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(54) **CAM LOCK ASSEMBLY KIT**

(57) A cam lock assembly kit (100) is disclosed. The kit (100) includes a two cams (130, 160), a bolt (180), a cam lock base (110), and two adapters (140, 170). The base (110) includes a hollow (124) with a female thread (126) to couple with the male thread (182) of the bolt (180). Each adapter (140, 170) includes a main profile (150A, 150B) dimensioned to clearance fit into the hollow (124), and a through adapter hole (152A, 152B) dimensioned to receive the male thread (182) to couple with the female thread (126). The first adapter (140) includes a first auxiliary profile (142) dimensioned to clearance fit a first through cam hole (132) of the first cam (130). The second adapter (170) includes a second auxiliary profile (172) dimensioned to clearance fit a second through cam hole (162) of the second cam (160).

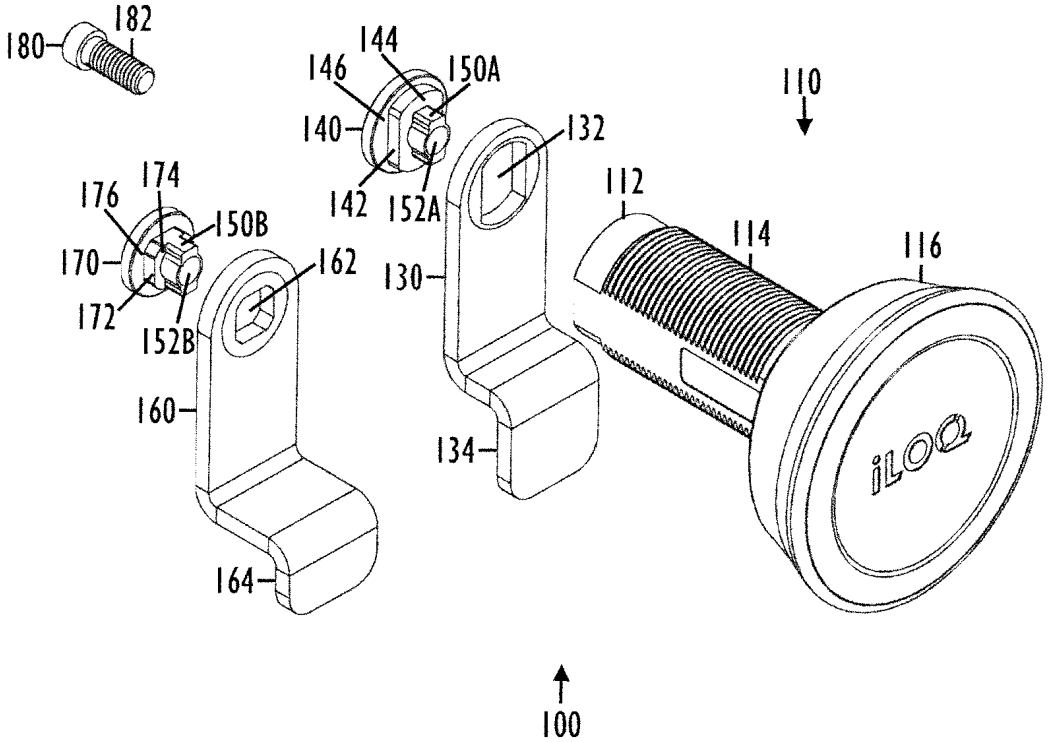

FIG. 1A

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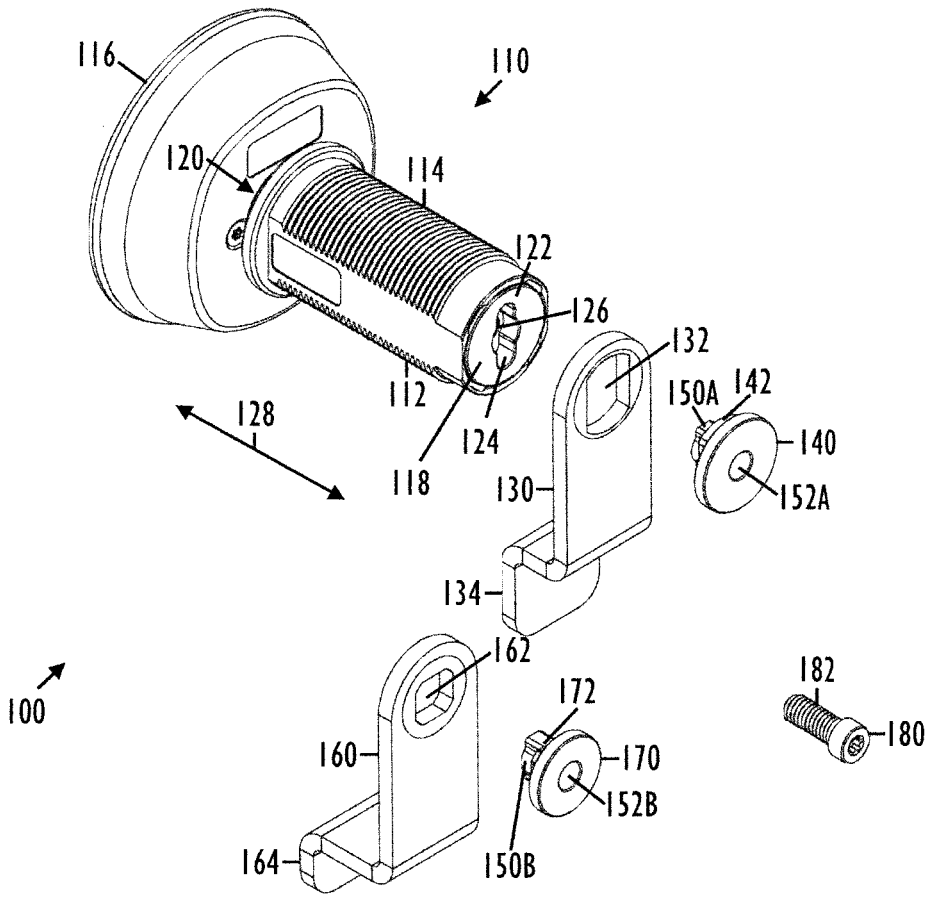
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180
152B
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150B

FIG. 1B

Description

FIELD

[0001] Various example embodiments relate to a cam lock assembly kit.

BACKGROUND

[0002] A cam lock has two main parts: a cam lock base and a rotatable cam as a latch. The cam lock may be used in various types of cabinets or other types of furniture, for example. Different markets use different kinds of cams, straight or offset cams, with different kinds of through cam holes, for example. Consequently, different markets require different versions of the cam lock, which complicates design and manufacturing and increases costs.

[0003] US 2009/0071209 A1, US 9,605,455 B2, and US 2012/0248794 A1 disclose various types of adapters for cam locks, but none of them solves the mentioned problem.

BRIEF DESCRIPTION

[0004] According to an aspect, there is provided subject matter of independent claims. Dependent claims define some example embodiments.

[0005] One or more examples of implementations are set forth in more detail in the accompanying drawings and the description of embodiments.

LIST OF DRAWINGS

[0006] Some example embodiments will now be described with reference to the accompanying drawings, in which

