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(54) **Lock**

(57) A lock for a door structure, comprising a frame (1) arranged to be secured against a first side (13a) of a tubular member (13) of said door structure; at least one bolt (12a) which extends through a first opening (17) provided in this first side (13a) and through a second opening (16) provided in a second side (13b) of the tubular member (13) situated opposite to said first side (13a). For securing the lock against the tubular member (13), this lock comprises an externally screw threaded

tubular element (4) which provides a passage through which said bolt (12a) projects out of the frame (1) and which is arranged to project through said first opening (17) into the tubular member (13) and to co-operate by screwing with an internally screw threaded element (5) which is arranged to be slid over the said bolt (12a) through said second opening (16) into the tubular member (13), to secure the lock against said first side (13a) of the tubular member (13).

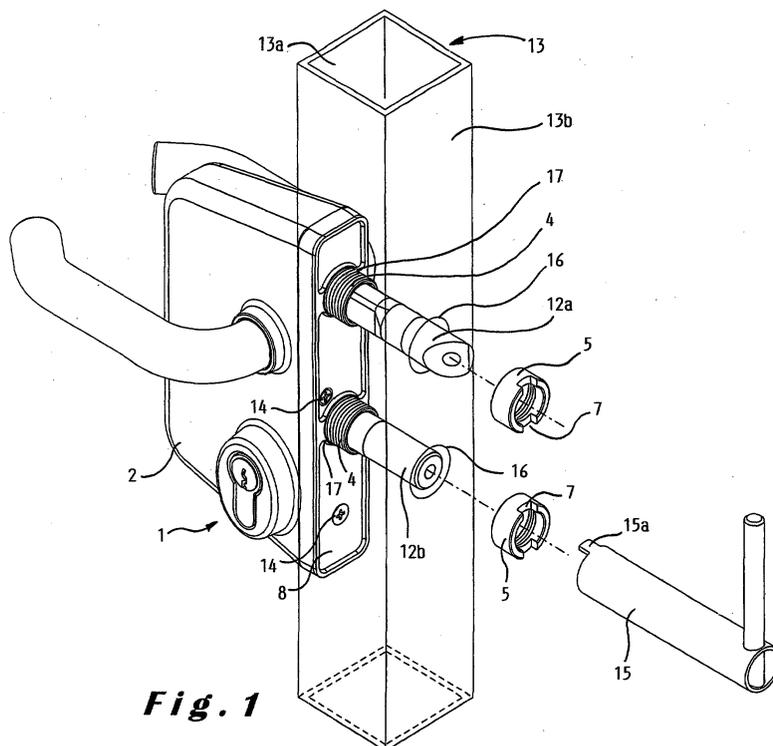


Fig. 1

Description

[0001] The present invention relates to a lock for a door structure comprising a frame arranged to be secured against a first side of a tubular member of said door structure; at least one bolt which is slidably mounted on the frame between a retracted and a projecting position and which extends in its projecting position, when the frame is mounted against the said first side of the tubular member, through a first opening provided in this first side and through a second opening provided in a second side of the tubular member situated opposite to said first side; an actuation mechanism arranged to move said bolt from its retracted to its projecting position and vice versa and means for securing the lock against the tubular member comprising a screw threaded tubular element having a diameter larger than that of said first opening but smaller than that of said second opening, which tubular element is arranged to be slid over said bolt through said second opening into the tubular member and to be fixed by screwing to the frame in order to secure the lock against the first side of the tubular member.

[0002] A lock presenting the aforementioned characteristics is described in EP 606 196 A. The lock according to this document comprises two bolts, namely a dead bolt and a latch bolt. Both bolts are associated with securing means comprising a tubular element showing a first end portion provided with an external screw thread. The diameter of this end is smaller than that of the first opening in the first side of the tubular upright member of the door structure against which the lock is to be secured. The tubular element further shows a second portion having an external diameter larger than that of the first opening but smaller than the diameter of the second opening so that it can pass through the second opening but not through the first one. To secure the lock to the upright tubular member of the door structure, the tubular element is slid over the bolt of the lock through the second opening into the tubular upright member until the first portion of the tubular element projects on the other side out of the tubular upright member. The first portion of the tubular element is then screwed into the frame of the lock in order to secure the lock against the tubular upright member. Since two bolts are comprised in the lock according to EP 606 196, the lock is secured against said tubular upright member at two different locations thanks to two securing means.

