



(22) Date de dépôt/Filing Date: 2007/05/07

(41) Mise à la disp. pub./Open to Public Insp.: 2008/11/07

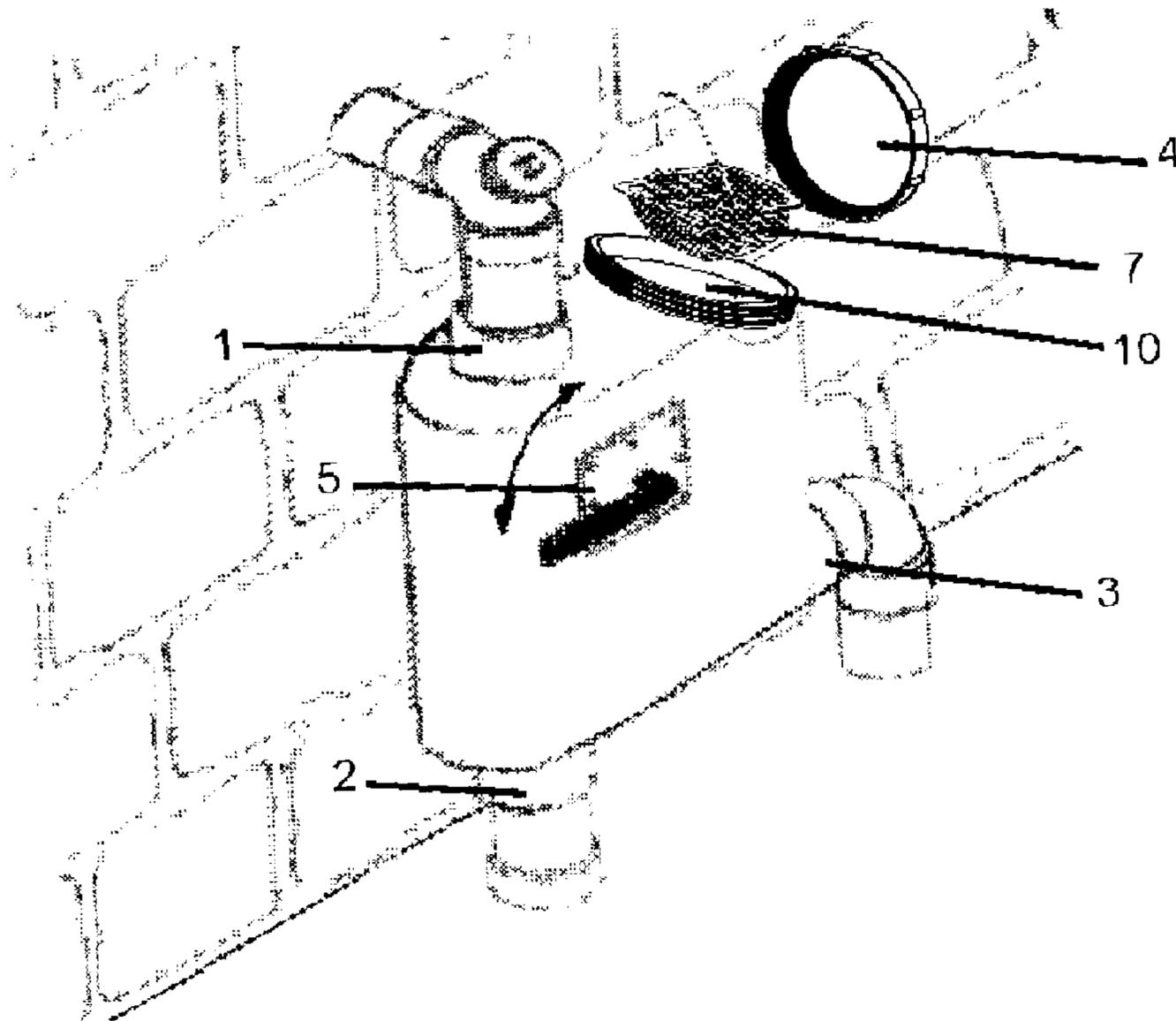
(51) Cl.Int./Int.Cl. *E03C 1/122* (2006.01)

