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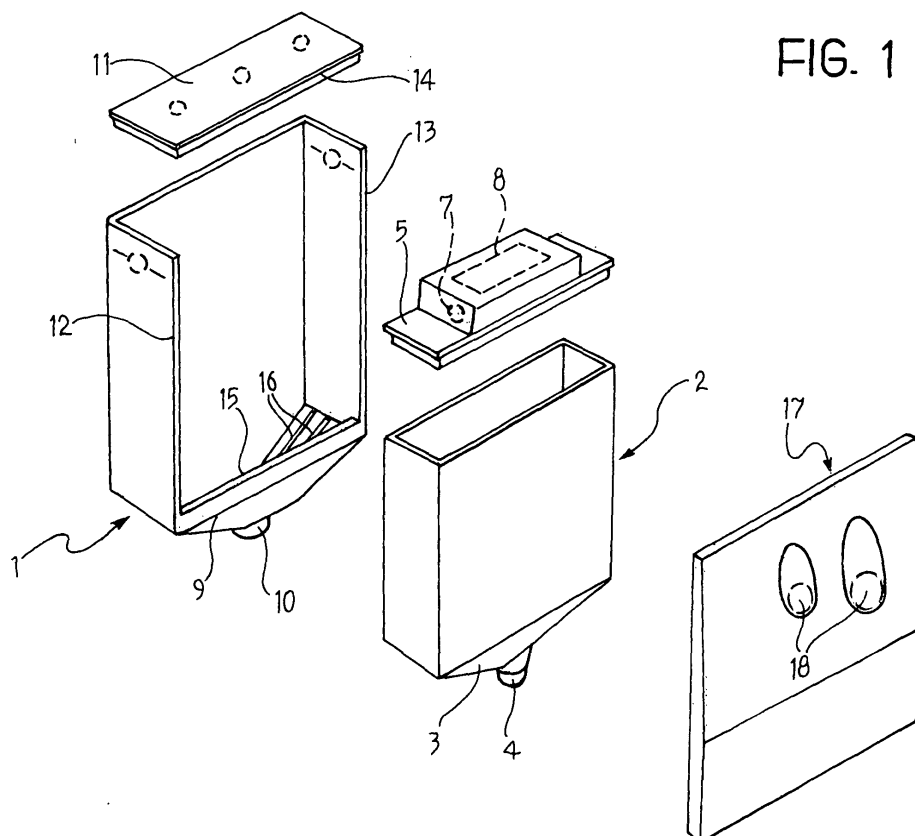
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(54) **A cistern assembly for a toilet bowl**

(57) A cistern assembly for a toilet bowl, of a type for embedding in a bathroom wall, which includes a frame (1) which can be received and embedded in a cavity formed in a wall, and a cistern (2) which can be inserted into the frame (1) or extracted therefrom through

an aperture in the frame and a corresponding aperture in the wall. The frame (1) has a lower receptacle portion (9) with a passage (10) which can be hydraulically connected to a pipe leading to a toilet bowl and which can receive a discharge connector (4) of the cistern (2).



Description

[0001] The present invention relates to a cistern assembly for a toilet bowl and, in particular, to a cistern assembly for embedding into a bathroom wall.

[0002] In the prior art, a cistern assembly having the characteristics defined in the preamble to Claim 1 is described in the Brazilian Patent Application n. BR-9804484-2A.

[0003] It is known that conventional embedded cisterns have various disadvantages, notably complicated installation and problems with access to the cistern once it is installed, due largely to the reduced dimensions of the opening left in the wall, which is normally closed by a panel which can be removed to gain access to the inside of the cistern when maintenance work is required.

[0004] It is also known that should an embedded cistern be faulty, or become faulty over time, this can cause water leakage which can infiltrate the wall housing the cistern and eventually other rooms in the building, causing serious damage.

[0005] The object of the present invention is to provide an improved cistern assembly capable of overcoming the problems described above.

[0006] This and other objects, which will be better understood below, are achieved according to the present invention by providing a cistern assembly having the features defined in the appended Claims.

