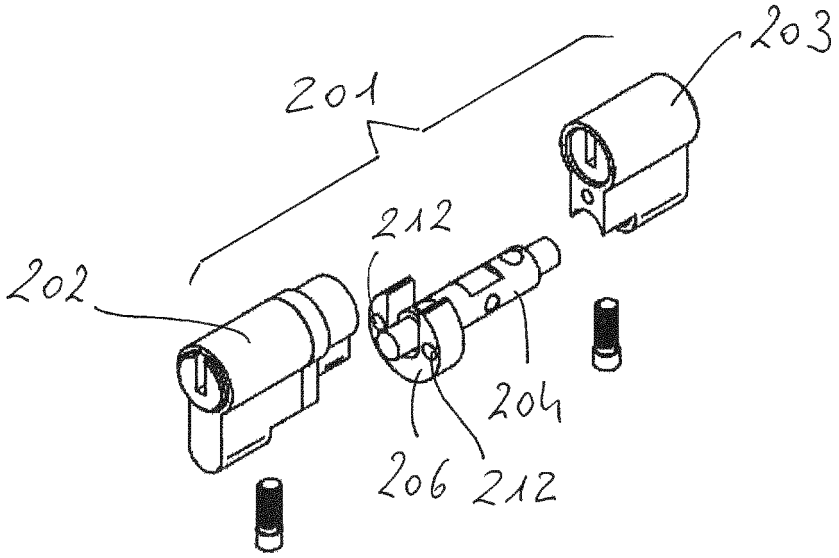


FIG. 6

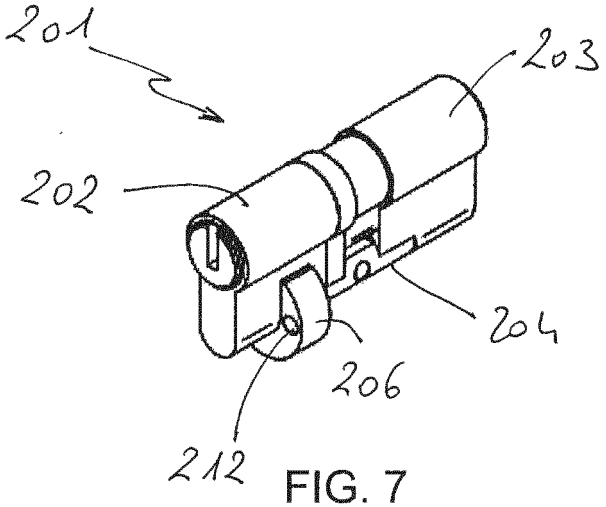


FIG. 7

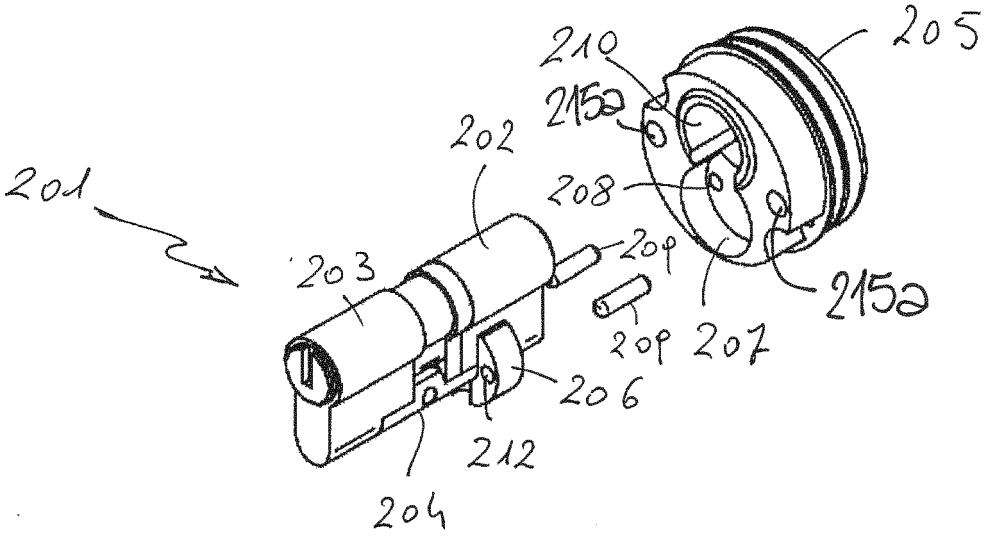
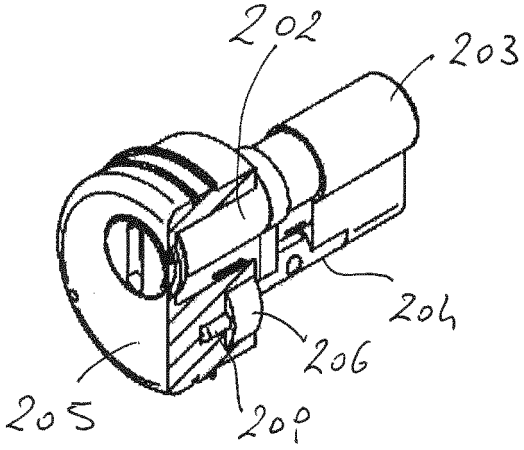

