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(54) **A SEWER VALVE WITH A LOCKING SYSTEM**

(57) The invention relates to a sewer valve with a locking system for coupling the sewer valve to a wall of a storm drain, comprising a catch body for insertion in a

wall's recess. The sewer valve is characterized in that the catch body is formed integrally with said sewer valve.

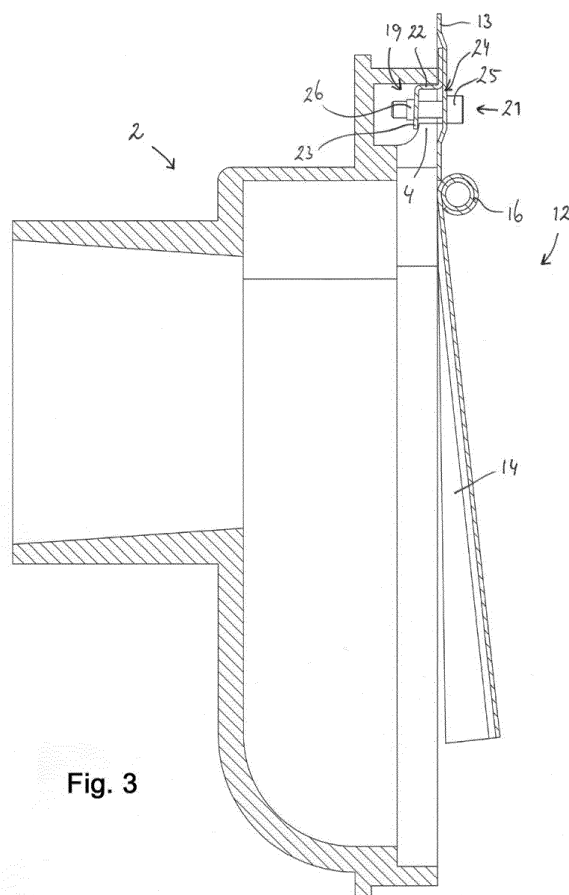


Fig. 3

Description

[0001] The present invention relates to a locking system for a sewer valve according to the preamble of claim 1. The invention also relates to a sewer valve comprising such locking system.

[0002] It is known in the art to couple a sewer valve to a wall of a storm drain so as to close off an entrance to the sewer pipe that ends up in said storm drain. A locking system is required for safely mutually coupling the sewer valve and the storm drain's wall, whereby there is no risk that the valve becomes detached from the wall.

[0003] A disadvantage of this known locking system is that it is extremely cumbersome to install. It needs much skill to connect the valve to the wall without individual components falling down into the storm drain.

[0004] The invention therefore aims at providing a locking system that overcomes the disadvantage mentioned above.

[0005] The invention aims at providing an improved locking system of the kind mentioned in the preamble wherein no individual components are used that may become detached from the valve.

[0006] The invention further aims at providing a locking system that allows for an easy, secure and fast coupling of a sewer valve in a storm drain.

[0007] According to a further embodiment, the present invention aims at providing a sewer valve comprising a locking system according to the present invention as mentioned above.

[0008] So as to obtain at least one of the above mentioned aims, the invention provides a locking system as mentioned in claim 1. This locking system has the advantage that a sewer valve can be simply hung in the sewer by positioning the catch element in the wall's recess. Since the sewer valve has no loose elements, no individual components can be separated from the sewer valve. Hence, a secure operation is obtained. Placing sewer valves thus is made easy and fast.

[0009] The present invention therefore relates to a sewer valve with a locking system for coupling the sewer valve to a wall of a storm drain, comprising a catch body for insertion in a wall's recess, said sewer valve being characterized in that the catch body is formed integrally with said sewer valve. The term "formed integrally" means that the catch body is made of a same material part as the sewer valve or, in case it is produced as a separate material part, is coupled to the sewer valve before the sewer valve is installed into a storm drain. Said coupling may be obtained by a bolt, a weld, an adhesive or any other suitable means for mutually coupling same. According to the present invention, only a single operation needs to be performed when installing the sewer valve according to the present invention into a storm drain.

