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(54) QUICK RELEASE HINGE FOR A SEAT-LID UNIT OF A TOILET BOWL

(57) A hinge (10) for a seat-lid unit (50) of a toilet bowl (100) comprises a fastening part (12) and a rotation part (14) rotatably arranged about a rotation axis (15) and configured to be integrally stabilized with said seat-lid unit (50), said hinge (10) comprise also means (20) locking to a pin (21) slidably arranged in an outlet hole (16) along a direction substantially axial to said rotation axis (15), wherein said locking means (20) comprises a slider (23) configured to actuate said pin (21) along a substantially axial direction in order to engage the hole (13). The invention comprises also a hinge kit and a seat-lit unit (50).

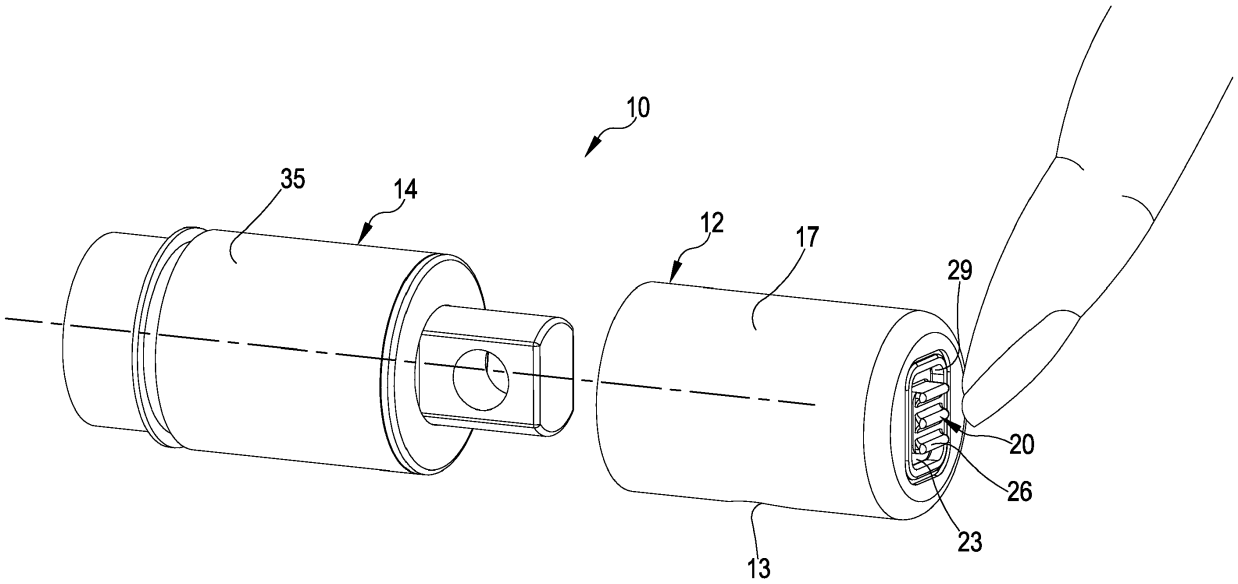

FIG.1a

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Description

FIELD OF THE INVENTION

[0001] The present invention refers to a quick-release hinge for the seat-lid unit of a toilet bowl.

[0002] More particularly, the present invention refers to a hinge for a seat-lid unit of a toilet bowl provided with a quick-unlocking fitting for quickly removing the overall unit itself from said toilet bowl.

STATE OF THE PRIOR ART

[0003] Hinges configured to anchor and support the seat-lid unit of a toilet bowl, simultaneously enabling to rotate said unit about an adjustable axis, in order to ensure both the rotation/disengagement of the seat and the rotation/opening of the cover of the seat-lid unit, are well known in the present state of the art. Typically, each seat-lid unit exhibits two axially arranged hinges enabling to angularly simultaneously independently move the seat and lid about the same rotation axis. Usually, each hinge is attached to a conventional toilet bowl made of ceramics at a stationary part or adapter by means of known fixing or anchoring means, such as screws, nuts, ties, screw anchors, etcetera, while the rotating part of the hinge is stably housed in recesses respectively formed on the seat and lid in order to be capable of integrally rotating with them.

[0004] Damping devices applied to said hinges of each seat-lid unit which prevent both said seat and said lid from uncontrolledly dropping in order to dampen an impact, are also known in the prior art.

[0005] Generally, said damping devices are conventional hydraulic-type rotational dampers axially arranged on each hinge and are typically configured to dampen the movement both of the seat and the lid. Moreover, these damping devices are generally arranged at the rotating portion of the hinge configured to be inserted in matching recesses formed in the seat and lid.

[0006] In some types of applications in the field, it is particularly felt the need of having the availability of a seat-lid unit which can be quickly removable from a respective toilet bowl, while being quickly mountable, for this purpose technical solutions for hinges are becoming successful which are configured to be capable of separating the seat-lid unit from the toilet bowl without using screws, wrenches and other tools.

[0007] For example, in public premises or in office, hotel buildings, etcetera, wherein there is a great number of toilet bowls, the seat-lid units must be periodically disassembled for correctly sanitizing them or for substituting broken, worn, or vandalized elements.

[0008] In order to solve this problem, quick-unlocking technical solutions, generally of a snap-type, were introduced, wherein the seat-lid unit can be unlocked from the toilet bowl by means of a device enabling to lock and unlock the hinge from the anchoring means. In these types of technical solutions, the hinge is typically inserted on a fixing vertical stud integral with the toilet bowl, by means of a locking device of the same stud, generally comprising a spring-type elastic element and a pin configured to abut and engage a groove or recess formed on the same stud, in order to prevent the stud from sliding inside the hinge or viceversa.

[0009] Generally, the unit can be unlocked by pulling it in order to forcedly extract the hinge, integral with the seat-lid unit, from the vertical stud, integral with the toilet bowl, in order to overcome the resistance of an elastic element or by acting on a knob or button for disengaging the pin from the stud groove.

