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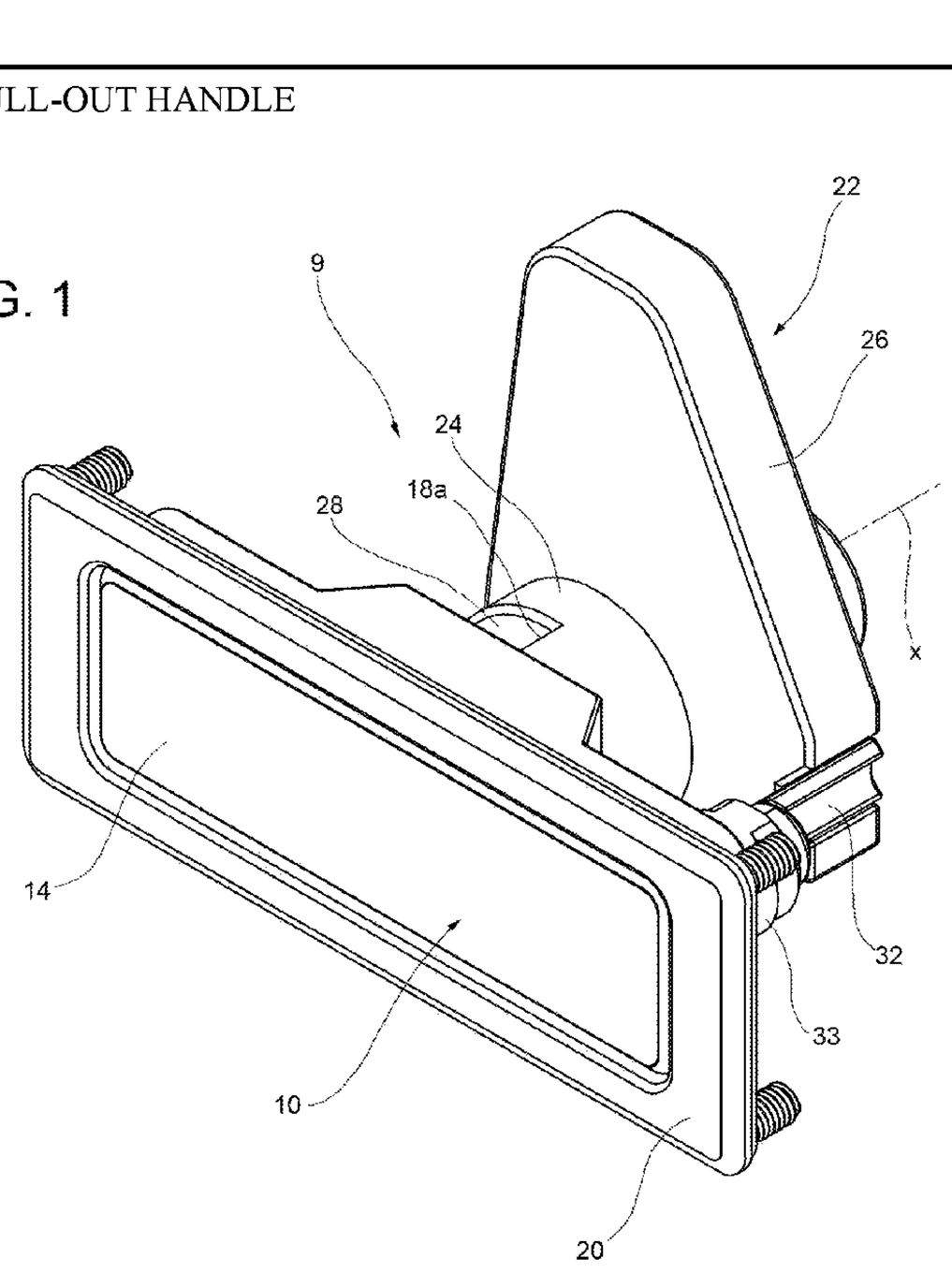
(54) Title: LOCK WITH A PULL-OUT HANDLE

FIG. 1



(57) Abstract: A lock (9) comprises a handle (10), a body (16) and a hook (22), mutually held together by a pin (28), slidable within slots in these elements, so that the handle (10) is movable between a retracted position and an extracted position, being able to rotate with respect to the body (16).

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Lock with a pull-out handle

Technical field

This invention relates, in general, to the sector of locks; in particular, the invention refers to a lock with a pull-out handle.

Summary of invention

Locks equipped with rotating or pull-out handles are known.

An example of a lock equipped with a handle extraction mechanism is known from the document US 2 833 582 A1.

A lock according to this invention provides a handle, which is rotatably slidable within a body fixed to a support (for example, the access door to a load compartment of a commercial vehicle, the door of a piece of furniture or a wall unit, a door, etc.), in such a way that, once extracted, it is rotatable integrally with a hook which disengages a striker, with respect to which the support is kept in a fixed position when the lock is in a closed configuration.

To carry out these rotary translation movements, the aforesaid components of the lock (i.e. the handle, the body and the hook) are equipped with tubular portions, mutually concentric, in which slots are obtained wherein a pin is inserted, which binds the relative movement between such tubular portions.

Specifically, the tubular portion associated with the body comprises a circumferential slot, at least partially aligned with a hole passing through the tubular portion associated with the hook and with a slot extending at least partially in the axial direction along the tubular portion associated with the handle.

The pin, passing through the through-hole in the tubular part of the hook, is inserted slidably into the slots of the tubular portions associated with the other two elements.

In this way, the pin, sliding in the at least partially axial slot of the handle, guides said handle in the movement of extraction (both in the axial direction and, preferably, in the rotational direction); thus, when the handle is maximally extracted axially, the sliding of the pin inside the circumferential slot of the body guides the handle in rotation, integrally with the hook.

With such a configuration, it is also possible to provide a lock of a latch which, by engaging the hook, prevents its rotation (i.e., by keeping the lock in the closed configuration).

Expediently, when the handle is in the retracted position, the relative grip portion blocks access to the latch, so that it is necessary to extract the handle in order to disarm the latch, disengaging the hook which, in turn, may rotate integrally with the handle, releasing the support to which the lock may be secured.

Moreover, according to a further aspect of the invention, the lock comprises a handle release mechanism of the so-called “push-pull” type (the application of which is well known, for example, for opening and closing cabinets and doors, an application wherein they are typically associated with magnets), comprising a pair of telescopically extendable tubular portions and equipped with coupling portions adapted to engage each other when the handle is in the retracted position, and disengage when the handle is pushed toward the rear portion of the lock so as to hold the handle in the retracted position with respect to the body and push the handle in axial extraction with respect to this body, respectively.

The aforesaid and other objects and advantages are achieved by a lock having the features defined in the appended claims. Preferred embodiments of the invention are defined in the dependent claims.

Brief description of the drawings

The functional and structural features of some preferred embodiments of a lock according to the invention will now be described. Reference is made to the accompanying drawings, wherein:

- Fig. 1 is a schematic perspective view of a lock, according to an embodiment of this invention;
- Fig. 2 is an exploded perspective view of the lock in Fig. 1;
- Fig. 3 is an exploded perspective view of a lock according to a further embodiment of this invention;
- Fig. 4A to 4H are a series of perspective views, illustrating an operating sequence of the lock of Fig. 3, which show respectively a closing configuration of the lock (wherein the handle is in the retracted position, and the hook behind it is rotated into a position adapted to hold any support to which the lock is secured in the closed position), a series of passages of the handle up to an angularly intermediate position (rotated 90° with respect to the initial position of the handle), and a further angular excursion of 90° to cause the rotation and lowering of the hook (with consequent release of any support); and
- Fig. 5A to 5F are a series of schematic views in longitudinal section, illustrating an operating sequence of the lock according to an embodiment of the invention, which show respectively a closed configuration of the lock (wherein the handle is in the retracted position), a step wherein the handle is pushed axially in the direction of the hook to disengage coupling elements of a so-called “push-pull”-type actuation mechanism, an axial stroke of the handle coming out of the body, the rotation of the same by 180° (whereof 90° runs integrally with the hook), the return of the handle into the body with an extra stroke to restore the locking condition of the actuation mechanism, and the return of the handle to a position axially corresponding to the retracted position.

Detailed description

Before describing in detail a plurality of embodiments of the invention, it should be clarified that the invention is not limited in its application to the construction details and the configuration of the components presented in the following description or illustrated in the drawings. The invention is able to assume other embodiments and to be implemented

or constructed in practice in different ways. It should also be understood that the phraseology and terminology have a descriptive purpose and should not be construed as limiting.

Referring by way of example to Fig. 1, a lock 9 comprises a handle 10, which includes a primary tubular portion 12, elongated in an axial direction.
The primary tubular portion 12 comprises a primary groove 12a, extending over at least part of an outer lateral surface of the primary tubular portion 12 along said axial direction.

The handle 10 further comprises a grip portion 14, integrally connected to a first end of the primary tubular portion 12 and elongated in a direction perpendicular to said axial direction. Said grip portion 14 is contoured in such a way as to allow a user to grip it, in order to manipulate the handle 10.

There is also a body 16, adapted to be fixed to a first external support and comprising a secondary tubular portion 18, elongated in said axial direction.

This secondary tubular portion 18 comprises a secondary groove 18a passing therethrough, extending circumferentially along at least part of the lateral surface of said secondary tubular portion 18. Preferably, the ends of the secondary groove 18a are circumferentially spaced 180° apart.

The secondary tubular portion 18 accommodates coaxially the primary tubular portion 12 of the handle 10, in a slidable and rotatable manner with respect to a main axis x parallel to said axial direction, the end of the handle 10 which carries the grip portion 14 protruding axially to the exterior of said secondary tubular portion 18.

The lock 9 further includes a hook 22, comprising a tertiary tubular portion 24, elongated in the axial direction and mounted coaxial to said primary and secondary tubular portions 12, 18.

This tertiary tubular portion 24 has a through-hole 24a, oriented along a radial direction, and the hook 22 further comprises a striker 26, placed at one end of the tertiary tubular portion 24 distal with respect to the grip portion 14 of the handle 10 and elongated in a direction perpendicular to said axial direction.

The striker 26 is rotatable integrally with the tertiary tubular portion 24 with respect to the body 16 about the main axis x and is adapted to abut against a second external support to prevent its movement with respect to said first external support.

There is also a pin 28, passing through the through-hole 24a of the tertiary tubular portion 24 and slidably accommodated in the axial and/or circumferential direction in the primary groove 12a and in the secondary groove 18a. In effect, the through-hole 24a, the primary groove 12a and the secondary groove 18a are in a condition of at least partial alignment, such that the pin 28 may simultaneously engage said through-hole 24a, said primary groove 12a and said secondary groove 18a.

The handle 10 is movable between a retracted position, wherein the primary tubular portion 12 is mostly accommodated in the secondary tubular portion 18 and the grip portion 14 is arranged in a first angular position, and an extracted position, wherein the primary tubular portion 12 is maximally protruding axially from the secondary tubular portion 18 and the grip portion 14 is arranged in a second angular position, rotated (expediently, by 180°) with respect to the first angular position.

According to the configurations, the tertiary tubular portion 24 of the hook 22 may be in a radially external position with respect to the secondary tubular portion 18 of the body 16 (as, for example, in the embodiment illustrated in Fig. 3), or in a radially intermediate position between the secondary tubular portion 18 of the primary tubular portion 12 of the handle 10 (as, for example, in the embodiment illustrated in Fig. 2). Expediently, the primary tubular portion 12 of the handle 10 is radially accommodated inside the other two secondary and tertiary tubular portions 18, 24.

Expediently, the ends of the primary groove 12a are axially spaced by a length at least equal to the stroke of the handle 10 from the retracted position to the extracted position, so that the pin 28, in the condition of maximum axial extraction of the handle 10, abuts against the end of said primary groove 12a, distal with respect to the grip portion 14.

