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Amended claims in accordance with Rule 137(2)
EPC.

(54) **A VALVE FITTING FOR FILLING A SANITARY CISTERN AND A CISTERN COMPRISING SUCH
A VALVE FITTING**

(57) The invention relates to a valve fitting for a sanitary cistern comprising a water supply connection element and a filling valve, wherein a plug-in connection can be secured by means of a securing element having a lever rotatable for securing and releasing.

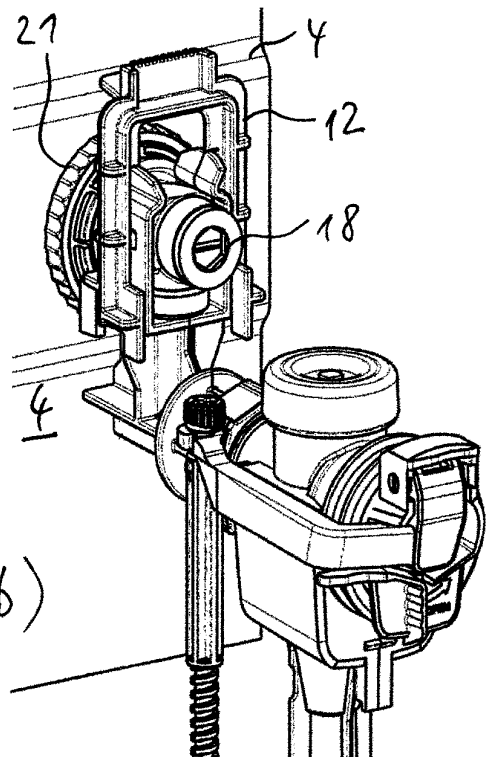


Fig. 5

Description

[0001] The present invention relates to a valve fitting for filling a sanitary cistern, in particular a built-in cistern to be mounted in a wall, for example a prewall in a bathroom. It also relates to a cistern equipped with this valve fitting.

[0002] Sanitary cisterns for collecting flush water for toilets of various types have generally been known for a long time. They are adapted to be connected to a water supply line, normally a rigid tubing arranged within a wall of a building. For said filling, a valve fitting is used which provides for the connection to the water supply and also include a filling valve. The filling valve is adapted for filling the cistern in terms of starting and stopping a filling procedure in response to the water level in the cistern. For example, the filling valve may include a float element, the height of which varies with the water level and induces and stops the filling of the cistern.

[0003] Usually, such a filling valve can be dismantled from a water supply connection element of the valve fitting, the latter being adapted for the connection to the water supply. Further parts may, but need not be arranged there between. A standard technique to implement such a dismantlable connection is by means of a male element to be inserted into a female element, this plug-in connection being secured for example by means of a sleeve nut.

[0004] The prior art WO 2017/118583 A1 discloses a valve fitting of the above described type. Therein, a shut-off valve is arranged between the water supply connection element and the filling valve by means of two mutually opposed plug-in connections. These are provided with a respective securing element which can be moved in a transverse direction relative to the local waterflow direction, that is to say "radially" with regard to the respective portion of the water line.

[0005] The present invention is based on the problem to disclose an improved valve fitting of the above described type having a securing element for securing a plug-in connection.

[0006] This problem is solved in that the securing element of the valve fitting according to the invention comprises a rotatable lever, the rotation of which serves for securing and releasing the plugged-in state of the plug-in connection. In other words, in one state of rotation, the plug-in connection cannot be disconnected but only in another state of rotation of the lever. This is in contrast to the above cited prior art document and some others in which a shiftable securing element is proposed.

[0007] A first advantage of the rotating lever is an enhanced security and simplicity of the operation thereof because a rotating lever can easily be grasped by the hand and is easier to recognize in a tactile sense (when operating "blindly" due to bad illumination or a visual obstruction). In case of a visual control, it is easier to distinguish the rotation state of a lever in comparison to the shifting position of a securing element according to the

WO citation.

[0008] In addition, it can be easier to implement a rotating lever in a substantial dimension, compare for example the shut-off valve actuation lever in the WO citation compared to the securing element therein.

[0009] Finally, the inventors have found that a rotation axis can be better protected against dirt or is less sensitive in this regard in comparison to a shiftable securing element according to the prior art.

[0010] Preferably, the above-mentioned plug-in connection is adapted to be connected and disconnected (opened or closed) by a merely linear movement, in other words without a rotational component of the movement. Thus, the operation of plugging-in is very simple and straight forward compared to screws, nuts or bayonet type couplings. A simple male / female combination with adequate sealing may be sufficient.