[0010] A typical example of technical solutions regarding hinges provided with a quick-unlocking device is described in the Italian model utility patent IT 247405 (Y1), which refers to a hinge to be applied to a seat-lid unit on a toilet bowl, comprising an anchoring unit having a head facing upwardly and having an external annular groove and a supporting and hinging body forcedly reversibly engaging said head by interposing a gripping sleeve, wherein the support is made of metal and the sleeve is made of a plastic material, by means reversibly engaging the groove of said head.

[0011] A further example of technical solutions regarding hinges provided with a quick-release device, is described in the European patent EP 1 199 020 B1 referring to a hinge for a seat-lid unit of a toilet bowl, wherein the movement for lowering the seat itself is restrained by a damping device directly connected to the hinge placed on the back of the toilet bowl or by an adapter defining the rotation axis of the unit. The damping devices are stably connected to the adapter and are housed in a step space formed on the back of the unit. The adapter is provided with a blind hole, the interior thereof receives a stud attached to the toilet bowl by a snap-type connection configured to block said stud inside the adapter.

[0012] Another further example of technical solutions regarding hinges provided with a quick-release device is described in the European patent application EP 1 199 020 B1, regarding a hinge for a seat-lid unit of a toilet bowl, wherein the disengagement of the stud from the hinge is ensured by a button or knob which is suitably actuated in order to overcome the resistance of the elastic element, and ensures the simultaneous disengagement of the pin of the locking device from the groove of the vertical stud.

[0013] However, said traditional types of quick-release hinges have operative inconveniences and drawbacks.

[0014] A serious inconvenience, which is such to hinder the efficiency and convenience of said conventional hinges for seat-lid unit of a toilet bowl, is that they make difficult and tricky to disassemble the seat-lid unit.

[0015] Particularly, since the pull-type release hinges are not lubricated, and since scales and oxidation among the metal elements of the quick-locking device, can partially harden and stick the elastic parts of the hinge to the toilet bowl fastening stud, it is difficult to disassemble the

seat-lid unit or it is required to apply a greater force for separating it, consequently making difficult the pull disassembling operation to an operator which usually must uncomfortably work in a confined space.

[0016] A further inconvenience, especially for hinges provided with button or knob quick-release devices, is that the operator must necessarily apply a force for a prolonged time to the button or knob for being capable of releasing the seat-lid unit from the toilet bowl, or for installing it, so that it is more difficult to easily grip the seat-lid unit for extracting or inserting it, since the available force is limited.

[0017] A further limit is determined by hinges provided with a knob for disengaging the pin of the locking device because the knob is axially directly connected to the pin, so that the disengagement thereof from the groove of the vertical fastening stud requires the knob itself to be actuated by at least two fingers of a hand and hold it in a stretched condition in order to prevent the elastic element from moving again the pin to a locking position. This makes more difficult and complicated the operation of extracting and separating the seat-lid unit from a toilet bowl and also the opposite inserting operation.

[0018] It is an object of the present invention to overcome and solve the above described operative inconveniences and limits.

[0019] More particularly, it is an object of the present invention to provide a quick-release hinge for the seat-lid unit of a toilet bowl easily and simply installable and extractable by applying a very small force.

[0020] A further object of the present invention consists of providing a quick-release hinge for the seat-lid unit of a toilet bowl with a locking device configurable in bistable locking and unlocking positions and capable of being held unlocked without applying a force for a prolonged time to the unlocking command of the hinge.

[0021] A further object of the present invention consists of providing a quick-release hinge for the seat-lid unit of a toilet bowl with a hinge locking device being simple and easy to be activated and deactivated by just one finger of a hand and by using only one hand.

[0022] A further possible object of the present invention consists of providing a quick-release hinge for the seat-lid unit of a toilet bowl capable of ensuring a high level of strength and reliability over time, and further capable of being easily manufactured at a low cost.

[0023] These and other objects are met by the quick-release hinge for the seat-lid unit of a toilet bowl according to the independent claim.

[0024] The structural and operative characteristics of the quick-release hinge for the seat-lid unit of a toilet bowl, object of the present invention, can be better understood from the detailed following description, in which it is made reference to the attached drawings which represent a preferred non-limiting embodiment, wherein:

BRIEF DESCRIPTION OF THE FIGURES

[0025]

Figure 1 is an overall axonometric schematic exploded representation of the hinge object of the invention applied to a seat-lid unit of a toilet bowl;

Figure 1a is an axonometric schematic exploded detailed representation of the hinge object of the invention and of the slider actuating the locking means;

Figure 2 is a schematic representation of a cross-section view of the quick-release hinge for the seat-lid unit of a toilet bowl object of the present invention in the locked configuration on the external fastening stud integral with the toilet bowl;

Figure 2a is a detailed schematic representation of the cross-section view of the quick-release hinge in the locked configuration of Figure 2;

Figure 3 is a schematic representation of a cross-section view of the quick-release hinge for the seat-lid unit of a toilet bowl object of the present invention in the unlocked configuration on the external fastening stud integral with the toilet bowl;

Figure 3a is a schematic detailed representation of the cross-section view of the quick-release hinge in the locked configuration of Figure 3;

Figure 4 is a schematic representation of a cross-section view of the quick-release hinge for the seat-lid unit of a toilet bowl object of the present invention in the configuration featuring the external fastening stud separated from the rest of the hinge.

DETAILED DESCRIPTION OF THE INVENTION

[0026] Firstly, it is made reference to Figures 1, 1a and 4, the hinge 10 for a seat-lid unit 50 of a toilet bowl 100 comprises a fastening part 12 in which a hole 13 is formed, preferably a blind hole, extending along a substantially radial direction and configured to house an external fastening stud 30 and a rotating part 14 rotatably arranged about a rotation axis 15 and configured to be integrally stabilized with said seat-lid unit 50. Said hinge 10 comprises means 20 locking to said external stud 30 for a stabilized fastening to the toilet bowl 100. Said locking means can be also conventional pressure snap locking-type means.

[0027] Referring also to Figures from 2 to 3a, said locking means 20 comprise a pin 21 slidably arranged along the direction of said rotation axis 15 in an outlet hole 16 placed in connection with said hole 13 and preferably perpendicular to it. Said locking means 20 can also comprise an elastic element 22 for returning said pin 21.