201
202
203
204
205
206
207
208
209
210
212
215a
215b

FIG. 8


202
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209

FIG. 9

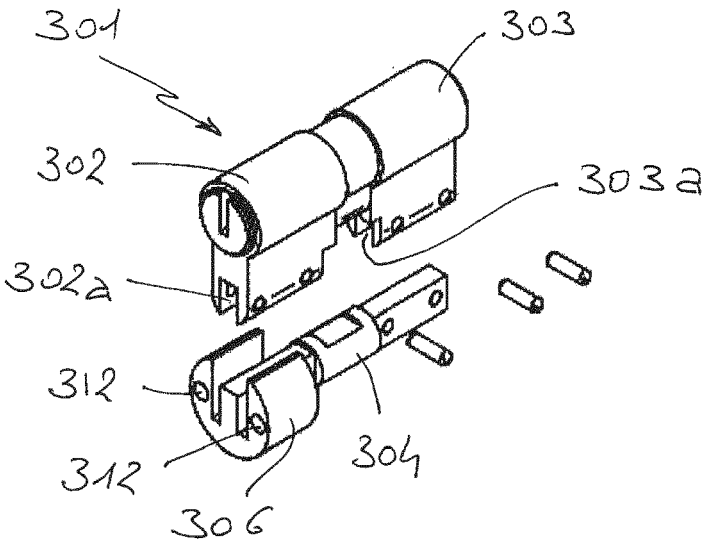

301
303
302
303a
302a
312
304
312
306

FIG. 10

