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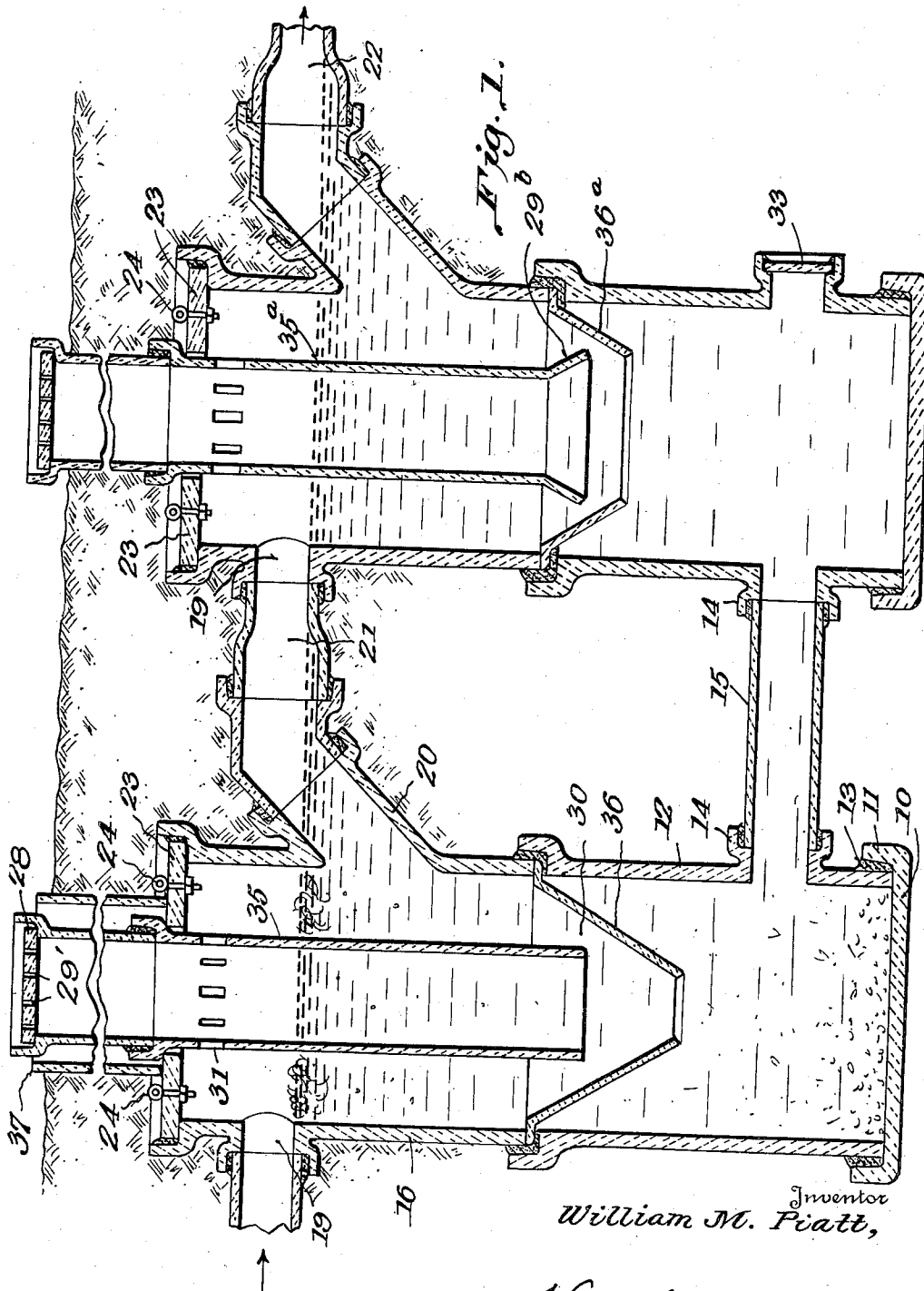
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2,364,472