[0028] The improvement of the present invention consists of said locking means 20 which comprise a slider 23 slidably arranged along a direction substantially radial to said rotation axis 15, said slider 23 being configured to actuate said pin 21 along a substantially axial direction so that a free end 21' of the pin 21 itself can engage said

hole 13 along a direction substantially radial to it.

[0029] Referring now also to Figure 4, the present invention describes a hinge 10 separated from the external fastening stud 30 configured to be stabilized by known fastening means 32 to a toilet bowl 100. The fastening means 32 can be conventional fastening and anchoring means, not shown, of a screw and nut type, screw anchors, ties, bored flanges, washers, etcetera.

[0030] Said free end 21' of said pin 21 is configured to engage a groove 34 formed close to a connection end 30' of said external stud 30 in order to prevent a relative movement and an axial sliding between said hinge 10 and the external stud 30 itself, when the hinge 10 is in the locked configuration.

[0031] Referring again to Figures from 2 to 4, the slider 23, having a generally flat shape, comprises also a protrusion 24 formed on the not exposed part or face thereof and configured to cooperate in a translation movement with an inclined surface 25 formed on an enlarged end 21" of said pin 21, in such a way as to convert the translating linear radial movement of said slider 23 into an axial linear translating movement of said pin 21. Referring particularly to Figure 1a, said slider 23 can further comprise a grip surface 26 formed on the exposed part or face thereof, opposite to the part regarding the protrusion 24, said grip surface 26 being configured to be handled by a single finger of an operator.

[0032] Preferably, the pin 21 is made of a metal, polymeric material or of other types of materials for example of sintered powders, etcetera, and on said enlarged end 21", on which said inclined surface 25 is formed, said pin further comprises a surface flat portion 27, consecutive to said inclined surface 25, and configured to cooperate with said protrusion 24 of the slider 23.

[0033] The slider 23 can be made of a metal material, a polymeric material or of other types of materials, for example of sintered powders, etcetera.

[0034] The pin 21 can be slidably monostable and can be held in the preferred unlocked position by said elastic element 22, generally defined by a coil spring or by a mechanical equivalent, such to cause said pin 21 to be disengaged from the hole 13 when said protrusion 24 of the slider 23 does not engage said inclined surface 25 of said pin 21.

[0035] In the preferred embodiment schematically shown in all the figures, said slider 23 is slidably arranged on the exposed end of the fastening part 12 of the hinge 10, and is leaded to the position by a plug 28 being in the shape of a small glass, generally made of a metal or polymeric material and coaxially arranged and outwardly applied to said fastening part 12. Said plug 28 defines a through opening 29 formed on the bottom of the plug 28 itself and such to allow to slidably leading said grip portion 26 of slider 23 along the radial direction of the hinge to the locked and unlocked limit positions of the pin 21. Advantageously, the exposed surface of said grip portion 26 of the slider 23 can protrude from the outline of the exposed end of the hinge 10 and advantageously can be made with a rough surface examplary provided with a knurling in order to aid and improve the grip and adherence of the operator's finger.

[0036] With a particular reference to Figures 1a, 2a, 3a and 4, the body of the hinge 10 can be also provided with an external coating 17 generally made of a natural metal or painted in a desired color, or is also made of a polymeric material.

[0037] In the embodiment of the cited Figures from 1 to 4, the hinge 10 can also comprise a conventional damper 35 or a rotational braking device, preferably of a fluid, hydraulic or pneumatic type, coaxially arranged on said rotating part 14 of the hinge 10 itself and integrally rotatively stabilized both to the lid and seat of said seat-lid unit 50.

[0038] The present invention refers also to a hinge kit for the seat-lid unit 50 of a toilet bowl 100, comprising, besides at least one hinge 10 according to the description, also at least one external fastening stud 30 suitable to be stabilized by known fastening means 32 to a conventional toilet bowl 100, wherein said external stud 30 defining on the external diametral surface thereof a groove 34 having a substantially annular shape, said groove 34 being configured to be engaged by the free end 21' of said pin 21.

[0039] The scope of the present invention is meant to be further extended to a seat-lid unit 50 for a toilet bowl 100, comprising a seat and a lid rotatably constrained to at least one hinge 10 according to the present invention, and comprising at least an stud 30 cooperating with said hinge 10 in order to couple and decouple it, said stud 30 being configured to be stabilized to said toilet bowl 100.

[0040] The description of the quick-release hinge 10 for a seat-lid unit of a toilet bowl object of the present invention, hints the operation described in the following.

[0041] First of all, it is made reference to Figures 2 and 2a, the fastening part 12 and rotating part 14 of the hinge 10, are stabilized and integral with the seat-lid unit 50 at the rotating part 14 and damper 35 coaxially arranged on said rotation part, housed in the seats formed in the seat-lid unit 50. The seat-lid unit is generally provided with housings for two hinges 10 for angularly moving the unit itself. Typically, the damper 35 can restrain the angular movement both of the seat and lid of said seat-lid unit 50, which can freely angularly rotate independently from each other.

[0042] The fastening part 12 and rotating part 14 of both the hinges 10, integral with the seat-lid unit 50, are mounted to the toilet bowl 100 by coupling them to the respective external stud 30 at the holes 13 of the respective fastening parts 12. Each fastening part 12 is inserted on the respective external stud 30 substantially to bottom the blind hole 13 so that the groove 34 faces and is radially aligned with the outlet hole 16 and the free end 21' of the pin 21.

[0043] In order to assemble the seat-lid unit 50, initially with reference to Figure 4, the slider 23 of each hinge 10 must be moved to the unlocked limit configuration of Fig-

ures 3 and 3a, so that the free end 21' of the pin 21 does not radially engage the hole 13, consequently preventing the external stud 30 from axially engaging the hole 13 itself.

[0044] Once both the fastening parts 12 are engaged with the studs 30, at the holes 13, the operator can act by a single finger on the grip surface 26 of the slider 23 for translating it to the opposite locked limit configuration of Figures 2 and 2a. The protrusion 24 engages the inclined surface 25 of the pin 21 by axially pushing it towards the hole 13, simultaneously overcoming the force of the elastic element 22 until the free end 21' of the pin 21 does not radially engage the hole 13 and groove 34 of the external stud 30, so that the relative sliding motion between said external stud 30 and hole 13 of the fastening part 12 is prevented.