[0011] In another preferred embodiment, the securing function of the securing element as operated by the lever rotation is based on the establishment and release of a form closure of the securing element with another part of the valve fitting. A form closure is safer in function and operation than a frictional mechanism.

[0012] Preferably, a complete rotating part of the securing element, namely the complete part rotating with the lever, is arranged in a way not to encompass or surround or embrace the water line (the line of the waterflow in the valve fitting) completely, in contrast to for example a sleeve nut or the like. The rotating part is meant to be arranged not on all sides of the water line but for example just on one side thereof or, as in the preferred embodiment, around a bit more than half of the circumference of the water line. Further, it is preferred that the rotation axis is at an angle of at least 30° to the local water flow direction, again in contrast to a sleeve nut and the like. For illustration, the preferred embodiment is referred to, again.

[0013] In many cases, also in the cited prior art, a shut-off valve is included in the valve fitting in order to alleviate the closing of the water flow in case of maintenance or other works. This also applies to a preferred implementation of the invention. The shut-off valve can preferably be integrated with a connection element. Thus, it cannot be separated or dismantled therefrom and preferably any dismantling within the valve fitting (relevant to the water flow) is downstream of the shut-off valve. Thus, in the eventual case of an unintentional open state of the shut-off valve during such a dismantling could easily and quickly be resolved by simply closing the shut-off valve. In contrast thereto, if the shut-off valve of the cited WO citation is dismantled from the connection element, then there is no shut-off valve left in the waterline and either some upstream main valve would have to be closed or the shut-off valve would have to be remounted very quickly in order to close an unintentional water flow in such an event.

[0014] The combined implementation of a shut-off valve and the connection element can preferably be se-

cured to a cistern wall, preferably from both sides thereof. Thus, the connection element is the structure penetrating the cistern wall. Preferably, a manipulating element of the shut-off valve can be arranged within the cistern and can for example be operated via a standard revision opening of the cistern to the front side.

[0015] In a further advantageous implementation of the invention, the securing element has the additional function of blocking the manipulation element of the shut-off valve in the non-securing position of rotation of the lever. In particular, the lever can have a part extended such as to cover the manipulating element in a projection thereof, in this state of rotation as can be seen in the preferred embodiment.

[0016] In another preferred implementation, the securing element serves for securing a provisional fixing of the plug-in connection. In particular, spring means projecting from one of the elements to be connected can be provided and can for example engage over or behind the other one of the two elements to be plug-in connected. In this embodiment, the spring means could provisionally hold the two not yet completely secured elements, before the securing is performed.

[0017] Preferably, the plug-in connection discussed in this description is between the water supply connection element and a further element of the valve fitting, this further element connecting the water supply connection element to the filling valve. Generally, this further element could be a shut-off valve as in the cited prior art. If, however, the shut-off valve is integrated with the water supply connection element, it is still preferred not to connect the filling valve directly to this combined structure but still to use an additional element there between. This can, for example, be an elbow piece implementing an angular flow direction change of the water line by for example 90°.

[0018] With this implementation, it may be easier to adapt the valve fitting to special applications by changing for example the angle or dimensions of such a further element. Also, it might be advantageous to assemble the valve fitting from a plurality of individual pieces to alleviate or enable the introduction through a revision opening or another geometrical restriction during mounting.

[0019] Finally, a preferred implementation can provide for a conventional screw connection element on the opposed side of the further element in relation to the plug-in connection. Here, "opposed" relates to the water flow, not necessarily to a straight direction, compare the elbow piece of the preferred embodiment. The conventional screw connection can for example be a plug-in connection with a sleeve nut. The cited WO document has two similar plug-in connections on both opposed sides of the shut-off valve between the water supply connection element on the one side and the filling valve on the other side which might lead to confusion and mixing up whereas the clear difference of the two connections eliminates such causes of error.

[0020] Hereunder, a preferred embodiment of the invention is described for illustration, the details of which

are not meant to limit the scope of the present invention as defined by the claims. The explanations as to the embodiment shall be understood with regard to the valve fitting and the cistern.

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Figure 1 shows a side elevational view of a valve fitting according to the embodiment, wherein figure 1a shows the complete valve fitting and figure 1b the upper part thereof in larger scale, the elements of the valve fitting being separated from each other in both illustrations.

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Figure 2 shows a side elevational view of the elements in figure 1b but in an assembled state of the valve fitting and as mounted to a cistern wall.

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Figure 3 is a top view onto the elements in figure 1b.

Figure 4 is a perspective view of what is shown in figures 2 and 3.

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Figure 5 corresponds to figure 4 but with a securing element being in a securing positioning contrast to figures 1 to 4, wherein figure 5a shows the complete valve fitting as in figure 1a and figure 5b shows an upper part thereof as in the other preceding figures.

