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(54) **STREET MANHOLE COVER WITH KEY/LOCK ASSEMBLY**

(57) A key/lock assembly (1) for a street manhole cover (2), which comprises a lid (3) and a peripheral frame (4) fixed to the ground and arranged so as to peripherally surround the lid (3). The key/lock assembly comprises a latch (6) mounted on a lower surface (3a) of the lid (3) and designed to assume an advanced closing position, in which it cooperates in abutment with an abutment portion of the frame (4), and a retracted opening position, in which it is released from the abutment portion; a key (12) designed to move the latch (6); and return means (8), which are designed to automatically force the latch (6) to its closing position. In the latch (6)

there is obtained a moving recess (10), which is designed to be engaged by a key (12) in order to overcome the action of the return means (8) and move the latch (6) to its opening position. Furthermore, the key/lock assembly comprises a locking wall (11), which extends from the lower surface (3a) of the lid (3) in the area of the moving recess (10) and is designed to be crossed by an oblong end portion (14) of the key (12) when it is arranged in its inactive position. In the locking wall (11) there is obtained a locking groove (11a), which is designed to be engaged by the oblong end portion (14) when it is in its active position.

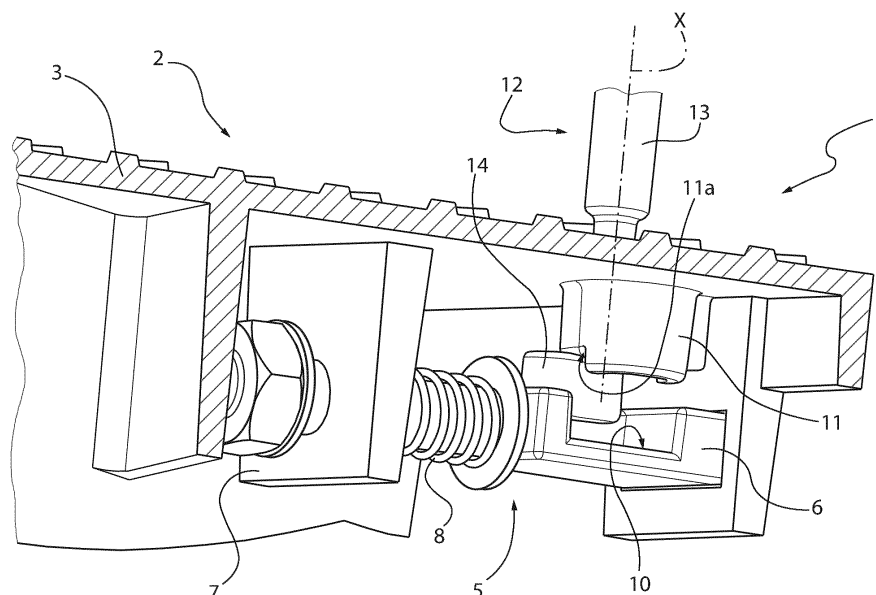


FIG.6

Description

CROSS-REFERENCE TO RELATED APPLICATIONS

[0001] This Patent Application claims priority from Italian Patent Application No. 102021000010874 filed on April 29, 2021.

TECHNICAL FIELD

[0002] The invention relates to a street manhole cover comprising a key/lock assembly, whose technical features ensure an automatic closing as well as an easy and safe opening.

BACKGROUND ART

[0003] A manhole cover basically is the lid over the opening of manholes for water systems or sewage systems (both sanitary sewers and stormwater sewers) as well as manholes used for power lines and telephone lines.

[0004] Manhole covers are generally made of materials such as steel, gray iron and ductile iron.

[0005] Key/lock assemblies of street manhole covers have to meet a series of requirements due to the positioning and the use of the manhole covers themselves. Indeed, these systems must ensure a closing that is stable over time and, at the same time, a simple and easy opening. Furthermore, these systems cannot pose an obstacle to traffic.

[0006] As anyone can immediately figure out, it is extremely important that a manhole cover cannot be opened, if not by operators.

[0007] Indeed, manhole covers allow access to the functional structure of services of utmost importance for society. Therefore, a reliable closing of manhole covers must ensure that these functional structures are not tampered with and that the relative services are not jeopardized.

[0008] Furthermore, a free access to underground vaults or pipes would imply a significant risk in terms of safety, as said underground vaults or pipes could be used for terrorist actions.