[0045] The flat portion 27, consecutive to the inclined surface 25 of said enlarged end 21" of the pin 21, provides the locking means 20 with the bistability feature, since when said protrusion 24 of the slider 23 engages said flat portion 27, the locking means remain in an unlocked position, indeed, the action of the elastic element 22, which thrusts the pin 21, is capable of returning the slider 23 to the unlocked position only by a new action of the operator on the slider 23 itself.

[0046] Still referring to the same Figures 2 and 2a, the operator in order to unlock and extract the seat-lid unit 50, acts on the sliders 23 of the respective hinges 10, by translating the slider 23 along a radial direction with respect to the rotation axis 15, as shown in Figure 1a, and by progressively disengaging the protrusion 24 of said slider 23 from the inclined surface 25 to the limit position. Simultaneously, the pin 21 is caused to axially translate towards the rotation axis 15 under the action of the elastic element 22, by disengaging it from the groove 34 of the external stud 30, as shown in Figures 3 and 3a, so that the external stud 30 can freely slide with respect to the hole 13 in order to extract the seat-lid unit 50 from the toilet bowl 100. The locking means 20 of the hinge 10 are bistable and remains in the limit positions without requiring the operator to apply a force on the slider 23 for holding disengaged the pin 21 from the groove 34 of the external pin 30.

[0047] In this way, the operator can stably grip, also by only one hand, the seat-lid unit 50 and can decouple it from the toilet bowl 100, as schematically shown in Figure 4.

[0048] From the beforehand discussion it is understood the clear advantages of the quick-release hinge for a seat-lid unit of a toilet bowl object of the present invention.

[0049] The quick-release hinge 10 is particularly advantageous because it enables the operator to quickly and simply substitute and install the seat-lid unit 50 of a toilet bowl 100, enabling at the same time the operator to stably grip also by a single hand, the seat-lid unit without simultaneously acting on the locking means 20 of said seat-lid unit 50.

[0050] The quick-release hinge 10 is also particularly advantageous since enables the operator to lock/unlock the locking means 20 by a single finger without the requirement of continuously exerting a force on the slider 23 for holding the pin in the desired position.

[0051] A still further advantage of the quick-release hinge 10 consists of enabling the operator to quickly and easily work in a confined space and to be capable of quickly substitute a substantial number of seat-lid units in buildings or public sites provided with many toilet bowls, for substituting broken or vandalized units or for periodically cleaning and sanitizing the same units.

[0052] While the above described invention was given with a particular reference to a preferred embodiment given only in an exemplifying non-limiting way, several modifications and variants will be understood by a person skilled in the art in light of the above description. Therefore, the object of the present invention consists of encompassing all the modifications and variants falling in the spirit and scope of the following claims.

Claims

1. Hinge (10) for seat-lid unit (50) of a toilet bowl (100) comprising a fastening part (12) in which a hole (13) is formed configured to house an external fastening stud (30) and a rotating part (14) rotatably arranged about a rotation axis (15) and configured to be integrally stabilized with said seat-lid unit (50), said hinge (10) comprising locking means (20) to the external stud (30) comprising a pin (21) slidably arranged substantially along the direction of said rotation axis (15) in an outlet hole (16) placed in connection with said hole (13), said locking means (20) **characterized in that** they comprise a slider (23) slidably arranged along a direction substantially radial to said rotation axis (15), said slider (23) being configured to activate said pin (21) along a substantially axial direction so that a free end (21') of the pin (21) can engage said hole (13).

2. Hinge (10) according to claim 1, wherein said free end (21') of the pin (21) is configured to engage a groove (34) formed close to a connection end (30') of said external stud (30) in order to prevent a relative movement and an axial sliding between said hinge (10) and the external stud (30)..

3. Hinge (10) according to claim 1, comprising an elastic element (22) for returning said pin (21).

4. Hinge (10) according to claim 1, wherein said slider (23) having a flat shape and comprises a protrusion (24) formed on the not exposed part configured to cooperate in a translation movement with an inclined surface (25) formed on an enlarged end (21") of said pin (21), in such a way as to convert the radial move-

ment of said slider (23) into an axial movement of said pin (21).

5. Hinge (10) according to claim 1, wherein said slider (23) comprises a grip surface (26) formed on its exposed side and configured to be handled by a single finger of an operator.

6. Hinge (10) according to claim 1, wherein said enlarged end (21") on which said inclined surface (25) is formed, comprises a surface flat portion (27) , consecutive to said inclined surface (25), configured to cooperate with said protrusion (24) of the slider (23).

7. Hinge (10) according to claim 4, wherein said slider (23) is slidably arranged on the exposed end of said fastening part (12) and leaded to the position by a plug (28) coaxially arranged and outwardly applied to said fastening part (12), said plug (28) defining a through opening (29) formed on the bottom of the plug (28) such to allow to slidably leading said grip portion (26) of said slide (23).

8. Hinge (10) according to claim 5, wherein on said grip surface (26) a rough surface is formed in order to facilitate the grip action by the finger of an operator.

9. Hinge (10) according to claim 1, wherein said pin (21) and said slider (23) are made of metal or polymeric material.

10. Hinge kit for a seat lead unit (50) of a toilet bowl comprising a hinge (10) according to at least one of the claims 1 to 9, and at least one external stud (30) suitable to be stabilized by fastening means (32) to a toilet bowl (100), said external stud (30) defining on the external diametral surface thereof a groove (34) formed in proximity of a connection end (30'), said groove (34) having a substantially annular shape and being configured to be engaged by the free end (21') of said pin (21) .

11. Seat-lid unit (50) for a toilet bowl (10) comprising a seat and a lid rotatably constrained to at least one hinge (10) according to at least one of the claims 1 to 9, and comprising at least an external stud (30) cooperating with said hinge (10) and configured to be stabilized with said toilet bowl (100).