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Figure 6 is another perspective view corresponding to figure 5b but from a different perspective.

Figure 7 is a sectional view of the upper part of the valve fitting with a perspective perpendicular to the one of figures 2 and 3.

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Figure 8 shows a perspective illustration of the elbow piece 2 in the condition of figure 1, only.

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[0021] Figures 1a and b show the valve fitting according to the embodiment and comprising a water supply connection part 1, an elbow piece as a further element 2 and a filling valve 3. These parts are shown separated from each other in figures 1a and b and mounted to each other in the other figures.

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[0022] The filling valve 3 is as such unconventional and serves for filling the inside volume of a sanitary cistern 4 (compare figures 2, 4 and 5) with a water volume for flushing a toilet. Hereto, the filling valve 3 has a float 5 operating a valve mechanism integrated in the structure shown by a gear mechanism known as such. When flushing the toilet, the float 5 opens the integrated valve mechanism by its sinking down and closes the valve mechanism when having reached a predefined (and adjustable) height of the water level.

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[0023] Replacement water for this filling operation is fed into the filling valve 3 by means of the water supply connection element 1 and the elbow piece 2 and thus enters the filling valve 3 via a connection socket shown in figures 1a and b and directed towards the elbow piece 2.

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[0024] As can be seen in figures 2, 4 and 5, the water supply connection element 1 can be mounted or is mounted to a portion of the wall of the cistern 4 by a combination

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of an abutment ring 20 on the outside of this wall and a screw ring 21 on the inside thereof. On the outside of the wall, there is also a standard fitting 21 for connecting a water feed line to the water supply connection element 1 in the usual manner. The elbow piece 2 receives replacement water via the water supply connection element 1 from above and thus vertically and delivers the replacement water horizontally to the filling valve 3 as just explained. The respective interconnection between the elbow piece 2 and the filling valve 3 is a screw connection of a standard type comprising an externally threaded member 6 on the filling valve 3, a respective male insertion member 7 on the elbow piece 2 and a sleeve nut 8 concentrically thereon. This screw connection 6, 7, 8 can be connected for example after insertion of parts 2 and 3 through a revision opening of the cistern 4 therein. In contrast to the plug-in connection between elements 1 and 2 described hereunder, it will often not be necessary to open it again thereafter or at least less frequently than the plug-in connection.

[0025] In figure 8, a male insertion element 9 of the plug-in connection can be seen which is obstructed from view in other figures, in particular in figure 1 by one arm of spring means 10. This male part 9 is to be inserted into a female receiving part 11 shown in figures 1a and b in a vertical direction and makes up a watertight connection therewith provisionally fixed by the two arms of spring means 10 latching above and at the water supply connection element 1 as best shown in figure 4. Hereto, the two arms of spring means 10 can elastically be extended away from each other to snap in after the insertion has been completed. Figure 4 shows this state particularly clearly.

[0026] The plug-in movement is just linear, there is no rotational component necessary such as with a screw connection or a bayonet mechanism.

[0027] The fixing is provisional in that the water supply connection element 1 and the elbow piece 2 could still be separated in a vertical direction by overcoming the elastic latching just explained. When it is intended to secure the plug-in connection to eliminate this option/risk, a lever 12 shown in all figures can be rotated from a horizontal position shown in figures 1 to 4 and 8 into a vertical position shown in figures 5 to 7. The axis of the lever rotation is perpendicular to the plane of the drawing in figures 1 and 2 and vertical in this plane in figure 3 as well as horizontal in this plane in figure 7.

[0028] The lever 12 has roughly an inverted U-shape, compare figures 5 and 7 and is articulated to the elbow piece 2 on two sides of the above-mentioned male element 9, compare figure 8. In the upright vertical position, the lever 12 contacts or at least is adjacent to the respective outsides of both arms of spring means 10 and thus inhibits any substantial outward movement for releasing the above explained elastic latch fixing, compare figure 7.

[0029] Further, a respective shoulder 13 of both inner sides of the two legs of the U-shape, which contact the arms, also rest upon the uppermost ends of the arms of

spring means 10 so that these ends inhibit a downward movement of the lever 12 and thus of the elbow piece 2 relative to the water supply connection element 1.

[0030] Further, each of the arms has an outwardly protruding lock structure 14 in a lower region thereof which engages into a respective recess of the inner sides of the legs of the U-shape as can also be seen in figure 7. This recess is somewhat larger in the vertical direction in the section shown in order to enable a rotation of the lever 12 to engage the lock structure 14 into the recess. Again, the connection between water supply connection element 1 and elbow piece 2 is secured hereby. All in all, there are three form closures on each of both sides as shown in figure 7 for the securing of the plug-in connection in its plugged-in state and both the lever 12 and the spring means 10 are part of the securing element.