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(54) Titre : DEFLEXION DES EAUX GRISSES

(54) Title: GREY WATER DIVERSION



(57) Abrégé/Abstract:

A plumbing device for connection to a wastepipe carrying grey water from a building, for the selective diversion and filtration of the grey water for reuse (as shown in Figure 2). The device comprises a vessel with three pipe connection points and a gas tight

(57) **Abrégé(suite)/Abstract(continued):**

greywater filter access lid. The device has an externally operated valve switch for a user to selectively operate an internal diversion valve which directs the flow of grey water to discharge from the device for disposal or alternatively to a removable grey water filter and then discharge from the device as filtered grey water for reuse. The device has an internal failsafe overflow which allows greywater to bypass the greywater filter should the discharge of filtered grey water from the device be blocked by a clogged filter or other blockage when the device is switched to grey water reuse mode, without restricting or limiting the continued normal free outflow of graywater from the building's plumbing fixtures.

ABSTRACT

A plumbing device for connection to a wastepipe carrying grey water from a building, for the selective diversion and filtration of the grey water for reuse (as shown in Figure 2). The device comprises a vessel with three pipe connection points and a gas tight greywater filter access lid. The device has an externally operated valve switch for a user to selectively operate an internal diversion valve which directs the flow of grey water to discharge from the device for disposal or alternatively to a removable grey water filter and then discharge from the device as filtered grey water for reuse. The device has an internal failsafe overflow which allows greywater to bypass the greywater filter should the discharge of filtered grey water from the device be blocked by a clogged filter or other blockage when the device is switched to grey water reuse mode, without restricting or limiting the continued normal free outflow of graywater from the building's plumbing fixtures.

FIELD OF INVENTION

The present invention titled "grey water diversion and filtration device" relates to a plumbing device for selective diversion and filtration of grey water for reuse purposes so as to provide water conservation and reduction in the volume of wastewater requiring disposal.

BACKGROUND OF THE INVENTION

There is a need for communities to conserve drinking water supplies and grey water reuse for uses that would otherwise have utilised drinking water supplies can provide water conservation. Likewise, there is a need for communities to dispose of used water as wastewater the ability of which to do so is affected by a number of factors including the volume, which can be reduced by grey water reuse.

Grey water is generally considered to be the components of domestic wastewater that have originated from the laundry, bath, shower and hand wash basins. Whilst these wastewater contributing streams account significantly to the total domestic wastewater volume, they contribute little to the organic content of wastewater and therefore need only minimal treatment to remove suspended solids such as lint and hair for uses such as garden irrigation. However, as untreated grey water contains suspended organic material and generally the same micro-organisms as found in toilet waste, albeit in lower concentrations, the regulators of plumbing and health standards seek to ensure grey water reuse and the associated plumbing works are undertaken only in an acceptable manner using suitably designed plumbing hardware.

A number of grey water reuse systems and products have previously been developed and promoted, but they have not been particularly successful or accepted, either because:

- they did not satisfy the established standards demanded by regulators of plumbing and health laws and codes to be approved, and were typically illegitimate ad-hock plumbing type configurations consisting of a variety of components including three

way valves connected to flexible hoses, rubber funnels, cloth/stocking filter bags, modified rain water holding barrels, and other temporary type component adaptations, that provided little or no contingency against failure and human exposure to the grey water or regard for the control of human exposure to sewer gases, or;

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- have been acceptable to regulators but were too complex and not cost-effective for domestic users to purchase, operate and maintain compared to the value of water saved, and have typically been large complex treatment tank systems consisting of septic tank systems, aerobic treatment systems, sand filtration systems or other
10 treatment type systems that incorporated disinfection, electric pumping, failure alarms, sewer anti-backflow fittings and other components which generally added significantly to the overall cost, and generally required that ongoing maintenance contracts be entered into by users with specialized licensed contractors.

