Sept. 20, 1949. G. L. LOELKES 2,482,353

SEPTIC TANK

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Fig. 1.

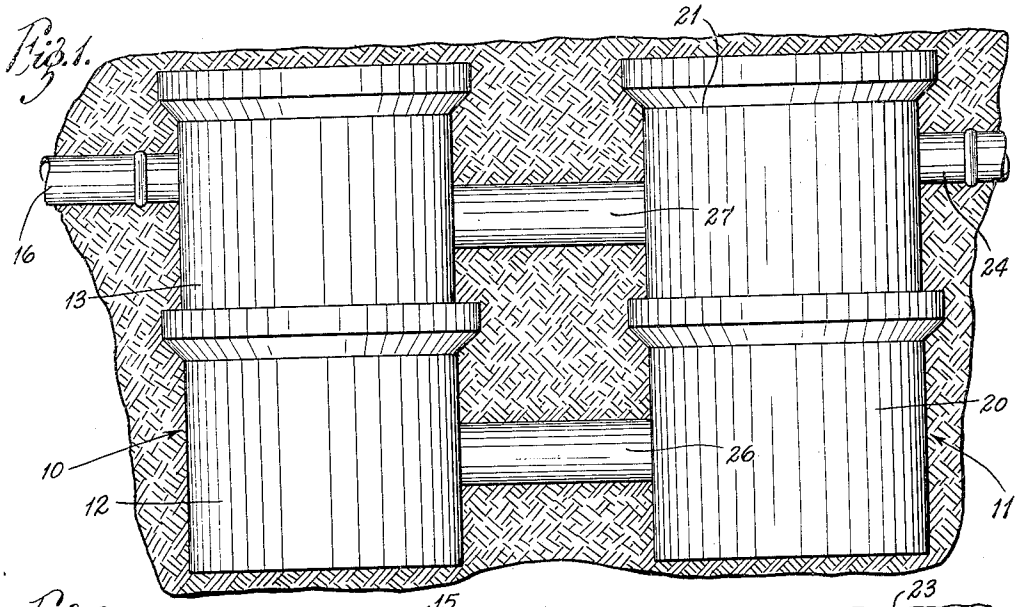


Fig. 2.

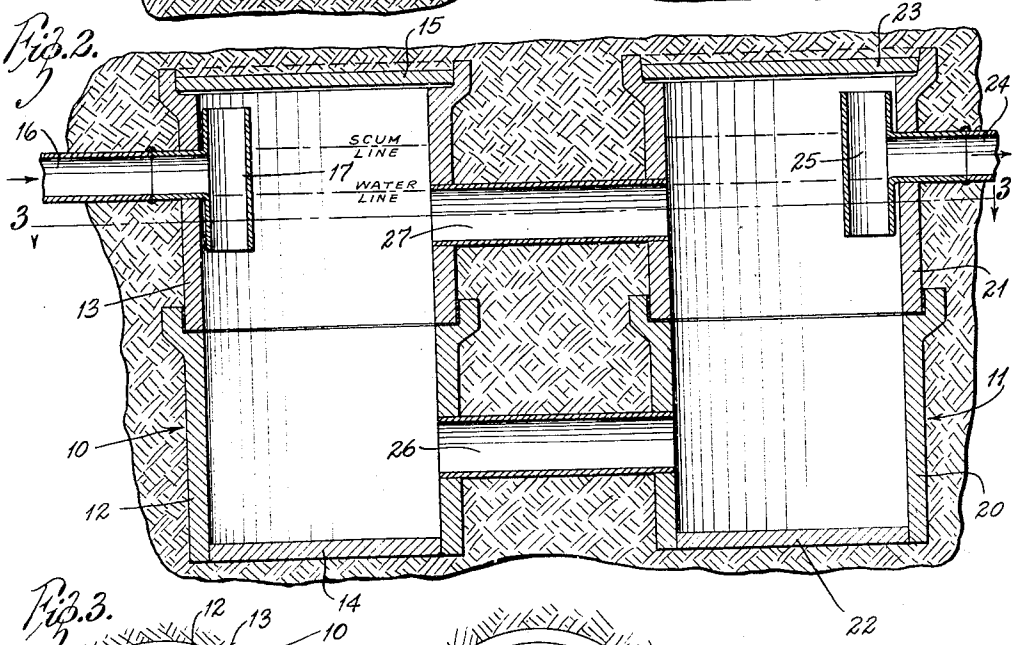
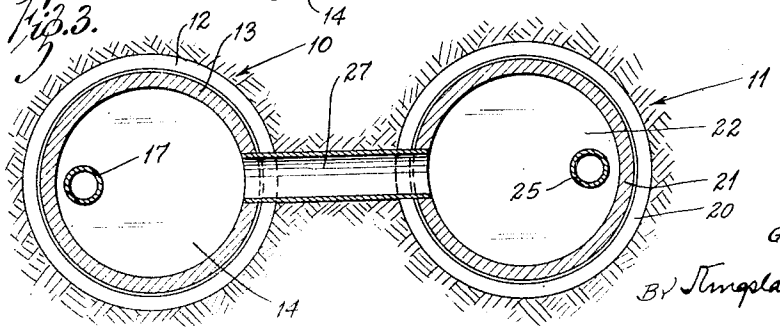