[0003] This configuration of securing means leads to a number of problems.

[0004] Firstly, since the externally screw threaded portion of the tubular securing element is screwed into the frame of the lock for securing it to a tubular upright member of the door structure, the tubular element will extend into the lock over a distance depending on the thickness of the wall of the first side of the tubular upright member. Indeed, the externally screw threaded portion of the tubular element has such a length that it can be

used for large and small wall thickness of the upright tubular member. Thus, for small wall thickness, the externally screw threaded portion of the tubular element will extend over a distance into the lock which is greater than the distance required for a good securing of said lock on the upright tubular member. The required free space has however to be provided within the lock. This will thus influence the dimensions of the lock, so that in certain circumstances the lock cannot be mounted between two upright members of the door structure.

[0005] Secondly, it has been noticed that screwing the tubular element through the tubular upright member of the door into the frame of the lock can be difficult. The bolts and especially the latch bolt, are indeed urged laterally by means of springs so that the bolts have to be pushed manually into a straight forward position in order to be able to screw each of the externally screw threaded tubular securing elements through the first opening in the tubular upright member into the threaded frame of the lock.

[0006] Thirdly, the externally screw threaded tubular elements are relatively expensive to manufacture. Indeed, they need to present the global shape of a tubular bolt having an elongated screw threaded portion forming the body of the element and a portion forming the head of the element. This head portion must have a diameter larger than the diameter of the first opening in the tubular member in order to abut this tubular member when securing the lock. In view of the required wall thickness of the tubular securing element, this element has to be milled out of massive metal. Since not only the screw thread but also the hole has to be milled, this can be an expensive process.

[0007] The present invention is aimed at solving the aforementioned problems.

[0008] Therefore, a lock according to the invention is characterised in that said screw threaded tubular element is internally screw threaded and the securing means further comprise an externally screw threaded tubular element which is a protruding part of said frame and which provides a passage through which said bolt projects out of the frame, which externally screw threaded element is arranged to project through said first opening into said tubular member and to cooperate by screwing with said internally screw threaded element to secure the lock against said first side of said tubular member.

[0009] According to the invention, thanks to the fact that said externally screw threaded tubular element is part of the frame and projects through the first opening of the tubular member to cooperate by screwing with the internally screw threaded tubular element to secure the lock against said tubular member, no unnecessary free space has to be provided within the lock to accommodate the externally screw threaded securing element when the lock is secured against a tubular member having a reduced wall thickness. Therefore, the dimensions of the said lock can be maintained as reduced as pos-

sible.

[0010] Since the externally threaded tubular securing element can now be easily made from tube metal, its length can be increased without a substantial increase of its manufacturing costs so that a better or longer guidance can be provided for the bolt.

[0011] Preferably, the frame of the lock comprises a cover plate having at least one internally screw threaded opening in which said externally screw threaded tubular element is screwed.

[0012] This enables to achieve quite easily a strong fixation of the externally screw threaded tubular element to the cover plate without requiring any welding operation.

[0013] More preferably, the externally screw threaded tubular element has a peripheral collar arranged for abutting said cover plate when the externally screw threaded tubular element is screwed in said internally screw threaded opening.

[0014] The collar is easy obtained from a metal tubular element which is externally screw threaded from both of its ends leaving between the obtained two screw threaded end portions a non screw threaded portion of the tubular element, which portion constitutes the collar.

[0015] This collar enables an easy mounting of the externally screw threaded tubular element since this element will automatically be screwed to the correct position.

[0016] It is preferred that the frame of the lock further comprises a base plate to which the cover plate is secured and that said peripheral collar is blocked between said base plate and said cover plate.

[0017] With this configuration, the externally screw threaded tubular element can neither be screwed in one direction nor in the opposite direction in said cover plate. Said tubular element will thus be maintained in its place both when screwing the internally screw threaded securing element onto the externally screw threaded element and when unscrewing it.