SEPTIC TANK

Filed July 18, 1939

2 Sheets-Sheet 1



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2 Sheets-Sheet 2

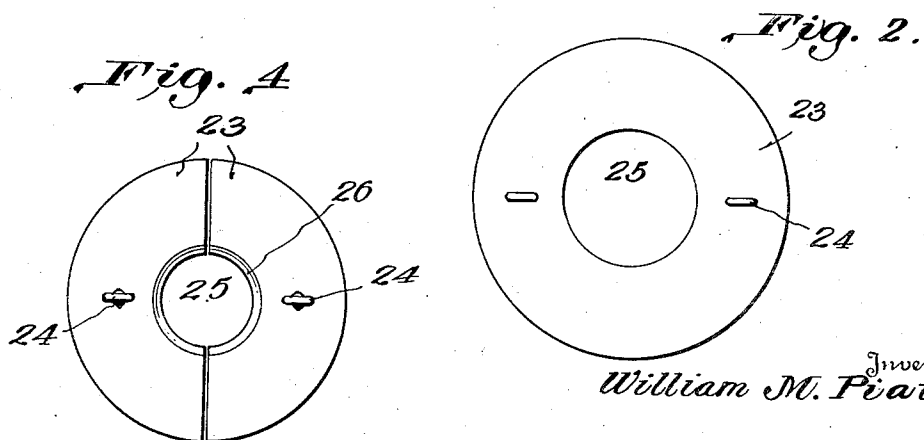
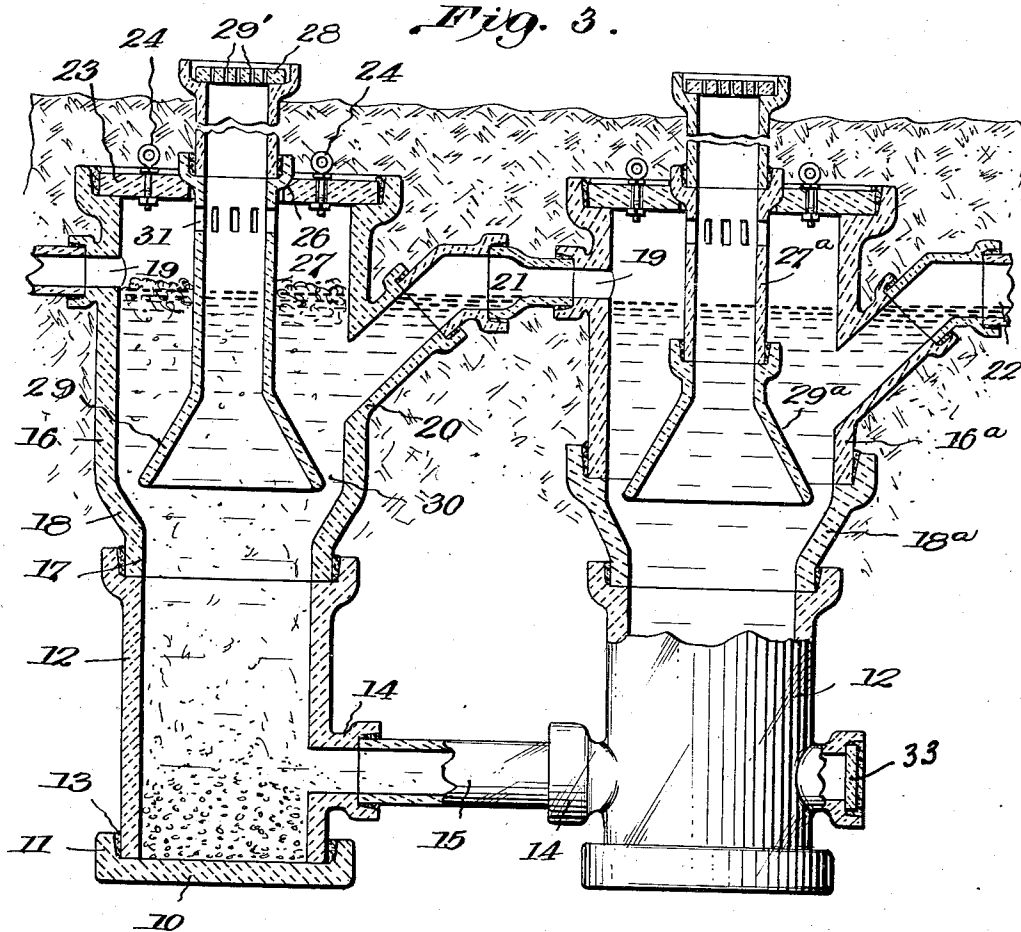


Fig. 2.