15 SUMMARY OF THE INVENTION

It is an objective of this invention to provide a miniature passive grey water reuse plumbing product to provide water conservation and to reduce the volume of wastewater for treatment and disposal, whilst satisfying all plumbing and health requirements, to be failsafe, simply operated by users and be economically viable for
20 that reuse compared to the value of water conserved. The invention is intended primarily for use in domestic residential situations as and where grey water is generated.

A grey water diversion and filtration device connects onto a wastewater pipe
25 conveying only grey water from the laundry trough, bath, shower and hand basin fixtures for disposal. When so installed a user of a grey water diversion and filtration device may by switching a valve either direct the majority of grey water to flow through a removable grey water filter before it flows out of the device as filtered grey water for reuse, or alternatively switch the valve so all grey water is directed to flow
30 only to the sewer or onsite wastewater system for disposal.

A grey water diversion and filtration device comprises a gas tight vessel with three wastewater pipe connection points, being a grey water inlet connection and a grey water outlet connection and a filtered grey water outlet connection, an internal diverter valve operated by an external valve switch handle or similar for selecting if grey water flow is directed for either reuse or disposal, an internal grey water filter for filtering suspended solids from the grey water, a removable gas tight access lid for a user to open and close for servicing the grey water filter and an internal fail safe overflow that permits the flow of greywater to bypass the grey water filter for disposal in the event of a blockage restricting the free flow of filtered greywater from the device when the valve is switched to grey water reuse mode.

BRIEF DESCRIPTION OF THE SEVERAL VIEWS OF THE DRAWINGS

Having thus generally described the nature of the invention, reference will now be made to the accompanying drawings, showing by way of illustration a preferred embodiment thereof and its use, and in which:

- Fig.1 is a front view of the grey water diversion and filtration device fitted onto an external vertical wastewater pipe, that utilises a manual handle valve switch.
- Fig.2 is a front view of the grey water diversion and filtration device fitted showing the gas tight access lid opened for grey water filter servicing.
- Fig.3 is a sliced through view of the grey water diversion and filtration device with diverter valve shown switched to the grey water reuse mode.
- Fig.4 is a sliced through view of the grey water diversion and filtration device with diverter valve shown switched to the grey water disposal mode.
- Fig. 5 is a schematic sliced through view of one possible variation of the embodiment of the grey water diversion and filtration device. In this embodiment example the device is not contained as a discrete single unit device but instead plural component units connected together by a conduit. Such example embodiment may be used so a grey water filtering unit might be located in a more easily accessible location (eg. outside a building) and apart from the grey water wastepipe connection points and point of grey water diversion as might be preferable when used in basement or other installations

where user access to service the grey water filter would otherwise be difficult or inconvenient.

DETAILED DESCRIPTION OF THE INVENTION

5 To better understand the invention the grey water diversion and filtration device will be described in more detail with reference to the accompanying drawings (Fig. 1-5).

The device comprises a gas tight vessel with three pipe connector points (1, 2, 3) and a grey water filter access opening with gas tight lid (4). The grey water diversion and
10 filtration device is gravity operated and is installed so when installed it takes on in an upright position with the grey water inlet connection (1) positioned towards the top of the device and the grey water outlet connection (2) and filtered grey water outlet connection (3) set at lower points near the base of the device. The device incorporates a valve switch (5) that is connected to and moves a diverter valve (6)
15 that allows a user to selectively switch the device's mode of operation to be for either grey water reuse mode (Fig 3) or grey water disposal mode (Fig 4). When a user switches the valve switch (5) for grey water reuse mode (Fig 3) the flow of most grey water entering the device via the grey water inlet pipe connection (1) is directed by the diverter valve (6) under gravity to flow through a grey water filter (7) and exit the
20 device as filtered grey water via the filtered grey water outlet pipe connection (3), for subsequent reuse. When the user switches the valve switch (5) for grey water disposal mode (Fig 4) all grey water entering into the device via the grey water inlet connection (1) is instead directed by the diverter valve (6) under gravity to flow out of the device as unfiltered grey water via the grey water outlet pipe connection (2),
25 for subsequent disposal.

