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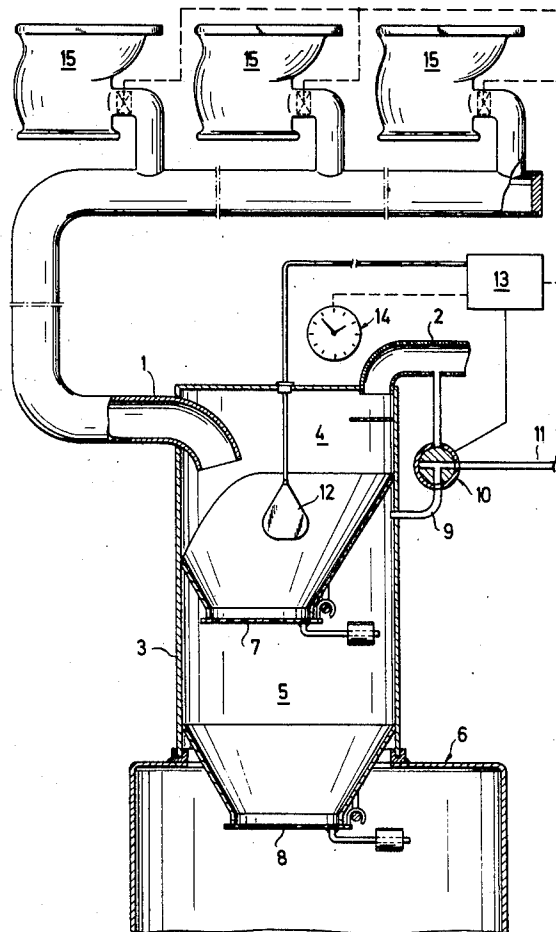
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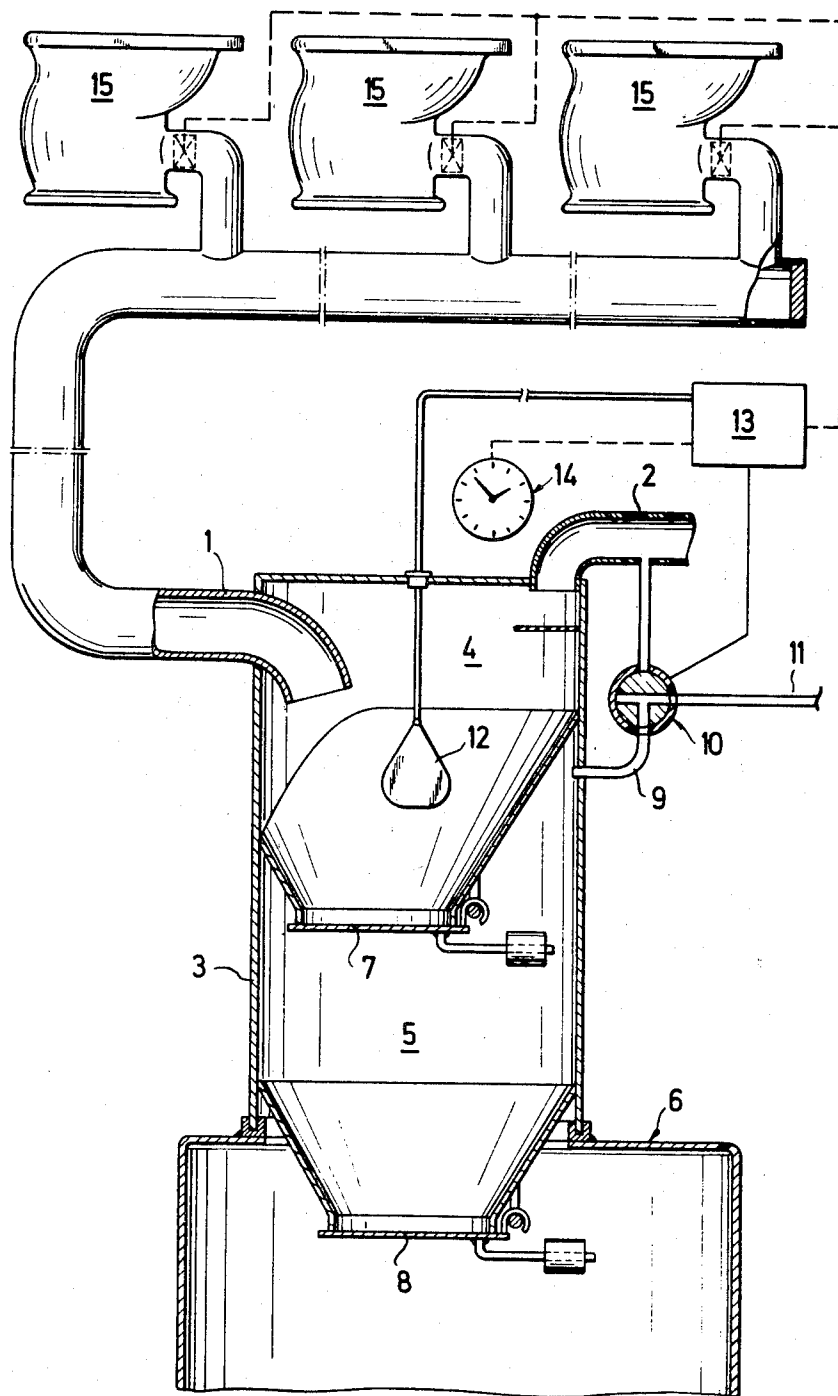
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[54] **DISCHARGE DEVICE FOR A VACUUM SEWERAGE SYSTEM**
6 Claims, 1 Drawing Fig.