[0009] The closing systems of manhole covers generally require operators to secure the closing of the manhole cover through a suitable closing operation directly controlled by operators themselves, such as, for example, the rotation of a key element. This solution is necessarily based on the good will and on the sense of responsibility of each single operator. Indeed, it can happen that operators, due to an oversight or because of carelessness, fail to carry out the operations required for the closing of the manhole cover, which, hence, only rests on the relative frame and can be opened by anyone, thus allowing access to the relative underground vaults or pipes.

[0010] Therefore, a technical solution is needed, which is capable of ensuring an automatic closing of the man-

hole cover and, at the same time, allows it to be opened in a simple and safe manner.

[0011] The inventors of this invention conceived a solution, whose technical features are capable of fulfilling the aforesaid need.

DISCLOSURE OF INVENTION

[0012] The subject-matter of the invention is a street manhole cover comprising a lid, a peripheral frame fixed to the ground and arranged so as to peripherally surround said lid and a key/lock assembly; said key/lock assembly comprising a latch mounted on a lower surface of said lid and designed to assume an advanced closing position, in which it cooperates in abutment with an abutment portion of said frame, and a retracted opening position, in which it is released from said abutment portion; a key designed to move said latch; and return means, which are designed to automatically force said latch to its closing position; in said latch there being obtained a moving recess, which is designed to be engaged by a key in order to overcome the action of said return means and move said latch to its opening position; said key comprises an oblong end portion, which is designed to engage said moving recess, where it is movable between an inactive position, in which it does not counter the action of said return means, thus leaving the latch in its advanced closing position, and an active position, in which it overcomes the action of said return means, thus moving said latch to its retracted opening position; said oblong end portion being movable between said inactive and active positions of its by means of a rotation around a rotation axis, which is perpendicular to said oblong end portion; said street manhole cover being characterized in that said key/lock assembly comprises a locking wall, which extends from said lower surface of said lid in the area of said moving recess and is designed to be crossed by said oblong end portion when it is arranged in its inactive position; in said locking wall there being obtained a locking groove, which is designed to be engaged by said oblong end portion when it is in its active position.

[0013] Preferably, said key comprises a rod extending along said rotation axis and comprising a first end, which is fixed to said oblong end portion, and a second end, which is fixed to a handle.

[0014] Preferably, said return means comprise a helical spring.

BRIEF DESCRIPTION OF THE DRAWINGS

[0015] The invention will be best understood upon perusal of the following description of an embodiment thereof, provided by way of mere explanatory, non-limiting example, with reference to the accompanying figures, wherein:

- figures 1 - 5 show the key/lock assembly according to the invention, with sectional parts and in five re-

- spective operating positions; and
- figure 6 is an enlargement of the key/lock assembly of the preceding figures, in order to better highlight some components.

BEST MODE FOR CARRYING OUT THE INVENTION

[0016] In figure 1, number 1 indicates, as a whole, the key/lock assembly according to the invention applied to a street manhole cover 2, which consists of a lid 3 and of a frame 4 fixed to the ground and arranged so as to peripherally surround the lid 3, which is hinged thereto.

[0017] The key/lock assembly 1 comprises a lock 5 comprising, in turn, a latch 6 supported, in a sliding manner, by a bracket 7 orthogonally extending from a lower surface 3a of the lid 3, and a helical spring 8 wound around a portion of the latch 6 and compressed between the bracket 7 and a collar 9 orthogonally extending from the main body of the latch 6.

[0018] On the latch 6 there is obtained a moving recess 10, which, as described below, is engaged by an end portion of a key in order to cause the latch 6 to move.

[0019] Figure 1 shows the latch 6 in an advanced closing position of it, in which a front portion of its engages in abutment a portion of the frame 4.

[0020] The key/lock assembly 1 comprises a locking wall 11, which extends from the inner surface 3a of the lid 3 and, as described below, is crossed by the end portion of the key before engaging the moving recess 10. In the locking wall 11 there is obtained a locking groove 11a (visible in Figure 6).

[0021] Figure 1 shows a key 12 consisting of a rod 13, an oblong portion 14 fixed to a first end of the rod 13 and a handle 15 fixed to a second end of the rod 13.

[0022] In use, starting from the situation in which the latch 6 is in its advanced closing position, the key is used by inserting the oblong portion 14 into the moving recess 10 after having crossed the locking wall 11 (Figure 2).