Fig. 3.



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SEPTIC TANK

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4 Claims. (Cl. 210—6)

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The present invention relates to a septic tank.

It is an object of the invention to provide a septic tank that is most effective by virtue of having a desirable shape, liquid capacity, and operation. A further object of the invention is to provide a septic tank that may be easily installed and which will be effective in operation to a degree greater than those now in use. A particular object is to provide a tank having improved flow-through characteristics, with better circulation and more uniform time of dwell.

A further object of the invention is to provide a septic tank that may be easily built up, and which, with a minimum of installation difficulties, will have a maximum of liquid capacity. A particular object is to provide a septic tank that has adequate depth without requiring too great a hole for its installation.

A specific object of the invention is to provide a septic tank that may be made of stock parts, such as sewer pipe sections, and yet which will obtain the advantages commonly associated with septic tanks especially built for this use. More particularly, it is an object to provide a septic tank made up of sewer pipe sections that has the flow characteristics of a tank twice as long as it is wide.

An especial object is to provide a septic tank, and particularly one made of pipe sections, having desirable sludge area, but with deep circulation, even flow, improved velocity control, and reduced short circuiting.

Other objects will appear in the description to follow.

In the drawings:

Fig. 1 is a side elevation of a septic tank made in accordance with the present design;

Fig. 2 is a vertical section through the septic tank of Fig. 1; and

Fig. 3 is a horizontal section taken through the axis of the upper connecting pipe, looking downwardly, this view being on a somewhat smaller scale.

The present septic tank includes two main chambers, generally indicated at 10 and 11. The chamber 10 is made up of a lower cylindrical tile 12 and an upper such tile 13, the two being connected together by duly tight bell and spigot connections, as shown.

The tank 10 has fitted glazed parts making a cylindrical bottom, which, when cemented together by use of a jointing compound, forms a solid bottom 14, and it has a removable top 15 that may be interfitted with the bell at the top of the section 13. An inlet or influent pipe 16,

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from the house or other building to be connected with the septic tank, is provided. Within the chamber 10, this inlet line 16 has a T 17 providing openings both upwardly and downwardly into the chamber 10.

The chamber 11 is made up of a lower cylindrical pipe section 20 and an upper section 21, fitted together by bell and spigot connections, as shown, this connection being duly tight. The tank 11 likewise has fitted glazed parts making a cylindrical bottom, which, when cemented together by use of a jointing compound, forms a bottom 22, like the previously mentioned bottom 14, and a removable top 23. An outlet pipe 24 leads from the tank 11, and, at its inner end, has a T 25 that opens upwardly and downwardly.

The two pipe sections 12 and 20 of the two chambers 10 and 11, respectively, are connected by a connecting pipe 26; whereas the two upper sections 13 and 21 are connected by a pipe 27.

It will be observed that the four pipe sections 12, 13, 20 and 21 are conventional sewer pipe sections, cut only for the inlet, the outlet, and the connecting pipes. Also, the sections 13 and 21 are identical, as are the sections 12 and 20.

The sections 12, 13, 20 and 21 preferably are approximately as wide as they are deep. That is to say, the chambers are twice as long as wide, in the direction of flow. This meets desirable standards for effective function. The construction also permits the use of a tank that is at least four feet deep, as, for an average size dwelling, the two chambers will be two and one-half feet in diameter.

Operation

For any proper septic tank action, there must be a certain maximum velocity of flow-through, and a certain minimum detention period of the sewage in the tank. Horizontal tanks have been made following the rule of length equals twice the width. They reduce the velocity and control the detention period by such shape. In a deep tank of narrow horizontal section, there is a tendency to short circuit from the inlet to the outlet, so that, even when sedimentation is satisfactory, the liquid phase passes across from the inlet to the outlet without sufficient dwell to permit proper anaerobic action. The present tank, by its flow course, follows the rule of length equals twice the width, in a vertical arrangement.