FIG. 1A and FIG. 1B illustrate example embodiments of a cam lock assembly kit from two different views;
FIG. 2 illustrates example embodiments of a first adapter from three different views;
FIG. 3 illustrates example embodiments of a second adapter from three different views; and
FIG. 4 illustrates example embodiments of an assembled cam lock fitted to a cabinet from three different views and one magnified detail view.

DESCRIPTION OF EMBODIMENTS

[0007] The following embodiments are only examples. Although the specification may refer to "an" embodiment in several locations, this does not necessarily mean that each such reference is to the same embodiment(s), or that the feature only applies to a single embodiment. Single features of different embodiments may also be combined to provide other embodiments. Furthermore, words "comprising" and "including" should be understood as not limiting the described embodiments to consist of only those features that have been mentioned and such embodiments may contain also features/structures that have not been specifically mentioned.

[0008] Reference numbers, both in the description of the example embodiments and in the claims, serve to illustrate the example embodiments with reference to the drawings, without limiting it to these examples only.

[0009] The embodiments and features, if any, disclosed in the following description that do not fall under the scope of the independent claims are to be interpreted as examples useful for understanding various embodiments of the invention.

[0010] Let us first study FIG. 1A and FIG. 1B illustrating a cam lock assembly kit 100.

[0011] The kit 100 comprises six main parts: a first cam 130, a second cam 160, a bolt 180, a cam lock base 110, a first adapter 140, and a second adapter 170.

[0012] The first cam 130 is provided with a first through cam hole 132.

[0013] The second cam 160 is provided with a second through cam hole 162.

[0014] The cams 130, 160 may be offset cams as shown, with offset parts 134, 164, but they may also be straight cams. Likewise, the external forms of the cams 130, 160 may be different from those illustrated. The cams 130, 160 may be commercially available standard cams, i.e., they are not specifically manufactured for the cam lock assembly kit 100.