[0010] It is preferred that said sewer valve comprises a valve plate for closing off an entrance to a sewer pipe and a connection plate for connecting the sewer valve to

the wall of the storm drain, said connection plate and valve plate being mutually swivably coupled, said catch body being integrally formed with said connection plate. Since the connection plate is connected firmly to the wall, the valve plate will have a strictly confined degree of motion, providing a worry-free operation. Also, such embodiment provides a secure positioning of the sewer valve in the storm drain since no loose components can get lost upon positioning same.

[0011] It is even furthermore preferred that the catch body being shaped as a bent piece of material, said material being a piece of material which is partially cut out of the connection plate, since such ensures a cheap production nevertheless secure operation and positioning of the sewer valve.

[0012] It is especially preferred in the sewer valve according to the invention, that said connection plate and valve plate being mutually swivable along a rotation axis; said catch element being a piece of material that is integrally formed with said connection plate along a connection line, said piece of material being defined by a cut through said connection plate such that said piece of material is connected to the connection plate by said connection line; a first part of said piece of material being bent away from said connection plate along the connection line; a second part of said piece of material being subsequently bent along a catch line so as to obtain a hanging element substantially parallel to said connection plate for insertion into the wall's recess. Such embodiment can be manufactured easily and at low costs, for example in a single die-cutting or punching operation.

[0013] A simple and fast positioning can furthermore be obtained if said second part comprises a threaded hole for receiving a bolt for clamping said second part to the wall.

[0014] According to an alternative embodiment, the catch element can be a material piece connected to said connection plate, said catch element comprising a first part connected to said connection plate and substantially directing away therefrom and a second part substantially parallel to said connection plate and positioned at a distance from said connection plate for insertion into the wall's recess. When positioned in the storm drain, said second part will point downwards, such that the valve plate can be easily hung in the wall's recess.

[0015] In such embodiment also, it is preferred for the second part to comprise a threaded hole for receiving a bolt for clamping said second part to said wall.

[0016] In both said alternative embodiments as mentioned above, it is preferred that said second part is connected to said first part in a bendable way, for then the second part will move towards the connection plate when tightening the bolt.

[0017] In an embodiment wherein the connection part comprises an integrally formed catch element by partly cutting out a material part from the connection plate, it is preferred for the sewer valve to further comprise a plate shaped coupling member, said catch element being po-

sitioned at a first side of the connection plate and the coupling member being positioned at a second, opposite side of the connection plate, said coupling member comprising a receiving means for receiving the bolt, such that said coupling member abuts said connection plate at said second side. Such also provides an easy and simple way of positioning the sewer valve in the storm drain.

[0018] In an embodiment wherein the catch element is embodied as a separate material piece that is mutually connected with the connection plate, the catch element is positioned at a first side of the connection plate, wherein the connection plate comprises a receiving means for receiving a bolt, and wherein the receiving means is situated in a protuberance of the connection plate, said protuberance being directed to the second side of the connection plate. Such provides additional room for the connection plate to deform so as to obtain a continuous force at the bolt that connects the catch element to the wall.

[0019] According to another aspect, the invention relates to a storm drain with a sewer valve according to the present invention, said storm drain comprising a wall with a recess for coupling the sewer valve, the sewer valve comprising a catch body for insertion in a wall's recess. The storm drain is characterized in that the catch body is formed integrally with said sewer valve. A storm drain comprising such sewer valve has the advantages as mentioned above in respect of the sewer valve.

[0020] Hereafter, the invention will be further described by means of a drawing. The drawing shows in:

Fig. 1A, 1B and 1C part of a storm drain's wall for coupling a sewer valve according to the state of the art,

Fig. 2A, 2B, 2C and 2D a perspective view of a valve plate according to the invention,

Fig. 3 a sectional view of a valve plate according to the invention,

Fig. 4 and Fig. 5 a perspective view of another embodiment of a valve plate according to the invention, and

Fig. 6 shows a catch element for use with the sewer valve according to the invention.