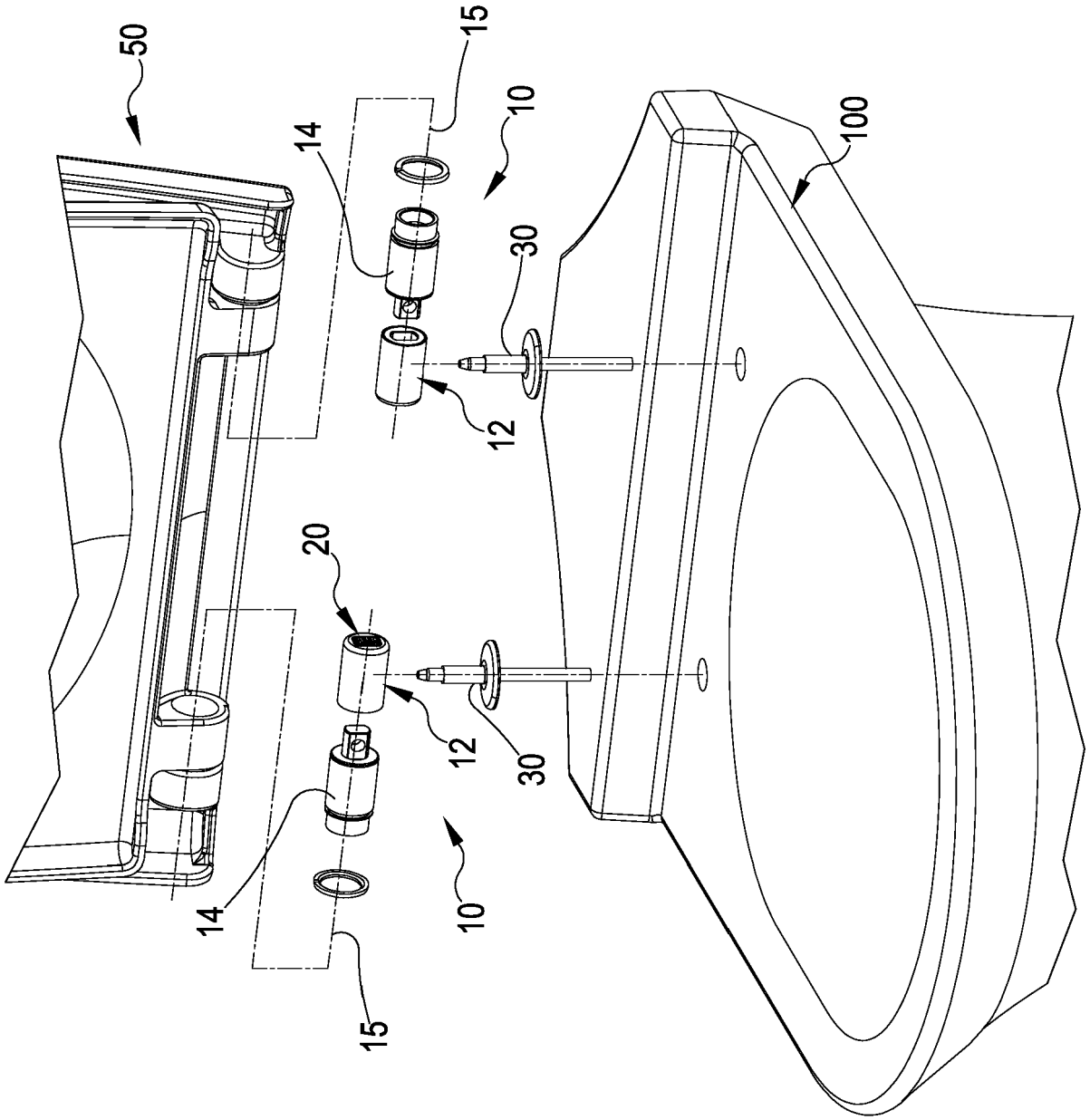


FIG.1

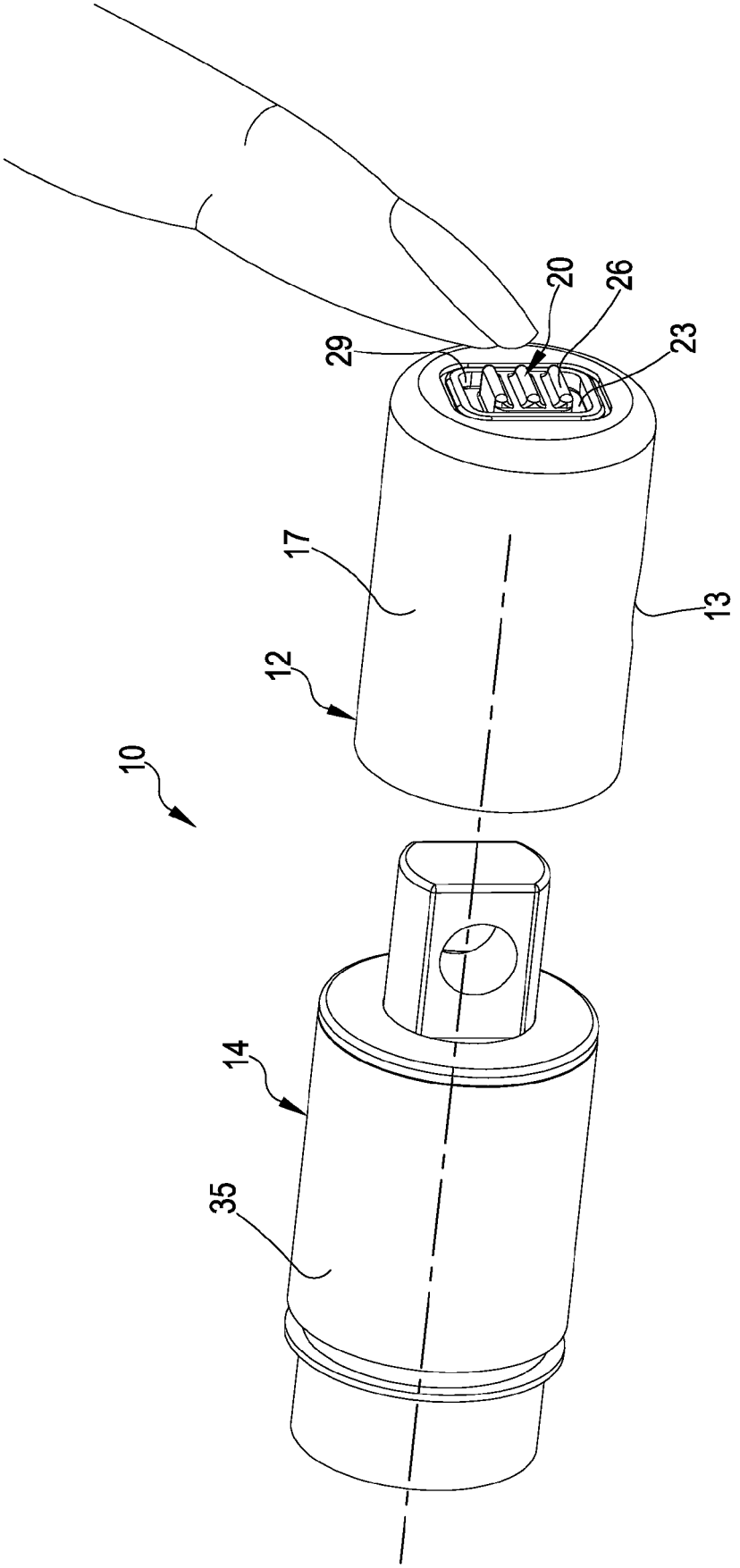
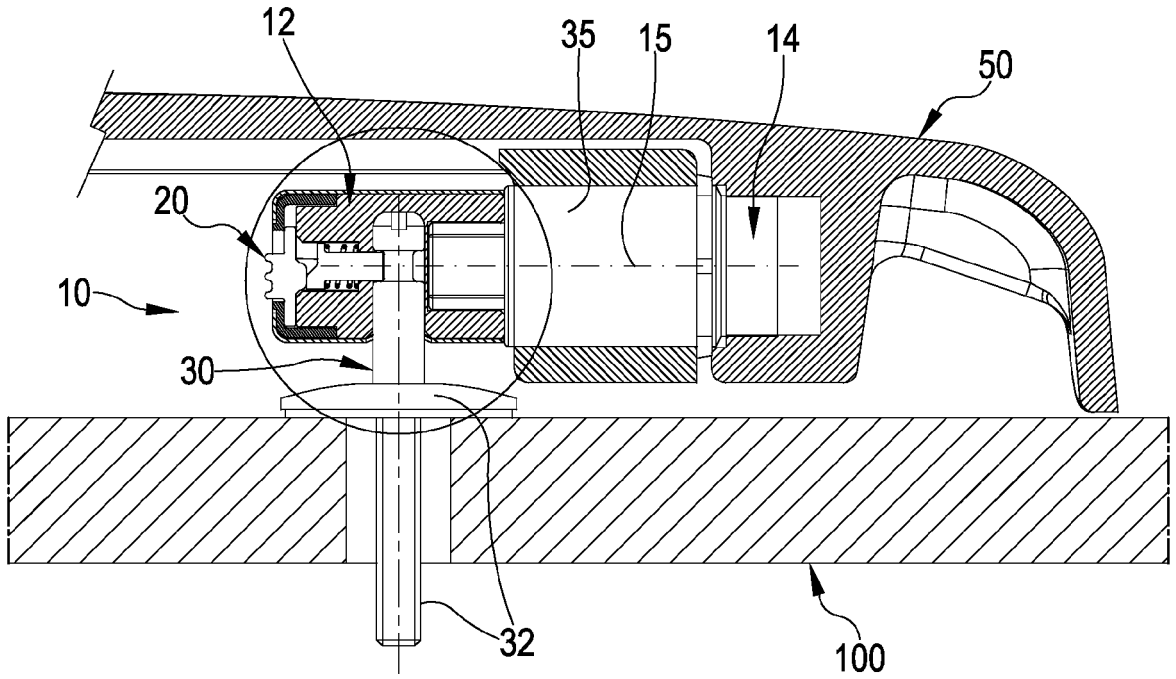