According to a preferred embodiment, the grip portion 14 is rotatable about the main axis x in a manner integral with the hook 22 between a median position, angularly intermediate between said retracted and extracted positions of the handle 10 (for example, at 90° with respect to the first angular position), and said extracted position.

This effect is expediently obtained by contouring the primary groove 12a so that it extends between two ends spaced axially and circumferentially along the outer lateral surface of the primary tubular portion 12. In this way, the sliding of the pin 28 inside the primary groove 12a, in the passage of the handle 10 from the retracted position to the median position, causes a rotation of the handle 10 about the main axis x.

An operating sequence of the lock 9, in the transition from the retracted position to the extracted position of the handle 10, is shown by way of example in Fig. 4A to 4G, which will be described below merely for illustrative purposes to better clarify the operating principle of a lock according to an embodiment of this invention.

In particular, Fig. 4A shows the lock 9 with the handle 10 in the retracted position (the relative grip portion 14 being received in a tray or embedding portion 20 of the body 16, as described below).

Subsequently, the handle 10 is axially extracted from the body 16; during the stroke, the pin 28 slides within the primary groove 12a. In the illustrated example, this primary groove 12a has a pseudo-helical course, with a first substantially axial portion (inside of which the pin 28 slides to force the handle 10 to travel an axial stroke, as shown by way of example in Fig. 4B), and a second non-axial section, inside of which the pin 28 slides to force the handle 10 to rotate about the main axis x (as shown by way of example in Fig. 4B to 4E,

the rotation being expediently 90° in a counterclockwise direction), until reaching the median position of the handle 10 (as shown by way of example in Fig. 4F).

In this median position, the handle 10 is made to rotate further (expediently, by a further 90° in a counterclockwise direction). In this configuration, the pin 28 abuts against the side of the primary groove 12a, whereby it is pulled to slide inside the secondary groove 18a (as illustrated by way of example in Fig. 4G and 4H), causing the hook 22 also to rotate about the main axis x. This involves the rotation of the striker 26, and the relative passage from a condition of potential engagement with an external protuberance (to which the support of the lock 9 would be bound), to a condition of potential disengagement therefrom (so that the support of the lock 9 is made movable with respect to the protuberance). In the illustrated example, these conditions of potential engagement and disengagement of the hook 22 from the external protuberance are represented by a vertically raised or horizontally lowered position of the striker 26 respectively.

Expediently, once the extracted position has been reached, the handle 10 may be further retracted in an axial direction with respect to the body 16, until it abuts in a final position axially corresponding to the retracted position.

According to a preferred embodiment, the body 16 further comprises an embedding portion 20, integrally connected to a first end of the secondary tubular portion 18 (proximal to the grip portion 14) and elongated in a direction perpendicular to said axial direction, the embedding portion 20 of which has a box-like section which identifies a compartment adapted to receive at least partially the grip portion 14 of the handle 10.

Expediently, the compartment defined by the embedding portion 20 is delimited by a back wall 20a, extending on a plane parallel to the plane of rotation of the grip portion 14 between said first and second angular positions, and four side walls 20b, facing in pairs and projecting perpendicularly from the back wall 20a with respect to the axial direction.

Expediently, the lock 9 comprises a swivel pin 32, rotatably supported by the back wall 20a of the embedding portion 20 about an axis parallel to the main axis x, said swivel pin

32 protruding from the back wall 20a toward the striker 26 and being rotatable between an engagement position, wherein the swivel pin 32 engages the striker 26 and prevents a rotation of said striker 26 about the main axis x, and a disengagement position, wherein the swivel pin 32 avoids engaging the striker 26 and permits a rotation of said striker 26 around the main axis x integral with the handle 10.

Ideally, the swivel pin 32 is a substantially cylindrical or semi-cylindrical element, adapted to engage a corresponding seat 26a on the striker 26, whereby, when the swivel pin 32 is accommodated in said seat 26a, a rotation of said striker 26 about the main axis x is prevented.

According to a preferred embodiment, the swivel pin 32 may not be rotated when the handle 10 is in its retracted position, wherein the grip portion 14 is accommodated in the embedding portion 20.

Expediently, the lock 9 comprises a traditional cylinder for locks 33 operatively associated with the swivel pin 32 and adapted to rotate said swivel pin. This lock cylinder 33 includes an access compartment 33a, adapted to allow the insertion of a key for operating the lock cylinder 33 (in a manner well known to a person skilled in the art), this access compartment 33a facing the compartment defined by the bottom and side walls 20a, 20b of the embedding portion 20 (whereby, when the handle 10 is in the retracted position, the relative grip portion 14, by inserting itself into the embedding portion 20, closes the access compartment 33a, preventing the actuation of the cylinder 33, and the consequent rotation of the swivel pin 32).

Ideally, a resilient means (not shown) is provided which on the one hand engages the body 16 and/or the hook 22, and on the other the handle 10, this resilient means being capable of pushing the handle 10 from the retracted position toward the extracted position.

According to a preferred embodiment, the lock 9 comprises a release mechanism 30, coaxially accommodated in a radially internal position with respect to the primary, secondary and tertiary tubular portions 12, 18, 24, said mechanism comprising a radially

internal cylindrical portion 30a, having an end fixed to the body 16 and/or to the hook 22, and a radially external cylindrical portion 30b, having one end fixed to the handle 10.

Such internal and external portions 30a, 30b are telescopically extendable from a compact configuration, wherein the handle 10 is in the retracted position, to an extended configuration, wherein the handle 10 is in the extracted position.

Expediently, the operating mechanism 30 is configured as a mechanism of the so-called "push-pull" or "push latch" or "push to open latch" type, wherein a pressure on the extendable element (in this case, the handle 10) toward a recessed position in the relative support (in this case, the body 16) produces a brief extra stroke of this extendable element, with consequent disengagement of the coupling elements which bind the telescopic components of the actuation mechanism 30 to each other. These telescopic components, released in this manner, then extend telescopically, pushing the extendable element toward an extracted position from the support.

An example of a functionally similar mechanism is known from the document US 2014001938 A1, which describes a system for locking and extracting a piston from a body by means of the engagement of resilient means and profiles in mutual coupling.

According to an embodiment, the radially internal and external portions 30a, 30b of the release mechanism 30 comprise respective coupling means 31a, 31b, capable of passing (when the handle 10, being in the retracted position, is pushed toward the hook 22) from a mutual coupling configuration, wherein said radially internal and external cylindrical portions 30a, 30b are held in the compact configuration against the thrust of the resilient means, to a decoupling configuration, wherein said radially internal and external cylindrical portions 30a, 30b are telescopically extendable under the thrust of said resilient means.

According to a preferred embodiment, the radially external cylindrical portion 30b comprises a hollow cylindrical sleeve, inside of which a cylindrical stem extends which carries, near its end (distal to the grip portion 14), the respective coupling means 31b (in

the form, for example, of an externally threaded cylindrical portion). At the same time, the radially internal cylindrical portion 30a comprises a hollow cylindrical crown, fixed at one end to the body 16 and/or to the hook 22, and inserted in a radially intermediate position between the cylindrical sleeve and the stem of the radially external cylindrical portion 30b, in such a way that said cylindrical sleeve and stem are integrally slidable with respect to said hollow cylindrical crown. The hollow cylindrical crown includes respective coupling means 31a, configured, for example, in the form of a pair of internally threaded cylindrical portions.

The coupling means 31a, 31b, associated with the two radially internal and external cylindrical portions 30a, 30b, are configured in such a manner that, when the handle 10 is in the retracted position, the coupling means 31b of the radially external cylindrical portion 30b engages the first coupling means 31a of the radially internal cylindrical portion 30a (distal with respect to the grip portion 14), preventing the radially external cylindrical portion 30b from sliding axially with respect to the radially external cylindrical portion 30b (as illustrated by way of example in Fig. 5A).

Such coupling means 31a, 31b are also arranged to disengage when the handle 10 (and, consequently, the radially external cylindrical portion 30b, which is integral therewith) retracts further inside the body 16 in response to a thrust exerted from the outside on the grip portion 14; this determines the telescopic extension of the radially external cylindrical portion 30b with respect to the radially internal cylindrical portion 30a (as illustrated by way of example in Fig. 5B and 5C), expediently under the thrust of a resilient means, accommodated in the actuation mechanism 30 between the external sleeve, the stem and the cylindrical crown.

When the radially external cylindrical portion 30b is maximally extended with respect to the radially internal cylindrical portion 30a, and the handle 10 has been rotated around the main axis x to the extracted position (as illustrated by way of example in Fig. 5D), the handle 10 is further retractable (in response to a thrust exerted from the outside on the grip portion 14) in the body 16, to an end-stroke position, axially more rearward (with respect to the embedding portion 20) than the retracted position.

In this condition, the coupling means 31a, 31b are arranged to engage each other when the handle 10 returns to a position axially corresponding to the retracted position; this prevents the telescoping of the radially external cylindrical portion 30b with respect to the radially internal cylindrical portion 30a.

Throughout this description and in the claims, the terms and expressions indicating positions and orientations, such as “axial” or “radial,” refer to the main axis x.

Various aspects and embodiments of a lock according to the invention have been described. It is understood that each embodiment may be combined with any other embodiment. Furthermore, the invention is not limited to the described embodiments, but may be varied within the scope defined by the appended claims.

CLAIMS

1. Lock (9), comprising:

- a handle (10), comprising a primary tubular portion (12), elongated in an axial direction and comprising a primary groove (12a) extending over at least part of an outer lateral surface of the primary tubular portion (12) along said axial direction, the handle (10) further comprising a grip portion (14), integrally connected to a first end of the primary tubular portion (12) and elongated in a direction perpendicular to said axial direction;
- a body (16), adapted to be fixed to a first support and comprising a secondary tubular portion (18), elongated in said axial direction and comprising a secondary groove (18a) passing therethrough and extending circumferentially along at least part of the lateral surface of said secondary tubular portion (18), said secondary tubular portion (18) accommodating coaxially the primary tubular portion (12) of the handle (10) in a slidable and rotatable manner with respect to a main axis (x) parallel to said axial direction;
- a hook (22), comprising a tertiary tubular portion (24), elongated in the axial direction and mounted coaxial to said primary and secondary tubular portions (12, 18), said tertiary tubular portion (24) comprising a through-hole (24a) oriented along a radial direction, said hook (22) further comprising a striker (26), placed at one end of the tertiary tubular portion (24), distal with respect to the grip portion (14) of the handle (10) and elongated in a direction perpendicular to said axial direction, said striker (26) being rotatable integrally with the tertiary tubular portion (24) with respect to the body (16) about the main axis (x) and being adapted to abut against a second support to prevent the movement thereof with respect to said first support; and
- a pin (28), passing through the through-hole (24a) of the tertiary tubular portion (24) and slidably accommodated in the axial and/or circumferential direction in the primary groove (12a) and the secondary groove (18a);

said handle (10) being movable between a retracted position, wherein the primary tubular portion (12) is maximally accommodated in the secondary tubular portion (18) and the grip portion (14) is arranged in a first angular position, and an extracted position, wherein the primary tubular portion (12) is maximally protruding axially from the secondary tubular portion (18) and the grip portion (14) is arranged in a second angular position, rotated with respect to the first angular position;

said lock (9) further comprising a release mechanism (30), coaxially accommodated in a radially internal position with respect to the primary, secondary and tertiary tubular portions (12, 18, 24), said mechanism comprising a radially internal cylindrical portion (30a), having one end fixed to the hook (22), and a radially external cylindrical portion (30b), having one end fixed to the handle (10), said internal and external portions (30a, 30b) being telescopically extendable from a compact configuration, wherein the handle (10) is in the retracted position, to an extended configuration, wherein the handle (10) is in the extracted position,

wherein the radially internal and external (30a, 30b) cylindrical portions of the release mechanism (30) comprise respective coupling means (31a, 31b), which are capable of switching from a mutually coupled configuration, wherein said radially internal and external (30a, 30b) portions are retained in the compact configuration against the thrust of a resilient means, to a decoupled configuration, wherein said radially internal and external portions (30a, 30b) are extendable telescopically under the thrust of said resilient means, said coupling means (31a, 31b) being arranged to disengage each other when the handle (10), being in the retracted position, is pushed toward the hook (22).