When the device is switched to grey water reuse mode (Fig 3) the diverter valve (6) is configured so that not all grey water entering the device will be directed for filtration and reuse, and a small percentage of the total grey water flow will continue
30 to exit the device as unfiltered grey water via the grey water outlet connection point (2), so as to ensure downstream drain water traps always remain charged to stop

escape of sewer gas. In contrast, the diverter valve (6) is also configured so that when the device is switched to disposal mode (Fig 4) all grey water entering the device via the grey water inlet connection point (1) will be directed for disposal and all flow will cease being directed to the grey water filter (7).

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In the event that the free flow of filtered grey water exiting the device for reuse is blocked or restricted when the device is switched to grey water reuse mode (Fig 3) due to either clogging of the removable grey water filter (7) or other blockage, the continued flow of grey water into the device via the grey water inlet pipe connection
10 (1) will cause the grey water level within the device to rise until the rising grey water level reaches the level of the internal failsafe overflow (8) to then flow out of the device via the grey water outlet connection point (2) for disposal.

A grey water diversion and filtration device incorporates an internal removable grey
15 water filter (7) for the purpose of filtering suspended solids such as lint and hair from the grey water and requires regular cleaning by the user to remove trapped suspended solids captured within the grey water filter (7). Users can access and remove the grey water filter (7) from the device for cleaning through the filter access opening (10) by opening the gas tight access lid (4) after which they may then return the grey water
20 filter into the device before again closing the gas tight lid (4).

The above described grey water diversion device can be easily fitted to a new or existing plumbing installation and may be installed inside or outside a building.

25 The foregoing describes only one embodiment of the invention and modifications that are obvious to those skilled in the art may be made thereto without departing from the scope of the invention. For example;

- the grey water diversion device can be split into separate components one example of which is shown in (Fig 5), so the grey water diversion only component (11) of the
30 embodiment (incorporating grey water diversion, switch, failsafe overflow and grey water wastepipe connections) is install away from but connected to the grey water

filtration only component (13) of the embodiment (incorporating grey water filtration, filter access and filtered grey water discharge connection) by a conduit (12) for the flow of diverted grey water for filtration. Such an embodiment would permit a grey water filtration component of the device (13) or to be in a more accessible
5 location for servicing, such as outside a building, whilst a grey water diversion only component (11) (or multiples thereof) were positioned in a less easily accessed location or locations, such as at a raised height within a basement or placed in some other subfloor space;

- the devices mode of use could adapt a valve switch (5) that was operated by a
10 manual, electronic, or other remote valve switching mechanism;
- the grey water inlet connection (1), grey water outlet connection (2) and filtered grey water outlet connection (3) may protrude predominantly vertically or horizontally from the device;
- the device may be installed predominantly or completely above or below the ground
15 surface;
- the device may be utilised without a filter as only a grey water diverter, as exemplified in the grey water diversion only component (11) of the embodiment shown in Figure 5; and
- the device may be adapted to other uses either with or without a grey water filter
20 (7) when there was a need to selectively direct the flow of a liquid flowing under gravity and a need to incorporate a failsafe overflow (8).

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CLAIMS

What I claim is:

1. A plumbing grey water diversion and filtration device connectable into a wastepipe, carrying grey water from a building, for constant flow and selective grey water reuse under gravity without need for grey water storage or external power source, wherein said device comprises:
 - (a) a gas tight vessel incorporating a first upper grey water inlet pipe connector for receiving grey water from the building via a connected wastepipe, a second lower filtered grey water pipe connector for discharging filtered grey water for reuse, and a third grey water outlet pipe connector point for discharging grey water to a connected wastepipe for disposal.
 - (b) a diverter valve connected to a valve switch that a user can selectively change the device mode of operation between grey water reuse so that grey water flow within the device is directed for filtration before exiting the device as filtered grey water for reuse, or alternatively switch the devices mode of operation to grey water disposal so that grey water flow within the device is directed to the grey water outlet connection pipe point for disposal;
 - (c) a valve constructed and arranged within the device so that when the device is set to grey water disposal mode all grey water shall be discharged from the device for disposal, and when switched to reuse mode only the majority of grey water shall be filtered to exit the device for reuse and a small portion of the grey water shall continue to discharge for disposal so as to continue charging downstream water traps;
 - (d) a failsafe overflow within the device to allow grey water to bypass the filter when the device is switched to reuse mode and exit the device for disposal in the event that filtered grey water exit from the device is restricted by a blocked filter or other blockage, without inhibiting the continued free flow of grey water from the building;
 - (e) a removable grey water filter; and
 - (f) a gas-tight filter access lid for users to open and close to access the grey water filter for servicing.