[0018] Preferably, the internally screw threaded tubular element is provided at one end with at least one engagement means for a screwing device.

[0019] This enables said tubular element to be tightened by screwing onto the corresponding externally screw threaded tubular element by use of an appropriate ring or box spanner.

[0020] In another preferred configuration of the invention, the lock comprises a second bolt and the securing means comprise a second externally screw threaded tubular element which is a further protruding part of the frame and which provides a further passage through which said second bolt projects out of the frame and a second internally screw threaded tubular element cooperating by screwing with said second externally screw threaded element to secure the lock against said first side of the tubular member.

[0021] The invention will now be described in further details with reference to the attached drawings. This de-

scription is only given by way of illustrative example and is not intended to limit the scope of the invention as defined by the annexed claims. The reference numerals used in the description refer to the drawings wherein :

Figure 1 represents a perspective view of a lock according to the invention in its mounted position on a tubular member of a door structure.

Figure 2 represents a perspective view of the lock according to the invention as shown in figure 1.

Figure 3 represents a partially exploded perspective view of a lock according to the invention.

[0022] Illustrated in figure 1 is a lock according to the invention in its secured position against a tubular member 13 of a door structure such as a gate. The lock comprises a frame 1 which comprises a housing 2 and a cover plate 8 fastened on the housing 2 by means of a screw 14, the peripheral edge of the cover plate 8 abutting the housing 2. The lock further comprises two bolts 12a and 12b, namely a dead bolt and a latch bolt which are slidably mounted on the frame between a retracted and a projecting position. In their projecting position, they extend through first openings 17 provided in a first side 13a of the tubular member 13 of the door structure and through second openings 16 provided in a second side 13b of the tubular member 13 situated opposite to the first side. The lock further comprises securing means comprising externally screw threaded tubular elements 4 and internally screw threaded tubular elements 5 which are arranged to be slid over the bolts 12a and 12b. These elements 4,5 cooperate with one another for securing the lock onto the first side 13a of the tubular member 13.

[0023] The cover plate 8 shows openings 10 for the passage of the externally screw threaded tubular elements 4. The openings 10 in the cover plate 8 are internally screw threaded so that the externally screw threaded tubular elements 4 can be screwed into these openings until they form a protruding part of the frame. Instead of screwing the externally screw threaded securing elements into the openings, they could also be fixed in another way to the frame, for example by welding.

[0024] In the securing position of the lock, the externally screw threaded tubular elements 4 project through the first openings 17 provided therefore in a first side 13a of the hollowed tubular member 13. Corresponding second openings 16 which faces the first openings 17 are provided in a second side 13b of the tubular member 13 opposite to the first side 13a. The diameter of the first openings 17 is chosen to be smaller than the outer diameter of the internally screw threaded tubular elements 5 whilst the diameter of the second openings 16 is chosen to be larger than this outer diameter so that the externally screw threaded securing elements can pass through the second but not through the first openings. Consequently, the internally screw threaded tubular elements 5 can be slid over the bolts 12a and 12b

through the openings 16 into tubular member 13 and can then be screwed onto the externally screw threaded tubular elements 4 until they abut the internal face of the first side 13a of the tubular member 13. In this way, the lock is firmly secured to the member 13. The relatively large area of engagement between the internally screw threaded tubular elements 5 and an externally screw threaded tubular elements 4 increases the reliability of the securing of the lock against the tubular member 13.

[0025] The internally screw threaded tubular elements 5 are provided at their extremities with engagement means such as notches 7 for tightening these tubular elements 5 onto the tubular elements 4 by using an appropriate ring or box spanner 15. The spanner 15 has a length which is substantially greater than the section of the tubular member 13 so as to allow the spanner to be worked from the outside. The diameter of the spanner 15 corresponds substantially to the diameter of the periphery of the extremities of the internally screw threaded elements 5. The spanner 15 has projections 15a intended to interact with notches 7.

[0026] Furthermore, it is possible to provide a special peripheral arrangement of notches 7 in the internally screw threaded tubular elements 5. In the example illustrated, two diametrically opposed notches are provided, each having a rectangular profile.