[0021] The same and similar parts and features have been denoted by the same reference numerals in the figures. However, for ease of understanding, not all parts that are required for a practical embodiment have been shown in the figures.

[0022] Fig. 1A, 1B and 1C show a coupling member 1 for connecting a sewer valve (not shown in Fig. 1) to a pipe connection 2 of a storm drain in accordance with the state of the art. In practice, the pipe connection 2 actually will form part of a wall of a storm drain and usually is manufactured integrally with such wall. The coupling member 1 is to be inserted in a wall's recess 3. The recess 3 is positioned at a top portion of the pipe connection 2. The recess 3 is defined by a raised edge 4. At both ends 5, 6 the coupling member 1 is narrowed 7, such that it

can pass between the raised edge 4 and a roof portion 8 of an entrance to said recess 3. According to the state of the art this coupling member 1 must be inserted into the recess 3, only after which step the sewer valve can be coupled to the coupling member 1. Due to the small dimensions of the coupling member 1 and the strict direction in which it must be inserted into the recess 3, the coupling member 1 often falls into the storm drain. Also, if the coupling member 1 is inserted it is a burden to connect the sewer valve to the coupling member, since the threaded holes 9, 10 are very small and difficult to find for an operator hanging upside down in a storm drain. Operation may be made easier by a projecting cam 11 on the coupling member 1 since for some operators such provides additional grip. However, many operators find such cam 11 inconvenient since grip on the coupling member 1 is worsened. However, such projecting cam 11 is required to ensure that the threaded holes 9, 10 are aligned correctly for positioning the sewer valve.

[0023] Fig. 2A, 2B, 2C and 2D show in consecutive order the positioning of a sewer valve 12 according to the present invention. The sewer valve 12 comprises a connection plate 13 and a valve plate 14. The connection plate 13 is to be coupled to the wall of a storm drain at a position above the entrance 17 to the sewer pipe, such that the valve plate 14 is positioned in front of an entrance to the sewer pipe. The valve plate 14 is swivable with respect to the connection plate 13 along a rotation axis 15 defined by hinge 16. Said hinge 16 mutually connects connection plate 13 and valve plate 14.

[0024] At a side 18 of connection plate 13 a catch element 19 is provided. Fig. 3 also clearly identifies this catch element 19.

[0025] Fig. 2A shows the sewer valve 12 according to the invention in a perspective view from the back side, also identified as first side; this is the side that is to be positioned against the sewer wall. More in particular, as shown in this drawing, the second side is the side that is to be positioned away from the pipe connection 2. Fig. 2B shows a perspective view of both the sewer valve 12 and the pipe connection 2. In Fig. 2B can also be seen the recess 3 that is positioned at a top portion of the pipe connection 2. The recess 3 is defined by a raised edge 4 and a roof portion 8. The catch element 19 can be simply hung in said recess 3, as shown in Fig. 2C. By slightly tilting the connection plate 13 forward, i.e. away from the pipe connection 2, a downwardly directing part of the catch element 19 can be inserted between the raised edge 4 and the roof portion 8 into the recess 3. After the catch element 19 is received in said recess 3, bolts 20, 21 will be tightened for coupling the sewer valve 12 to the pipe connection 2, i.e. to the wall.

[0026] Fig. 3 shows the sewer valve 12 connected to the pipe connection 2 in sectional view. The catch element 19 is comprised of a first part 22 that directs away from the connection plate 13 and a second part 23 that directs downwardly. Said catch element 19 is received in recess 3, wherein said downwardly protruding ele-

ment, said second part 23, abuts an inside of the raised edge 4. A bolt 21 abuts with its head 25 against an outside of the connection plate 13 and is received in threaded portion 26 of said second part 23 of catch element 19. By tightening said bolt 21, the second part 23 will be drawn towards the inside of raised edge 4 and tightly connecting said sewer valve to the pipe connection 2, i. e. to the wall of the storm drain.