[0023] Once inside the moving recess 10, the oblong portion 14 is rotated by 90° around a rotation axis X, which extends along the rod 13 (Figure 3). The rotation of the oblong portion 14 causes the movement of the latch 6 with compression of the spring 8.

[0024] In this way, the latch 6 is moved to its retracted opening position, in which it is released from the portion of the frame 4.

[0025] After having reached the condition in which the latch 6 is in its retracted opening position, the key 12 is lifted until the oblong portion 14 engages the locking groove 11a (Figure 4; Figure 6). In this way, the oblong portion 14 is locked in its active position and there is no risk of an accidental rotation thereof with a consequent movement of the latch 6 from its retracted opening position to its advanced closing position.

[0026] The locking of the oblong portion 14 in the locking groove 11a also creates a portion to take hold of the lid 3 so as to allow the latter to be lifted by acting upon the key 12 (Figure 5).

[0027] In order to move the street manhole cover 2 to its closing position, the operations described above have to be repeated in reverse order.

[0028] Hence, once the cover 3 is back within the frame 4, the key 12 is lowered until the oblong portion 14 gets out of the locking groove 11a. At this point, the oblong portion 14 is rotated by 90° around the axis X until it reaches its inactive position. In this position, the helical spring 8 automatically pushes the latch 6 to its advanced closing position, in which it cooperates in abutment with the portion of the frame 4.

[0029] According to the description above, the key/lock assembly according to the invention ensures an automatic closing of the manhole cover and, at the same time, allows it to be opened in a simple and safe manner.

Claims

1. A street manhole cover (2) comprising a lid (3), a peripheral frame (4) fixed to the ground and arranged so as to peripherally surround said lid (3) and a key/lock assembly (1); said key/lock assembly (1) comprising a latch (6) mounted on a lower surface (3a) of said lid (3) and designed to assume an advanced closing position, in which is cooperates in abutment with an abutment portion of said frame (4), and a retracted opening position, in which it is released from said abutment portion; a key (12) designed to move said latch (6); and return means (8), which are designed to automatically force said latch (6) to its closing position; in said latch (6) there being obtained a moving recess (10), which is designed to be engaged by a key (12) in order to overcome the action of said return means (8) and move said latch (6) to its opening position; said key (12) comprises an oblong end portion (14), which is designed to engage said moving recess (10), where it is movable between an inactive position, in which it does not counter the action of said return means (8), thus leaving the latch (6) in its advanced closing position, and an active position, in which it overcomes the action of said return means (8), thus moving said latch (6) to its retracted opening position; said oblong end portion (14) being movable between said inactive and active positions of its by means of a rotation around a rotation axis (X), which is perpendicular to said oblong end portion (14); said street manhole cover (2) being **characterized in that** said key/lock assembly comprises a locking wall (11), which extends from said lower surface (3a) of said lid (3) in the area of said moving recess (10) and is designed to be crossed by said oblong end portion (14) when it is arranged in its inactive position; in said locking wall (11) there being obtained a locking groove (11a), which is designed to be engaged by said oblong end portion (14) when it is in its active position.

2. The street manhole cover (2) according to claim 1, **characterized in that** said key (12) comprises a rod (13) extending along said rotation axis (X) and comprising a first end, which is fixed to said oblong end portion (14), and a second end, which is fixed to a handle (15). 5
3. The street manhole cover (2) according to one of the preceding claims, **characterized in that** said return means comprise a helical spring (8). 10

