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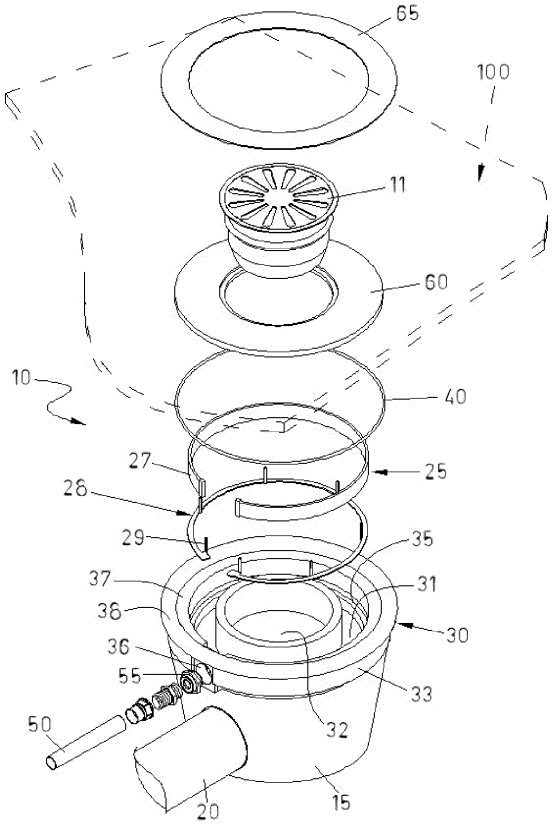
(54) **Drain assembly with lighting device and sanitary appliance comprising such drain assembly**

(57) The drain assembly (10) comprises a drain element (11) and a container body (30) adapted for receiving therewithin a light source (27) which is powered directly from the mains. The container body (30) is associable with the drain element (11) so that the light source (27) is integrated therein and is not in direct contact with the fluid flowing through the drain element (11). It further includes a cover (60) to cover the top of the container body (30) with allows the light projected by the light source (27) to at least partly pass through.



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Description

Technical field

[0001] The present invention belongs to the technical field of sanitary appliances and the like, including bathtubs, showers, shower trays, washbasins, toilets, urinals, sinks etc. and the like, but not limited to these, and in general to devices intended for receiving liquids and/or solids to which a drain can be fitted for evacuating said liquids and/or solids.

BACKGROUND

[0002] Sanitary appliances and the like, such as bathtubs, showers, shower trays, washbasins, toilets, urinals, sinks, etc. and the like have evolved over time, both in terms of shape and in configuration as well as materials used in their manufacture, etc.

[0003] For example, light sources have been recently included associated with these devices, especially with decorative purposes. For example, bathtubs are known including light in their walls or taps provided with a source of coloured light that is activated when water flows. Shower trays are also known including a light source. Thus, document DE102009028759 discloses a shower tray that includes a light source formed by light emitting diodes (LEDs) powered by batteries. In the tray shower described in this document, the diodes are arranged just above the drain and they are simply covered by a cover. Also document ES1076070U discloses a shower tray having a LED strip that is arranged below the tray to project ambient light outwards. In yet a further specific example, document ES1077475U discloses a shower tray including a LED strip that is arranged inside an L-shaped groove formed by the periphery of the tray.

[0004] A major drawback in most cases in arrangements known in the art where a light source is incorporated in the sanitary appliance lies in the fact that the light source is arranged so as to be in direct contact with the water flowing through the drain. In practice it has been found that having the light source arranged in direct contact with water passing through the drain poses a risk to the light source, with faults and malfunctions in the light source and related electrical equipment being frequent, which requires frequent tasks of maintenance, repair or replacement of one or more electrical elements of the light source. In addition, since the light source is usually located very close to or in direct contact with the water passing through the drain a battery based power supply is usually used in the prior art for activating the light source for safety reasons. This has the disadvantage that they have to be loaded or replaced from time to time for the operation of the light source. All this results in that the assembly becomes undesirably complex and consequently involving high manufacturing and maintenance costs.

[0005] The invention provides a drain assembly having a configuration with low mechanical complexity and which has a very effective operation as it will be detailed hereinafter. The present drain assembly is adaptable to any conventional standard sanitary appliance and the like, including bathtubs, showers, shower trays, washbasins, toilets, urinals or sinks of the conventional type. With the drain assembly of the present invention it has been shown that prior art drawbacks are at least be mitigated or reduced.