[0027] As shown in Fig. 3, the bolt is received in a hole in connection plate 13, said hole being situated in a protuberance 24 of connection plate 12. Such protuberance 24 provides room for deflection when tightening bolt 21, so as to exert a continuous force on bolt 21.

[0028] Fig. 4 and Fig. 5 relate to an alternative embodiment of the present invention, showing a sewer valve 12'. The sewer valve 12' is specifically designed for installation in a tube-shaped storm drain 27. As a rule, a tube shaped storm drain 27 has a circular wall 28. As a consequence, a sewer valve as shown in Fig. 2 and 3 cannot be mounted to a circular wall. To that end, the sewer valve 12' comprises a partly circular abutting plate 31 at a top side of the connection plate 13' and two catch elements 19' in side parts 30 of connection plate 13', for cooperation with two recesses 3' in the wall 28. Like the sewer valve 12 shown in Fig. 2, the sewer valve 12' comprises a connection plate 13' and a valve plate 14'. The connection plate 13' is to be coupled to the wall 28 of the storm drain 27 at a position above the entrance 17' to the sewer pipe, such that the valve plate 14' is positioned in front of an entrance to the sewer pipe. As with the sewer valve 12, the valve plate 14' is swivable with respect to the connection plate 13' along a rotation axis defined by hinge 16'. Said hinge 16' mutually connects connection plate 13' and valve plate 14'. The sewer valve 12' is installed by tilting a top part of connection plate 13' slightly away from the storm drain's wall and inserting the catch elements 19', shown in sectional view in Fig. 6, in the recesses 3' provided in the wall. Then, bolts 29 are tightened so as to mutually couple the sewer valve 12' and the storm drain's wall 28.

[0029] The invention is not limited to the embodiments as mentioned above and as shown in the drawings. The invention is limited by the claims only.

[0030] The invention also relates to all combinations of features described here independently of each other.

Claims

1. A sewer valve with a locking system for coupling the sewer valve to a wall of a storm drain, comprising a catch body for insertion in a wall's recess, **characterized in that** the catch body is formed integrally with said sewer valve.
2. A sewer valve according to claim 1, wherein said sewer valve comprises a valve plate for closing off an entrance to a sewer pipe and a connection plate

for connecting the sewer valve to the wall of the storm drain, said connection plate and valve plate being mutually swivably coupled, said catch body being integrally formed with said connection plate.

3. A sewer valve according to claim 1, said catch body being shaped as a bent piece of material, said material being a piece of material which is partially cut out of the connection plate.
4. A sewer valve according to claim 1, said connection plate and valve plate being mutually swivable along a rotation axis; said catch element being a piece of material that is integrally formed with said connection plate along a connection line, said piece of material being defined by a cut through said connection plate such that said piece of material is connected to the connection plate by said connection line; a first part of said piece of material being bent away from said connection plate along the connection line; a second part of said piece of material being subsequently bent along a catch line so as to obtain a hanging element substantially parallel to said connection plate for insertion into the wall's recess.
5. A sewer valve according to claim 4, said second part comprising a threaded hole for receiving a bolt for clamping said second part to said wall.
6. A sewer valve according to claim 1, said catch element being a material piece connected to said connection plate, said catch element comprising a first part connected to said connection plate and substantially directing away therefrom and a second part substantially parallel to said connection plate and positioned at a distance from said connection plate for insertion into the wall's recess.
7. A sewer valve according to claim 6, said second part comprising a threaded hole for receiving a bolt for clamping said second part to said wall.
8. A sewer valve according to claim 4 or 6, said second part being connected to said first part in a bendable way.
9. A sewer valve according to claim 5, further comprising a plate shaped coupling member, said catch element being positioned at a first side of the connection plate and the coupling member being positioned at a second, opposite side of the connection plate, said coupling member comprising a receiving means for receiving the bolt, said coupling member abutting said connection plate at said second side.
10. A sewer valve according to claim 7, wherein the catch element is positioned at a first side of the connection plate and the connection plate comprising a receive-

ing means for receiving the bolt, wherein said receiving means is situated in a protuberance of the connection plate, said protuberance being directed to the second side of the connection plate.