2. The plumbing grey water diversion and filtration device of claim 1, wherein the device is installed so it is positioned in an upright position when connected on a wastewater pipe.

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3. The plumbing grey water diversion and filtration device of claim 1, wherein the device is manufactured from plastic or other materials compatible for use with wastewater plumbing.

10 4. The plumbing grey water diversion and filtration device of claim 1, wherein the device may take the form so all components and features within a single discreet unit or alternatively be separated into components that connect by conduit to provide the device.

15 5. The plumbing grey water diversion and filtration device of claim 1, wherein the device can be used for grey water diversion alone without a mesh filter.

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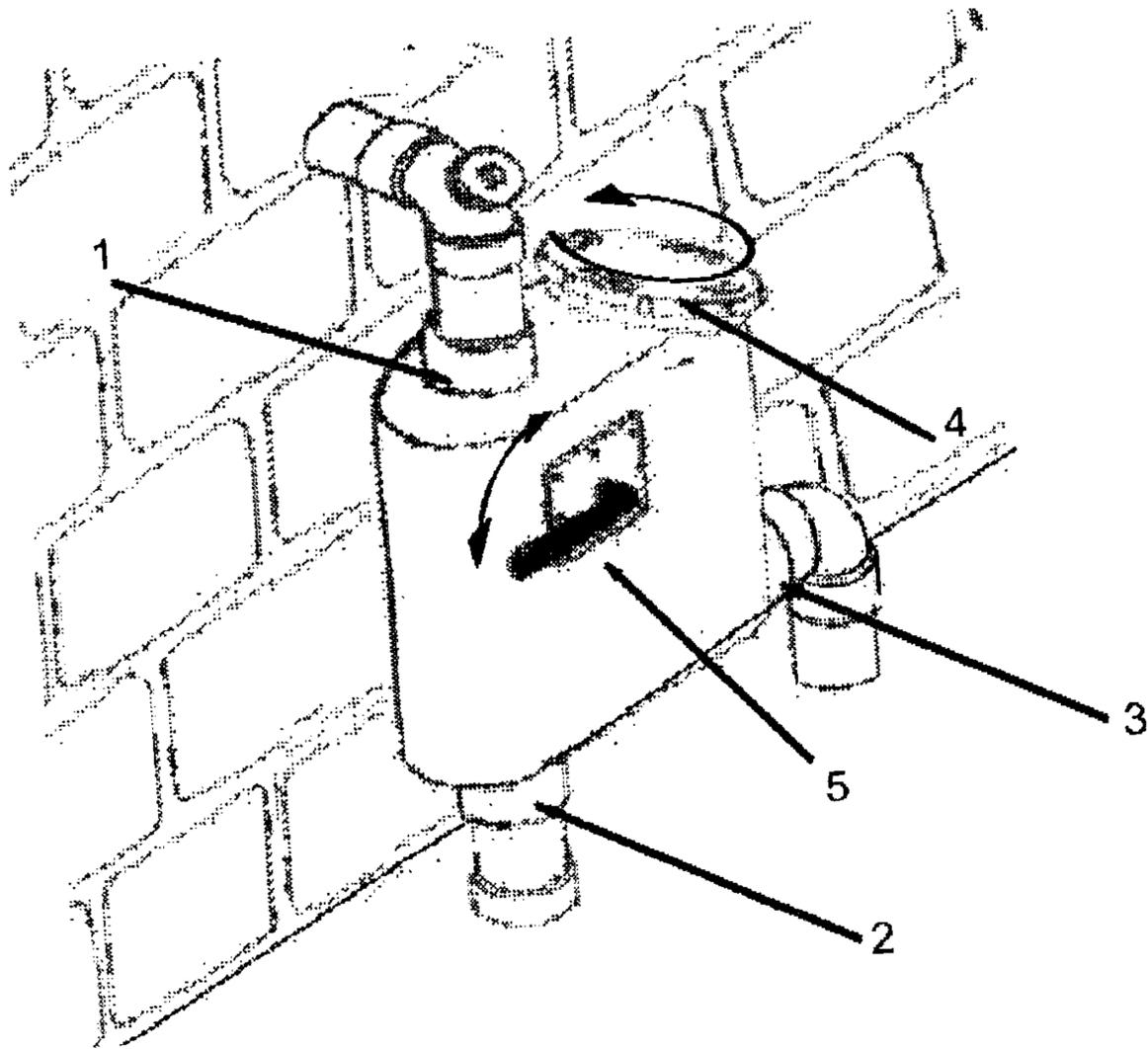