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UNITED STATES PATENT OFFICE

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SEPTIC TANK

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3 Claims. (Cl. 210-6)

Although the material may not be essential the invention relates particularly to a septic tank which may conveniently and economically be made of pottery. Most of the parts may be made by using as a foundation elements manufactured in the standard or usual molds employed in potteries for pipes.

There is provided in general a settling chamber into which the raw sewage may empty. Below this is a digestion chamber where the settled materials may be purified. They may be joined by inclined walls down which the settling material will fall and readily slide. Depending from the cover of the settling chamber there may be a conduit to receive gases formed during the digestion of the sewage. Preferably the gas receiver will be directly above the digestion chamber and it may have a mouth covering substantially the entire area of the entrance to the digestion chamber so that substantially all gas formed will enter therein. Some gas may escape into the settling chamber and may collect therein above the level of the liquid. To carry away this gas as well as to provide for variations in amount of air space above the level of the liquid there may be provided openings in the gas conduit as it passes through the upper part of the settling chamber.

The apparatus and its various parts may be of any suitable size and shape. For economy of manufacture, handling and installation it may be convenient to make them round but this is not essential.

In the septic tank there may be provided suitable outlets. One of these may be toward the bottom of the digestion chamber for the purpose of cleaning or for the purpose of connection with an adjacent septic tank when they are used in batteries of two or more. Another outlet or opening may be provided farther up in the septic tank but preferably below the ordinary level of the liquid. By being sufficiently below the level of the liquid substantially nothing but clear liquid may pass out this outlet. It will be understood, of course, that there may be some lighter portions of the sewage which will float and remain near the top of the liquid in the septic tank. In order not to carry off this upper layer before it has settled or been decomposed, the outlet may be placed well below it. In order to prevent the outlet from drawing off the liquid to the level of the outlet the outlet conduit connecting thereto may be slightly inclined upward so that the actual level from which the liquid is withdrawn, or carried into an adjacent septic tank, or into a field or

stream or tiles or other disposal means, may be arranged at substantially the same level of the sewage normally in the septic tank so that normally the level of the liquid therein may be at about the level of the final outlet opening.

This arrangement of the outlet, and the fact that there is thus held sewage in the outlet and more or less separate from the main body of the settling tank, in effect constitutes a second settling chamber. Thus although sewage liquid containing some settleable matter may enter the outlet it may be held in the outlet long enough to allow additional matter to settle from it. While its size is not essential it may be particularly convenient to make the content of the outlet passage at least as large as the normal unit of incoming sewage, for instance such as may come from a flushing of the toilet bowl.

Preferably the septic tank will be buried below the ground level in an inconspicuous manner and may be arranged at a suitable distance from dwellings. The gas outlet itself, however, may, and preferably will, be extended upward to the ground level and there be provided with a perforated plate through which the gas may pass and be more or less continuously dissipated into the atmosphere. The gases may be disposed of in any other suitable manner.

Specific details are not essential to the carrying out or embodiment of the invention. Forms of apparatus embodying the invention are illustrated in the accompanying drawings to fully disclose the invention and not to limit it.

In the accompanying drawings Fig. 1 is a more or less diagrammatic transverse vertical section of two septic tanks connected into a battery. Fig. 2 is a top plan view of one form of cover for the settling chamber. Fig. 3 is a more or less diagrammatic transverse vertical section of two other forms of septic tanks connected into a battery. Fig. 4 is a top plan view of another form of cover for the settling chamber.

A preferred form the invention may take is illustrated in Figs. 1 and 2 in which there is provided a disc or plate-like bottom 10 which may have an upwardly extending rim 11. Placed in the base 10 may be a pipe 12. This pipe 12 may be held in the bottom or the joint between it and the bottom may be closed by a packing 13 of cement or other suitable material. The various parts of the apparatus may be packed or similarly held together by means of similar packing 13. At one or more points the pipe 12 may be provided with an outlet opening 14 which may be closed in any suitable manner. If the tank is to

be used in a battery as illustrated in the drawings a pipe 15 may be employed to connect together the two outlets 14 of the adjacent septic tanks. There may be several outlets 14 and one or more may be closed when not being used by a disc or plate 33.