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11. A storm drain with a sewer valve according to any of the preceding claims, said storm drain comprising a wall with a recess for coupling the sewer valve, the sewer valve comprising a catch body for insertion in a wall's recess, **characterized in that** the catch body is formed integrally with said sewer valve.

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Fig. 1A

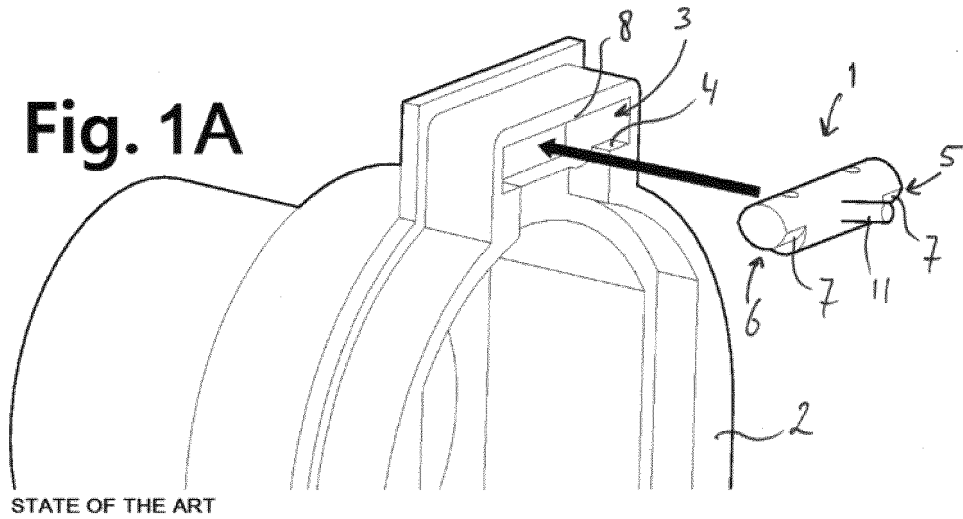


Fig. 1B

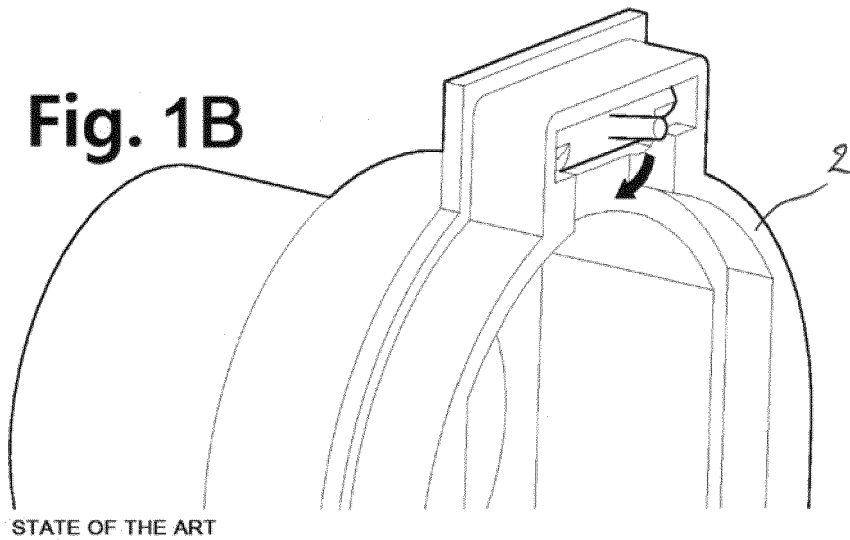


Fig. 1C

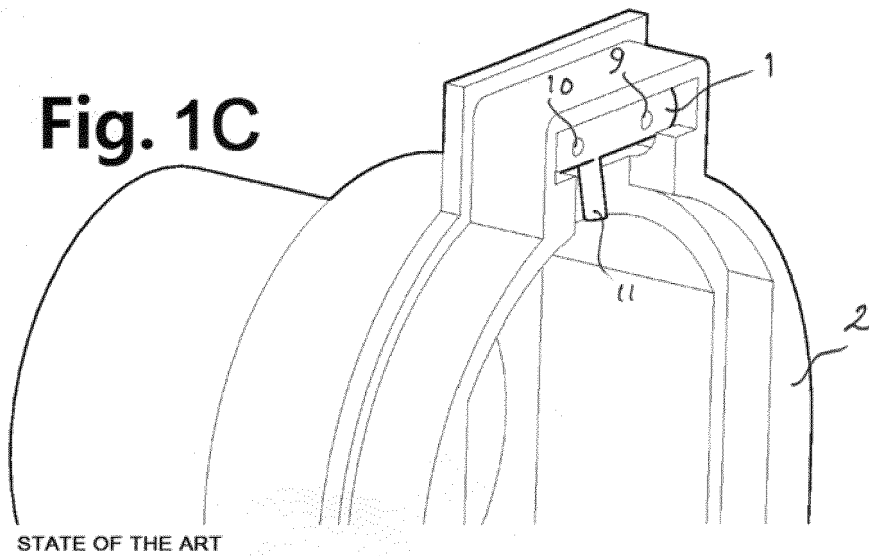


Fig. 2A

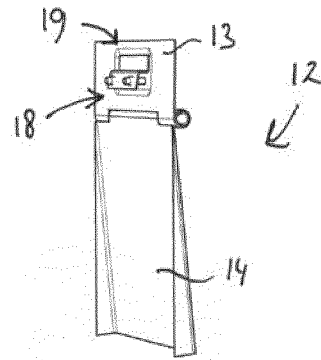


Fig. 2B

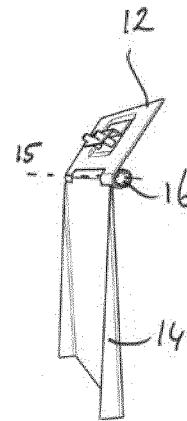
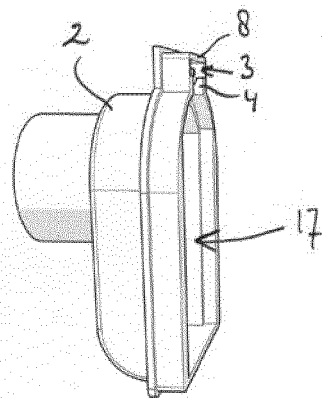