[0031] The securing vertical position of the lever 12 is secured with regard to the rotational movement by a latch ramp 15 quite clearly visible in figures 4 and 8, over which a portion 16 of the respective inner side of the legs of the lever 12 can slide to be latched there behind and between this latch ramp 15 and a stop proximate thereto. The latched condition can be seen in figure 5b and figure 6 in limited extent and the respective portion 16 of the lever 12 can best be seen in figure 8.

[0032] The U-shape of lever 12 and the complete rotating structure do not completely embrace or encompass the water line being locally vertical in figure 8 between the two articulations of lever 12 in any rotational position.

[0033] At a base part interconnecting both legs of lever 12, a plate-like arm 17 is arranged which protrudes therefrom in a direction perpendicular to the plane of the U-shape of lever 12, wherein the plate-shape is vertical in the horizontal position of lever 12 and horizontal in the vertical position thereof, compare figures 4 and 6. Figures 2 and 4 illustrate that this arm 17 inhibits the insertion of a tool for operating a manipulating element 18 of the water supply connection element 1. The manipulating element 18 has a shape adapted for the insertion of a hexagonal wrench and a slotted screwdriver, both tools requiring a certain free space before the manipulating element 18 which is blocked or obstructed in the projection direction required for the tool insertion.

[0034] This manipulating element 18 serves for operating a shut-off valve integrated in water supply connection element 1 and adapted for closing and opening the water flow through the water line integrated therein and feeding water (in the open state) to the elbow piece 2. Consequently, the shut-off valve 19 can only be operated if the plugged-in state of water supply connection element 1 and elbow piece 2 is secured as in figure 5. In this condition, usually a completely mounted state is present wherein the open state of shut-off valve 19 is adequate.

[0035] If an operating person should forget to close shut-off valve 19 before opening the plug-in connection, the shut-off valve 19 would still be on the line and thus could be closed very quickly. Any inadvertent opening

during a just provisional fixing of the plug-in connection is impossible.

[0036] For any usual service operation, it is normally sufficient to separate the filling valve 3 just by opening the plug-in connection (and the leaving the screw connection 6 to 8 closed).

[0037] The difference between these two connections inhibits any inadvertent wrong mounting of the elbow piece by interchanging the two ends thereof in contrast to the prior art cited in the introductory portion of the description.

Claims

1. A valve fitting for filling a sanitary cistern, comprising
 - a water supply connection element (1) for connecting the cistern via the valve fitting to a water supply,
 - a filling valve (3) for filling the cistern with water from the water supply,
 - the filling valve (3) being connectable to and disconnectable from the water supply connection element (1) by a plug-in connection (9,11),
 - the plug-in connection being provided with a securing element (10,12) adapted for securing the plug-in connection (9,11) in a plugged-in state thereof,
 - characterized in that** the securing element (10,12) comprises a lever (12) rotatable for securing and releasing the plugged-in state of the plug-in connection (9,11).
2. The valve fitting of claim 1, wherein the plug-in connection (9,11) is adapted to be connected and disconnected by an exclusively linear movement.
3. The valve fitting of claim 1 or 2 adapted for that a rotation of the lever (12) engages and disengages a form closure of the securing element (10,12).
4. The valve fitting of one of the preceding claims, wherein the lever (12) is part of a rotating structure (12,17) adapted for rotating with the lever (12), the rotating structure (12,17) not embracing a waterline of the valve fitting.
5. The valve fitting of one of the preceding claims, wherein the lever (12) is adapted for a rotation around an axis at an angle to a local waterflow direction of a waterline of the valve fitting.
6. The valve fitting of one of the preceding claims comprising a shut-off valve (19).
7. The valve fitting of claim 6, wherein the shut-off valve (19) is integrated with the water supply connection