SUMMARY OF THE INVENTION

[0006] The invention provides a drain assembly of the standard type, which in general requires no special modifications for use according to the intended purpose, which is capable of providing light, for example for decorative purposes, avoiding or at least reducing the problems that have been mentioned in connection with the prior art.

[0007] As used herein, the term drain assembly is intended to designate an arrangement suitable for conducting fluids and/or solids, especially liquids such as water into an outlet duct for evacuation.

[0008] In general, the drain assembly according to the present invention comprises a drain element, a container body and a lighting device comprising at least one light source. The container body is configured as a receptacle, for example having a circular perimeter, made for example of a suitable plastic material.

[0009] The container body is suitably configured for receiving therein the light source, or light sources, of the lighting device. Such container body of the present drain assembly is also adapted for connecting to a standard manhole if necessary. The container body may be defined by a bottom base, a side portion and a recessed area may be included in the inner portion to receive a top cover, as it will be described hereinafter.

[0010] According to an important feature of the drain assembly of the present invention, the container body is associable with said drain element so that the light source is not in direct contact with the fluid as it passes from the drain element to the outlet duct.

[0011] The fact that the container body is associable with the drain element means that, once the drain assembly is assembled, the container body is integrated into the drain element forming a whole. Thanks to this feature and the particular arrangement of the container body associable with the drain element as stated, in combination with the capacity of the container body for housing therein the light source in isolation, the light source is arranged perfectly as part of the drain assembly itself and without being in direct contact with the fluid (water, etc.) flowing into the outlet duct.

[0012] With such a simple configuration an assembly having the following advantages is obtained:

- it is extremely compact since the whole assembly is integrated into one body;

- it is very reliable as the light source and the various electrical components that may be associated therewith are arranged, in an operative position, without being in direct contact with liquids; this may further allow the present drain assembly to pass the current approval tests for this kind of devices;
- it is cost effective due to the extremely simple configuration of the assembly; and
- it is adaptable to any conventional sanitary appliance or the like, such as for example a shower tray, without requiring modifications thereof to incorporate the present drain assembly.

[0013] Preferably, the light source of the present drain assembly may comprise at least one light emitting diode (LED), and more preferably a strip of light emitting diodes (LEDs). Of course within this general configuration, the drain assembly light source may be formed by a plurality of strips (for example two or more LED strips) mechanically and/or electrically connected to one another, or a number of separate strips connected mechanically and/or electrically directly to the assembly, not to each other. However, within the scope of the present invention, the use of other light sources of other than those already cited, for example light sources such as incandescent, fluorescent lamps or even optical fibre, are not ruled out. In any case, the light source, which may be in strip form, may be also of the same colour or it may be of different colours, etc. It is also envisaged that in some cases the colour of the source may be variable in defined cycles or as desired by the user. Similarly, it is also envisaged that in certain cases the intensity of the light emitted by the light source may be variable in defined cycles or as desired by the user as well. Therefore, the particular configuration of the present drain assembly with the light source isolated from direct contact with fluid allows a wide variety of options.

[0014] The main advantage of the present drain assembly is that the light source can be powered from the mains. This is due to the effective sealing of the assembly derived from the main feature of the present drain assembly that is the integration of at least one light source isolated from fluids in the drain assembly itself. Only if it is necessary, a 12V transformer may be included, which is also isolated from the passage of fluids through the drain assembly. Since the light source is integrated into the same drain assembly with no direct contact with the fluid passing therethrough in normal use, power supply from the mains is fully secure and reliable, and maintenance free.

[0015] In one particular embodiment of the present drain assembly, the container body can be suitably configured to have at least one perimeter recess therewithin. This perimeter recess is adapted for receiving the light source therewithin. This perimeter recess may be configured as a single continuous perimeter recess. However, embodiments where the perimeter recess is configured as a plurality of circumferential recesses, that is, defining a series of perimeter recess segments are not ruled out. In the latter case, the perimeter recess segments may be arranged aligned with each other, either concentrically or in a combination of both configurations, as needed according to the requirements and to the light source to be accommodated. In any case, it is preferred that the perimeter recess is formed inside the container body so that the light source is arranged therein at least partially surrounding the drain element in an operative condition. Within the concept of the invention, it will be understood that said perimeter recess may be defined by grooves, channels, cavities, etc. and in general areas adapted for receiving the light source.