[0027] Illustrated in figure 2 is the aforementioned lock according to the invention, further comprising a base plate 3 and an actuation mechanism whose components are generally designated by reference number 11. Bolts 12 are composite bolts. A member 3a of the base plate 3 facing the cover plate 8 presents openings 9 coaxially disposed with the openings 10 in the cover plate 8 for the passage of the externally screw threaded tubular elements 4.

[0028] Each externally screw threaded tubular element 4 is provided with a peripheral collar 6 having an external diameter larger than the diameter of the openings 9 in the base plate 3 and the diameter of the openings 10 in the cover plate 8 so as to abut both the base plate 3 and cover plate 8.

[0029] The collars 6 can be arranged at a distance from an extremity of each externally screw threaded tubular element 4 substantially corresponding to the thickness of the member 3a of the base plate 3 in which the openings 9 are provided. Consequently, the tubular element 4 does not penetrate within the housing 2 of the lock and thus doesn't occupy space therein.

[0030] The cover plate 8 is arranged to be fastened by means of a screw 14 to the housing 2. In this way, the collars 6 are blocked between the base plate 3 and the cover plate 8 when this cover plate is fastened on the housing 2 of the lock.

[0031] Illustrated in figure 3 is the aforementioned lock according to the invention shown in its assembled state

[0032] Examples of actuation mechanisms are disclosed in the published patent applications EP 1 118 739

A1 and EP 0 606 196 A1 the disclosure of which is incorporated herein by way of reference.

5 Claims

1. A lock for a door structure, comprising:

- a frame (1) arranged to be secured against a first side (13a) of a tubular member (13) of said door structure;
- at least one bolt (12a), which is slidably mounted on the frame (1) between a retracted and a projecting position and which extends in its projecting position, when the frame (1) is mounted against the said first side of the tubular member, through a first opening (17) provided in this first side and through a second opening (16) provided in a second side (13b) of the tubular member (13) situated opposite to said first side;
- an actuation mechanism (11) arranged to move said bolt (12) from its retracted to its projecting position and vice versa; and
- means for securing the lock against the tubular member comprising a screw threaded tubular element (5) having a diameter larger than that of the first opening (17) but smaller than that of the second opening (16), which tubular element is arranged to be slid over the said bolt (12) through said second opening (16) into the tubular member (13) and to be fixed by screwing to the frame (1) in order to secure the lock against the first side (13a) of the tubular member (13);

characterised in that said screw threaded tubular element (5) is internally screw threaded and the securing means further comprise an externally screw threaded tubular element (4) which is a protruding part of said frame and which provides a passage through which said bolt (12) projects out of the frame, which externally screw threaded element (4) is arranged to project through said first opening (17) into the tubular member (13) and to cooperate by screwing with said internally screw threaded element (5) to secure the lock against said first side (13a) of the tubular member (13).

2. A lock according to claim 1, **characterised in that** said frame (1) comprises a cover plate (8) having at least one internally screw threaded opening (10) in which said externally screw threaded tubular element (4) is screwed.

3. A lock according to claim 2, **characterised in that** said externally screw threaded tubular element (4) has a peripheral collar (6) arranged for abutting said cover plate (8) when said externally screw threaded

tubular element (4) is screwed in said internally screw threaded opening (10).