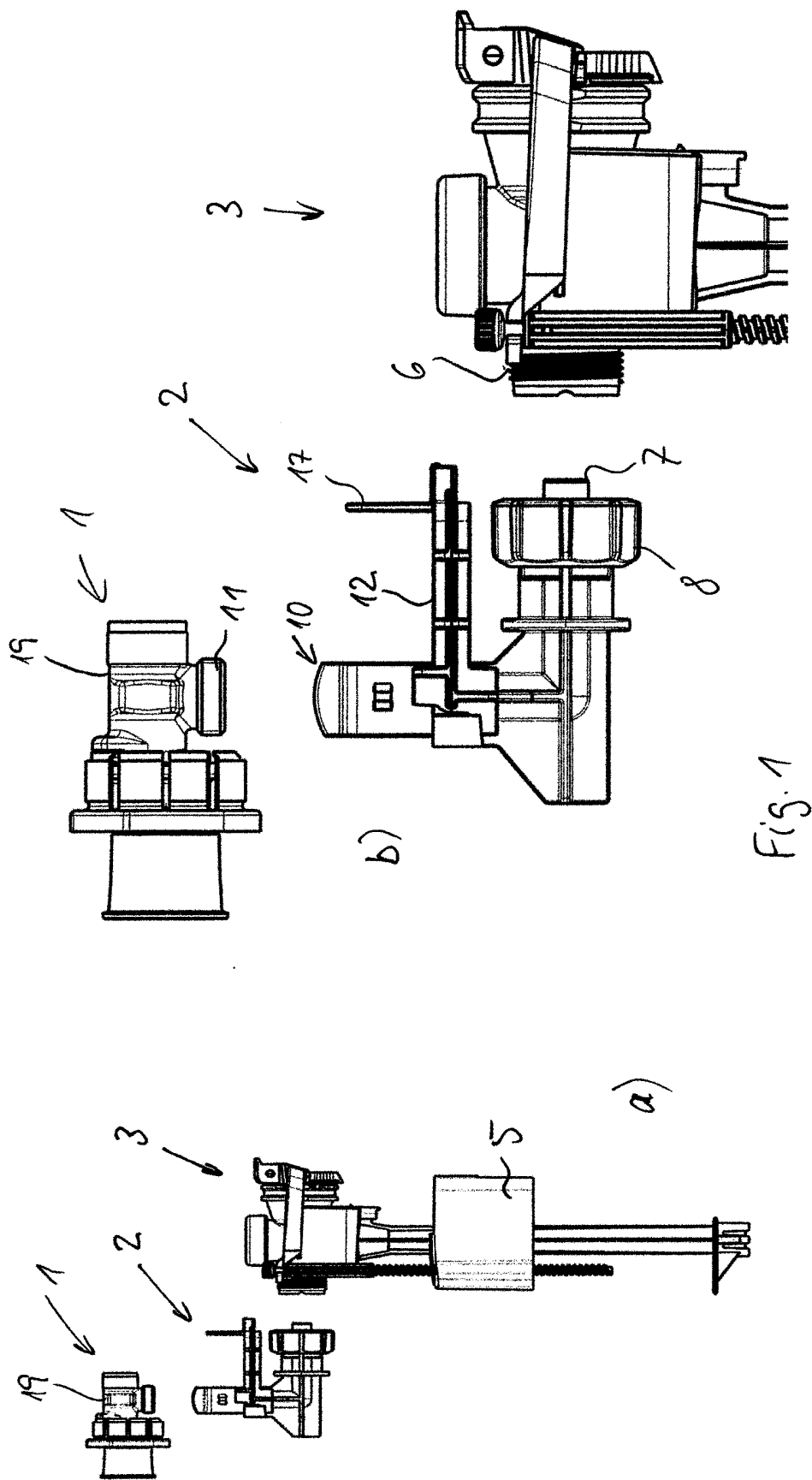
element (1).

8. The valve fitting of claim 7, wherein the water supply connection element (1) is mounted to a wall (4) of the cistern.
9. The valve fitting of claim 6, 7 or 8, wherein a rotation of the lever (12) for securing the plugged-in state also releases an obstruction of a manipulating element of the shut-off valve (19).
10. The valve fitting of claim 9, wherein the lever (12) has an arm (17) projecting therefrom, the arm (17) being adapted for the obstruction.
11. The valve fitting of one of the preceding claims, wherein the plug-in connection (9,11) can provisionally be fixed by spring means (10) in a not yet completely plugged-in state and a rotation of the lever (12) serves for securing the provisional fixing
12. The valve fitting of one of the preceding claims, wherein the plug-in connection (9,11) is between the water supply connection element (1) and a further element (2) of the valve fitting, the further element (2) connecting the water supply connection element (1) to the filling valve (3).
13. The valve fitting of claim 12, wherein the further element (2) is an elbow piece.
14. The valve fitting of claim 12 or 13, wherein there is a screw connection element (7,8) on a side of the further element (2) opposed to the plug-in connection (9,11).
15. A cistern, in particular a cistern for building into a wall, comprising a valve fitting according to one of the preceding claims.

Amended claims in accordance with Rule 137(2) EPC.