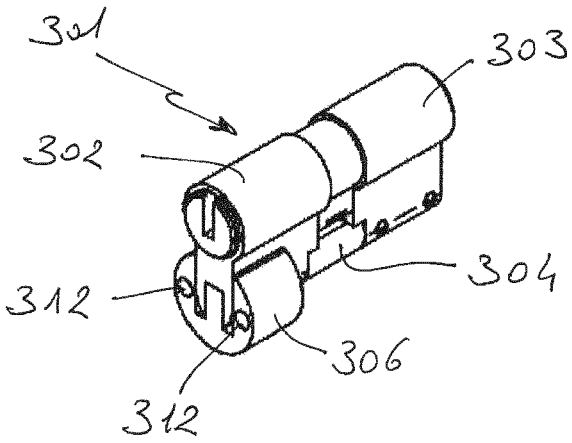

301
303
302
304
312
306
312

FIG. 11

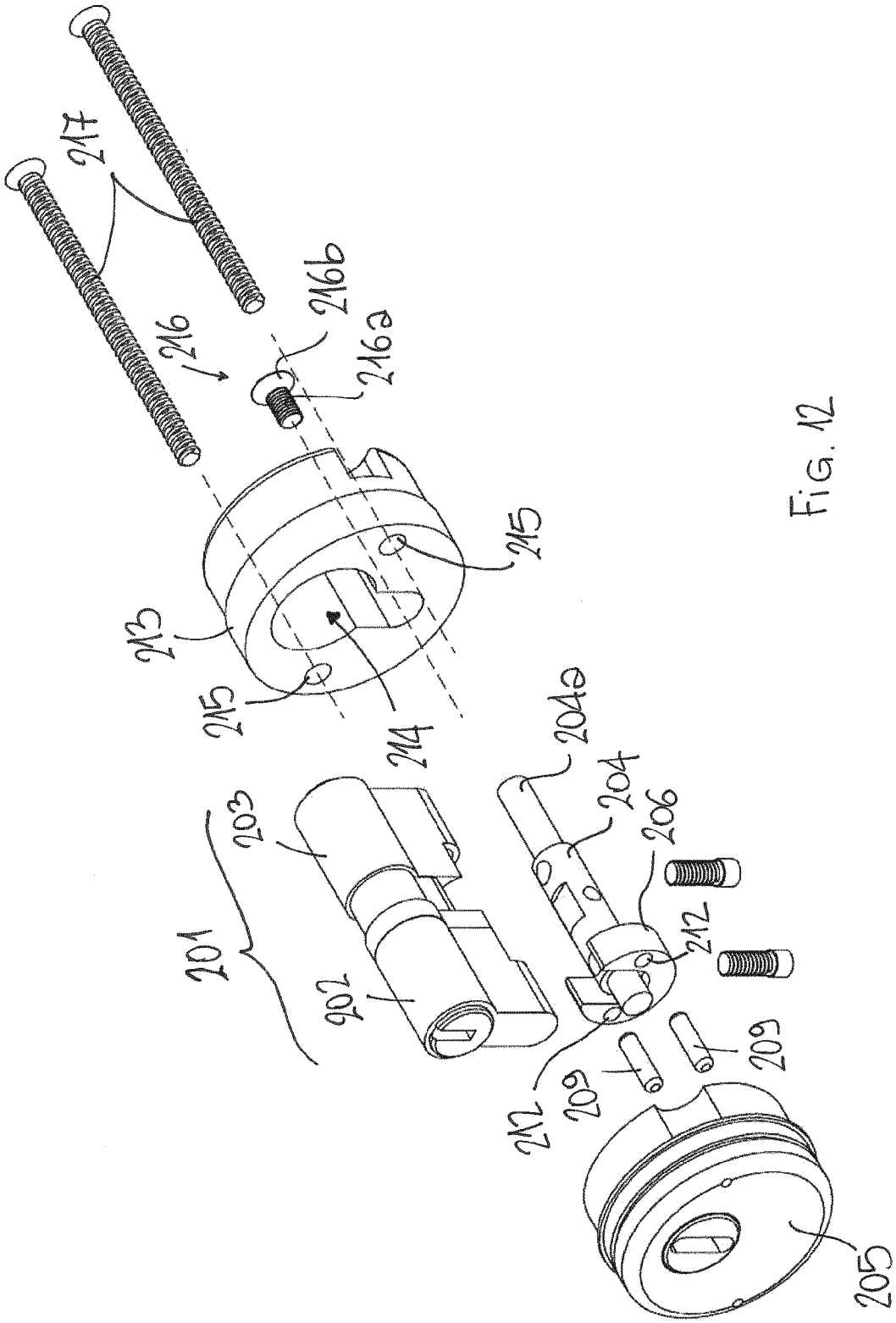

217
216b
216
216a
215
213
215
214
204a
204
206
203
101
212
202
209
209
212
205

FIG. 12