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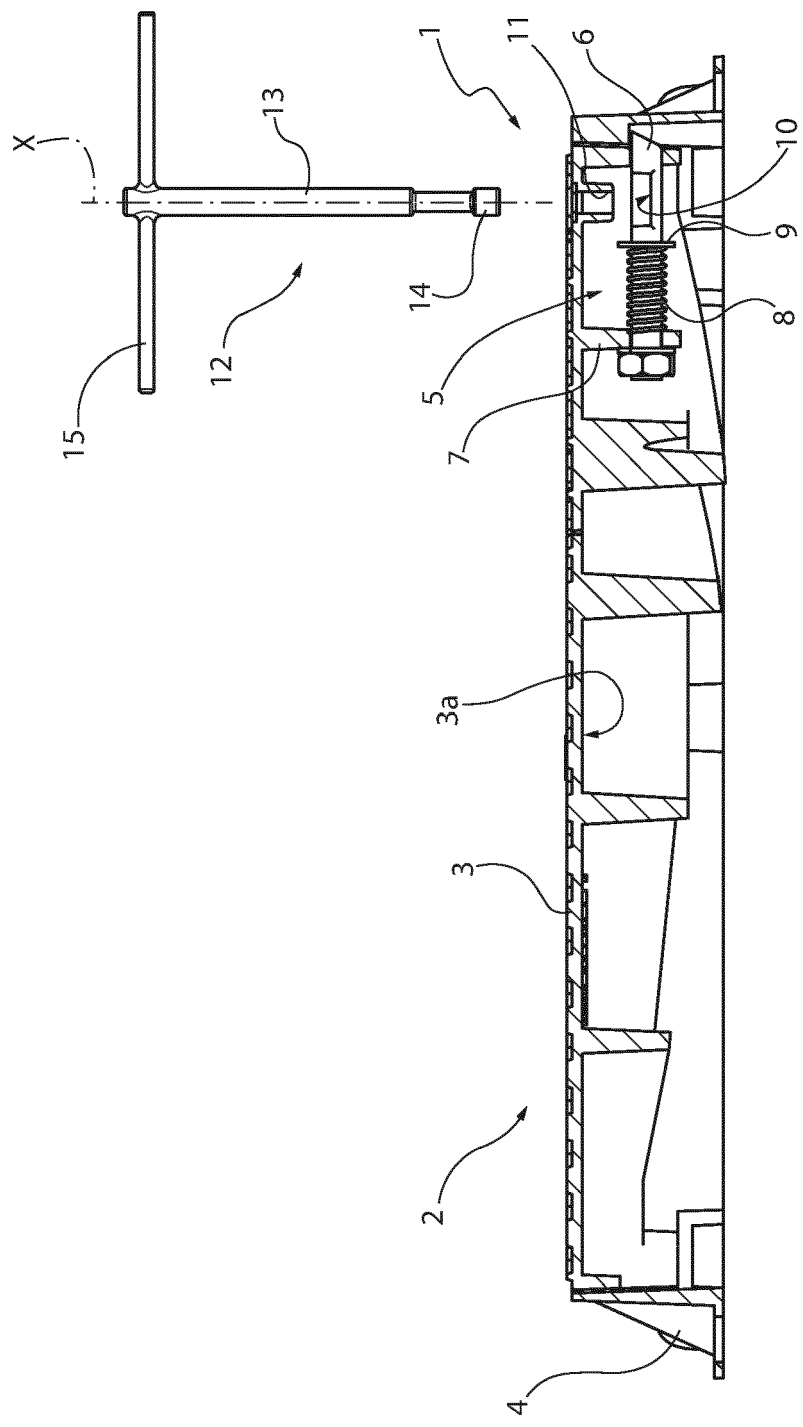