FIGURE 1

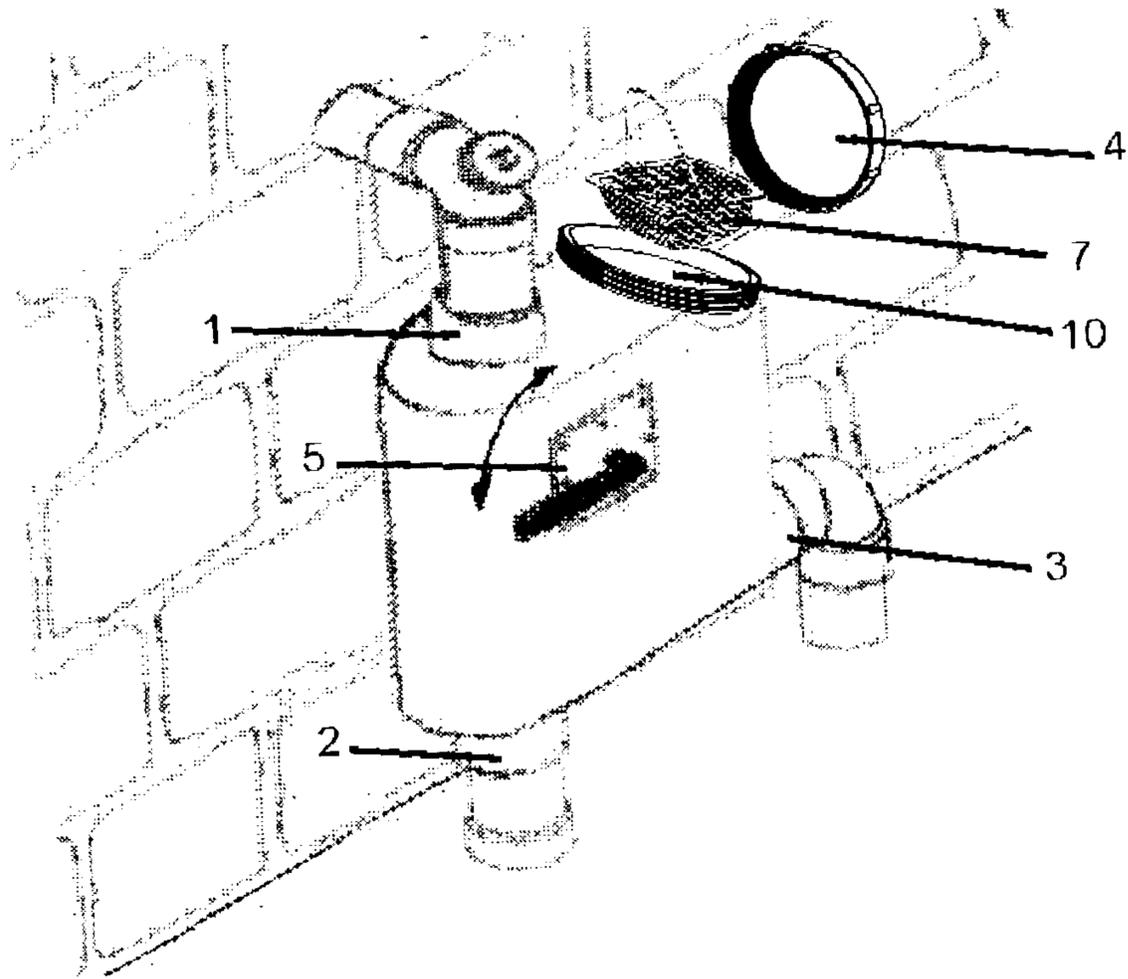


FIGURE 2