[0015] The second through cam hole 162 is of a different shape than the first through cam hole 132. This requirement may be set by different markets. For example, in some markets the cam hole 132, 162 may be of a rectangular shape with each side being 9 millimetres, whereas in some other markets, each side is 7 millimetres. Also, other shapes of the cam hole 132, 162, are also possible, like an oblong shape of the first through cam hole 132 of the first cam 130, with dimensions 8.1 millimetres x 11.7 millimetres, for example.

[0016] The bolt 180 is provided with a male thread 182. A head of the bolt 180 may be provided with a suitable fitting, such as a hexagonal head, a screw head, an Allen head, or a Torx head, for example, in order to enable an easy assembly of the cam lock with matching tools.

[0017] The cam lock base 110 comprises an axle 118 to receive mechanical rotation from a first end 120 of the axle 118 and transmit the rotation to a second end 122 of the axle 118.

[0018] The cam lock base 110 also includes mechanics and possibly electronics needed to allow or block rotation of the cam 130, 160. A body 112 of the cam lock base 110 houses the various components. Furthermore, the cam lock base 110 may comprise a knob 116, which may also house various electronics such as an NFC (Near Field Communication) antenna. The turn-knob 116 may also receive the mechanical rotation from the user and pass it on to the axle 118. The applicant, iLOQ Oy, has invented many improvements for electromechanical

locks, such as those disclosed in various EP and US patent applications / patents, incorporated herein as references in all jurisdictions where applicable. A complete discussion of all those details is not repeated here, but the reader is advised to consult those applications. The cam lock base 110 may utilize energy generation from a key insertion for powering the mechanics/electronics, or it may harvest the energy utilizing NFC technology, both being technologies developed by the applicant, but the cam lock base 110 may also be implemented with a purely mechanical technology, or with an alternative electromechanical technology.

[0019] The second end 122 of the axle 118 comprises a hollow 124 with a female thread 126 to couple with the male thread 182 of the bolt 180.

[0020] Each of the first adapter 140 and the second adapter 170 comprise a main profile 150A, 150B dimensioned to clearance fit into the hollow 124 of the cam lock base 110, and a through adapter hole 152A, 152B dimensioned to receive the male thread 182 of the bolt 180 to couple with the female thread 126 of the hollow 124 of the axle 118.

[0021] Furthermore, the first adapter 140 comprises a first auxiliary profile 142 dimensioned to clearance fit the first through cam hole 132 of the first cam 130. Furthermore, the second adapter 170 comprises a second auxiliary profile 172 dimensioned to clearance fit the second through cam hole 162 of the second cam 160. Note that the first auxiliary profile 142 and the second auxiliary profile 172 may be designed, dimensioned and manufactured to clearance fit the through cam holes 132, 162, i.e., it is not the other way around.

[0022] When assembled, the bolt 180 couples either the first cam 130 between the first adapter 140 and the second end 122 of the axle 118, or the second cam 160 between the second adapter 170 and the second end 122 of the axle 118.

[0023] FIG. 4 illustrates a cam lock 400 assembled from the cam lock assembly kit 100 and fitted to a door 404 of a cabinet 402. A detailed view 406 shows the way the cam 130 is located between the adapter 140 and the second end 122 of the axle 118. The cam lock 400 is locked, as the cam 130 is behind a striker 412 of the cam lock 400. Note that the shape of the cam 130 in FIG. 4 is different from those shown in FIG. 1A and FIG. 1B

[0024] FIG. 4 also illustrates that the cam lock base 114, provided with male threads 114 and a flange 408, may be attached with a matching bolt 410 to the cabinet door 404.

[0025] In an example embodiment illustrated in FIG. 1B, the hollow 124 comprises an oblong shape transversal to an axial direction 128 of the axle 118. Such oblong shape enables rotation of the axle 118 such that the adapter 140/170 stays securely in place in spite of the torque provided by the rotation. Note that FIG. 2 and FIG. 3 illustrate that the matching main profile 150A, 150B of the adapter 140, 170 also comprises the oblong shape: one side 212 of the main profile 150A, 150B in one transversal direction 210 is longer than another side 202 of the main profile 150A, 150B in another transversal direction 200.

[0026] In an example embodiment illustrated in FIG. 1B, the female thread 126 extends away from a bottom of the hollow 124. The depth of female thread 126 is dimensioned so that a reliable coupling is achieved.