Fig. 2C

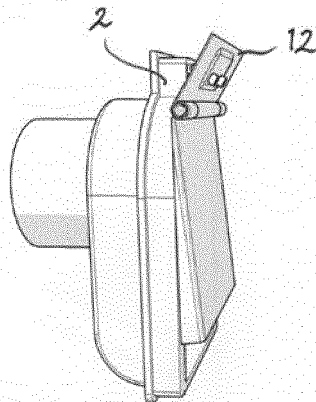
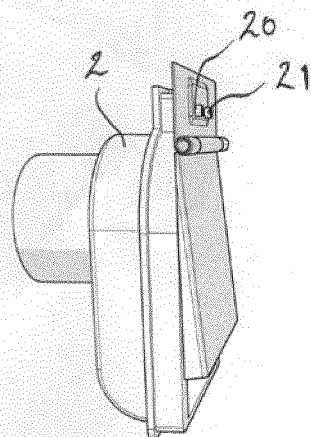
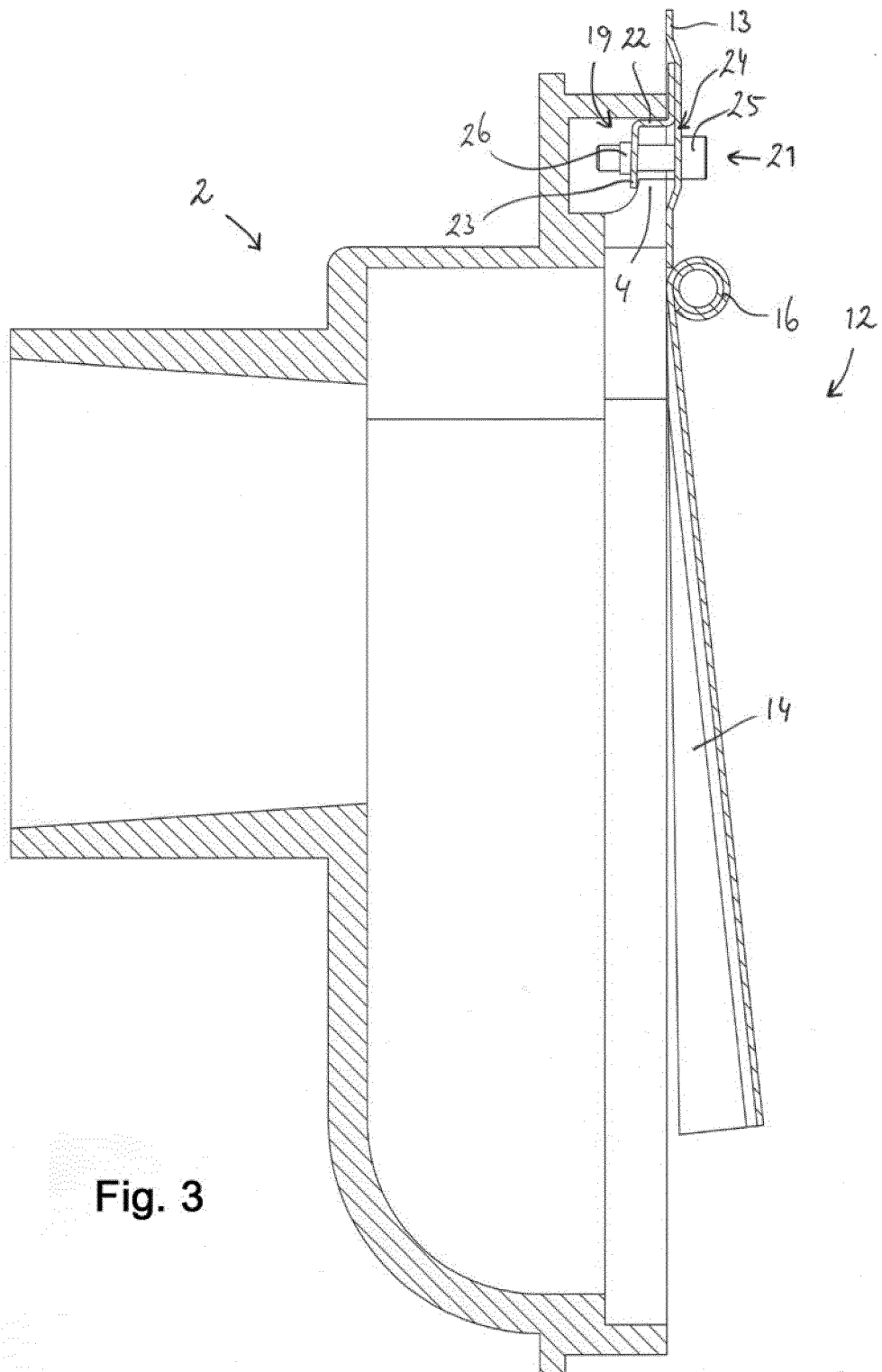