The apparatus and its various parts are illustrated in the drawings as being round but the shape is not essential. Above the pipe 12 which acts as a digestion tank is a settling tank 16. This may be supported on a connecting bell or chute 36 of inverted frustro conical shape of substantially the same diameter at its top as the settling tank 16 and the inwardly flaring walls of the chute 36 are connected with the walls of the settling tank 16. The settling tank 16 as a whole may preferably be of substantially the same cross section as the digestion tank 12.

At its upper end the settling chamber 16 is provided with a suitable inlet 19. The inlet may be above the preferred sewage level or below it or, as shown, at about the sewage level. Somewhat below the level of the inlet 19 may be provided an outlet 20 which is illustrated as inclining upwardly and connected to a conduit 21 which may lead to and through the inlet 19 of a second septic tank, or, as illustrated at the extreme right of Fig. 1, may be connected to a pipe 22 which may lead away to an out-fall or other suitable means for disposing of the outflow from the septic tank. While shown below the position of the inlet the outlet part is not controlled by the position of the inlet but rather by the position of the retained sewage being somewhat below the sewage level.

It will be noted that the outlet pipe 20 is shown of a diameter considerably larger than the inlet pipe 19. This may be a desirable feature of the apparatus.

Closing the upper end of the settling tank 16 is a cover 23, which, as shown in Fig. 2, may be formed of one piece with a central opening 25 or may be in two parts for convenience of manipulation, as indicated in Fig. 4, each of which parts may be provided with a screw-eye bolt 24 for ease of handling. Through the opening in the cover may be set the straight gas conductor 35. The upper end of the gas conductor may extend somewhat above the ground level and be provided with a closure plate 28 provided with suitable perforations 29 for the exit of the collected gases. Surrounding the gas conductor may be an inset pipe 37 to retain the dirt when the conductor 35 is removed for cleaning or any other purpose. It will be noted that the conductor 35 may be withdrawn through the hole in the cover 23 without removing the cover. Thus the inside of the septic tank may be exposed for cleaning, it being possible to thrust a cleaning instrument clear to the bottom 10 of the digestion tank 12. The lower mouth or end of the gas conduit 35 may preferably be substantially as large in cross section as the opening through the bell 36 into the digestion chamber 12. This arrangement may leave a passage-way 30 between the outer wall of the gas conduit 35 and the tapered wall 36 so that settling portions of the sewage may readily pass down and into the digestion chamber 12. It will be noted that neither the gas conduit 35 nor any other part of the apparatus touches or impedes the tapered walls 36 so that they remain clear and unobstructed to allow a ready passage of settling matter through them into the digestion chamber 12. By having the

opening or mouth of the gas conduit 35 arranged thus it will tend to collect substantially all of the gas rising from the digestion chamber 12 and conduct it upward for release into the atmosphere through the plate 28. If any gas escapes the mouth it may rise into the upper part of the settling chamber 16 above the liquid sewage. This gas, together with any gas which may be within the settling chamber itself or air displaced by incoming sewage may pass into the gas conduit 35 through openings 31 provided therein just below the cover 23.

At the left hand side of Fig. 1 the gas conduit 35 is shown as straight throughout its length and the bottom opening in the bell 36 is somewhat smaller in diameter. This may be a convenience. It may be desirable, however, in some instances for purposes of manufacture, transportation or manipulation, to make the gas conduit 35a, as shown in the right hand side of Fig. 1, flared out at its bottom end 29b. The lower opening in the bell 36a may thus be made somewhat larger and the height and weight of the bell somewhat reduced.

In such an arrangement the flared bottom 29b will not pass through the hole 25 in the top 23 in which the conductor 35a is suspended. For convenience of installation and removal, therefore, the top may be made in several pieces such as the two piece top shown in Fig. 4, each piece being provided with one or more lifting bolts 24. In this arrangement the lining 37 may be omitted.