[0027] In an example embodiment illustrated in FIG. 2 and FIG. 3, the main profile 150A of the first adapter 140 is superimposed on the first auxiliary profile 142 such that a diameter 202 of the main profile 150A is smaller than a diameter 204 of the first auxiliary profile 142 in at least one transversal direction 200, and the main profile 150B of the second adapter 170 is superimposed on the second auxiliary profile 172 such that the diameter 202 of the main profile 150B is smaller than a diameter 206 of the second auxiliary profile 172 in at least one transversal direction 200. Note that in FIG. 2, a diameter 212 of the main profile 150A is also smaller than a diameter 214 of the first auxiliary profile 142 in another transversal direction 210, whereas in FIG. 3, a diameter 212 of the main profile 150B is equal to a diameter 216 of the second auxiliary profile 172 in the other transversal direction 210. These features enable countersinking of the main profile 150A/150B into the hollow 124 of the axle 118 such that the auxiliary profile 142/172 remains outside of the hollow 124 of the axle 118.

[0028] In an example embodiment illustrated in FIG. 2 and FIG. 3, the through adapter hole 152A, 152B is positioned in the middle of the main profile 150A, 150B. This feature increases the robustness of the adapter 140/170.

[0029] In an example embodiment, illustrated in FIG. 2 and FIG. 3, a curved sidewall 220A, 220B of the through adapter hole 152A, 152B extends beyond an oblong shape 202, 212 of the main profile 150A, 150B forming an integral bulge 222A, 222B to the oblong shape 202, 212.

[0030] In an example embodiment, the first auxiliary profile 142 is of an angular shape, and the second auxiliary profile 172 is of an angular shape. In a further example embodiment illustrated in FIG. 2 and FIG. 3, edges of the angular shape of the first auxiliary profile 142 are rounded 230, and/or edges of the angular shape of the second auxiliary profile 172 are bevelled 232.

[0031] In an example embodiment, when assembled, the main profile 150A, 150B of the first adapter 140 or the second adapter 170 is countersunk into the hollow 124 of the axle 118, and the first auxiliary profile 142 or the second auxiliary profile 172 is outside of the hollow 124 of the axle 118. As was explained earlier, this is illustrated in the detailed view 406 of FIG. 4. Note also that FIG. 1A shows planes 144, 174 of the adapter 140, 170 forming flanges, which rest against the other end 122 of the axle 118 when the cam lock 400 is assembled. These flanges 144, 174 limit depth of the countersinking. Also, planes 224, 226 of the adapter 140, 170 may rest against the bottom of the hollow 124.

[0032] In an example embodiment, illustrated in FIG. 1A, FIG. 1B and FIG. 4, the first adapter 140 and the second adapter 170 each comprise a flange 146, 176 next to the first auxiliary profile 142 and the second auxiliary profile 172. When assembled, the bolt 180 presses either the first cam 130 between the flange 146 of the first adapter 140 and the second end 122 of the axle 118, or the second cam 160 between the flange 176 of the second adapter 170 and the second end 122 of the axle 118.

[0033] Even though the invention has been described with reference to one or more example embodiments according to the accompanying drawings, it is clear that the invention is not restricted thereto but can be modified in several ways within the scope of the appended claims. All words and expressions should be interpreted broadly, and they are intended to illustrate, not to restrict, the example embodiments. It will be obvious to a person skilled in the art that, as technology advances, the inventive concept can be implemented in various ways.

Claims

1. A cam lock assembly kit (100), comprising:

a first cam (130) with a first through cam hole (132);
a second cam (160) with a second through cam hole (162), wherein the second through cam hole (162) is of a different shape than the first through cam hole (132);
a bolt (180) with a male thread (182);
a cam lock base (110) comprising an axle (118) to receive mechanical rotation from a first end (120) of the axle (118) and transmit the rotation to a second end (122) of the axle (118), the second end (122) of the axle (118) comprising a hollow (124) with a female thread (126) to couple with the male thread (182) of the bolt (180);
a first adapter (140) and a second adapter (170), each of the first adapter (140) and the second adapter (170) comprising a main profile (150A, 150B) dimensioned to clearance fit into the hollow (124) of the cam lock base (110), and a through adapter hole (152A, 152B) dimensioned to receive the male thread (182) of the bolt (180) to couple with the female thread (126) of the hollow (124) of the axle (118), and
the first adapter (140) comprising a first auxiliary profile (142) dimensioned to clearance fit the first through cam hole (132) of the first cam (130), and
the second adapter (170) comprising a second auxiliary profile (172) dimensioned to clearance fit the second through cam hole (162) of the second cam (160),
wherein, when assembled, the bolt (180) couples either the first cam (130) between the first adapter (140) and the second end (122) of the axle (118), or the second cam (160) between the second adapter (170) and the second end (122) of the axle (118).