1. A valve fitting for filling a sanitary cistern, comprising
 - a water supply connection element (1) for connecting the cistern via the valve fitting to a water supply,
 - a filling valve (3) for filling the cistern with water from the water supply,
 - the filling valve (3) being connectable to and disconnectable from the water supply connection element (1) by a plug-in connection (9,11),
 - the plug-in connection being provided with a securing element (10,12) adapted for securing the plug-in connection (9,11) in a plugged-in state thereof,

- characterized in that** the securing element (10,12) comprises a rotating structure (12, 17), the rotating structure comprising a lever (12) as a part thereof and the rotating structure (12, 17) not embracing a waterline of the valve fitting completely, the lever (12) and the rotating structure (12, 17) together being rotatable for securing and releasing the plugged-in state of the plug-in connection (9,11). 5
2. The valve fitting of claim 1, wherein the plug-in connection (9,11) is adapted to be connected and disconnected by an exclusively linear movement. 10
3. The valve fitting of claim 1 or 2 adapted for that a rotation of the lever (12) operates the securing element (10,12) in order to establish and release a form closure of the securing element 10, 12 with another part of the valve fitting. 15
4. The valve fitting of one of the preceding claims, wherein the lever (12) is adapted for a rotation around an axis at an angle to a local waterflow direction of a waterline of the valve fitting. 20
5. The valve fitting of one of the preceding claims comprising a shut-off valve (19). 25
6. The valve fitting of claim 5, wherein the shut-off valve (19) is integrated with the water supply connection element (1). 30
7. The valve fitting of claim 6, wherein the water supply connection element (1) is mounted to a wall (4) of the cistern. 35
8. The valve fitting of claim 5, 6 or 7, wherein a rotation of the lever (12) operates the securing element (10, 12) in order to block and unblock a manipulating element of the shut-off valve (19). 40
9. The valve fitting of claim 8, wherein the lever (12) has an arm (17) projecting therefrom, the arm (17) being adapted for the obstruction. 45
10. The valve fitting of one of the preceding claims, wherein the plug-in connection (9,11) can provisionally be fixed by spring means (10) in a not yet completely plugged-in state and a rotation of the lever (12) serves for securing the provisional fixing 50
11. The valve fitting of one of the preceding claims, wherein the plug-in connection (9,11) is between the water supply connection element (1) and a further element (2) of the valve fitting, the further element (2) connecting the water supply connection element (1) to the filling valve (3). 55
12. The valve fitting of claim 11, wherein the further element (2) is an elbow piece.
13. The valve fitting of claim 11 or 12, wherein there is a screw connection element (7,8) on a side of the further element (2) opposed to the plug-in connection (9,11).
14. A cistern, in particular a cistern for building into a wall, comprising a valve fitting according to one of the preceding claims.