4. A lock according to claim 3, **characterised in that** said frame (1) further comprises a base plate (3) to which said cover plate (8) is secured and said peripheral collar (6) is blocked between said base plate (3) and said cover plate (8). 5
5. A lock according to anyone of the preceding claims, **characterised in that** said internally screw threaded tubular element (5) is provided at one end with at least one engagement means (7) for a screwing device. 10
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6. A lock according to claim 5, **characterised in that** said engagement means (7) consists in notches.
7. A lock according to anyone of the preceding claims, **characterised in that** it comprises a second bolt (12b), the securing means comprising a second externally screw threaded tubular element (4), which is a further protruding part of the frame and which provides a further passage through which said second bolt (12b) projects out of the frame, and a second internally screw threaded tubular element (5) arranged to cooperate by screwing with said second externally screw threaded element (4) to secure the lock against said first side (13a) of the tubular member (13). 20
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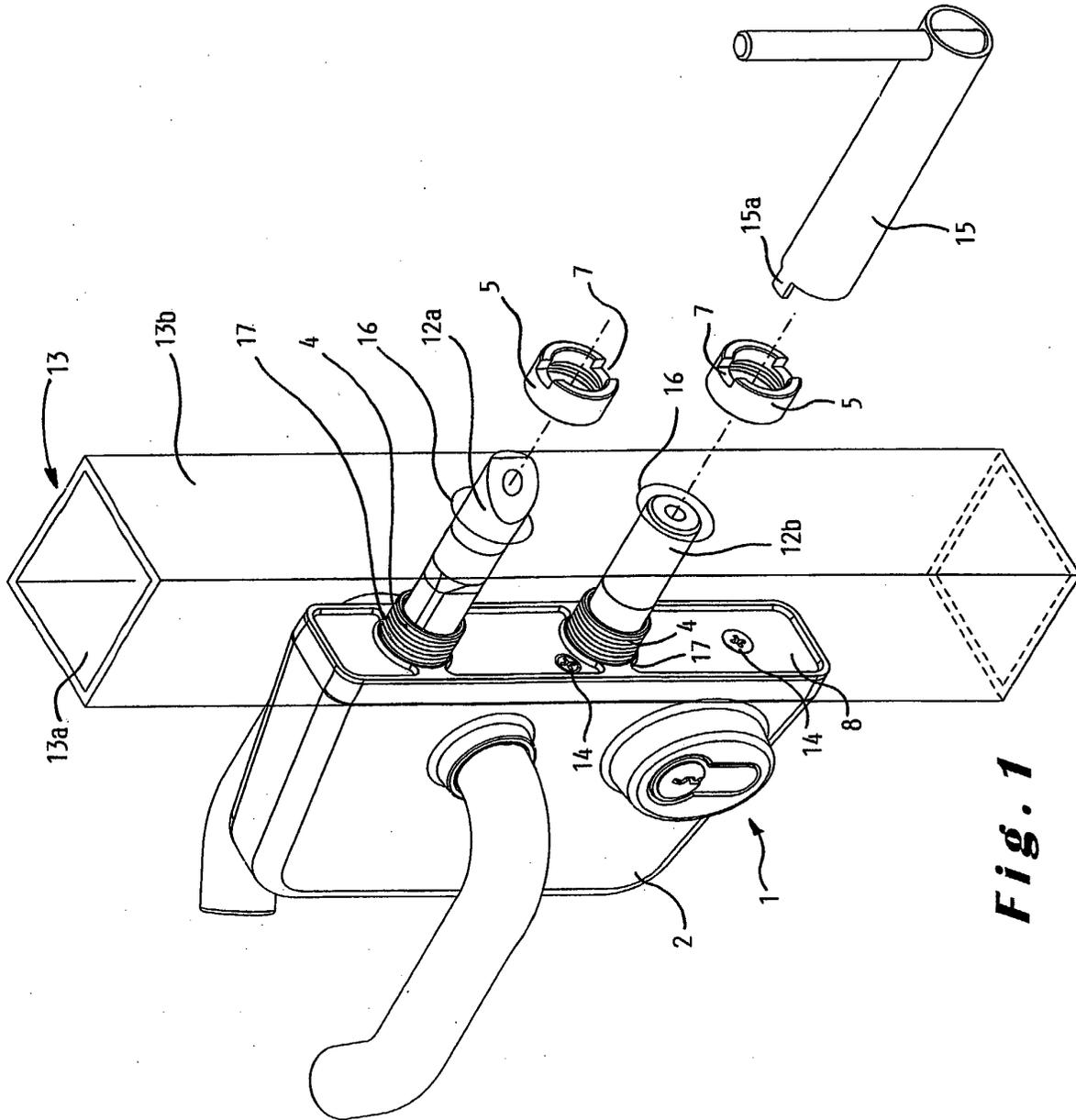