2. The cam lock assembly kit of claim 1, wherein the hollow (124) comprises an oblong shape transversal to an axial direction (128) of the axle (118).

3. The cam lock assembly kit of any preceding claim, wherein the female thread (126) extends away from a bottom of the hollow (124).

4. The cam lock assembly kit of any preceding claim, wherein the main profile (150A) of the first adapter (140) is superimposed on the first auxiliary profile (142) such that a diameter (202) of the main profile (150A) is smaller than a diameter (204) of the first auxiliary profile (142) in at least one transversal direction (200), and the main profile (150B) of the second adapter (170) is superimposed on the second auxiliary profile (172) such that the diameter (202) of the main profile (150B) is smaller than a diameter (206) of the second auxiliary profile (172) in at least one transversal direction (200).

5. The cam lock assembly kit of any preceding claim, wherein the through adapter hole (152A, 152B) is positioned in the middle of the main profile (150A, 150B).

6. The cam lock assembly kit of any preceding claim, wherein a curved sidewall (220A, 220B) of the through adapter hole (152A, 152B) extends beyond an oblong shape (202, 212) of the main profile (150A, 150B) forming an integral bulge (222A, 222B) to the oblong shape (202, 212).

7. The cam lock assembly kit of any preceding claim, wherein the first auxiliary profile (142) is of an angular shape, and the second auxiliary profile (172) is of an angular shape.

8. The cam lock assembly kit of claim 7, wherein edges of the angular shape of the first auxiliary profile (142) are rounded (230), and/or edges of the angular shape of the second auxiliary profile (172) are bevelled (232).

9. The cam lock assembly kit of any preceding claim, wherein, when assembled, the main profile (150A, 150B) of the first adapter (140) or the second adapter (170) is countersunk into the hollow (124) of the axle (118), and the first auxiliary profile (142) or the second auxiliary profile (172) is outside of the hollow (124) of the axle (118).

10. The cam lock assembly kit of claim 9, wherein the first adapter (140) and the second adapter (170) each comprise a flange (146, 176) next to the first auxiliary profile (142) and the second auxiliary profile (172), and, when assembled, the bolt (180) presses either the first cam (130) between the flange (146) of the first adapter (140) and the second end (122) of the axle (118), or the second cam (160) between the flange (176) of the second adapter (170) and the second end (122) of the axle (118).

11. A cam lock (400) assembled from the cam lock assembly kit (100) of any preceding claim 1 to 10.

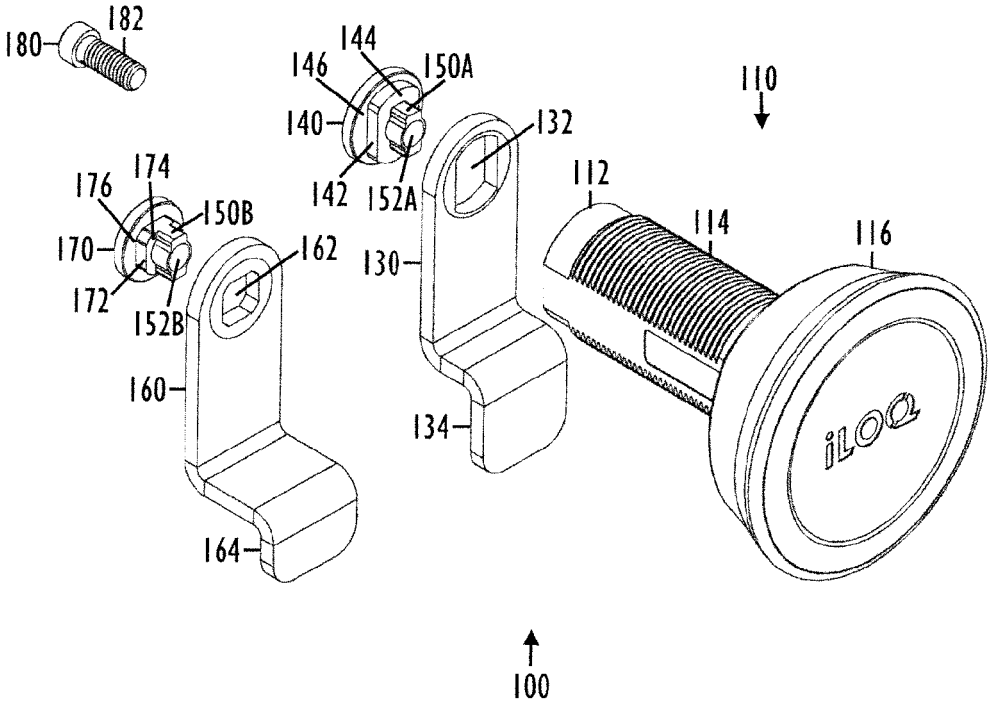
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FIG. 1A