FIG.1

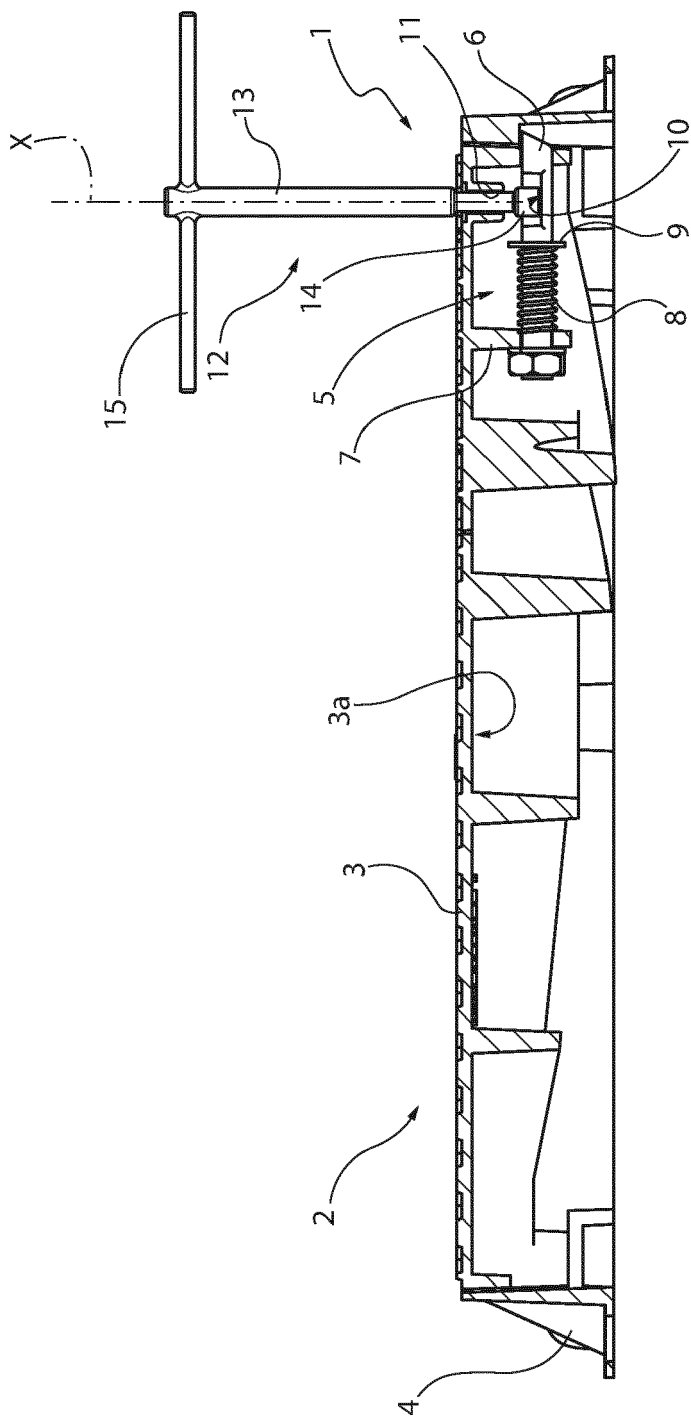


FIG.2

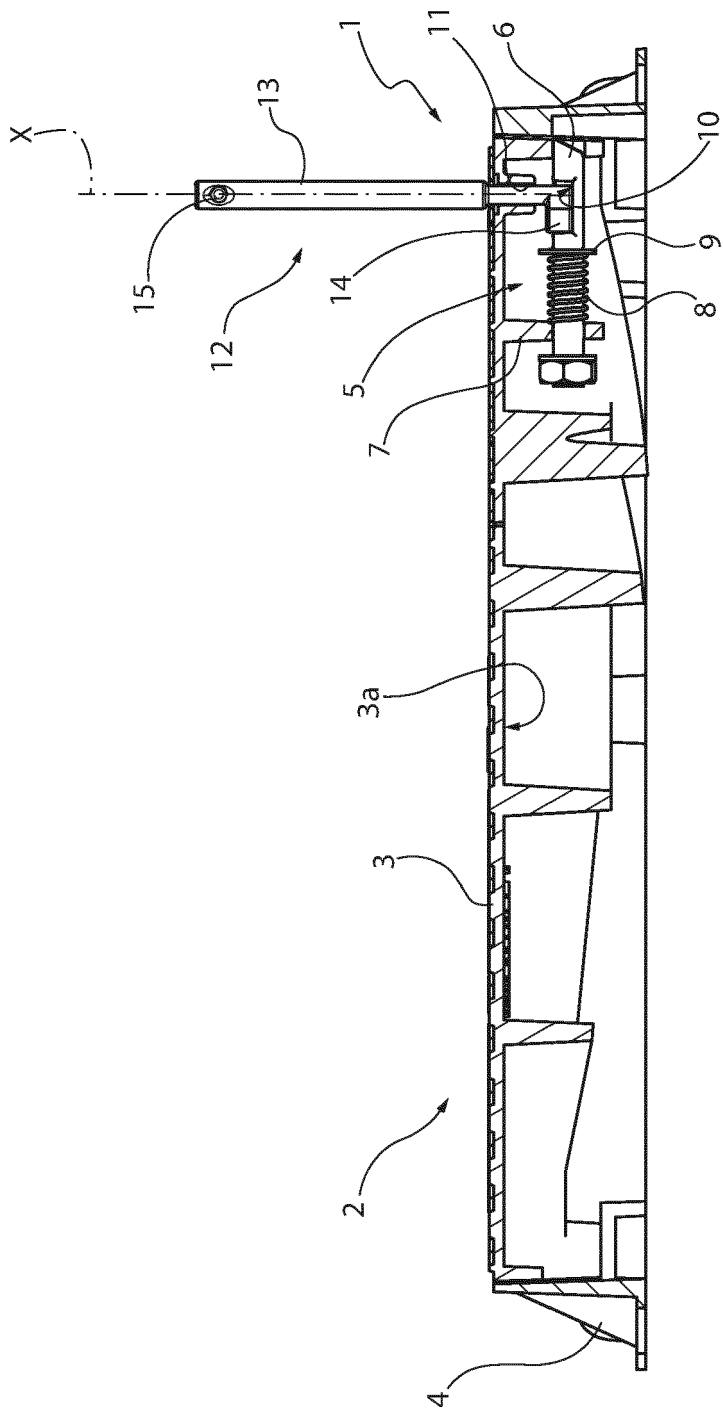


FIG.3

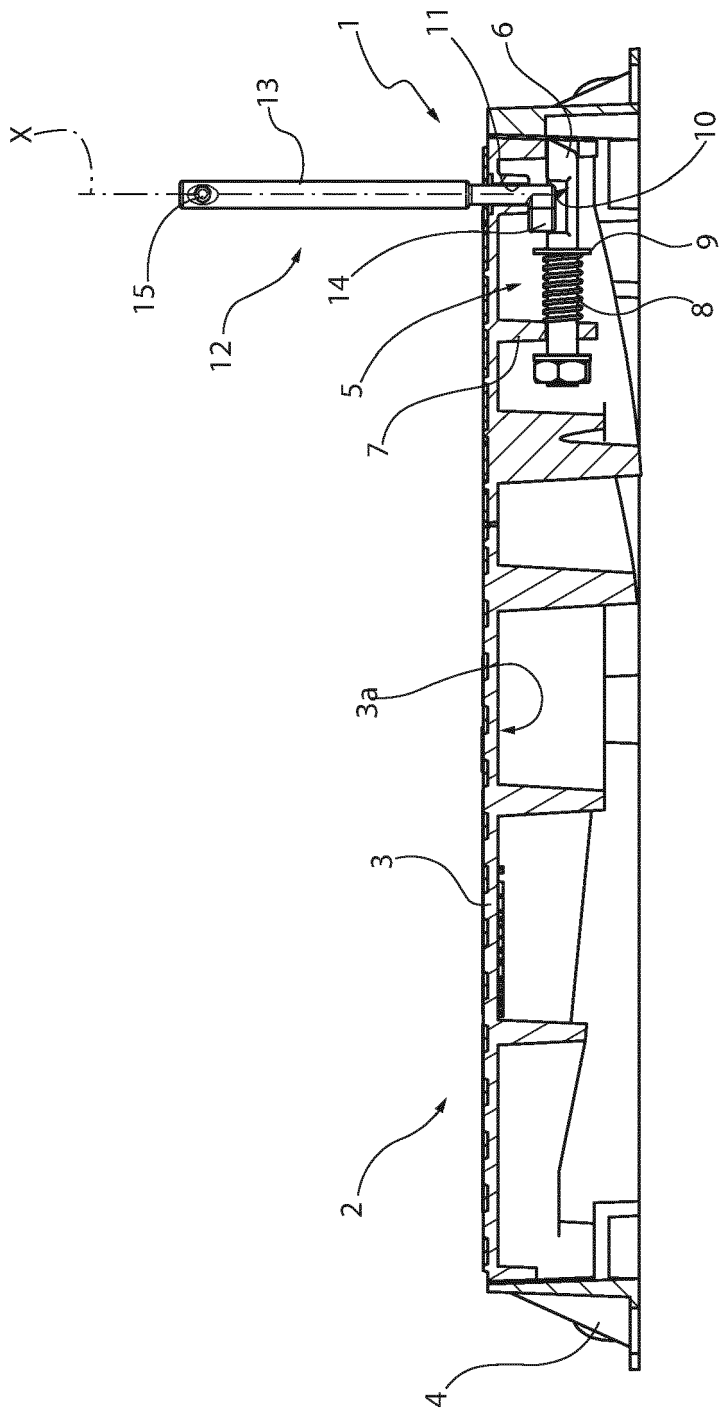


FIG.4

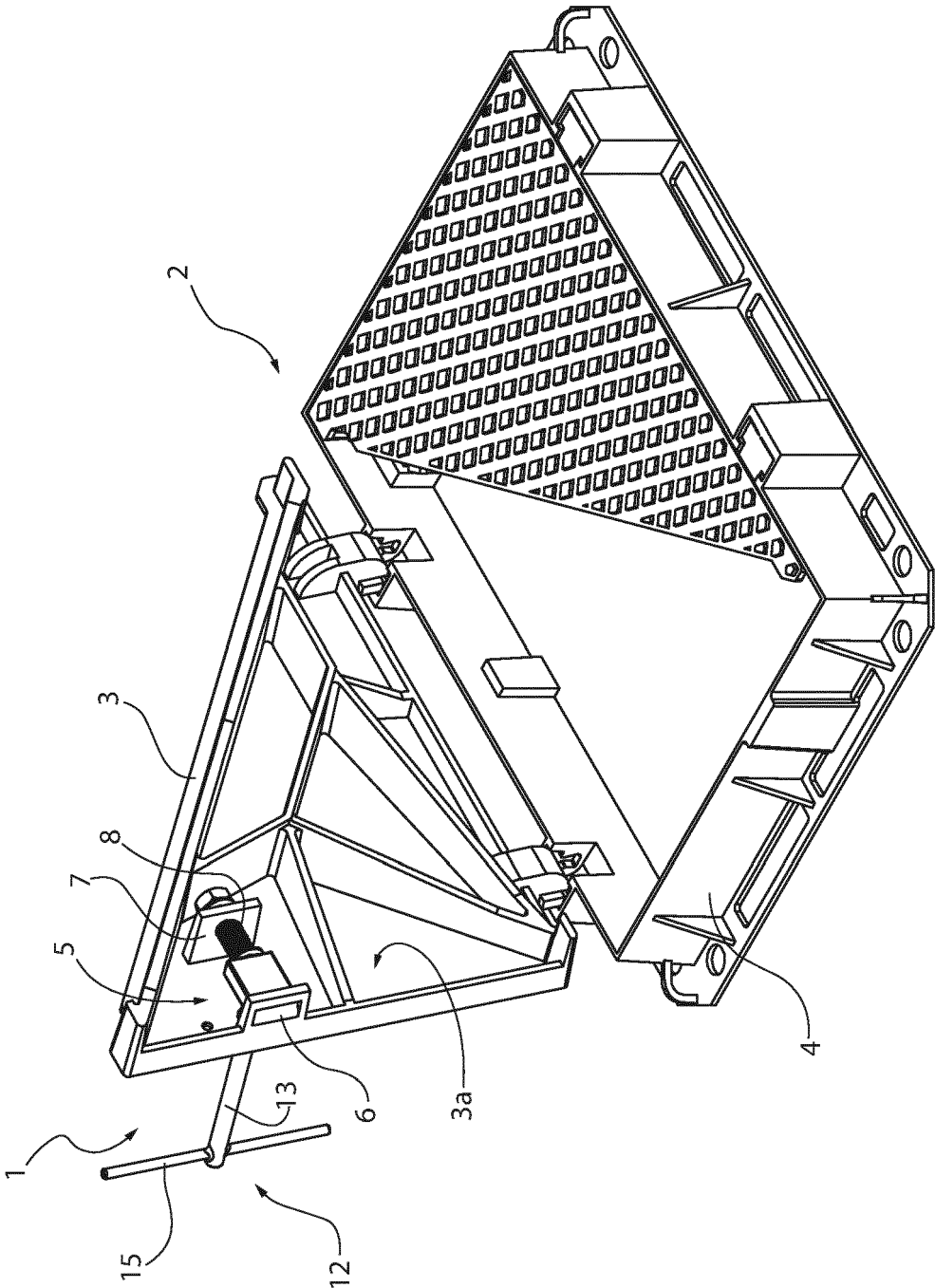
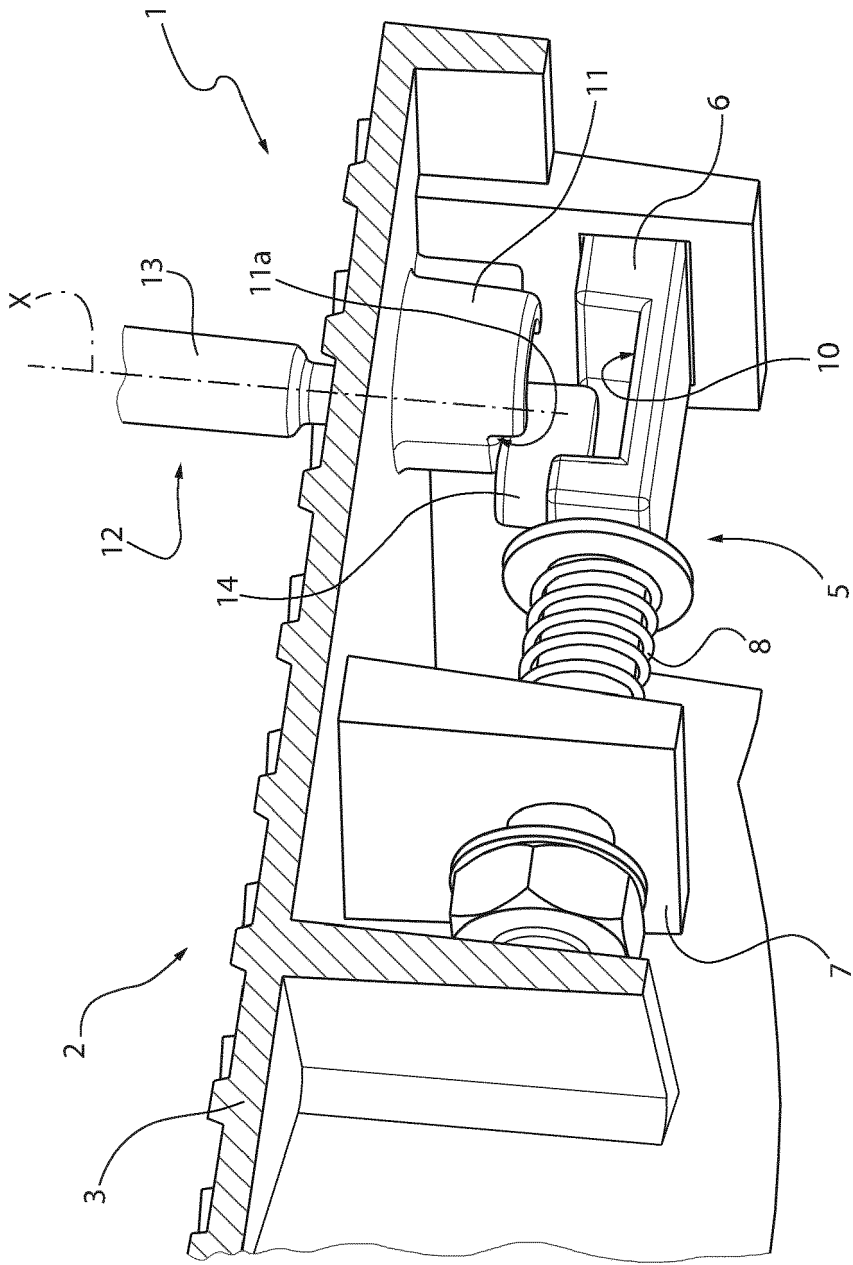


FIG.5





EUROPEAN SEARCH REPORT

Application Number

EP 22 17 0889

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	KR 2013 0057917 A (HWANG YOON HA [KR]) 3 June 2013 (2013-06-03) * figures 1-5 *	1-3	INV. E02D29/14
A	EP 2 363 555 A1 (FOND DE BROUSSEVAL ET MONTREUIL [FR]) 7 September 2011 (2011-09-07) * paragraph [0026] - paragraph [0050]; figures 1-13 *	1-3	
A	US 7 216 459 B1 (AKKALA STEVEN M [US] ET AL) 15 May 2007 (2007-05-15) * the whole document *	1	
A	EP 2 543 800 A1 (EJ EMEA [FR]) 9 January 2013 (2013-01-09) * the whole document *	1	
			TECHNICAL FIELDS SEARCHED (IPC)
			E02D

The present search report has been drawn up for all claims

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Place of search

Munich

Date of completion of the search

14 September 2022

Examiner

Horst, Werner

CATEGORY OF CITED DOCUMENTS

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ON EUROPEAN PATENT APPLICATION NO.**

EP 22 17 0889

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

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