[0007] The characteristics and advantages of the invention will become apparent from the detailed description of various embodiments thereof, provided purely by way of non-limitative example, with reference to the appended drawings, in which

Figure 1 is an exploded perspective view of a first embodiment of a cistern assembly of the present invention;

Figure 2 is a partial, vertically sectioned schematic view of a cistern of the assembly of Figure 1 mounted in a frame;

Figure 3 is a top plan view, on an enlarged scale, of the frame of Figure 1;

Figure 4 is an exploded perspective view of a frame for a cistern assembly of the invention; and

Figure 5 is an exploded perspective view of a second embodiment of a cistern assembly of the invention.

[0008] Referring first to Figure 1, a frame suitable for being accommodated and embedded in a cavity (not shown) formed in a wall of a bathroom is generally indicated 1.

[0009] The frame 1 is of a size and shape appropriate for housing a flushing toilet cistern 2 having a generally rectangular shape; the lower portion 3 of the cistern 2 is in the shape of a hopper, or inverted truncated pyramid and has in its lower central area a discharge connector 4 for insertion into a pipe (not shown) leading to a toilet

bowl (not shown).

[0010] The top of the cistern 2 is closed by a lid 5 with weakened lines 7, 8 along which the lid is breakable to form apertures for the connection of a water inlet pipe and for the operation of means for controlling water discharge.

[0011] The lower portion 9 of the frame 1 is essentially a truncated pyramid shape, similar to the lower portion 3 of the cistern 2.

[0012] An important characteristic of the arrangement of the present invention is that the lower portion 9 of the frame constitutes a receptacle ending at the bottom in a connector 10 for joining to the aforesaid pipe (not shown) leading to the toilet bowl.

[0013] The top of the frame 1 is closed by a flat cover element 11. In this way, the front edges 12, 13 of the vertical side walls of the frame 1, the upper edge 15 of the lower, receptacle portion 9 and the front edge 14 of the cover element 11 form a rectangular aperture through which the cistern 2 can easily be inserted or extracted.

[0014] With reference to Figure 2, in the assembled condition the discharge connector 4 of the cistern 2 is inserted into the connector 10 of the frame 1. As also shown in Figure 3, raised ribs 16 are preferably formed on the inner walls of the receptacle portion 9 for spacing the lower portions 3 and 9 of the frame and the cistern 2 and for guiding towards the discharge connector 10 any condensation or water which may have seeped from the cistern or escaped from it for any other reason, for example as a result of cracks formed therein.

[0015] Due to the receptacle portion 9, the risk of water from the cistern infiltrating the wall in which it is embedded is reduced, if not eliminated, thus avoiding any damage to the building.

[0016] With reference again to Figure 3, vertical ribs 6 are formed on the inner surface of the discharge connector 10 of the frame, extending radially inwards so as to define with the discharge connector 4 of the cistern (shown by the broken line in Figure 3) a plurality of passages 6a through which any water present in the receptacle portion 9 can be channelled into the pipe leading into the toilet bowl. The envelope of the radially inner surfaces of the vertical ribs 6 defines a centering surface which helps keep the discharge connector 4 of the cistern coaxial with the discharge connector 10 of the frame. According to a variant which is not illustrated, this centering surface, through which the discharge connector of the cistern is housed coaxially, can be constituted by a continuous cylindrical surface arranged coaxially inside the discharge connector 10 and fixed thereto by radial connector fins separating the aforesaid passages 6a.

[0017] The vertical ribs 6 can be formed, as shown in Figure 3, as a continuation of the ribs 16 formed on the inner walls of the receptacle portion 9 of the frame.

[0018] As stated earlier, in the embodiment illustrated in Figure 1 the cistern 2 is inserted and extracted

through the rectangular front opening in the frame 1 defined by the edges 12, 13, 14 and 15 thereof. This opening is closed by an outside panel 17 with push buttons 18 for controlling flushing; the panel 17 is hooked over and fixed to the edges 12-15 of the frame so that it is easily removable, for example by means of grooves and corresponding projections (not shown in detail) or by screw means.