An alternative form is shown in Figs. 3 and 4 in which there is provided a disc or plate-like bottom 10 which may have an upwardly extending rim 11. Placed in the base 10 may be a pipe 12. This pipe 12 may be held in the bottom or the joint between it and the bottom may be closed by a packing 13 of cement or other suitable material. The various parts of the apparatus may be packed or similarly held together by means of similar packing 13. At one or more points the pipe 12 may be provided with an outlet opening 14 which may be closed in any suitable manner. If the tank is to be used in a battery as illustrated in the drawings a pipe 15 may be employed to connect together the two outlets 14 of the adjacent septic tanks. There may be several outlets 14 and one or more may be closed when not being used by a disc or plate 33.

The apparatus and its various parts are illustrated in the drawings as being round but this shape is not essential. Above the digestion tank 12 is a settling tank 16. This may include a mouth 17 of substantially the same diameter as the digestion tank 12 and inwardly flaring walls 18 are at the bottom of the walls of the settling tank 16. The settling tank 16 as a whole in this embodiment of the invention may preferably be made larger in cross section than the digestion tank 12. In this apparatus as in that shown in Figs. 1 and 2 the digestion tank may be varied in diameter and length as may be deemed desirable for proper retention time for digestion of solids which have settled therein. The proportions of the upper or primary settling chamber may be varied as may be deemed desirable to insure a suitable retention period for settling the settleable solids.

At its upper end the settling chamber 16 is provided with a suitable inlet 19. The inlet may be above the preferred sewage level or below it or as shown at about the level of the sewage.

Somewhat below the level of the inlet 19 may be provided an outlet 20 which is illustrated as inclining upwardly and connected to a conduit 21 which may lead to and through the inlet 19 of a second septic tank or, as illustrated at the extreme right of Fig. 3, may be connected to a pipe 22 which may lead away to an out-fall or other suitable means for disposing of the outflow from the septic tank. While shown below the position of the inlet the outlet part is not controlled by the position of the inlet but rather by the position of the retained sewage, being somewhat below the sewage level.

It will be noted that the outlet pipe 20 is shown of a diameter considerably larger than the inlet pipe 19. This may be a desirable feature of the apparatus.

Closing the upper end of the settling tank 16 is a cover 23 which, as shown in Fig. 4, may be formed of two parts for convenience of manipulation, each of which parts may be provided with a screw-eye bolt 24 for ease of handling. The inner edge of each of the members 23 may be cut out so as to form an opening 25 with its upper edge bevelled slightly as at 26 to receive the depending gas conductor 27. The upper end of the gas conductor may extend somewhat above the ground level and be provided with a closure plate 28 provided with suitable perforations 29 for the exit of the collected gases. The lower end of the gas conduit 27 may preferably be tapered upwardly as at 29 so that the outer edges of the spreading portion 29 may be substantially as large in cross section as the digestion chamber 12 or the smaller end of the tapered walls 18. This arrangement may leave a passage-way 30 between the outer edge of the flaring wall 29 and the tapered wall 18 so that settling portions of the sewage may readily pass down and into the digestion chamber 12. By having the opening or mouth 29 of the gas conduit spreading it will tend to collect substantially all of the gas rising from the digestion chamber 12 and conduct it upward for release into the atmosphere through the plate 28. If any gas escapes the mouth it may rise into the upper part of the settling chamber 16 above the liquid sewage. This gas, together with any gas which may be within the settling chamber itself or air displaced by incoming sewage may pass into the gas conduit 27 through the openings 31 provided therein just below the cover 23.

At the left hand side of Fig. 3 the upper portion of the settling chamber 16 and the lower tapered walls 18 are shown as integral. This may be a convenience. It may be desirable, however, in some instances for purposes of manufacture, transportation or manipulation, to make the upper portion 16a, as shown in the right hand side of Fig. 3, separate from but suitably seated in or joined to the tapered wall portions 18a, which may be made as a separate unit. Likewise at the left hand side of Fig. 3 the gas conduit 27 and its flaring mouth 29 are shown as integral. They may, however, be made as separate members as indicated in the right hand side of Fig. 3 where the upper portion 27a is indicated as made in one piece which is seated in and attached to the separate lower flared mouth-piece 29a.