In the present septic tank, the total tank size—i. e., volume of the two chambers 10 and 11—is determined for the particular use. A conventional rule of thumb allows 100 gallons per day

per person. With thirty-inch pipe, the four pipe sections shown in the two chambers will afford this volume. If larger capacity is desired, the chambers may be larger or deeper; but preferably more than two chambers 10 and 11 are used, the additional chambers being connected by pipes 26 and 27 after the chamber 11, with the outlet leading from the last.

The influent material received in the inlet is caused to course downwardly by the T 17. The main sedimentation occurs in the chamber 10. The solid material descends to the bottom, where it contributes to the anaerobic action. The liquid courses primarily through the lower connecting pipe 26, which is located above the bottom of the tank. The elevation of the pipe 26 is sufficient to allow adequate sedimentation space, which is calculated for both chambers by established formulas. The pipe is as low as may provide such space, as the flow characteristics are better when deep.

The flow courses downwardly from the T 17, being baffled thereby against short circuiting to the connecting pipe 27. Sedimentation having largely taken place in the chamber 10, the liquid phase then passes through the connecting pipe 26 to the chamber 11. Therein any further necessary sedimentation takes place, while the liquid phase passes upwardly toward the outlet T 25, which likewise is arranged to inhibit short circuiting. The anaerobic action continues in the chamber 11. The two chambers afford adequate dwell for this bacterial effect to be as complete as is required of septic tanks. The liquid phase, comprising water, dissolved materials and suspended materials largely colloidal, is then delivered to proper secondary treatment means.

In the event the sedimentation well of the first chamber 10 becomes full, the velocity toward the pipe 26 may be somewhat speeded across the surface of the sedimentation, discharging solid material into the sedimentation well of the chamber 11 below the pipe 26.

The pipe 27 between the top sections has two functions, in preventing overflow of the chamber 10 should the lower pipe 26 become obstructed, and in relieving excess pressure conditions in the chamber 10 by establishing a balance of liquid level in the two chambers, with consequent reduction in velocity of normal flow. To be most effective, this pipe 27 is located just below the liquid line.

The inlet 16 is shown as being at the same level as the outlet, to enable the pipe sections 13 and 21 to be identical. Functionally the inlet may be above the outlet. The connecting pipe 27 is preferably somewhat larger than the inlet, to assure its capacity to conduct any volume of influent material freely.

The liquid level is determined by the outlet. Above it may be a scum line, through which the T's 17 and 25 open for pressure relief. These T's prevent the scum from entering the inlet and outlet.

It will be seen that this septic tank may be made of stock pipe sections, and yet it provides superior operation, with improved flow characteristics and insured dwell, brought about by the deep flow course, well baffled. There is a minimum of short circuiting, a better ability to reduce velocity, improved sedimentation, and improved bacterial action.

What is claimed is:

1. In a septic tank, a pair of vertical chambers, the chambers providing a free flow path from top to bottom of each, each being at least substantially twice as deep as it is wide, means closing the top of each chamber with a removable but relatively tight closure, an inlet into the upper part of the first chamber, an outlet from the upper part of the second chamber, the outlet determining a liquid level for the system, a first connection adjacent but above the bottom of the first chamber that leads into the second chamber adjacent but above the bottom of the second chamber, the space in each chamber below said connection comprising a sedimentation well, the two chambers and the connection establishing a flow path from the inlet into the first chamber, downwardly through the first chamber to the connection, through the second chamber upwardly to its outlet, and into said outlet, a second connection between the two chambers adjacent their tops, the second connection having its bottom continuously below the bottom of the outlet and below the liquid level in the chambers to establish continuous communication between the chambers adjacent their upper ends, said second connection being adapted to reduce the velocity of the previously described flow path to provide adequate time of retention of material within the two chambers.

2. The combination of claim 1 together with means to direct the influent material downwardly into the first chamber.

3. The combination of claim 1, wherein the second connection is wholly below the outlet.

4. The combination of claim 1, wherein the two chambers are each formed of two superposed cylindrical tiles, all of the same basic shape, the two upper tiles having identical openings for the inlet and the outlet, and identical openings for the second connection, the two lower tiles having identical openings for the first connection.

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