2. Lock according to claim 1, wherein the radially external cylindrical portion (30b) comprises a hollow cylindrical sleeve, inside of which a cylindrical stem extends, which carries, in proximity to its end, distal with respect to the grip portion (14), the respective coupling means (31b), and wherein the radially internal cylindrical portion (30a) comprises a hollow cylindrical crown, fixed at one of the ends thereof to the body (16) and/or to the hook (22), said hollow cylindrical crown being inserted in a radially intermediate position between the cylindrical sleeve and the stem of the radially external cylindrical portion (30b), so that said cylindrical sleeve and stem are integrally slidable with respect to this hollow cylindrical crown, the hollow cylindrical crown including respective coupling means (31a, 31b), configured in the form of a pair of internally threaded cylindrical portions, where the coupling means (31a, 31b), associated with the two radially internal and external cylindrical portions (30a, 30b), are configured so that when the handle (10) is in the retracted position, the coupling means (31b) of the radially external cylindrical portion (30b) engages the first coupling means (31a) of the radially internal cylindrical

portion (30a), preventing the radially external cylindrical portion 30b from sliding axially with respect to the radially external cylindrical portion (30b).

3. Lock according to claim 1 or 2, wherein the grip portion (14) is rotatable around the main axis (x) in an integral manner with the hook (22) between a median position, angularly intermediate between said retracted and extracted positions of the handle (10), and said extracted position.

4. Lock according to claim 3, wherein the primary groove (12a) is extended between two ends axially and circumferentially spaced along the outer lateral surface of the primary tubular portion (12), so that the sliding of the pin (28) within said primary groove (12a) in the passage of said handle (10) from the retracted to the median position causes the handle (10) to rotate about the main axis (x).

5. Lock according to any one of the preceding claims, wherein the body (16) further comprises an embedding portion (20) integrally connected to a first end of the secondary tubular portion (18) and elongated in a direction perpendicular to said axial direction, said embedding portion (20) having a box section that defines a compartment adapted to accommodate the grip portion (14) of the handle (10), said compartment being delimited by a back wall (20a), extending on a plane parallel to the plane of rotation of the grip portion (14) between said first and second angular positions, and four side walls (20b), facing each other in pairs and protruding perpendicularly from the back wall (20a) with respect to the axial direction.

6. Lock according to claim 5, comprising a swivel pin (32), rotatably supported by the back wall (20a) of the embedding portion (20) about an axis parallel to the main axis (x), said swivel pin (32) protruding from the back wall (20a) toward the striker (26) and being rotatable between an engagement position, wherein the swivel pin (32) engages the striker (26) and a rotation of said striker (26) about the main axis (x) is prevented, and a disengagement position, wherein the swivel pin (32) avoids engaging the striker (26) and a rotation of said striker (26) about the main axis (x) integrally with the handle (10) is allowed.

7. Lock according to claim 6, characterized in that the swivel pin (32) is not rotatable when the handle (10) is in its retracted position, wherein the grip portion (14) is accommodated in the embedding portion (20).

8. Lock according to claim 7, comprising a lock cylinder (33) operatively associated with the swivel pin (32) and adapted to rotate said swivel pin, said lock cylinder (33) including an access compartment (33a) adapted to allow the insertion of a key to operate the lock cylinder (33), said access compartment (33a) facing the compartment defined by the back and side walls (20a, 20b) of the embedding portion (20).

9. Lock (9), comprising:

- a handle (10), comprising a primary tubular portion (12), elongated in an axial direction and comprising a primary groove (12a) extending over at least part of an outer lateral surface of the primary tubular portion (12) along said axial direction, the handle (10) further comprising a grip portion (14), connected integrally to a first end of the primary tubular portion (12) and elongated in a direction perpendicular to said axial direction;
- a body (16), adapted to be fixed to a first support and comprising a secondary tubular portion (18), elongated in said axial direction and comprising a secondary groove (18a) passing therethrough, circumferentially extending along at least part of the lateral surface of said secondary tubular portion (18), said secondary tubular portion (18) accommodating coaxially the primary tubular portion (12) of the handle (10) in a slidable or rotatable manner with respect to a main axis (x) parallel to said axial direction;
- a hook (22), comprising a tertiary tubular portion (24), elongated in the axial direction and mounted coaxial to said primary and secondary tubular portions (12, 18), said tertiary tubular portion (24) comprising a through-hole (24a) oriented along a radial direction, said hook (22) further comprising a striker (26), placed at one end of the tertiary tubular portion (24), distal with respect to the grip portion (14) of the handle (10) and elongated in a direction perpendicular to said axial direction, said striker (26) being rotatable integrally with the tertiary tubular portion (24) about the main axis (x) with respect to the body (16) and being adapted to abut against a second support to prevent the movement thereof with respect to said first support; and

- a pin (28), passing through the through-hole (24a) of the tertiary tubular portion (24) and accommodated slidably in the axial and/or circumferential direction in the primary groove (12a) and the secondary groove (18a);

said handle (10) being movable between a retracted position, wherein the primary tubular portion (12) is maximally accommodated in the secondary tubular portion (18) and the grip portion (14) is arranged in a first angular position, and an extracted position, wherein the primary tubular portion (12) is maximally protruding axially from the secondary tubular portion (18) and the gripping portion (14) is arranged in a second angular position, rotated with respect to the first angular position,

wherein the body (16) further comprises an embedding portion (20) connected integrally to a first end of the secondary tubular portion (18) and elongated in a direction perpendicular to said axial direction, said embedding portion (20) having a box section that defines a compartment adapted to accommodate the grip portion (14) of the handle (10), said compartment being delimited by a back wall (20a), extending on a plane parallel to the plane of rotation of the grip portion (14) between said first and second angular position, and four side walls (20b), facing in pairs and protruding perpendicularly from the back wall (20a) with respect to the axial direction;

the lock (9) further comprising a swivel pin (32), supported rotatably by the back wall (20a) of the embedding portion (20) about an axis parallel to the main axis (x), said swivel pin (32) protruding from the back wall (20a) toward the striker (26) and being rotatable between an engagement position, wherein the swivel pin (32) engages the striker (26) and prevents a rotation of said striker (26) about the main axis (x), and a disengagement position, wherein the swivel pin (32) avoids engaging the striker (26) and a rotation of said striker (26) about the main axis (x) integrally with the handle (10) is allowed.

10. Lock according to claim 9, characterized in that the swivel pin (32) is not rotatable when the handle (10) is in its retracted position, wherein the grip portion (14) is accommodated in the embedding portion (20).

11. Lock according to claim 10, comprising a lock cylinder (33) operatively associated with the swivel pin (32) and adapted to rotate said swivel pin, said lock cylinder (33) including an access compartment (33a) adapted for inserting a key to operate the lock

cylinder (33), said access compartment (33a) facing the compartment defined by the back and side walls (20a, 20b) of the embedding portion (20).

12. Lock according to one of claims 9 to 11, wherein the grip portion (14) is rotatable about the main axis (x) integrally with the hook (22) between a median position, angularly intermediate between said retracted and extracted handle positions (10), and said extracted position.

13. Lock according to claim 12, wherein the primary groove (12a) extends between two ends spaced axially and circumferentially along the outer lateral surface of the primary tubular portion (12), so that the sliding of the pin (28) inside said primary groove (12a) in the passage of the handle (10) from the retracted position to the median position causes a rotation of the handle (10) about the main axis (x).

14. Lock according to any one of claims 9 to 13, comprising a release mechanism (30), accommodated coaxially in a radially internal position with respect to the primary, secondary and tertiary tubular portions (12, 18, 24), said mechanism comprising a radially internal cylindrical portion (30a), one end of which is attached to the hook (22), and a radially external cylindrical portion (30b), having one end attached to the handle (10), said internal and external portions (30a, 30b) being telescopically extendable from a compact configuration, wherein the handle (10) is in the retracted position, to an extended configuration, wherein the handle (10) is in the extracted position.

15. A lock according to claim 14, wherein the radially internal and external cylindrical portions (30a, 30b) of the release mechanism (30) comprise respective coupling means (31a, 31b), suitable to pass through a mutual coupling configuration, wherein said radially internal and external cylindrical portions (30a, 30b) are held in the compact configuration against the bias of a resilient means, to a decoupling configuration, wherein said radially internal and external portions (30a, 30b) are telescopically extendable under the thrust of said resilient means, said coupling means (31a, 31b) being configured to disengage each other when the handle (10), being in the retracted position, is pushed toward the hook (22).