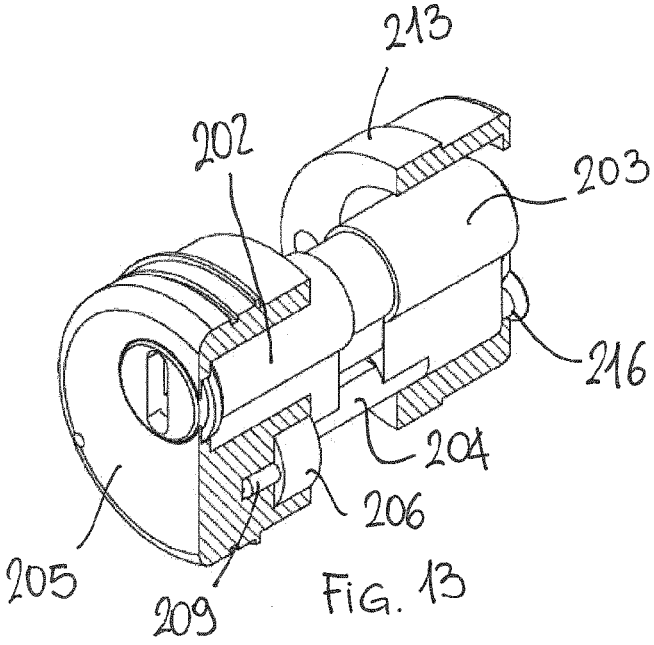
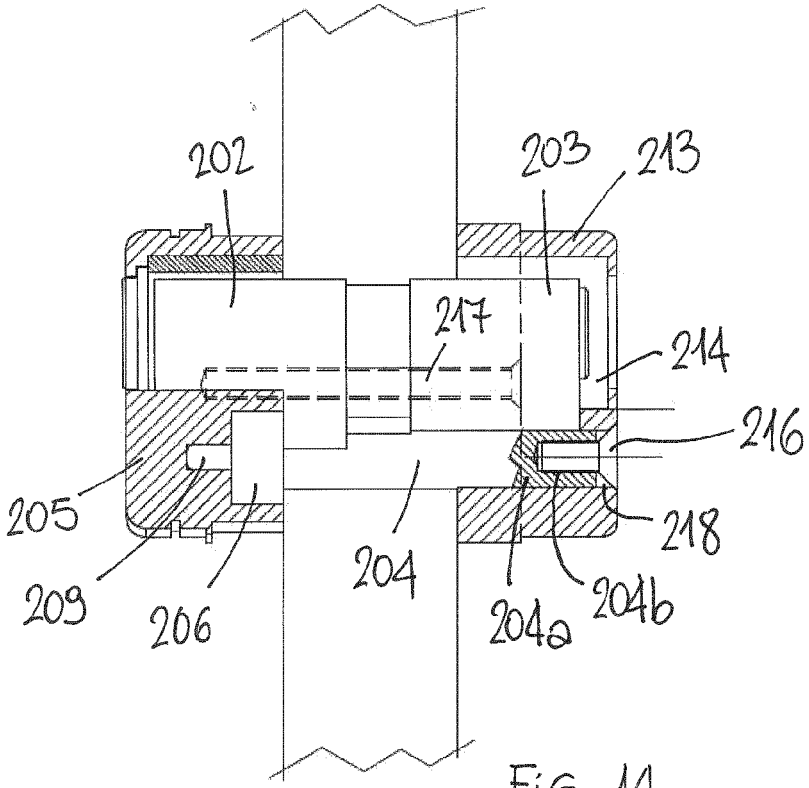

213
202
203
216
204
206
205
209

Fig. 13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204a
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Fig. 14