If a single tank is used it may be of any suitable form such as illustrated at either the right or at the left of Figs. 1 or 3. If a battery of two or more tanks is used they may all be made as illustrated at either the right or at the left of

Figs. 1 or 3 or various kinds of tanks may be assembled as desired.

It will be understood, of course, that in some instances a single tank may alone be sufficient to take care of sewage in a single dwelling or system. Where, however, more sewage is to be handled it may be convenient to connect the tanks together in batteries of two or more so as to give suitable capacity to the apparatus. In this instance, as illustrated in Figs. 1 and 3, there may be a connection between the tanks through the overflow outlet from one into the other and also through the connecting pipe 15 between the adjacent digestion tank portions of the various septic tanks.

There may be an advantage in having the outlet 20 enlarged and of considerable capacity. For instance as illustrated in Figs. 1 and 3 it will be understood that while there may be some floating material on the top of the liquid sewage in the settling chamber 16 the outlet 20 itself, being below the surface of the sewage, may receive substantially nothing but clear liquid. Thus when additional sewage enters through the inlet 19 it may cause the liquid to rise in the outlet 20 and overflow passing out substantially no solid matter but merely liquid which may go into the adjacent septic tank of a battery or may go out into the spillway or the like for release from the system. It may be desirable to so proportion the outlet 20 as to give it considerable capacity so that it may be sufficient to take care of a volume equivalent to the ordinary integer of additional sewage which may be introduced at any one time. Nevertheless the sewage will be held in the outlet 20 for a short time and if there is any solid or settling material therein it may pass over or it may settle and fall down the walls of the outlet 20 and pass down the tapered walls into the digestion chamber 12. Thus the outlet itself becomes a second settling chamber. Thus the outlet, because of its arrangement and position below the sewage level may receive substantially no solid matter but if solid matter does enter therein it may be held long enough to allow it to settle out.

Exact details of size, shape, proportion and relative location of the various parts of the apparatus may be varied in other embodiments of the invention.

I claim as my invention:

1. In a septic tank, a digestion chamber, a settling chamber above the digestion chamber and having unobstructed sloped walls between the two chambers and forming an opening therebetween, an inlet for the settling chamber, an outlet for the settling chamber below the inlet but inclined upwardly and extending to the sewage level so constructed and arranged that it forms a second settling chamber in the outlet, and normally retaining substantially a unit of sewage, an outlet pipe connected to the outlet and at substantially the same level as the inlet, a cover for the tank having an aperture therein, a gas conductor of uniform cross-section suspended in the aperture in the cover and extending within the first mentioned settling chamber and over the digestion chamber and having a mouth at its bottom of substantially as large cross-section as the opening surrounded by the sloped walls, vents to atmosphere at the top of the gas conductor, and vents through the side of the gas conductor from the first mentioned settling chamber.

2. In a septic tank embedded in the earth, a

settling chamber, a digestion chamber below the settling chamber, a gas outlet for gas from the tank extending to the surface of the earth, a cover for the settling chamber below the surface of the earth and having an opening through which the gas outlet may be inserted and withdrawn to permit of cleaning the septic tank, and a tubular collar on the cover extending from the cover to the surface of the earth and surrounding the gas outlet.

3. In a septic tank, a digestion chamber, a cylindrical settling chamber above the digestion chamber, an inlet for admitting units of sewage to the settling chamber, an outlet for the settling chamber disposed substantially diametrically opposite the inlet below the sewage level but inclined upwardly and having a capacity

about equal to the volume of an admitted unit of sewage normally retaining substantially a unit of sewage, an outlet pipe connected to the outlet and at substantially the same level as the outlet, a gas conductor suspended above the digestion chamber and within the settling chamber between the inlet and the outlet and providing an uninterrupted channel between its walls and the walls of the settling chamber and over the digestion chamber, a cover for the settling chamber supporting the gas conductor through a hole therein, vents to atmosphere at the top of the gas conductor, and unobstructed sloped walls between the two chambers and forming an opening communicating therebetween below the gas conductor.

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