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ABSTRACT: A discharge device situated at the outlet end of a vacuum sewerage system and having an upper chamber and a lower chamber. The upper chamber is directly connected to a sewer and through a nonreturn valve to the lower chamber. The lower chamber has valve controlled passages leading to a vacuum source and to the open air and is further connected through a nonreturn valve to a sewage collecting tank.





DISCHARGE DEVICE FOR A VACUUM SEWERAGE SYSTEM

The invention relates to a discharge device for a vacuum sewerage system.

One of the major disadvantages of known vacuum sewerage systems is that the collecting tank situated at the outlet end of the sewerage system is under vacuum which means that it is by its nature a pressure vessel. Therefore, the tank must be relatively strong and be provided with comparatively thick walls which make it expensive to manufacture. Moreover, the emptying of the tank is inconvenient because the operation of the whole vacuum system must be interrupted during the emptying process.

The object of the invention is to provide a vacuum sewerage system in which the sewage collecting tank is separated from the vacuum system and functions as an ordinary container. The invention is characterized in that the outlet end of the sewerage system is connected to a discharge device comprising two partitions, an upper chamber and a lower chamber, that said sewerage system is connected to said upper chamber which is under vacuum, that the upper chamber is connected to the lower chamber through a valve device of the nonreturn type, that the lower chamber can be alternatively connected to the vacuum system and to the open air and that the lower chamber is connected to a collecting tank through a valve device of the nonreturn type. A discharge device having these features can be directly connected to any kind of reservoir, as, for instance, a sewer pit. The vacuum system operates continuously without regard to what is done to the collecting tank. In a preferred embodiment of the invention the collecting tank is an interchangeable and transportable container. In this case the emptying of the collecting tank is performed by replacing a full tank by an empty one, which operation can be carried out quickly and tidily without letting out bad-smelling gases to the environment.

In a device according to the invention the sewage which is discharged into the evacuated upper chamber, has to be passed from there to the lower chamber from which it can flow into the collecting tank. This is preferably performed by connecting an automatically operated regulating means to the lower chamber, the operation of said regulating means being controlled, for instance, by a time-measuring device or by a device measuring the quantity of sewage in the upper chamber or by the operation of devices feeding sewage into the sewerage system, so that at suitable intervals a vacuum is created in the lower chamber, causing the sewage in the upper chamber on account of its own weight to fall down into the lower chamber. As the lower chamber is under atmospheric pressure, the closing of the nonreturn valve connecting the upper chamber to the lower chamber is accelerated by the pressure difference between the two chambers. This valve can be for instance a flap valve provided with a small counterbalance providing an initial closing force. A similar valve can be utilized also between the lower chamber and the collecting tank.

In the following, the invention is explained more fully with reference to the accompanying drawing, which illustrates schematically an axial section of a device according to the invention.

In the drawing, 1 indicates a sewer, 2 a suction pipe connected to a vacuum source, 3 the frame of a discharge device according to the invention, 4 its upper chamber, 5 its lower

chamber and 6 a collecting tank. At the bottom of the upper chamber there is a counterbalanced flap valve 7, and at the bottom of the lower chamber a similar valve 8. A pipe connects the lower chamber 5 through a three-way valve 10 either to the suction pipe 2 or through a pipe 11 to the open air. The three-way valve 10 is provided with remote control and it may receive regulating impulses for instance from a detector 12 which is influenced by the surface level of the sewage in the upper chamber. These regulating impulses are processed and transmitted by a regulating means 13, the operation of which can be influenced, instead of by the detector 12, also by a time-measuring device 14 or, alternatively, by the operation of devices 15, for instance a number of water closets feeding sewage into the sewerage system.

The illustrated device functions in the following manner: In normal operation only the upper chamber 4 is under vacuum and the lower chamber 5 is under atmospheric pressure. Because of the pressure difference between the lower and the upper chambers the valve 7 remains securely shut. When a sufficient amount of sewage has been collected in the upper chamber 4 the detector 12 gives a regulating impulse to the three-way valve 10 which connects the lower chamber to the vacuum system. When the lower chamber has been sufficiently evacuated the weight of the sewage in the upper chamber causes the valve 7 to open, and the sewage falls down into the lower chamber 5. By the action of a counterbalance the valve 7 is closed again, and thereafter the lower chamber 5 is again connected to the open air by the three-way valve 10. Both the collecting tank 6 and the lower chamber 5 are now under the same pressure, and the valve 8 opens in the same way as the valve 7 causing the sewage in the lower chamber to fall down into the collecting tank, after which the counterbalance closes the valve 8.

The invention is not limited to the illustrated embodiment but several modifications of the invention are feasible within the scope of the following claims.

We claim:

1. A sewerage system comprising a piping system for transporting sewage by means of vacuum and leading to a discharge device receiving said sewage and discharging it into a collecting tank, said discharge device comprising an upper chamber and a lower chamber, said upper chamber being connected to said piping system and through a nonreturn valve to said lower chamber, the lower chamber being connected to a vacuum source and to the open air through valve controlled passages, the lower chamber being further connected through a nonreturn valve to said collecting tank.

2. A sewerage system according to claim 1, in which said valve controlled passages are automatically governed by a regulating means providing with suitable time intervals an alternating connection of said lower chamber to said vacuum source and to the open air.

3. A sewerage system according to claim 2, in which said regulating means is influenced by a time-measuring device.

4. A sewerage system according to claim 2, in which said regulating means is influenced by a device measuring the quantity of sewage in said upper chamber.

5. A sewerage system according to claim 2, in which said regulating means is influenced by the operation of devices feeding sewage into said sewerage system.

6. A sewerage system according to claim 1, in which said collecting tank is an interchangeable and transportable container.

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