[0016] The dimensions of the perimeter recess or (segments of) perimeter recesses of the container perimeter body may be suitable for the light source, such as a LED strip, fibre optic, etc., to be properly press fitted therewithin, or received therein with a certain amount of clearance, as desired or as required by the configuration of the assembly or the type of light source used. In this regard, the use of suitable attaching means for retaining the light source in position on the container body if necessary is not ruled out. This could be useful if the light source comprises a plurality of light elements requiring to be retained in position in a simple way to facilitate installation, replacement and maintenance operations.

[0017] In some embodiments of the invention, it may be preferable that the perimeter recess intended for accommodating the light source (e.g. LED strip, optical fibre, etc.) therein is configured in a way that said light source is arranged in such a position that light emitted by the light source is projected radially toward a central portion of the container body. In one example, in the case that a LED strip is used as a light source, the perimeter recess is adapted to accommodate the LED strip therewithin so that it is substantially perpendicular to a lower base of the container body. This causes the light that is projected radially toward the central portion of the container body is scattered out advantageously producing pleasant environment for the user.

[0018] In addition to the perimeter recess for receiving the light source, the container body may include at least a first opening. Such first opening is adapted, that is, suitably sized and shaped for receiving the drain element inside of which the fluid flows into the outlet duct formed in the manhole.

[0019] The container body may further include at least one second opening. This second opening is suitably adapted for the passage of the light source power wiring. Embodiments where the second opening is alternatively formed in the manhole are not ruled out.

[0020] The drain assembly of the invention may further comprise a top cover, as noted above. This cover is suitably adapted for covering the upper portion of the container body. In a possible configuration of the cover, it is configured as a circular ring whose outside diameter substantially matches the diameter of said recessed area of the container body to fit therewithin while remaining sub-

stantially at the same level, and whose inside diameter substantially matches the outer diameter of the drain. In this way, water from the bathtub, shower, shower tray, washbasin, toilet, urinal, sink, etc. passes through the drain element but it does not enter the container body, that is, the container body is never flooded with water (or other fluid) so that the lighting device is advantageously isolated perfectly. One or more suitable sealing gaskets associated with the cover, the container body and the drain element may be provided.

[0021] The upper cover may be made of a suitable material such as methacrylate or glass, which allows the light projected by the light source to at least partly pass through. In some cases, the cover may be of a material that is at least substantially opaque and be provided with one or more areas suitably shaped for the passage of light that is projected by the light source, forming decorative motifs in accordance with a pattern defined by said areas. Such pattern defined by said areas may define text, symbols, graphics, etc. or combinations thereof for decorative purposes, advertising, etc. The passage of light through these areas may provide a pleasant environment to the user who is using a sanitary appliance, toilet, bathtub, shower, shower tray, washbasin, toilet, urinal, sink, etc. provided the present drain assembly.

[0022] The invention further relates to a sanitary appliance, toilet, bathtub, shower, shower tray, washbasin, toilet, urinal, sink, etc. comprising a body adapted for receiving a liquid and/or solid and evacuating it, and having therein the drain assembly according to any of the above described embodiments.

[0023] Additional objects, advantages and features of embodiments of the invention will become apparent to those skilled in the art upon examination of the description, or may be learned by practice of the invention.

BRIEF DESCRIPTION OF THE DRAWINGS

[0024] A particular embodiment of the present invention will be disclosed by way of a non-limiting example, with reference to the accompanying drawing which shows a general exploded view of one example of a shower tray, depicted partially and schematically, incorporating one particular embodiment of the drain assembly of the present invention.

DETAILED DESCRIPTION OF EMBODIMENTS

[0025] In the figure enclosed herein a possible non-limiting particular example of a shower tray 100 of the conventional type is shown. The figure only partially and schematically depicts the surface of the shower tray 100 for the sake of clarity. The shower tray 100 incorporates one embodiment of a drain assembly 10 according to the present invention. It should it be however understood that this drain assembly 10 may be applicable in many other sanitary appliances such as bathtubs, showers, shower trays, washbasins, toilets, urinals, sinks, etc., either in domestic (personal housings) or industrial (hotels, offices, offices, etc.) use, in toilets, kitchens, etc. and in general where a drain is required for evacuating liquids (water, etc.) and/or solids.

[0026] The drain assembly 10 which is described hereinbelow with reference to the figure and by way of a non-limiting example comprises a standard type drain element 11, made for example of stainless steel, having substantially cylindrical shape. The drain element 11 is adapted to engage the conventional shower tray surface 100 in a hole of the shower tray 100 to evacuate the water (or other fluids) falling into the shower tray 100 in a normal use thereof.