[0019] The dimensions of the external panel 17 match those of the aforesaid rectangular aperture; the horizontal dimension thereof is thus slightly greater than that of the cistern 2, while it is an advantage if the vertical dimension of the plate is smaller than that of the cistern, which should be inserted through the aperture slightly tilted. The dimensions of the external panel 17 are therefore only slightly greater than those of panels used in the prior art.

[0020] The cistern 2 and the frame 1 have respective connection means (not shown for the sake of simplicity), preferably on their facing side surfaces, for removably securing the cistern in its vertical operating position inside the frame.

[0021] It should be noted that the choice of forming the frame 1 and its flat upper closure element 11 in two separate elements constitutes a preferential choice for certain applications but is certainly not essential to the purposes of the invention. In particular, the frame could be made as a single element, with an integral top cover.

[0022] However in a preferred embodiment of the invention, illustrated in Figure 4, the frame 1 can also be made with a removable top cover 11 and also with a removable front wall 19.

[0023] In applications where the cistern is to be inserted through the front, as described with reference to Figure 1, the wall 19 is simply not used. On the other hand, as shown in Figure 5, this same wall is used in cases where the cistern is to be fitted in a cavity in a low wall, ending at the top with a horizontal surface; in such cases the frame 1 is closed by the wall 19 and embedded in the wall and the cistern 2 is inserted and extracted vertically from above, through the rectangular aperture defined by the upper edges 20, 21, 22 of the frame 1 and the edge 23 of the wall 19. Once the lid 5 has been fitted on the cistern 2, the aperture is closed by an external panel 24, fitted flush with the upper surface of the wall (not shown) and having push buttons 18 for controlling flushing.

[0024] Naturally, the principle of the invention remaining unchanged, the embodiments and manufacturing details may vary widely from those described and illustrated here purely by way of non-limitative example, without departing thereby from the scope of the invention as defined in the appended claims.

Claims

1. A cistern assembly for a toilet bowl, of a type suitable for embedding in a bathroom wall and comprising:

ble for embedding in a bathroom wall and comprising:

- a frame (1) for embedding in a cavity formed in the said wall;
- a flushing cistern (2) which can be inserted into the frame (1), and extracted therefrom through an aperture in the frame and a corresponding aperture in the wall;

characterised in that the frame (1) has a lower receptacle portion (9) with a passage (10) for hydraulic connection with a pipe leading to a toilet bowl.

2. A cistern assembly according to Claim 1, **characterised in that** the passage (10) is a connector for engaging a discharge connector (4) of the cistern (2).

3. A cistern assembly according to Claim 1, **characterised in that** the aperture for insertion and extraction of the cistern (2) is a front, vertical aperture defined by:

- a front edge (14) of an upper, horizontal cover portion or element of the frame (1);
- two front edges (12, 13) of the vertical side walls of the frame (1); and
- a front upper edge (15) of the lower receptacle portion (9).

4. A cistern assembly according to Claim 3, **characterised in that** it also includes an external vertical panel (17) which is removably fitted to the frame (1) for closing the vertical front aperture (12-15).

5. A cistern assembly according to Claim 1, **characterised in that** the aperture for inserting and extracting the cistern (2) is a top, horizontal aperture defined by the upper edges (20-23) of the vertical walls of the frame (1).

6. A cistern assembly according to Claim 5, **characterised in that** it also includes an external horizontal panel (24) which can be removably fitted to the frame (1) for closing the top horizontal aperture (20-23).

7. A cistern assembly according to Claim 1, **characterised in that** the frame (1) includes a removable, horizontal top cover element (11) and a removable front wall (19).

8. A cistern assembly according to Claim 1, **characterised in that** the cistern (2) has a tapered lower portion (3).

9. A cistern assembly according to Claim 8, **characterised in that** the tapered lower portion (3) is a front wall (19).

terised in that the lower receptacle portion (9) is tapered towards the bottom so as to match the bottom tapered portion (3) of the cistern (2).