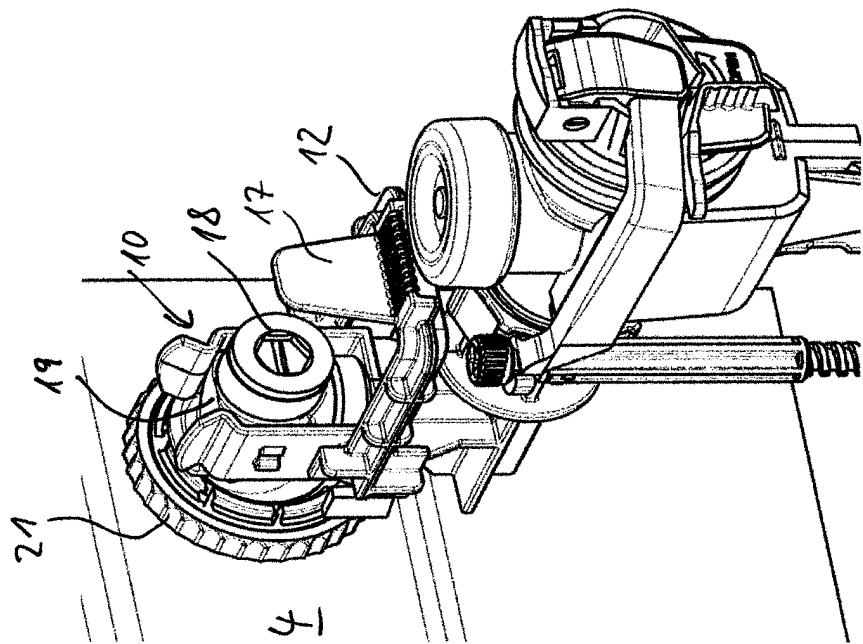


Fig. 1

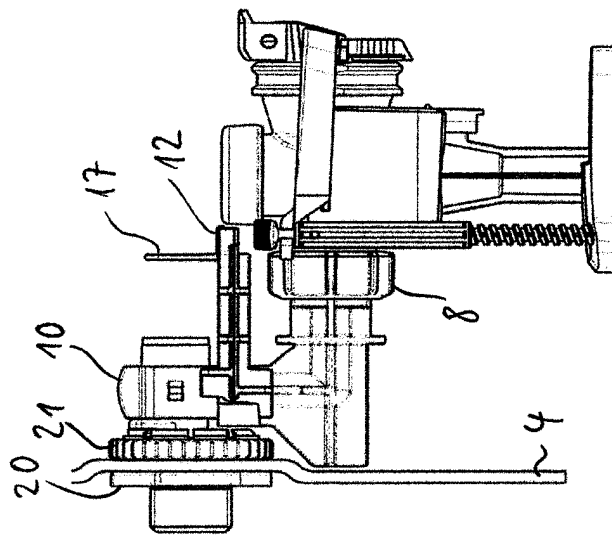


Fig. 2

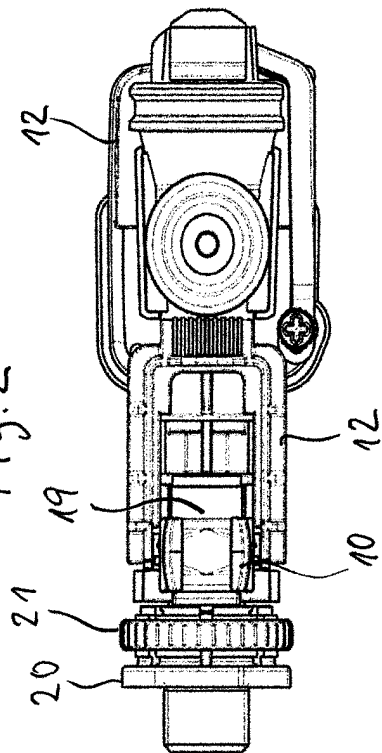


Fig. 3

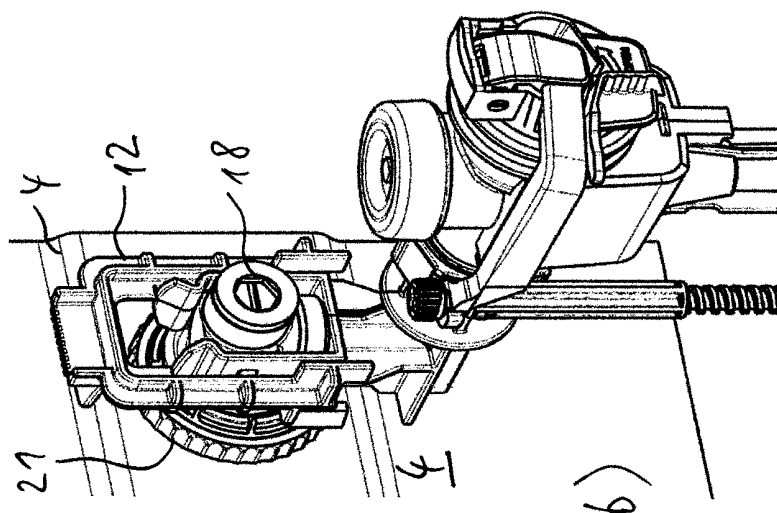
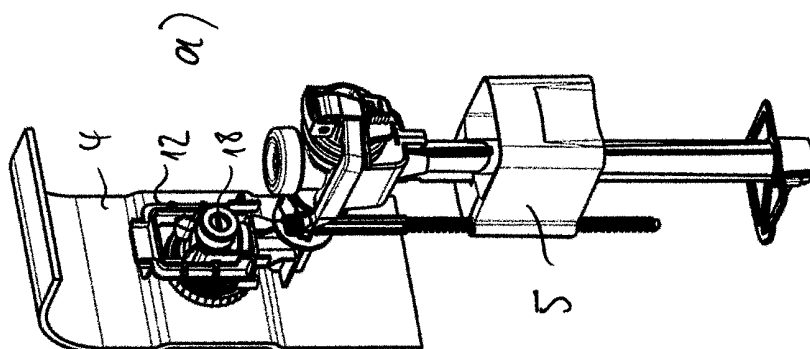