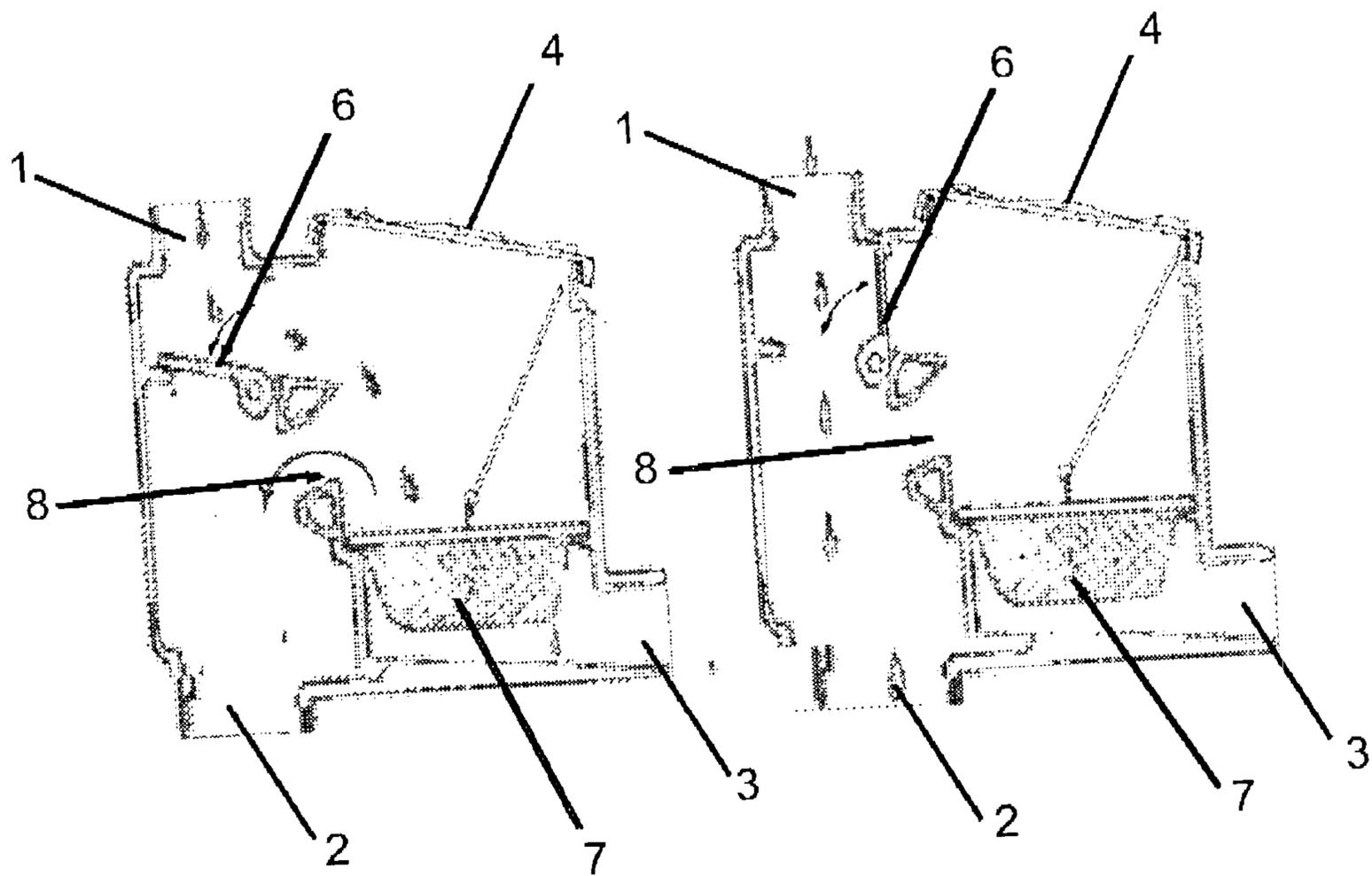


FIGURE 3