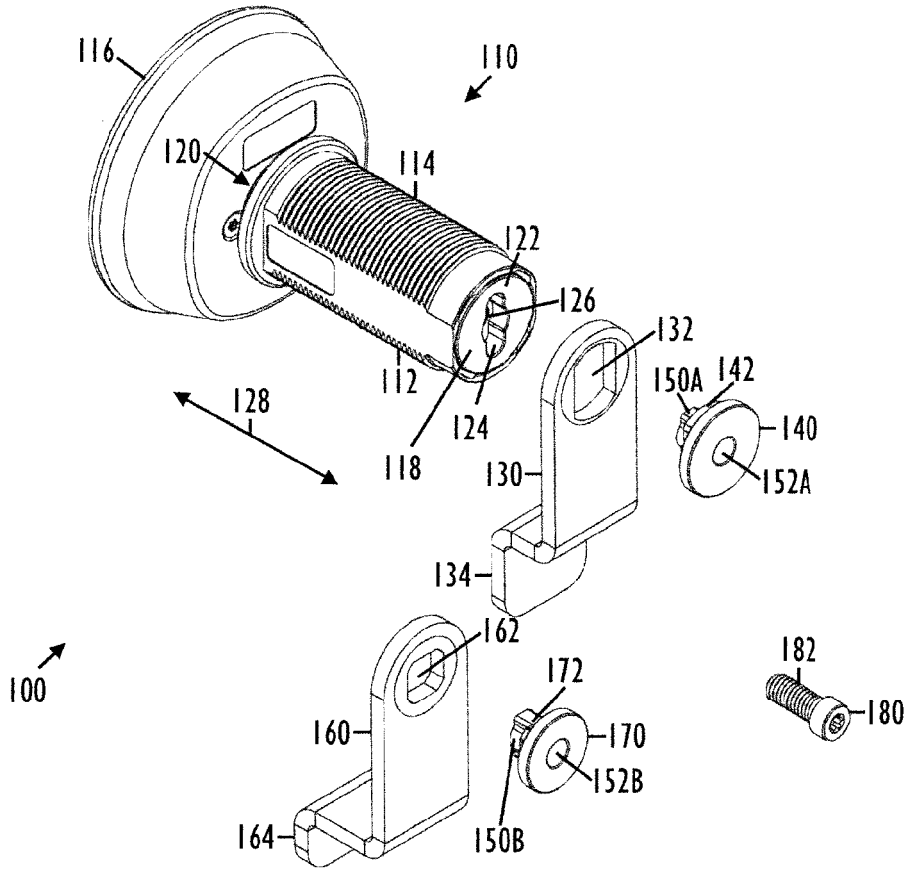
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FIG. 1B