Fig. 2D





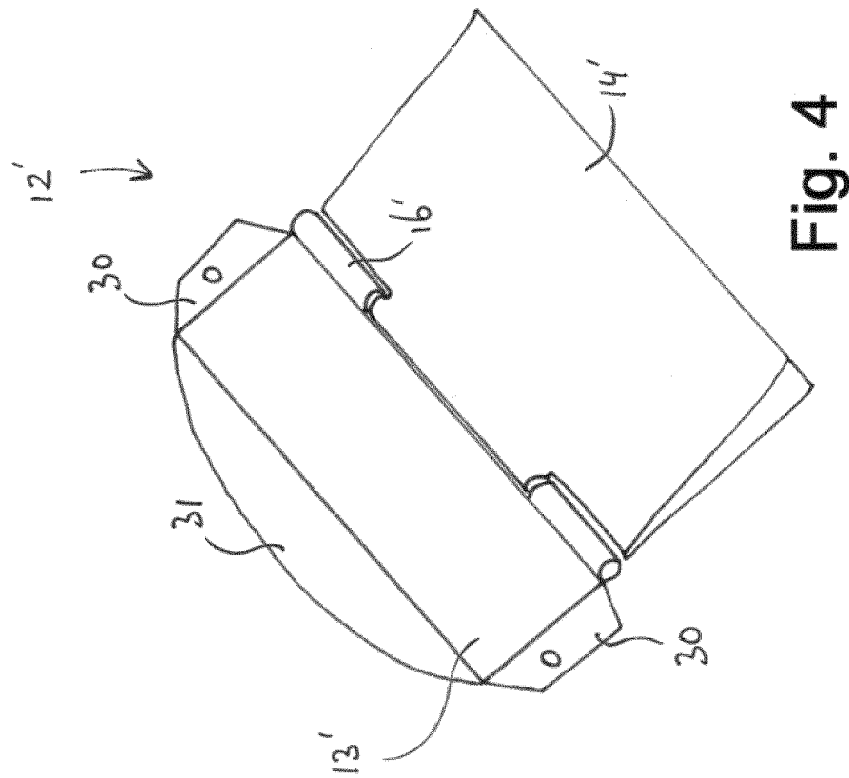


Fig. 4

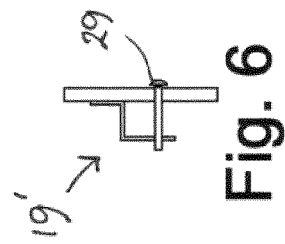


Fig. 6

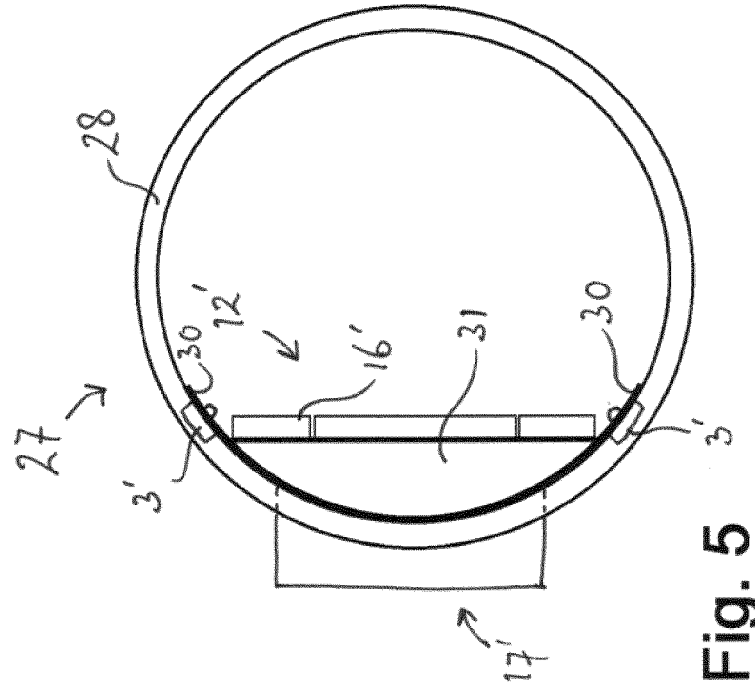


Fig. 5



EUROPEAN SEARCH REPORT

Application Number
EP 16 17 5361

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			TECHNICAL FIELDS SEARCHED (IPC)
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The present search report has been drawn up for all claims			
Place of search Munich		Date of completion of the search 2 December 2016	Examiner Leher, Valentina
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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.
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