FIG.1a

FIG.2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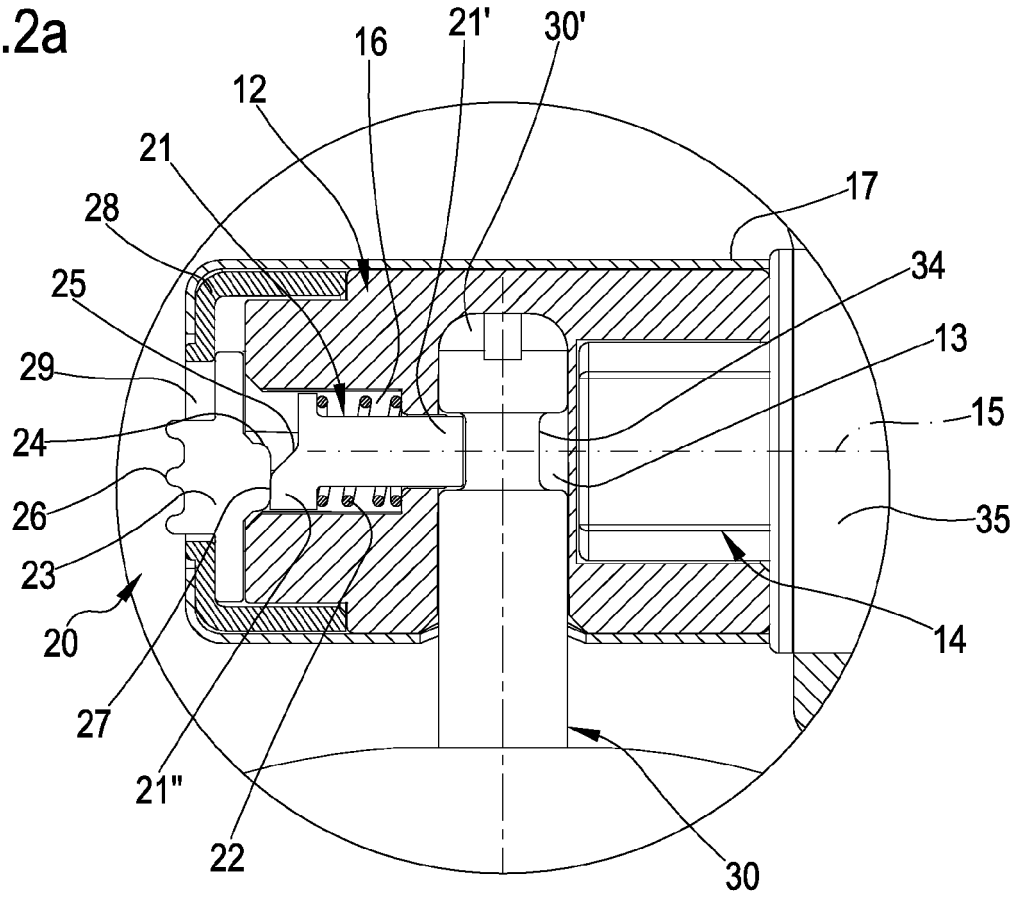
10
30
32
100