Fig. 5

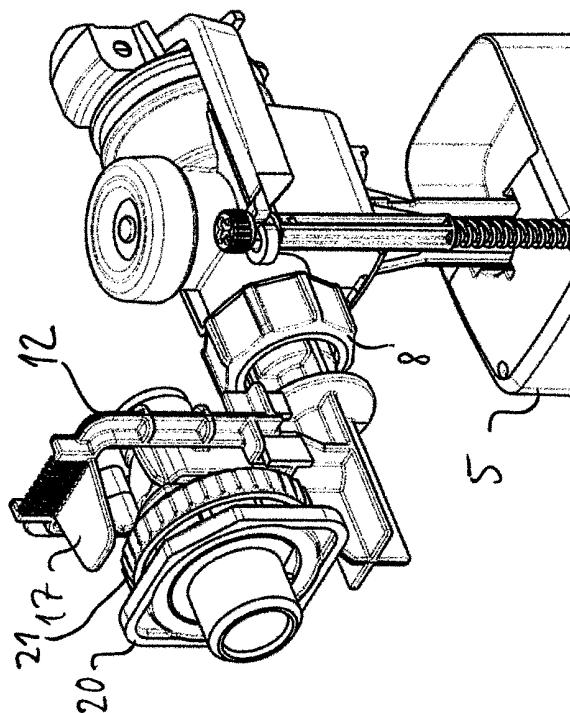


Fig. 6

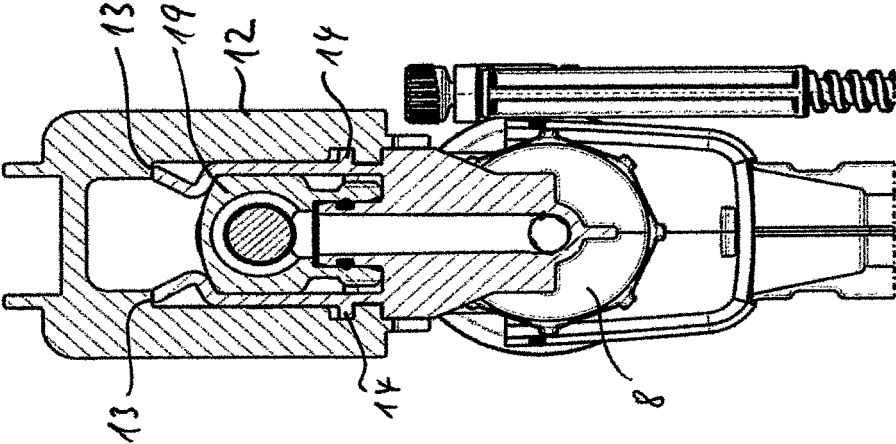


Fig. 7

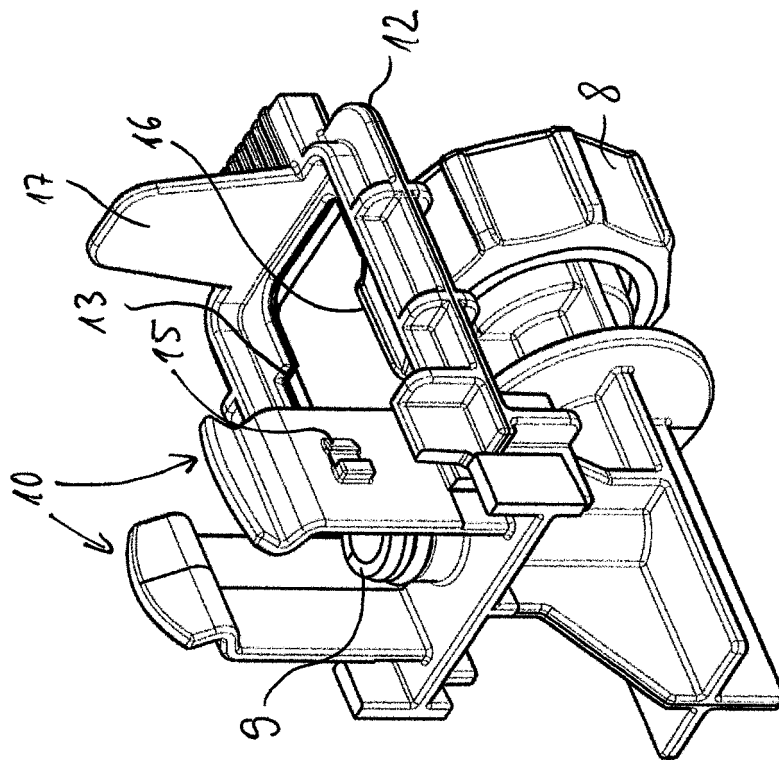


Fig. 8



EUROPEAN SEARCH REPORT

Application Number

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EPO FORM 1503 03.82 (P04C01)

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A	----- EP 3 366 851 A1 (TECE GMBH [DE]) 29 August 2018 (2018-08-29) * figure 2d *	1	
			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 7 July 2022	Examiner Posavec, Daniel
CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document		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	

**ANNEX TO THE EUROPEAN SEARCH REPORT
ON EUROPEAN PATENT APPLICATION NO.**

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