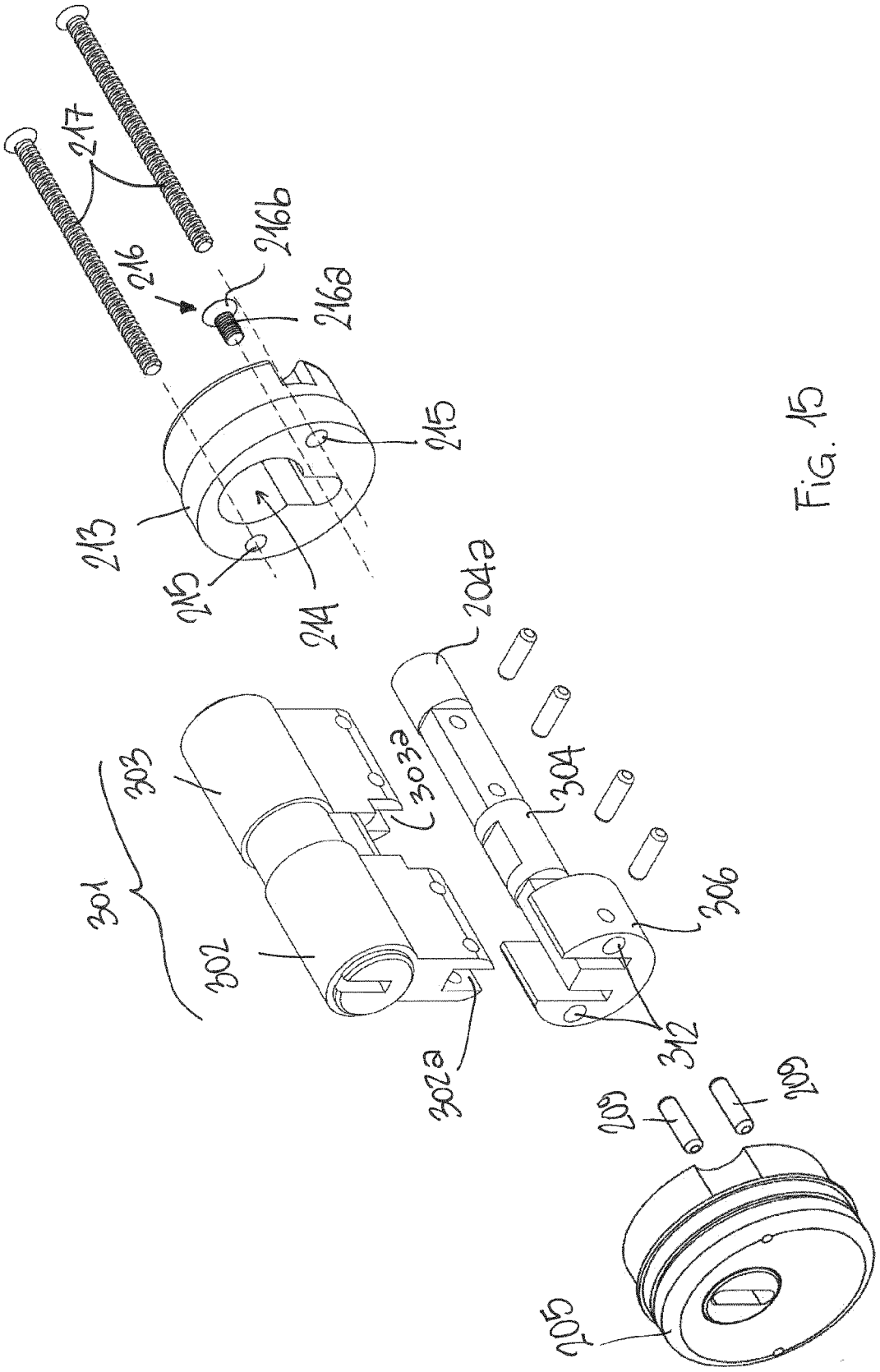
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Fig. 15

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EUROPEAN SEARCH REPORT

Application Number
EP 14 17 5741

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