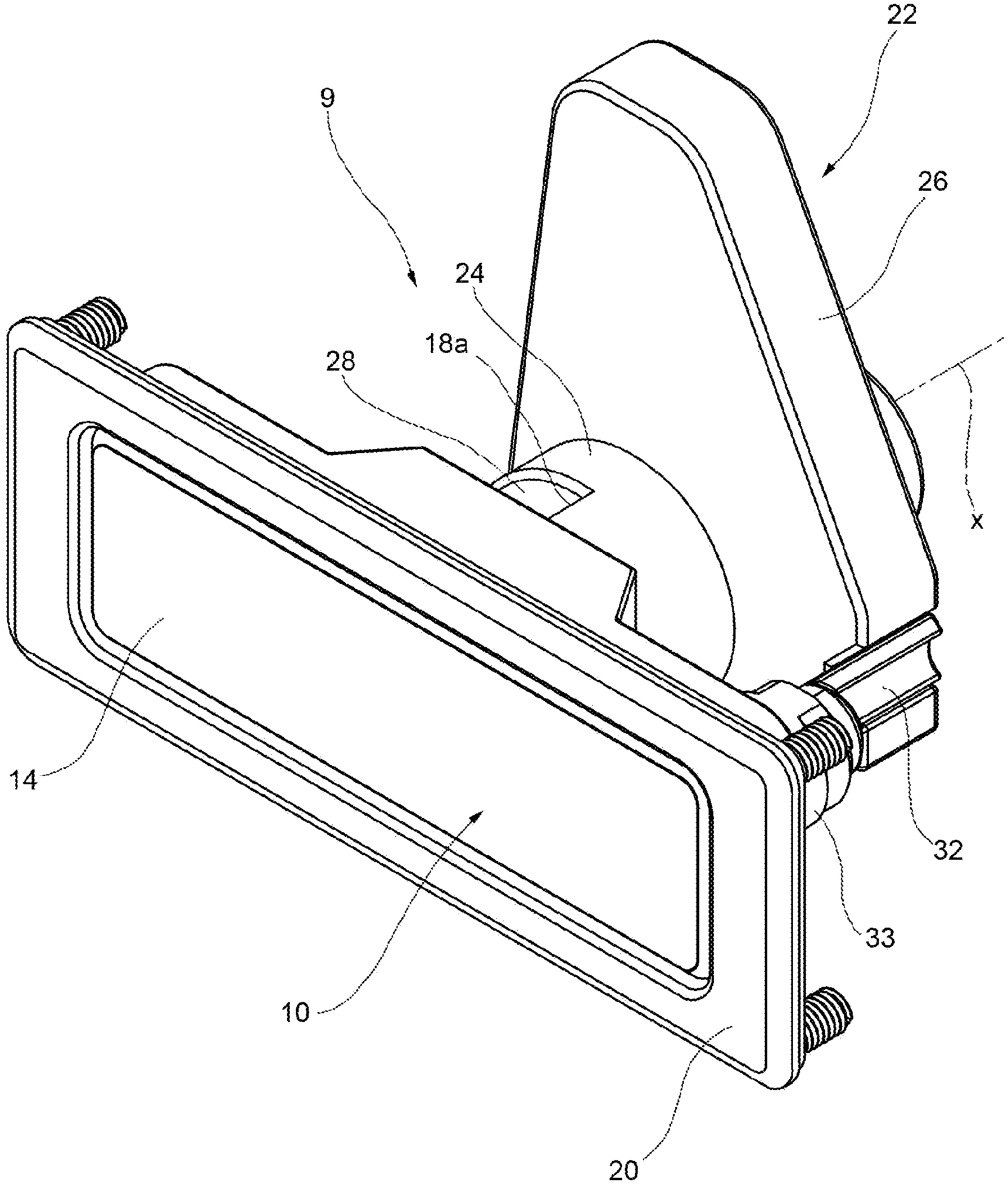

FIG. 1

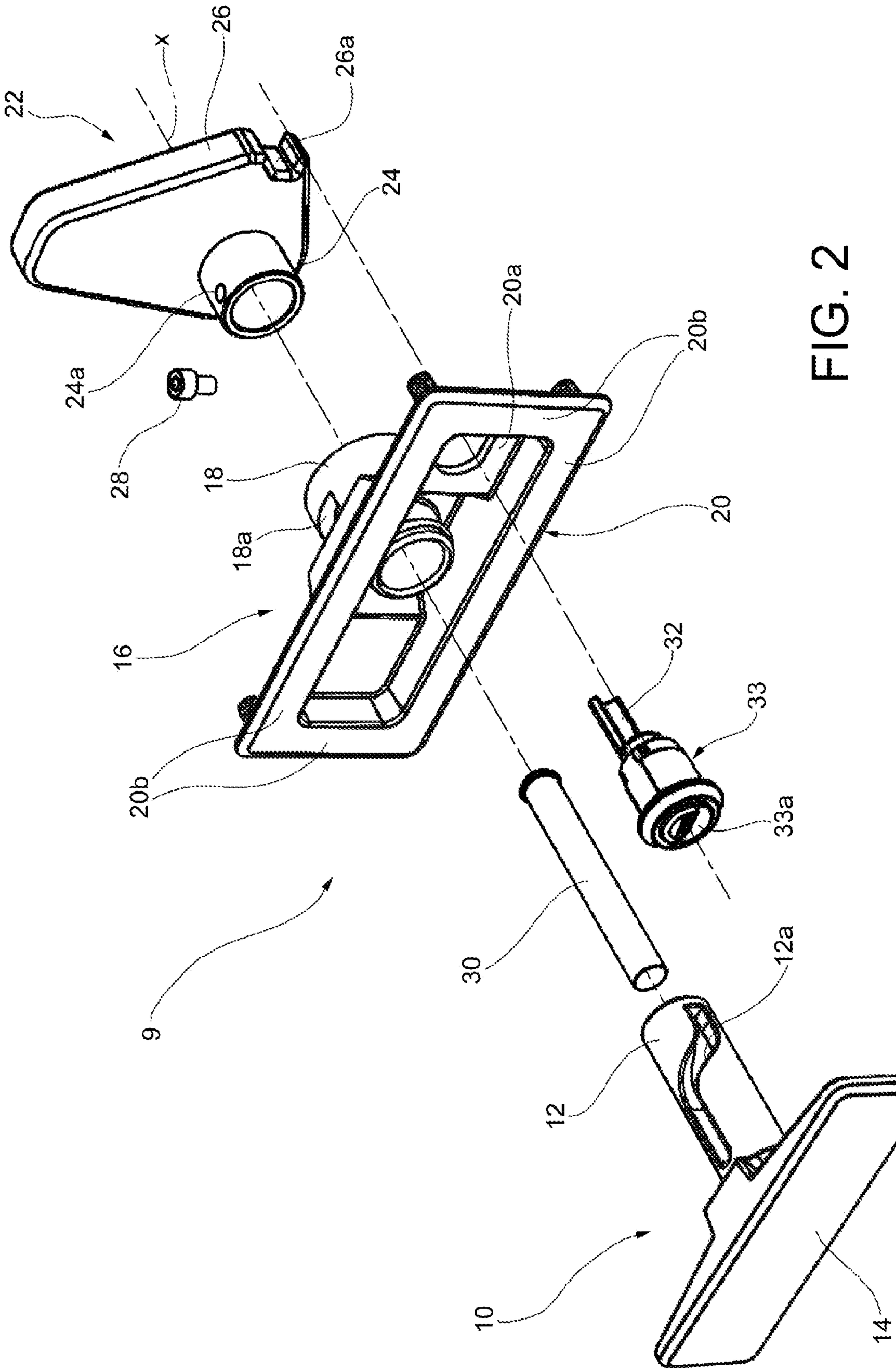
22
X
26
26a
24
24a
28
18
18a
16
20b
20a
20b
20
9
32
33
33a
30
12a
12
10
14