[0027] The drain assembly 10 shown includes a conventional lower manhole 15. This is a body, made for example of plastic, intended to be disposed below the level of the tray 100, hidden to the user in normal use, as well as the drain assembly 10. The drain assembly 10 further includes an outlet duct 20 connected to the manhole 15. This water outlet duct 20 carries water (or other fluids) entering the drain element 11 toward the manhole 15, for its evacuation.

[0028] The drain assembly 10 that is shown further includes a lighting device generally designated at 25. The lighting device 25 comprises a light source 27. In this particular example, the light source is a strip of light emitting diodes (LEDs) 27, although it is understood that other light sources such as incandescent, fluorescent, optical fibre, or a combination thereof may additionally or alternatively be used.

[0029] In this example, the strip of light emitting diodes (LEDs) 27 used is in itself sealed. Two separate silicone sealed plugs are provided at the ends of the LED strip 27 which ensure fluid tightness in case of rupture. Fluid tightness of the LED strip 27 itself provides the drain assembly 10 with a second level of security in the unlikely event of breakage.

[0030] If necessary, a 12V transformer may be provided for powering the LED strip 27. The transformer would be mounted above the level of the shower tray 100, for example on the ceiling of the cabin where it is mounted.

[0031] The drain assembly 10 further comprises a container body 30 that is associable with the drain element 11. Specifically, as illustrated in the example shown in the figure, the container body 30 is a circular perimeter receptacle, made for example of a plastic material such as nylon. The container body 30 is defined by a bottom base 31 and a side wall 33. Inside of it, the container body 30 has an upper perimeter recessed area 37. Within the container body 30 a perimeter recess is also formed 35. This peripheral recess 35 is adapted for receiving therein a LED strip 27 of the lighting device 25. In operation, a LED strip 27 is received in this perimeter recess 35 of the container body 30 in an arrangement inside of the container body 30 surrounding the drain element 11 when the latter is mounted within the first central circular aperture 32 of the container body 30. An embodiment is envisaged in which the LED strip 27 is arranged inside

the container body 30 partially surrounding the drain element 11.

[0032] On the other hand, the container body 30 has a first circular central opening 32 for receiving the drain element 11 and a second opening 36 for the passage of wiring 50 for powering the light source. For ensuring the sealing between the side wall 33 of the container body 30 and the wiring 50 cable glands 55 are provided in the second opening 36.

[0033] It is important to point out that the interior of the container body 30 is not floodable, that is, water (or any other liquid and/or solid component) can not enter the perimeter recess 35 of the container body 30. Therefore, the LED strip 27 received within the circumferential recess 35 is never exposed to direct contact with water (or other liquid and/or solid) which passes from the drain element 11 into the outlet duct 20.

[0034] With this simple configuration, the lighting device 25 is integrated into the drain assembly 10 itself, without direct contact with water when the shower tray 100 is used, i.e. when water passes through the assembly. In order to ensure water-tightness, an O-ring sealing 40 isolating the LED strip 27 from the outside of the container body 30 is provided. This avoids or reduces the risk of malfunctions and failures of the lighting device 25, thereby reducing repair, replacement and maintenance costs.

[0035] The above particular feature due to sealing of the assembly and isolation of the lighting device 25 from water allows the lighting device 25 to be powered by the mains, using a transformer (not shown) if needed.

[0036] In the particular embodiment shown as an example in the figure, the LED strip 27 is mounted on a support 28. In the example shown, the support 28 is an aluminium ring 29 provided with protrusions projecting perpendicularly to the support 28. This configuration of the support 28 with the protrusions 29 allows the LED strip 27 to be arranged inside the container body 30 substantially perpendicular to its lower base 33. Thus, the light emitted by the LED strip 27 projects radially towards the centre of the container body 30, that is towards the first central opening 32, causing the light to come out of the container body 30 so as to create a pleasant environment to the user.

[0037] The drain assembly 10 further includes a top cover 60. The upper cover 60 is adapted to cover the top of the container body 30. In an assembled condition, the top cover 60 is fitted into the container body 30 lying flush therewith. More specifically, the cover 60 is shaped as a circular ring. The outer diameter of the cover 60 substantially matches the diameter of the upper perimeter recessed portion 37 within the container body 30. The thickness of the cover 60 also substantially matches the height of said upper perimeter recessed portion 37 within the container body 30 to lie flush with the upper edge 38 of the container body 30. On the other hand, the inner diameter of the circular ring shaped cover 60 substantially matches the outer diameter of the drain element 11, as it can be seen from the figure. In general, the top cover 60 may have any suitable shape adapted to the configuration of the assembly and the function to which it is intended.