FIGURE 4

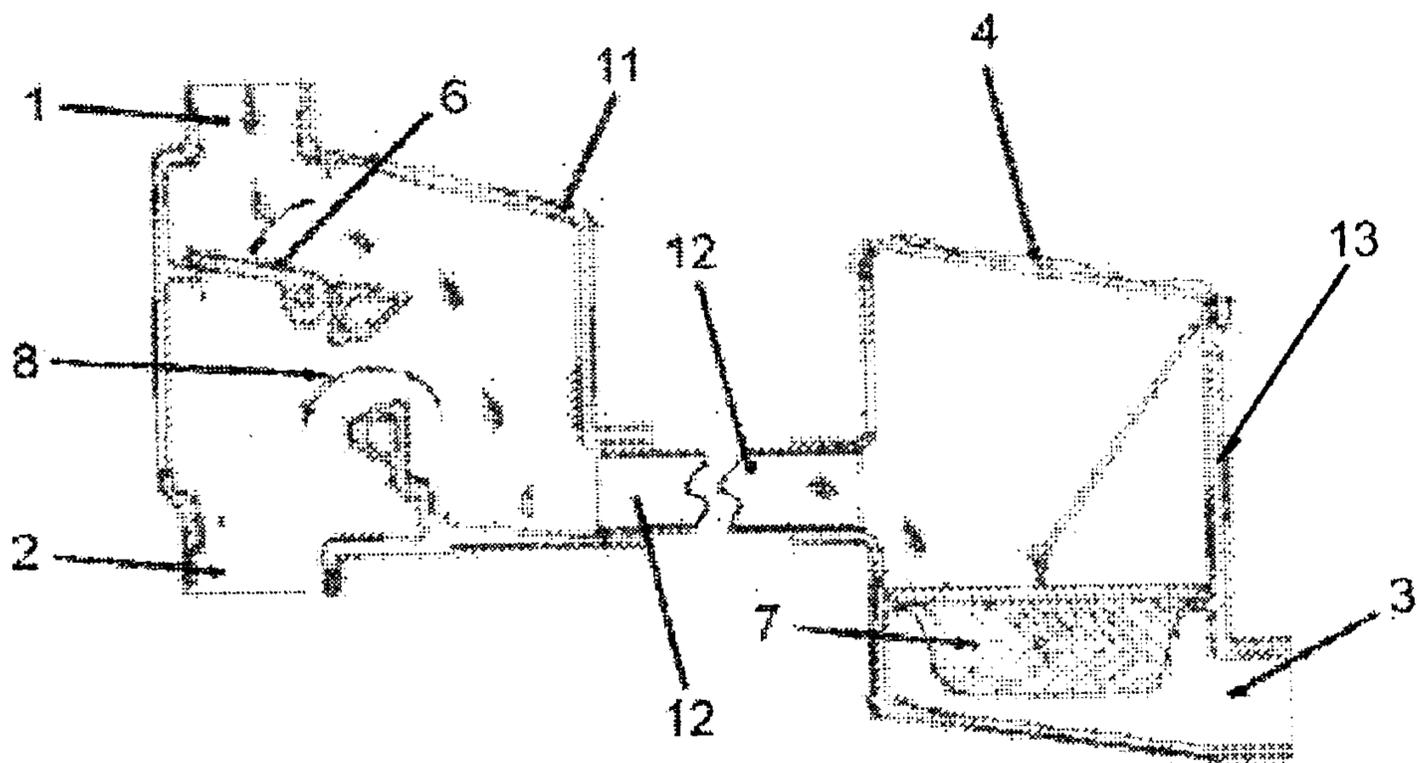


FIGURE 5