FIG. 2

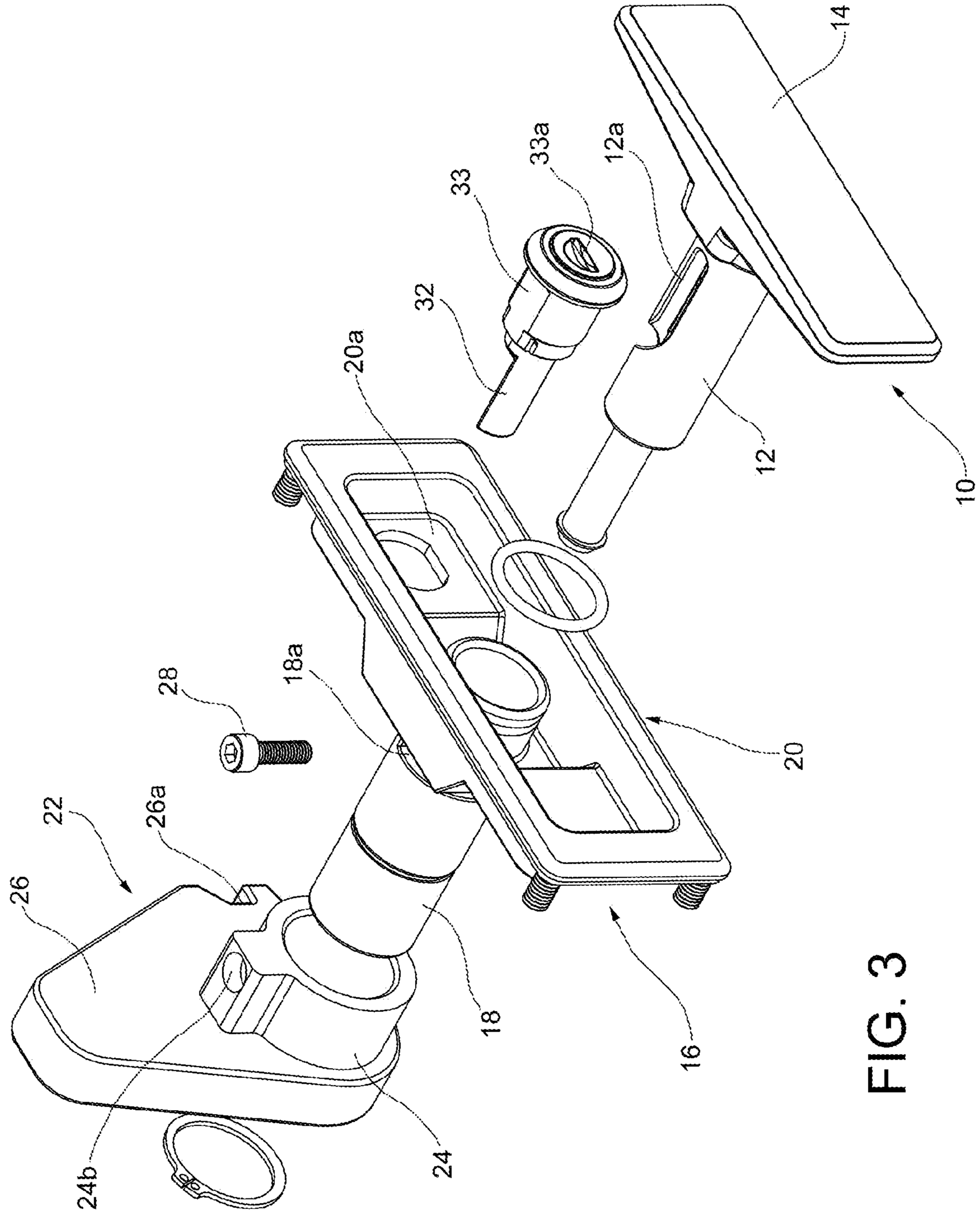

FIG. 3

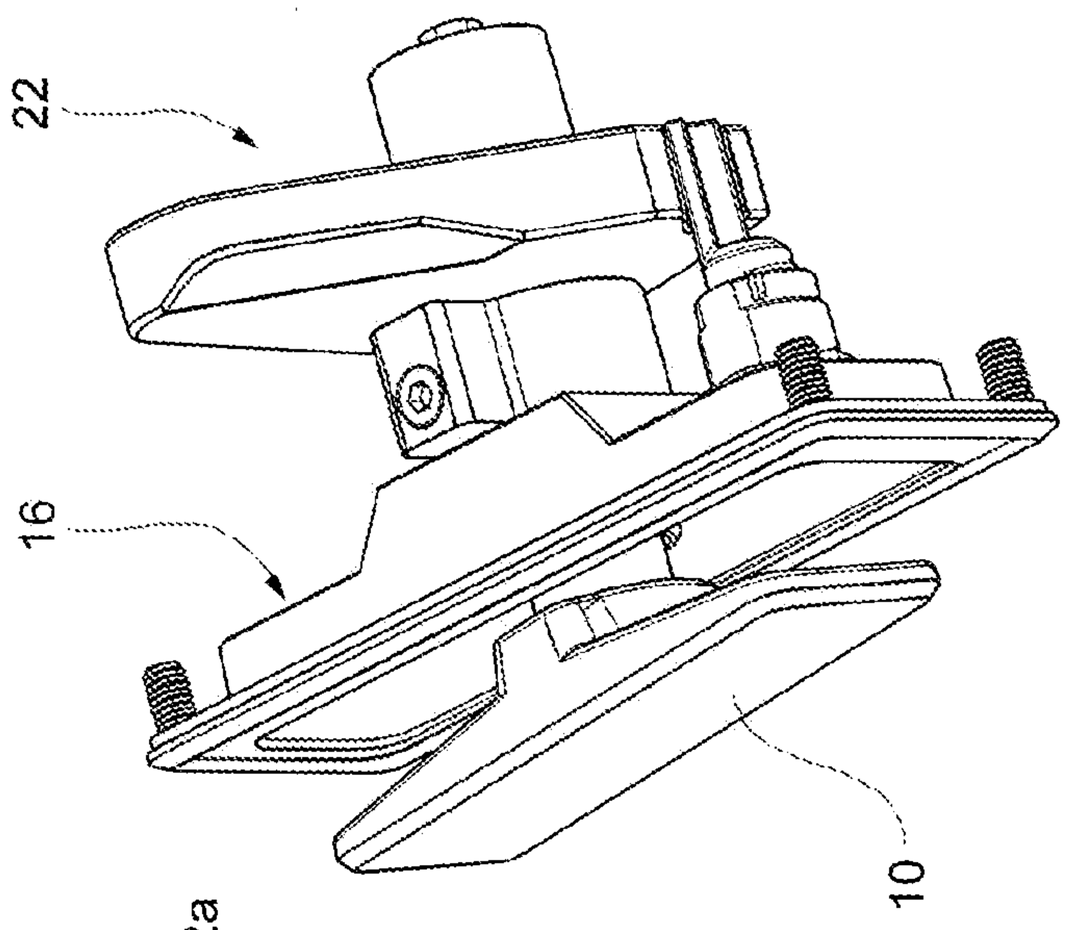

FIG. 4C

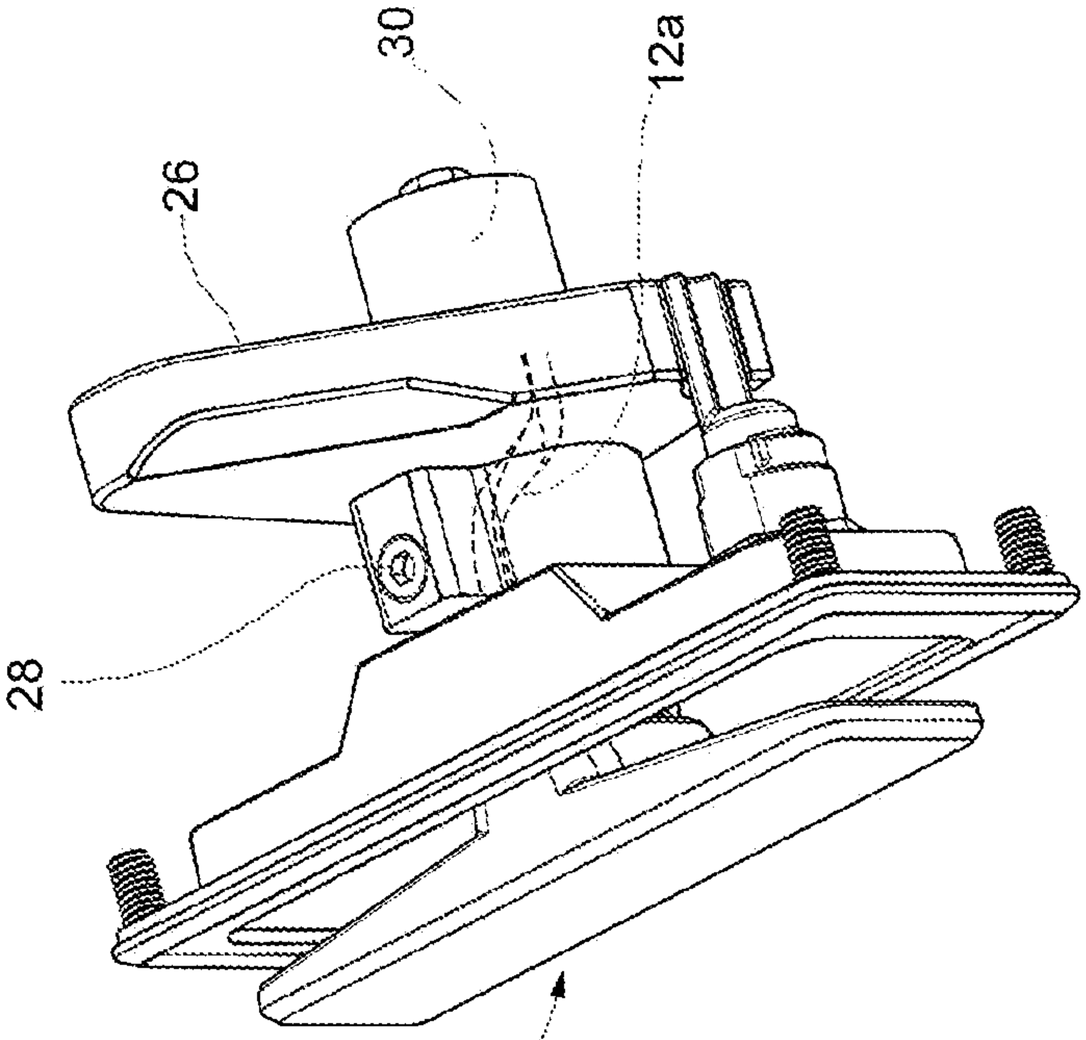

FIG. 4B

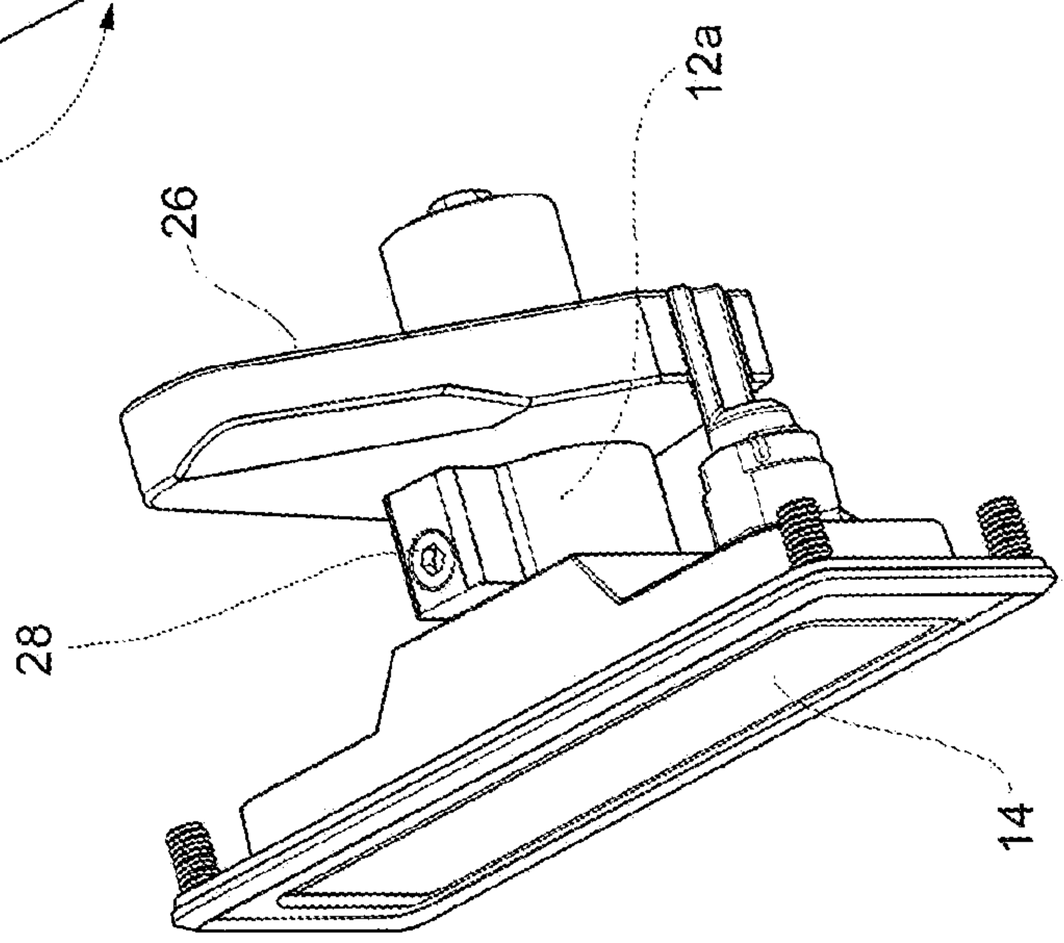

FIG. 4A

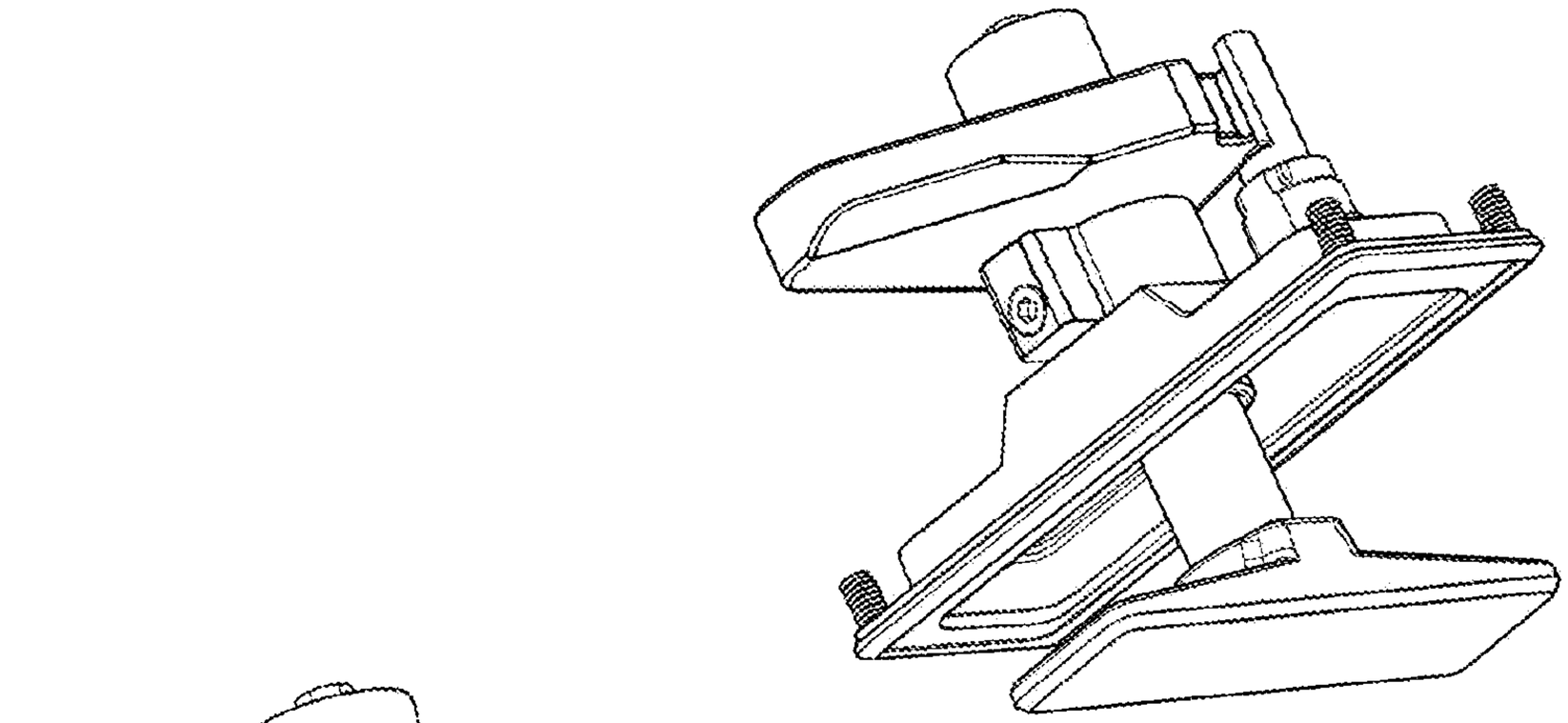

FIG. 4F

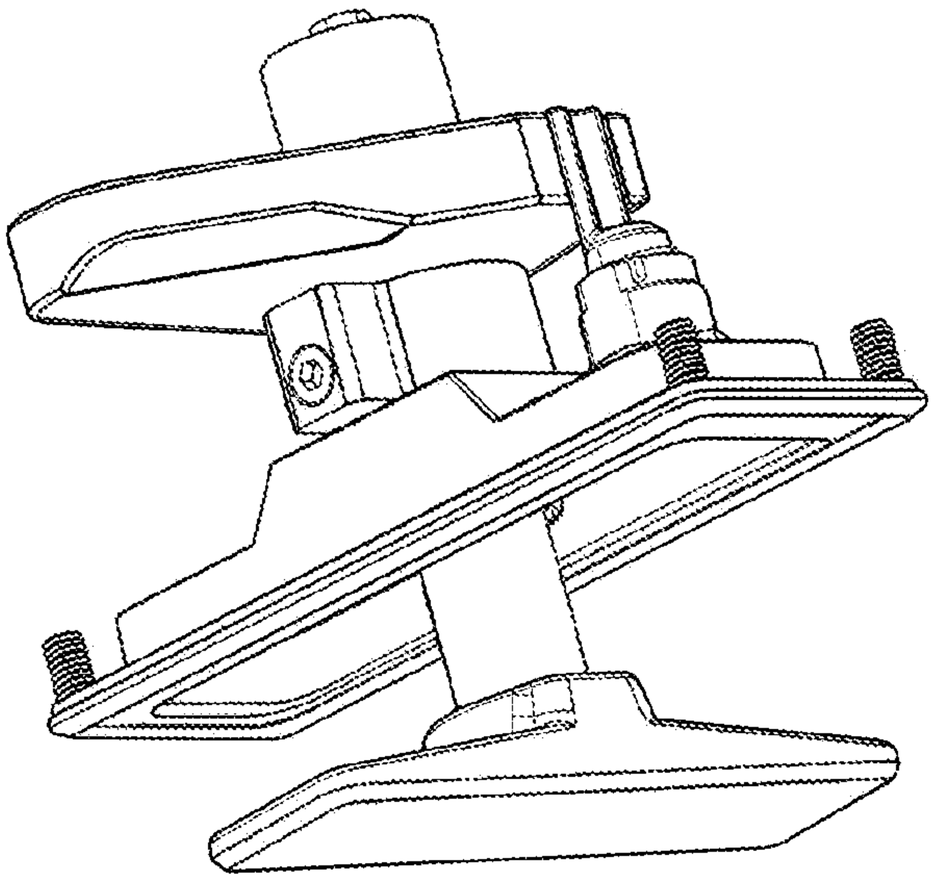

FIG. 4E

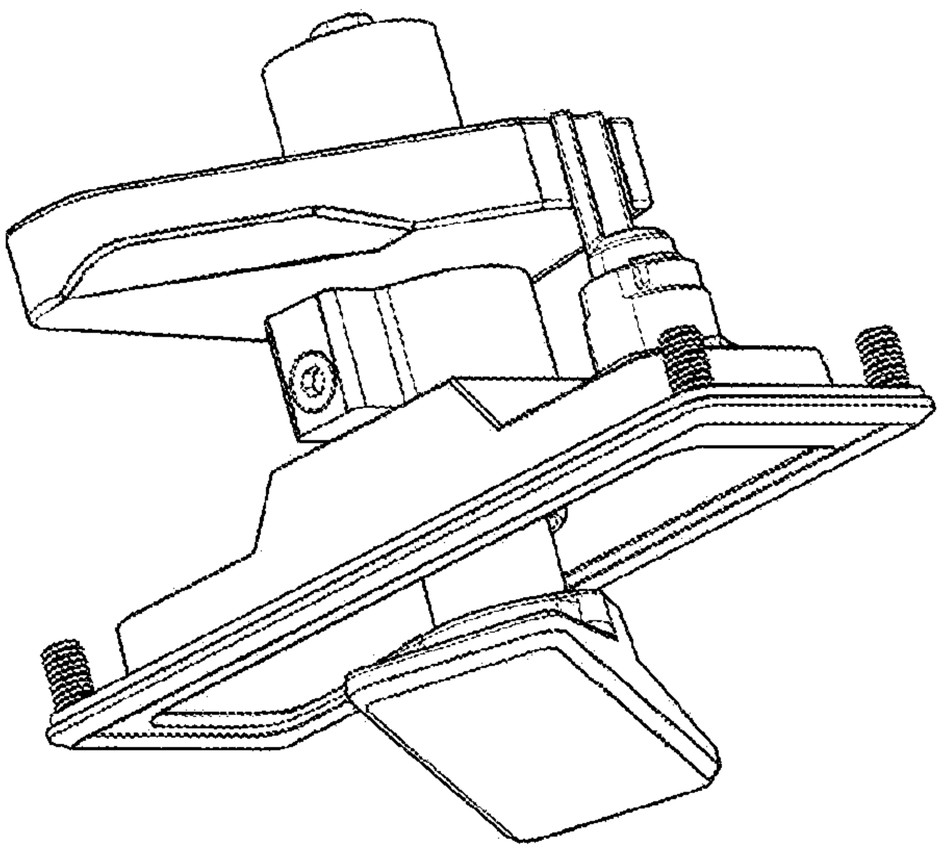

FIG. 4D

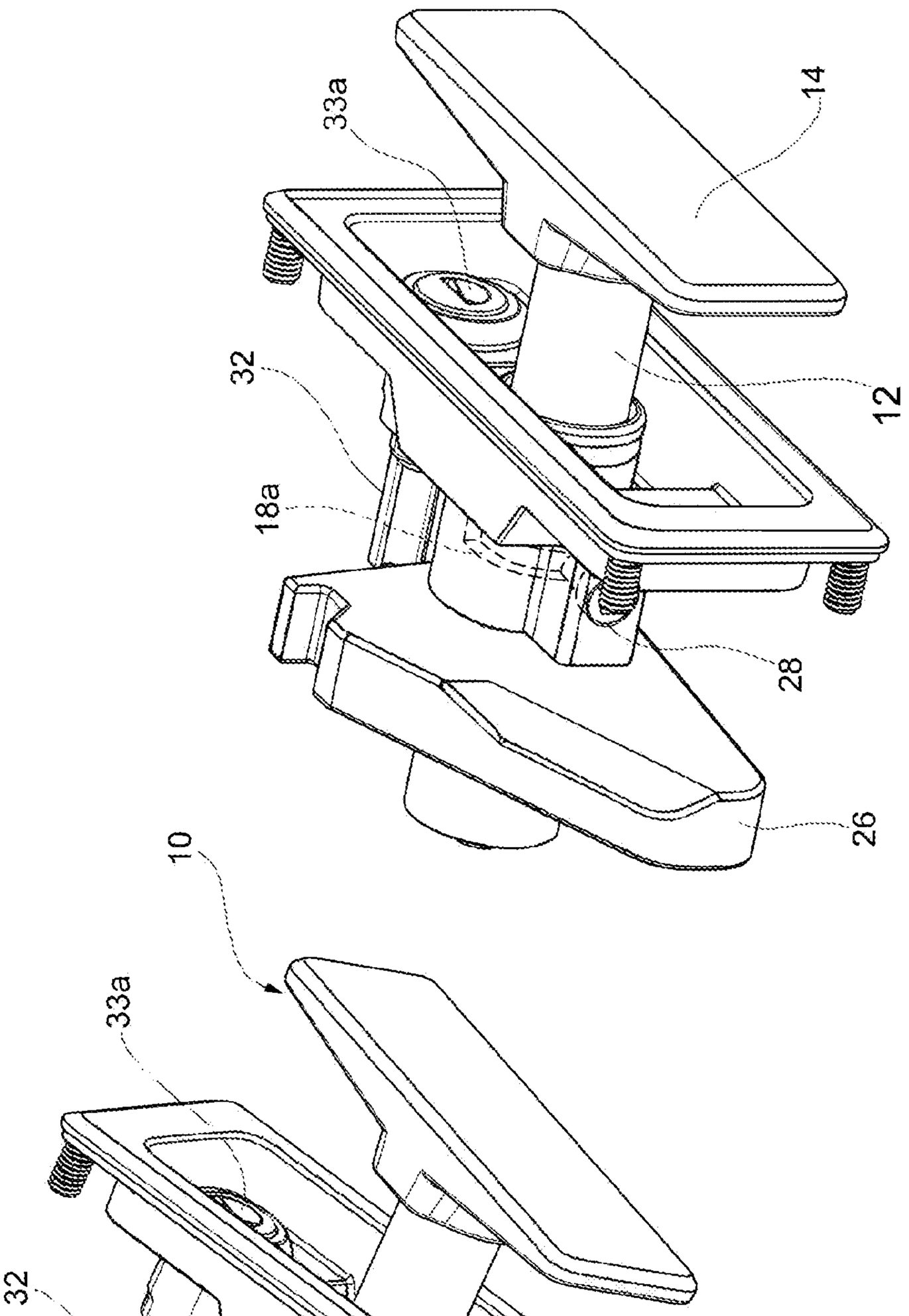

FIG. 4H

FIG. 4G

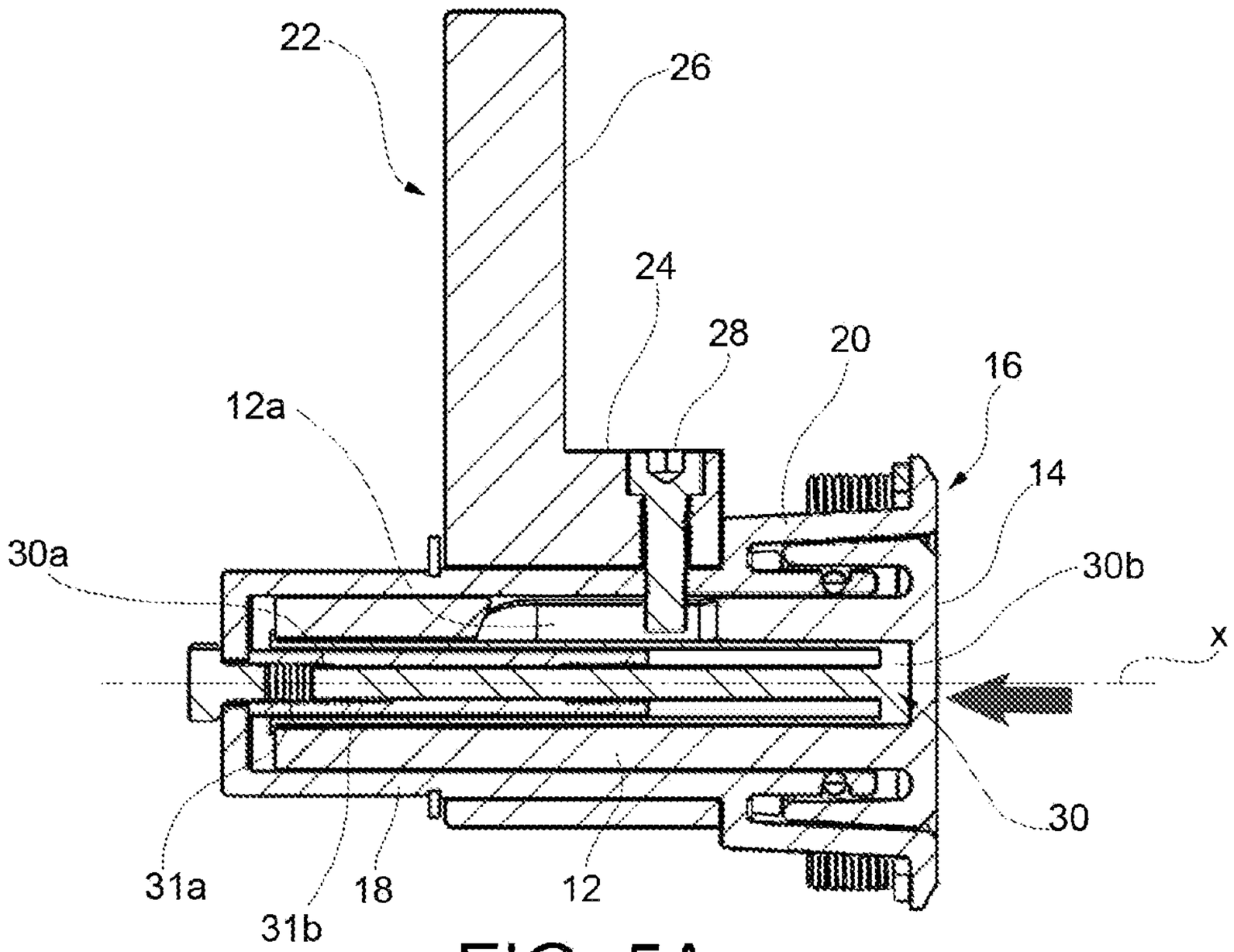

FIG. 5A

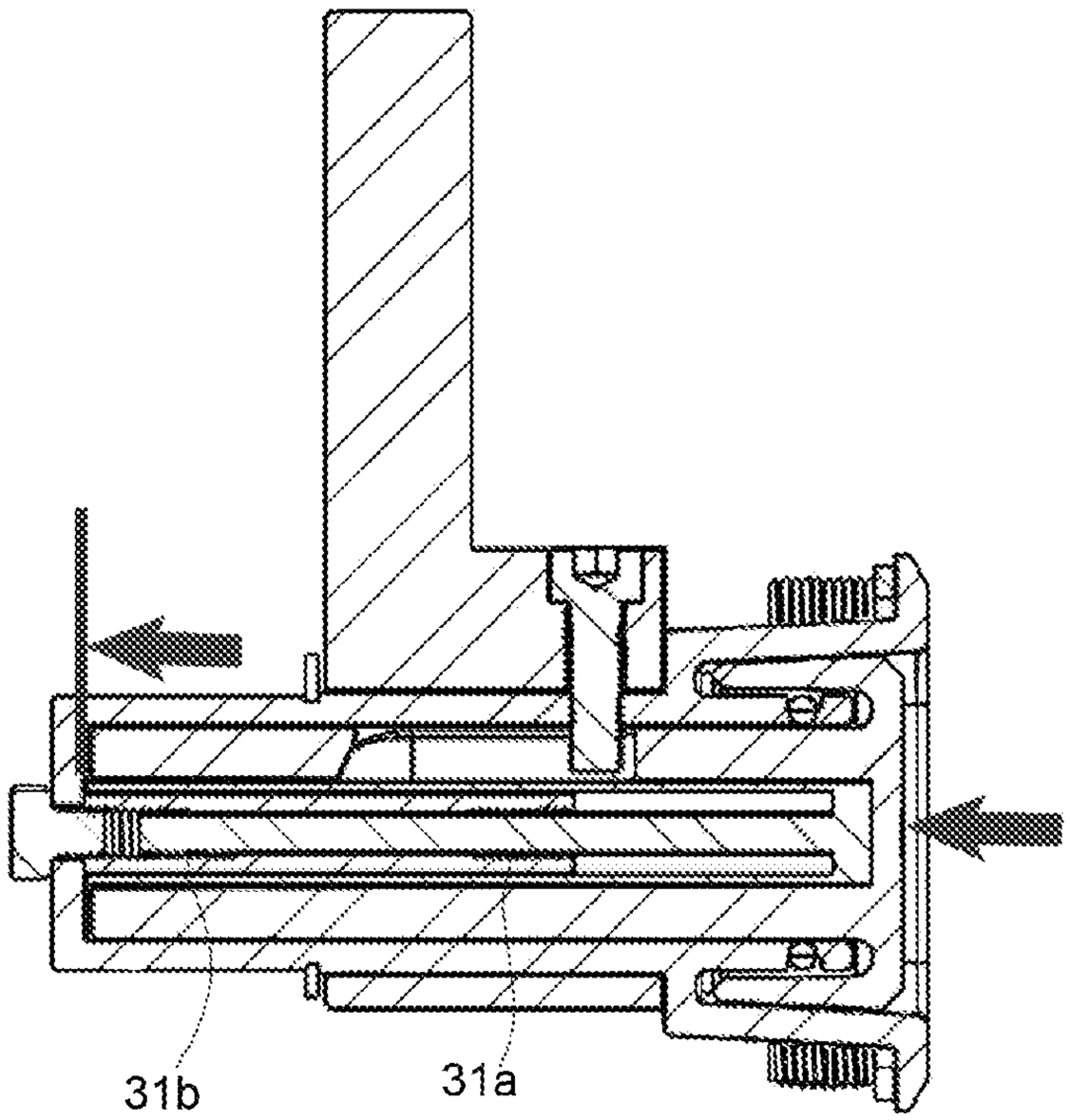

FIG. 5B

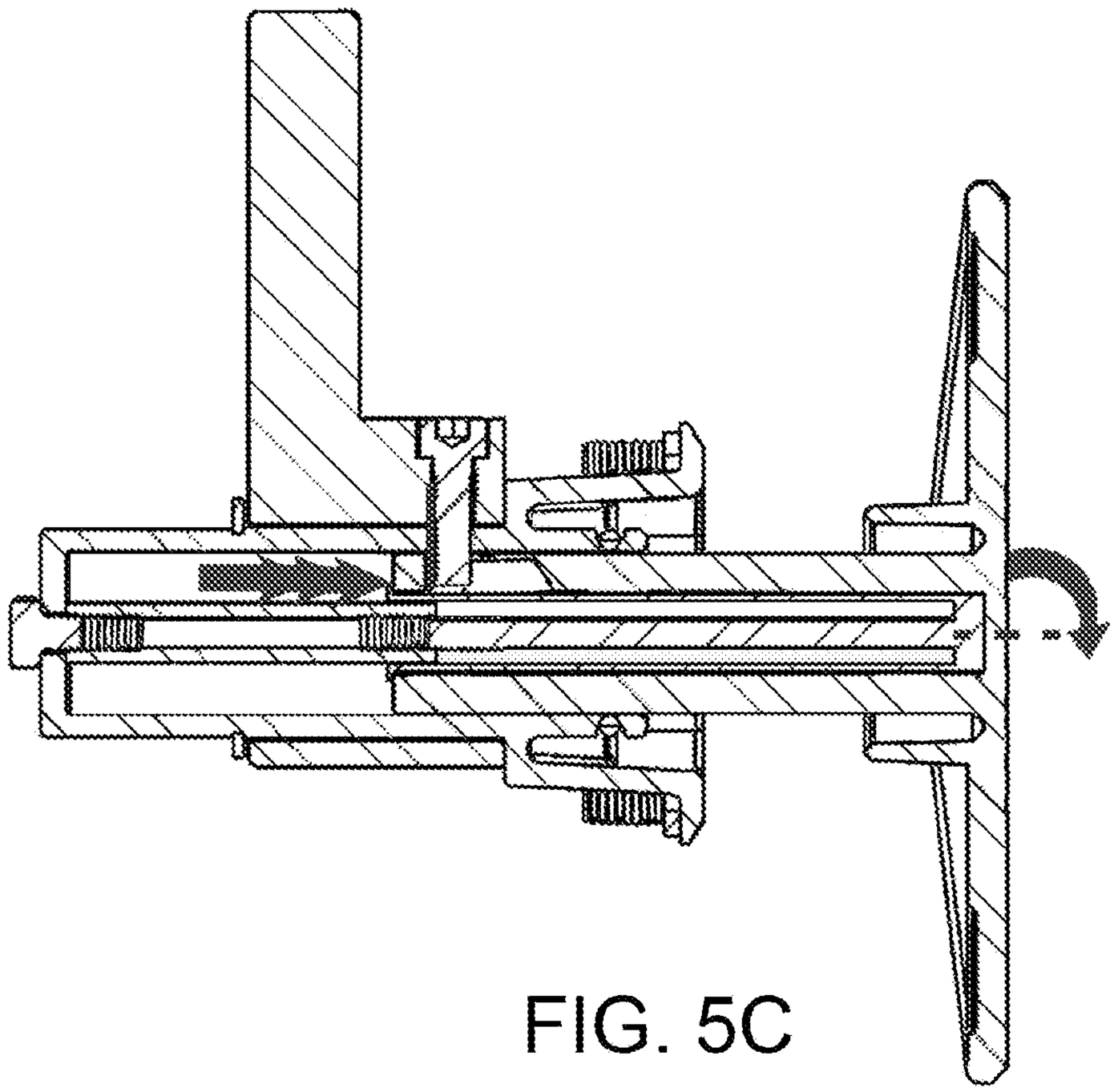

FIG. 5C

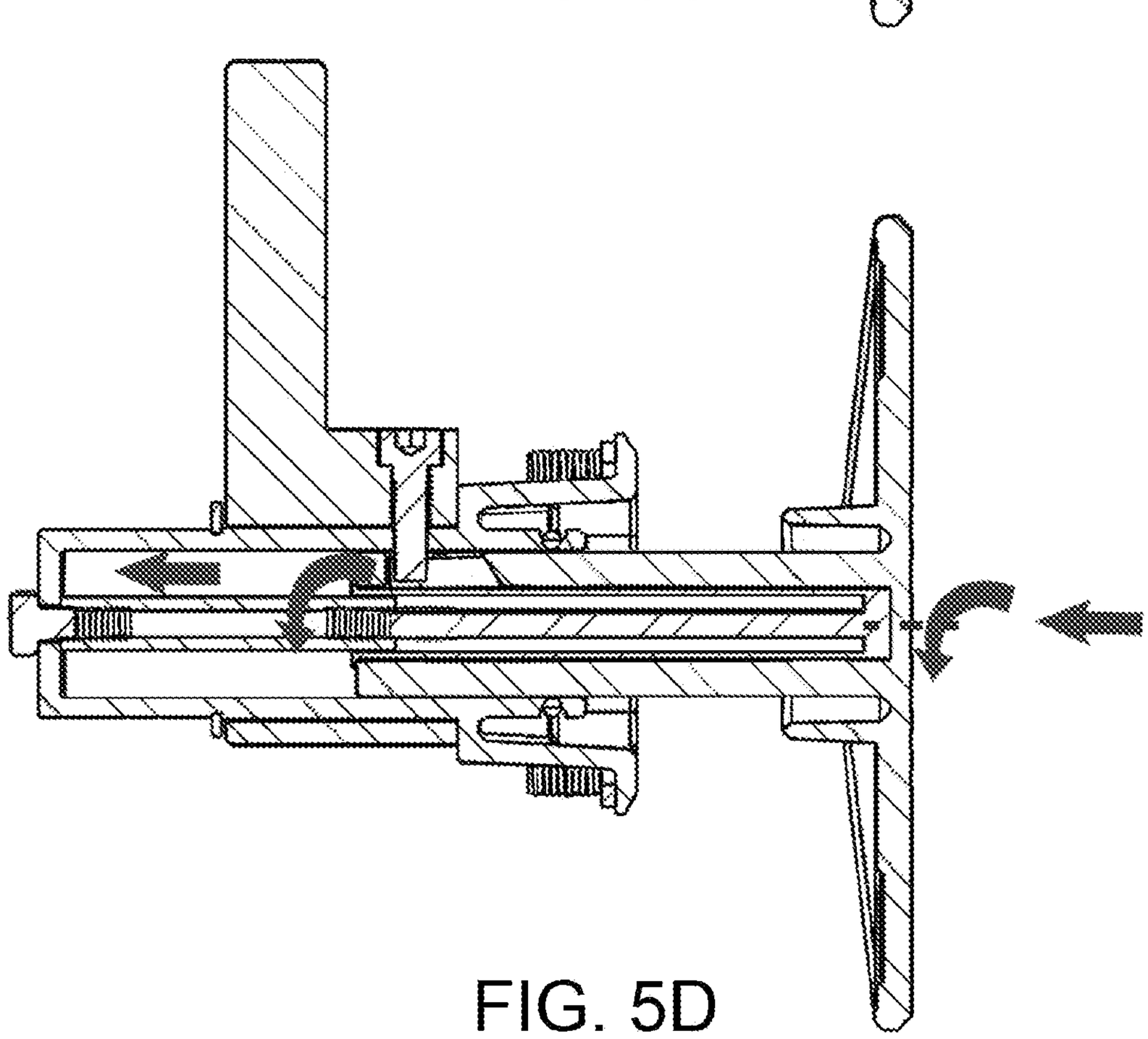

FIG. 5D

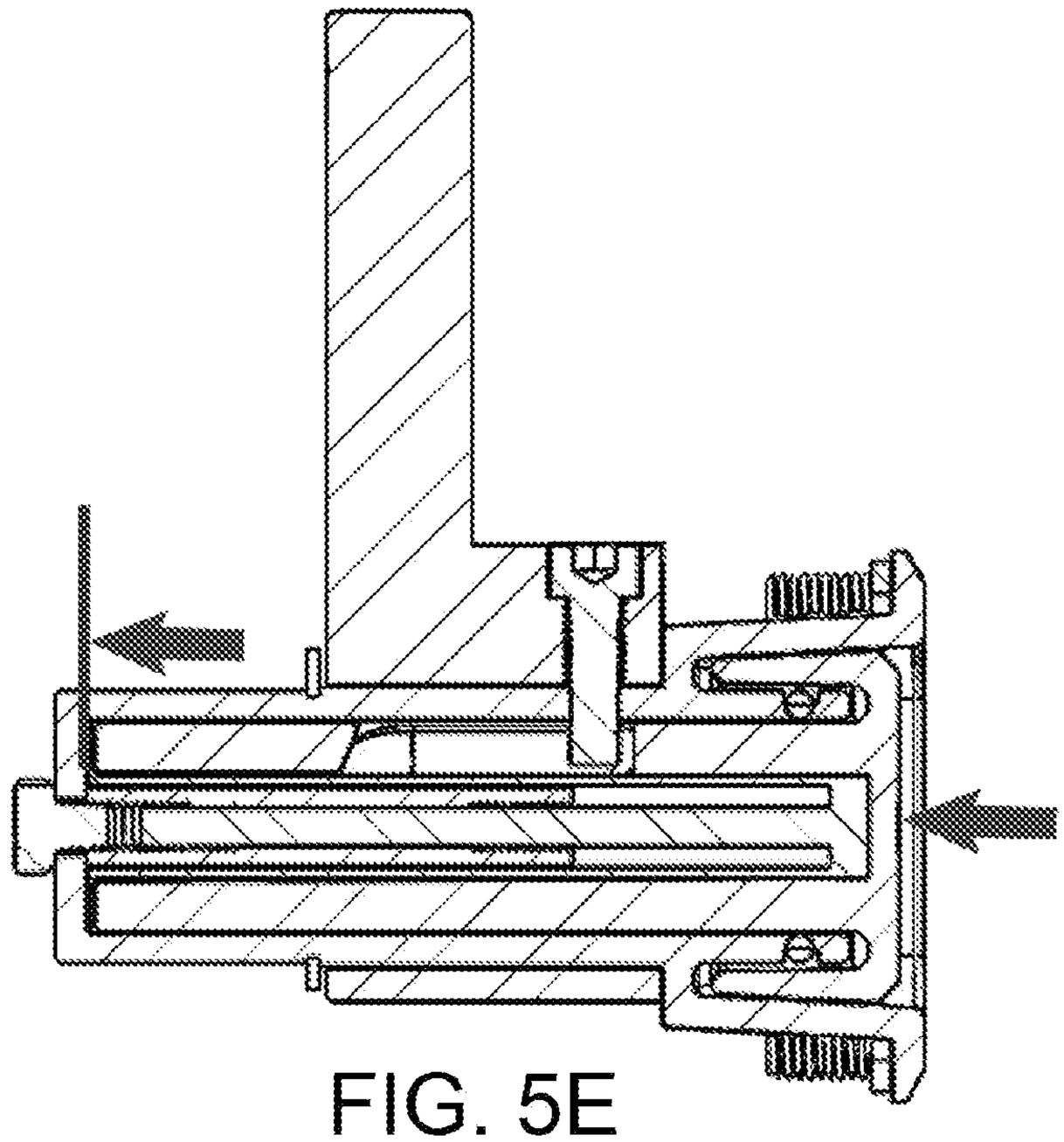

FIG. 5E

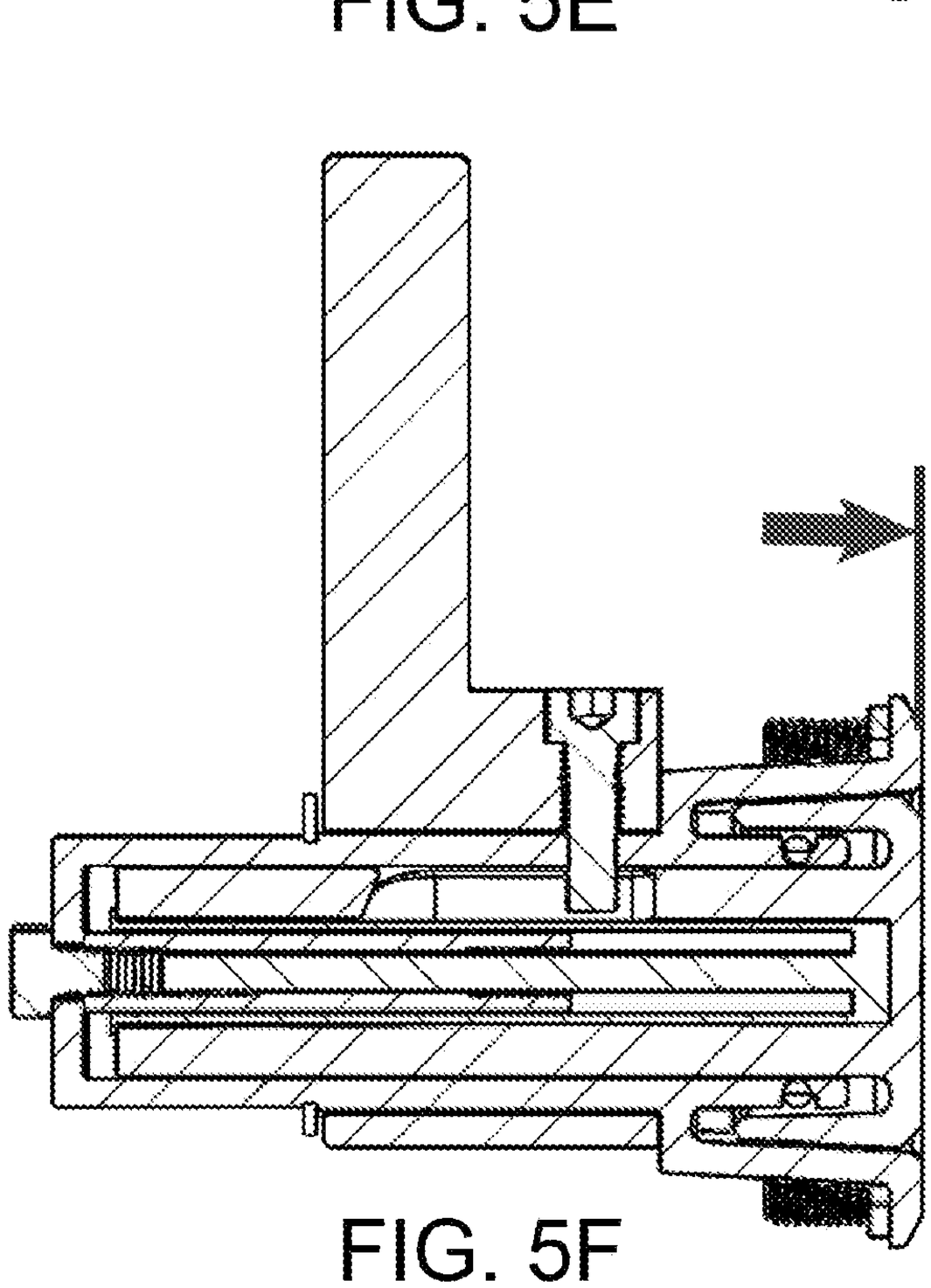

FIG. 5F

INTERNATIONAL SEARCH REPORT

International application No
PCT/IB2020/060892

A. CLASSIFICATION OF SUBJECT MATTER
INV. E05B5/02 E05B5/00
ADD.

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
E05B

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)
EPO-Internal

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	US 2 833 582 A (HENRICHS BERNARD W) 6 May 1958 (1958-05-06) the whole document	1-15
A	EP 3 290 623 A1 (CEV LAB S R L CON UNICO SOCIO [IT]) 7 March 2018 (2018-03-07) the whole document	1-15