Fig. 1

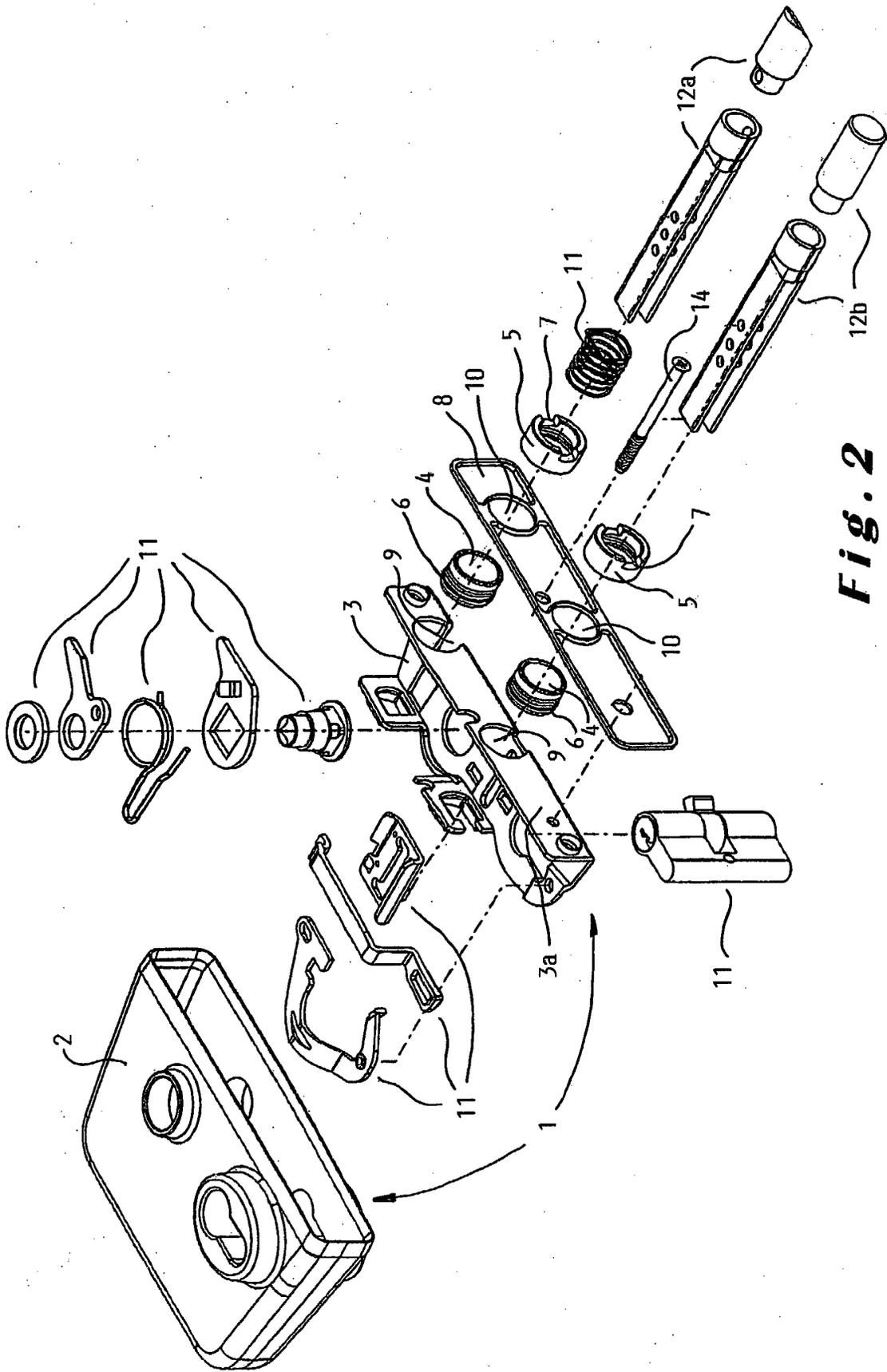


Fig. 2

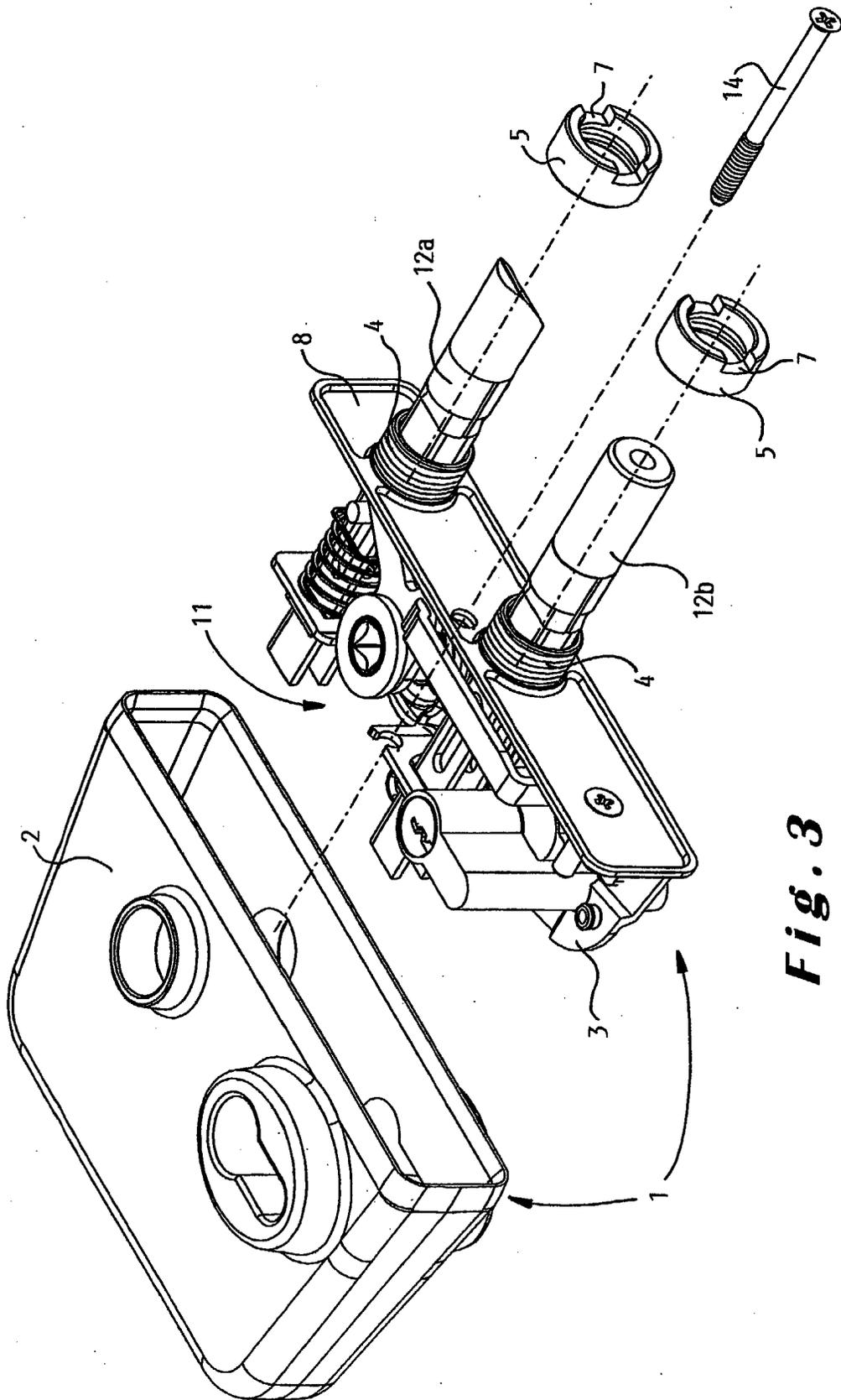


Fig. 3



European Patent Office

EUROPEAN SEARCH REPORT

Application Number
EP 03 44 7124

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Place of search	Date of completion of the search	Examiner	
THE HAGUE	11 September 2003	Van Beurden, J	
CATEGORY OF CITED DOCUMENTS		T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document	
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ANNEX TO THE EUROPEAN SEARCH REPORT
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This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report. The members are as contained in the European Patent Office EDP file on
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