[0038] The cover 60 is preferably formed of a material that allows the light projected by the light source 25 to at least partly pass through, such as methacrylate or glass. However, the cover 60 may be made of any other material. Embodiments where the top cover 60 is formed even of one or more sheets of an impervious nature are not ruled out. It is generally preferred that the cover 60 is made of a substantially transparent or translucent material that allows the light projected by the LED strip 27 to at least partly pass through to the outside of the drain assembly 10. In other cases, the cover 60 may be formed of a substantially opaque material with some substantially transparent or translucent portions in the form of text, symbols, graphics, etc. for decorative, advertising, functional purposes, etc. In this particular example, a stainless steel ring 65 having a number of symbols like grooves 66 is provided through which the light projected by the LED strip 27 passes through creating a pleasant visual effect.

[0039] Further objects, advantages and features of the invention will be derived to those skilled in the art from the present disclosure and also by practice of the invention. For example, the container body 30 may be applied both to siphon and flow-through type drains. The container body 30 may have any suitable shape besides the circular profile shown, and it could have an oval or polygonal profile, or a combination thereof. Furthermore, the activation of the light source 27 could be manually controlled by the user, through sensors that detect user presence or water flow through the shower tray 100, etc. Activation of the light source 27 may be in situ or remotely through a suitable controller or even through an electronic device such as a mobile phone, tablet, etc. Also, activation of the lighting source 27 of the assembly may be carried out by switching means and/or conventional mechanical switches or by switching means and/or touch switches. Timer means could be also provided for programming the light source switching on and switching off. Means for adjusting the intensity of the light emitted by the light source 27, means for changing the colour of the light emitted by the light source 27 and in general electronic mechanisms for control the characteristics of the light projected by the light source 27 could be provided. Decorative motifs as well as objects such as decorative stones and/or sand may be provided inside the perimeter recess 35 for increasing the aesthetic effect provided to the user.

[0040] Thus, the example given above in conjunction with the drawing is given only by way of illustration and they are not intended to limit the present invention. Reference signs relating to the drawings and in parentheses in a claim are only an attempt to increase the understanding of the claims and should not be construed as limiting the scope of protection of the claims. The present inven-

tion thus covers all combinations of particular and preferred embodiments set forth herein.

Claims

1. Drain assembly (10) comprising a drain element (11) for receiving at least one fluid and a lighting device (25) comprising at least one light source (27), **characterized in that** it further comprises a container body (30) adapted for receiving therewithin the light source (27), said container body (30) being associable with said drain element (11) so that the light source (27) is not in direct contact with the fluid as said fluid flows through the drain element (11).

2. Drain assembly (10) as claimed in claim 1, wherein the light source comprises one or more of light emitting diodes (LEDs) (27), incandescent lamps, fluorescent lamps, optical fibre, or a combination thereof.

3. Drain assembly (10) as claimed in claim 1 or 2, wherein the light source is in the form of a strip.

4. Drain assembly (10) as claimed in any of the preceding claims, wherein the light source (27) is powered from the mains.

5. Drain assembly (10) as claimed in any of the preceding claims, wherein the container body (30) has at least one perimeter recess (35) adapted to receive the light source (27).

6. Drain assembly (10) as claimed in any of the preceding claims, wherein the container body (30) has at least a first opening (32) adapted to receive the drain element (11).

7. Drain assembly (10) as claimed in any of the preceding claims, wherein the container body (30) has at least one second opening (36) adapted for the passage of wiring (50).

8. Drain assembly (10) as claimed in any of the preceding claims, wherein the container body (30) is adapted for receiving the light source (27) surrounding the drain element (11).

9. Drain assembly (10) as claimed in claim 3, wherein the container body (30) is adapted for receiving said strip therein in a position in which said strip is substantially perpendicular to a lower base (31) of the container body (30), so that the emitted light is projected radially toward a central portion of the container body (30).