10. A cistern assembly according to Claim 1, **characterised in that** the receptacle portion (9) of the frame (1) has projections (16) for keeping the bottom of the cistern (2) vertically spaced from the receptacle portion (9). 5
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11. A cistern assembly according to Claim 1, **characterised in that** the lower surface of the receptacle portion (9) of the frame (1) facing the bottom of the cistern (2) is formed (16) in such a way that any water is channelled to the passage (10). 15
12. A cistern assembly according to Claim 1, **characterised in that** the passage (10) is formed in the lowest portion of the lower receptacle portion (9) of the frame (1). 20
13. A cistern assembly according to Claim 2, **characterised in that** the inside of the discharge connector (10) of the frame is formed (6) so as to define, with the discharge connector (4) of the cistern (2), a plurality of vertical passages (6a) for conducting water from the receptacle portion (9). 25
14. A cistern assembly according to Claims 2 or 13, **characterised in that** radial, inwardly-projecting vertical ribs (6) are formed on the inner surface of the discharge connector (10) of the frame. 30
15. A cistern assembly according to Claims 10 and 14, **characterised in that** the vertical ribs (6) constitute an extension of the projections (16) formed on the inner walls of the receptacle portion (9) of the frame. 35
16. A cistern assembly according to Claim 2, **characterised in that** the discharge connector (10) of the frame forms a pair of coaxial walls, with the inner one acting to house the discharge connector (4) of the cistern (2) and to define, with the coaxially outer wall, at least one vertical passage (6a) for channeling water from the receptacle portion (9). 40
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FIG. 1