FIG.2a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30'
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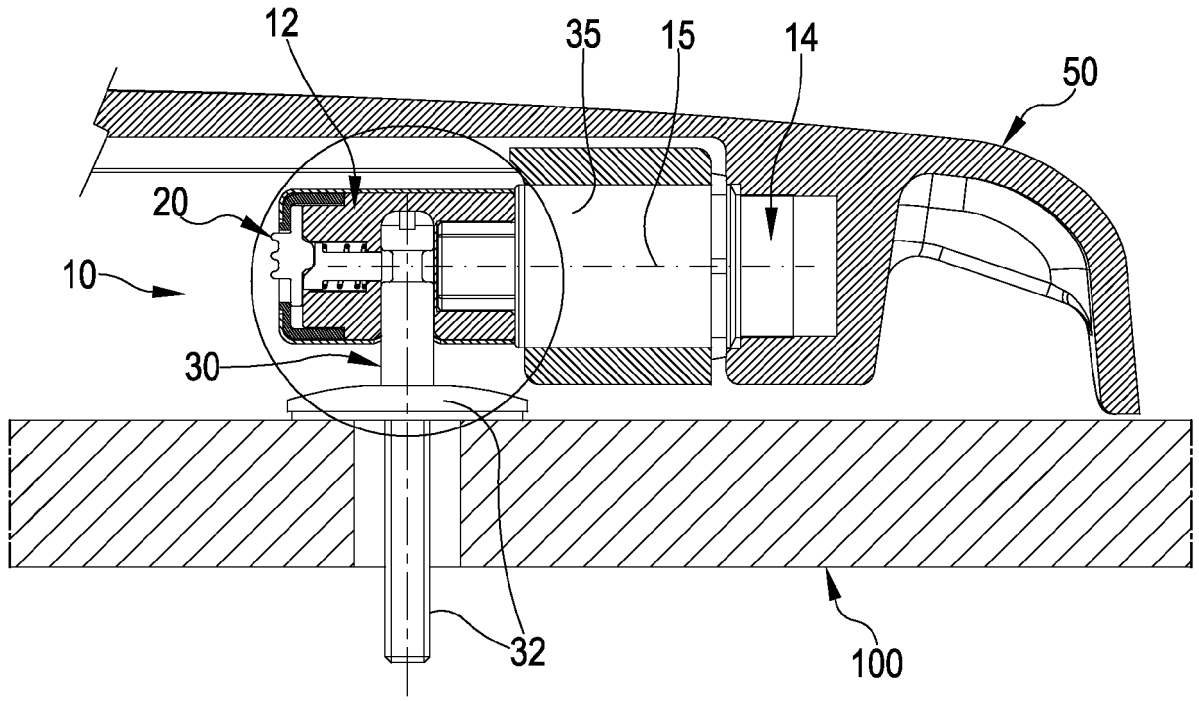
30

FIG.3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10
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100