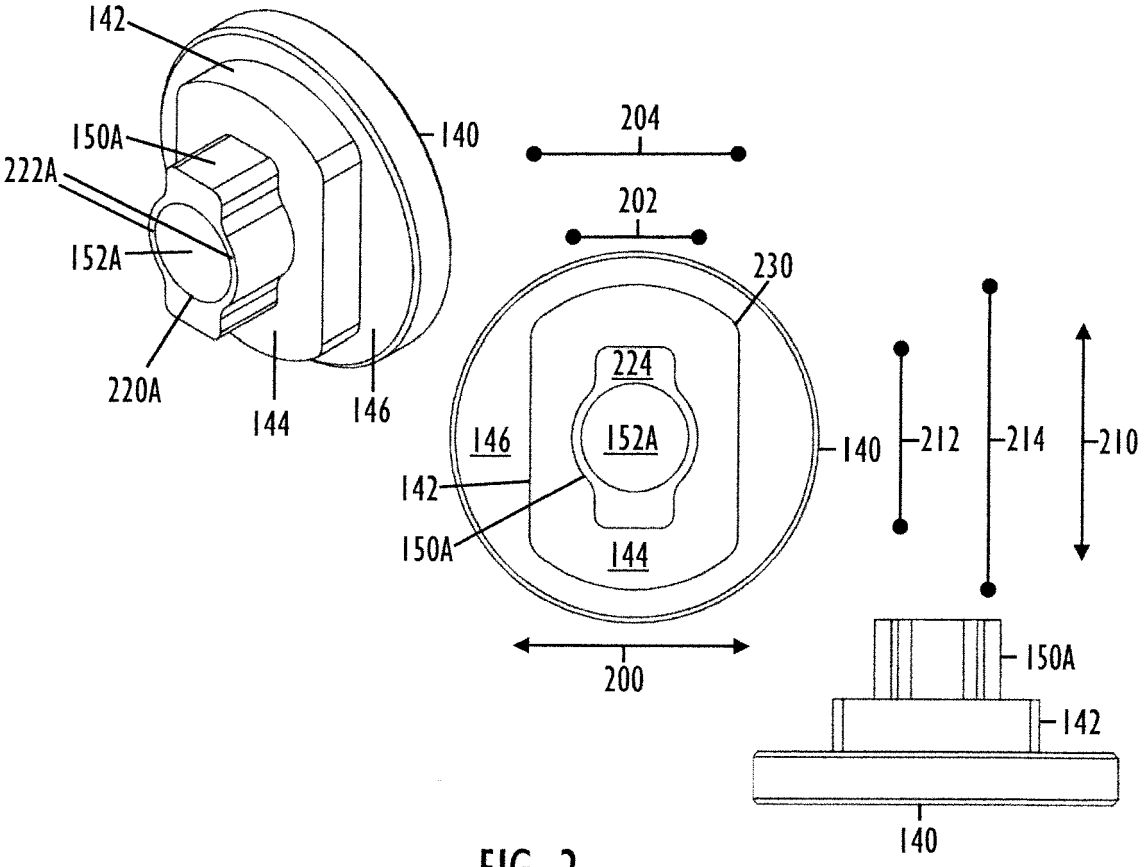
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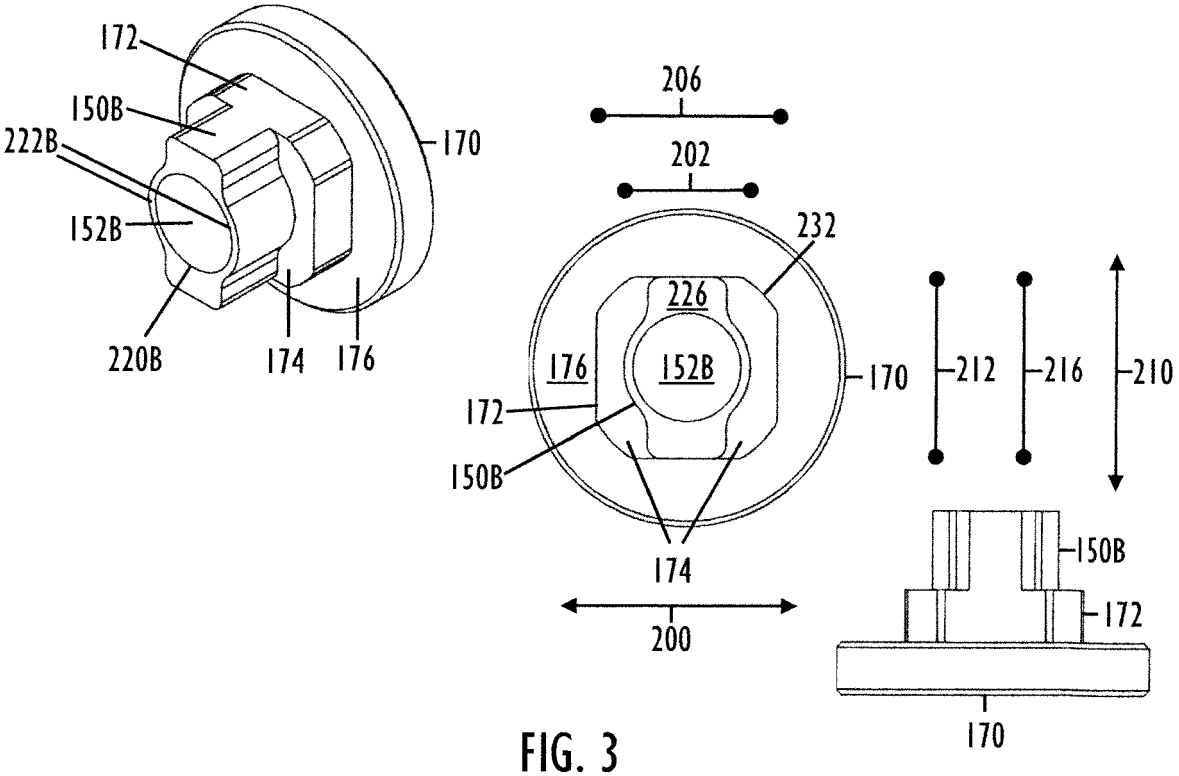
FIG. 2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170