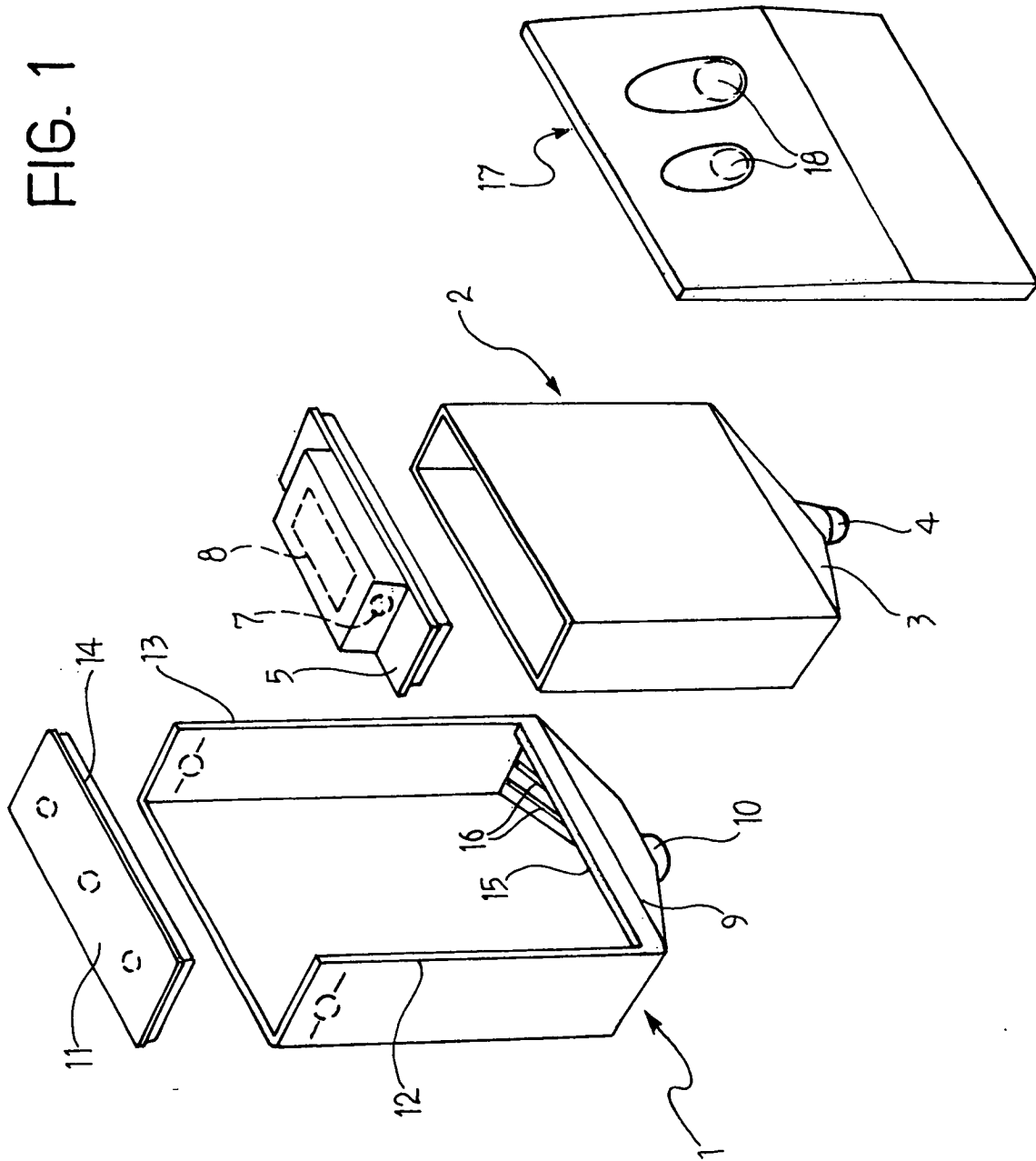


FIG. 2

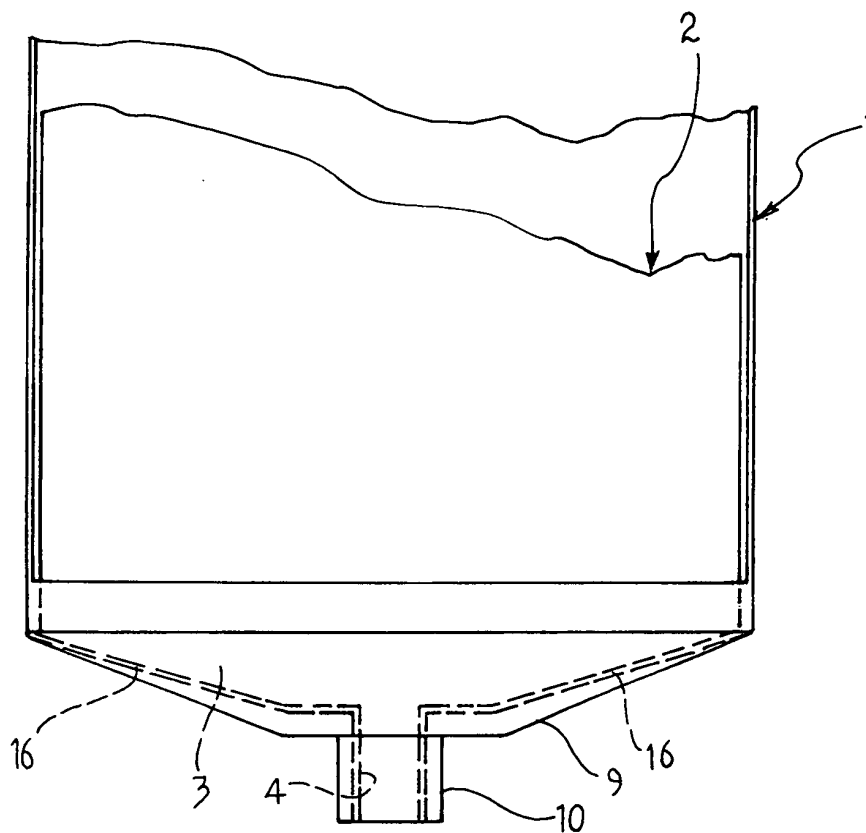


FIG. 3