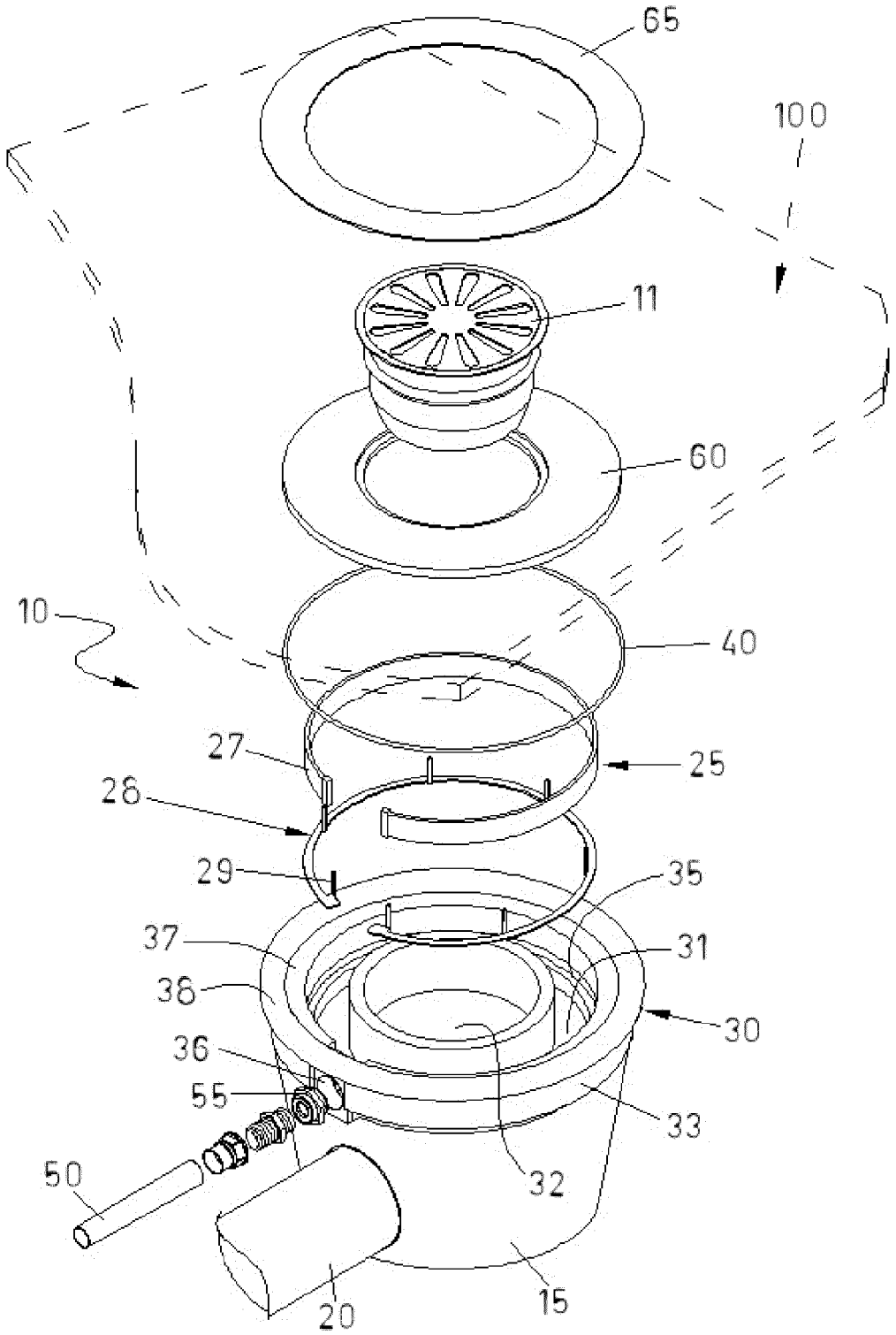
10. Drain assembly (10) as claimed in any of the preceding claims, wherein it further comprises a cover (60) adapted to cover the top of the container body (30) and to allow the light projected by the lighting device (25) to at least partly pass through.

11. Drain assembly (10) as claimed in claim 10, wherein the cover (60) includes at least one portion shaped for the passage of light projected by the lighting device (25) forming decorative motifs.

12. Drain assembly (10) as claimed in any of the preceding claims, wherein it further comprises a manhole (15), the container body (30) being adapted for engaging said manhole (15).

13. Sanitary appliance (100) comprising a body adapted for receiving a fluid and evacuating it, **characterized in that** it includes a drain assembly (10) as claimed in any of the preceding claims.

14. Sanitary appliance (100) as claimed in claim 13, wherein said sanitary appliance (100) is one or more of the following devices: bathtubs, showers, shower trays, washbasins, toilets, urinals, sinks, etc. and the like.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REFERENCES CITED IN THE DESCRIPTION

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