FIG.3a

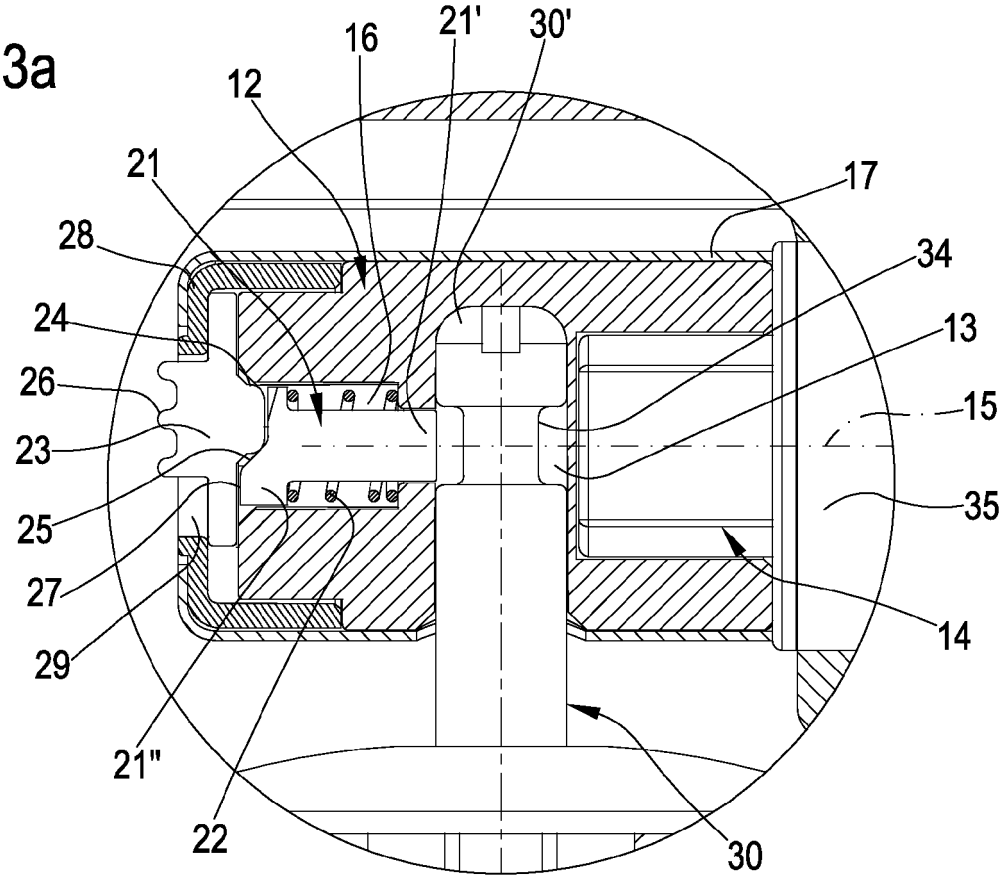
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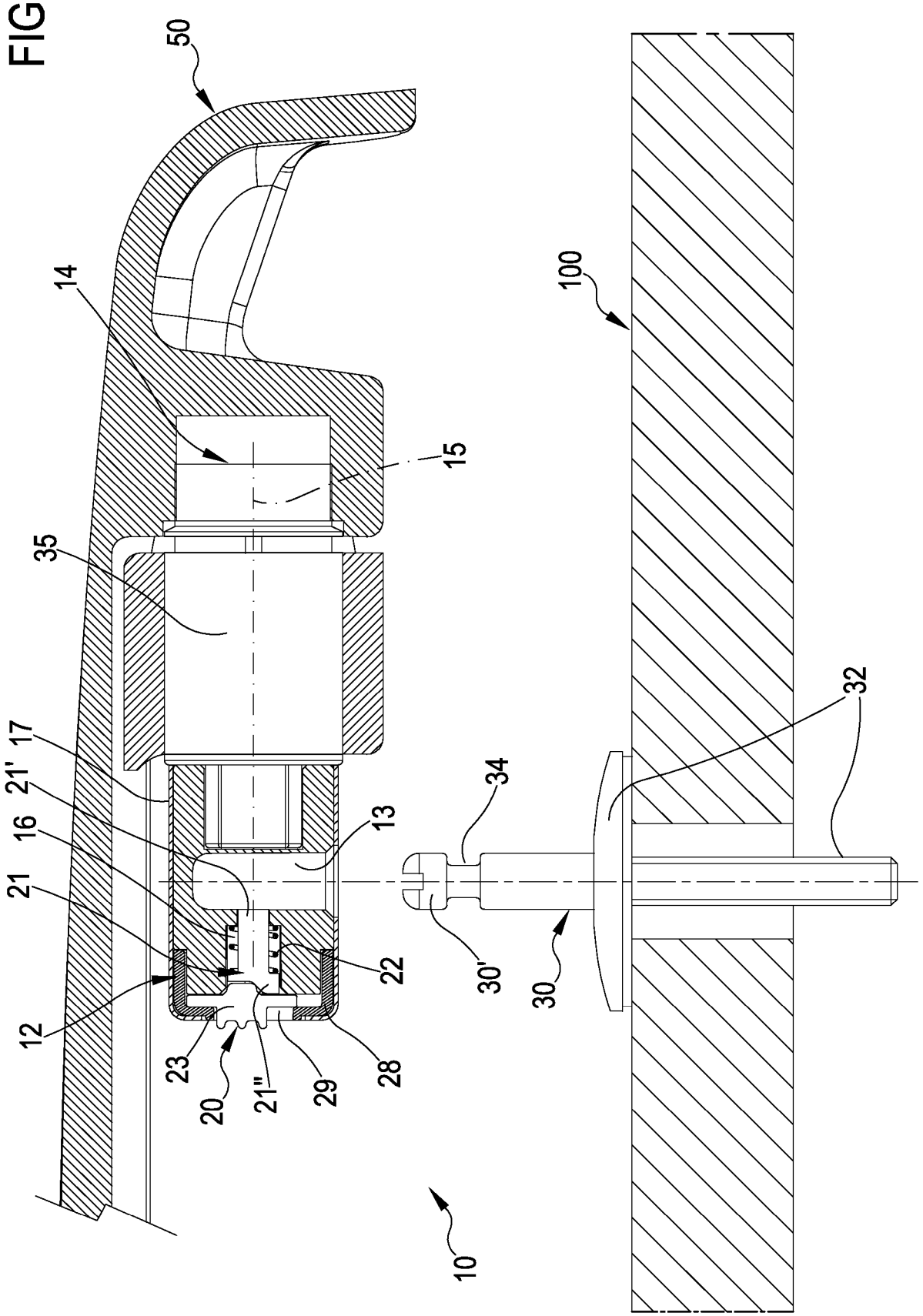
FIG.4



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EUROPEAN SEARCH REPORT

Application Number
EP 18 17 9153

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
A	DE 10 2015 103300 A1 (HAMBERGER IND GMBH [DE]) 8 September 2016 (2016-09-08) * paragraph [0009] - paragraph [0010]; figures *	1,3,6, 9-11	INV. A47K13/26
A	CN 103 892 765 A (LI FEIYONG) 2 July 2014 (2014-07-02) * figures *	1-4,9-11	
A	WO 2014/036824 A1 (ZHOU YUJIA [CN]; LIU WANGXIA [CN]; ZHOU XIAODONG [CN]; LI YONGHUA [CN]) 13 March 2014 (2014-03-13) * figures *	1,5,8-11	
A	WO 2013/013450 A1 (HOTI XIAMEN PLUMBING ING [CN]; CHEN GUOBIN [CN]) 31 January 2013 (2013-01-31) * figures *	1,5,8-11	
A	EP 1 800 585 A2 (CAVAGNA & SIPEX INTERNAT S R L [IT]) 27 June 2007 (2007-06-27) * paragraph [0015]; figures *	1	

TECHNICAL FIELDS SEARCHED (IPC)

A47K

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
The Hague	6 November 2018	Fordham, Alan

CATEGORY OF CITED DOCUMENTS

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EPO FORM 1503 03.82 (P04C01)

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