FIG. 3

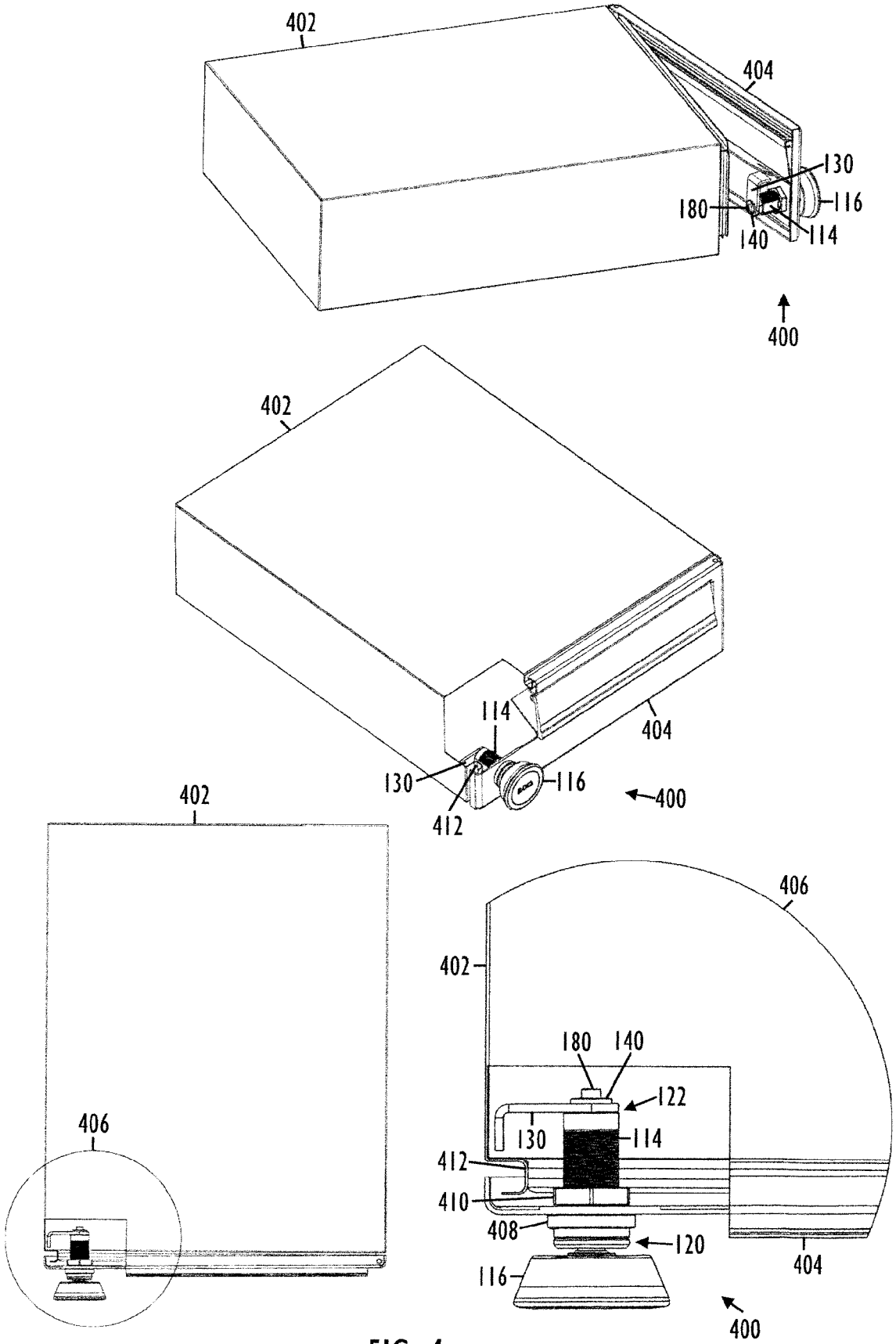
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FIG. 4

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EUROPEAN SEARCH REPORT

Application Number
EP 19 19 2199

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TECHNICAL FIELDS SEARCHED (IPC)

E05C
E05B

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
The Hague	13 November 2019	Pérez Méndez, José F

CATEGORY OF CITED DOCUMENTS

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13-11-2019

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For more details about this annex : see Official Journal of the European Patent Office, No. 12/82

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