A	US 2016/060916 A1 (HERNANDEZ ANDRES [US]) 3 March 2016 (2016-03-03) the whole document	1-15
A	GB 1 175 663 A (REGENT LOCK COMPANY LTD [GB]) 23 December 1969 (1969-12-23) the whole document	1-15

☐ Further documents are listed in the continuation of Box C.

☒ See patent family annex.

* Special categories of cited documents :

"A" document defining the general state of the art which is not considered to be of particular relevance

"E" earlier application or patent but published on or after the international filing date

"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)

"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art

"&" document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
9 February 2021	18/02/2021

Name and mailing address of the ISA/	Authorized officer
European Patent Office, P.B. 5818 Patentlaan 2 NL - 2280 HV Rijswijk Tel. (+31-70) 340-2040, Fax: (+31-70) 340-3016	Geerts, Arnold

Form PCT/ISA/210 (second sheet) (April 2005)

INTERNATIONAL SEARCH REPORT

International application No.
PCT/IB2020/060892

Box No. II Observations where certain claims were found unsearchable (Continuation of item 2 of first sheet)

This international search report has not been established in respect of certain claims under Article 17(2)(a) for the following reasons:

1. ☐ Claims Nos.:
because they relate to subject matter not required to be searched by this Authority, namely:

2. ☐ Claims Nos.:
because they relate to parts of the international application that do not comply with the prescribed requirements to such an extent that no meaningful international search can be carried out, specifically:

3. ☐ Claims Nos.:
because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a).

Box No. III Observations where unity of invention is lacking (Continuation of item 3 of first sheet)

This International Searching Authority found multiple inventions in this international application, as follows:

see additional sheet

1. ☐ As all required additional search fees were timely paid by the applicant, this international search report covers all searchable claims.

2. ☒ As all searchable claims could be searched without effort justifying an additional fees, this Authority did not invite payment of additional fees.

3. ☐ As only some of the required additional search fees were timely paid by the applicant, this international search report covers only those claims for which fees were paid, specifically claims Nos.:

4. ☐ No required additional search fees were timely paid by the applicant. Consequently, this international search report is restricted to the invention first mentioned in the claims; it is covered by claims Nos.:

Remark on Protest

☐ The additional search fees were accompanied by the applicant's protest and, where applicable, the payment of a protest fee.

☐ The additional search fees were accompanied by the applicant's protest but the applicable protest fee was not paid within the time limit specified in the invitation.

☐ No protest accompanied the payment of additional search fees.

FURTHER INFORMATION CONTINUED FROM PCT/ISA/ 210

This International Searching Authority found multiple (groups of) inventions in this international application, as follows:

1. claims: 1-15

A lock with a pop out handle comprising several tubular portions.

1.1. claims: 1-8

A lock with a pop out handle comprising several tubular portions with a push-push release mechanism.

1.2. claims: 9-15

A lock with a pop out handle comprising several tubular portions with an additional blocking mechanism for the striker.

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No
PCT/IB2020/060892

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US 2833582	A 06-05-1958	NONE	
EP 3290623	A1 07-03-2018	NONE	
US 2016060916	A1 03-03-2016	NONE	
GB 1175663	A 23-12-1969	NONE	