

# A Septic Tank for the Farm Home

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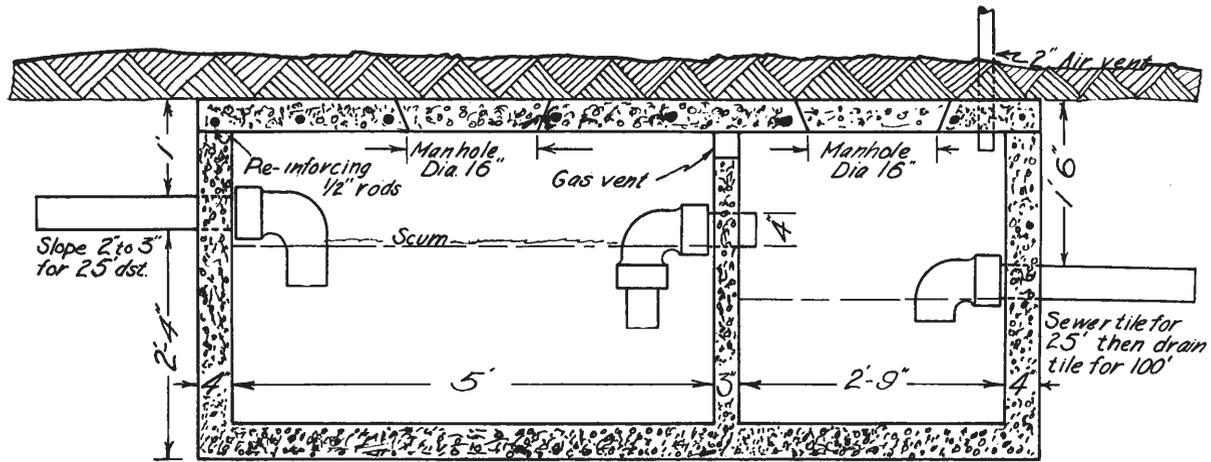


Fig. 1. Cross section of "Continuous Discharge Type of Septic Tank" large enough for family of ten.

## **A SEPTIC TANK FOR THE FARM HOME**

The object of a septic tank is economical, sanitary and permanent disposal of sewage from the farm home. A simple and effective form of septic tank for the farm home may be constructed by the farmer at a reasonable cost. The installation of such a sewage disposal system depends upon having running water in the home.

### **STEPS IN INSTALLATION**

There are four steps in the installation of a septic tank: First, the sewer from the house to the tank; second, the sewage tank consisting of one or more chambers; third, the sewer tile from the tank to the distribution field; and fourth, the distribution tile where effluent is distributed and wasted. The distribution tile may be laid with open joints, using 50 feet of 3 or 4-inch tile for each person served by the tank. About 500 square feet of absorption ground will generally care for the liquid waste of each person. Most engineers favor the use of a distribution system rather than having the outlet in streams or slough. Having the outlet above ground often results in unsanitary places and may be exceedingly dangerous to the health of the family or community.

A septic tank is the safest and least troublesome method of treating sewage on the farm because it makes use of bacteria in breaking up the solids and destroys harmful materials by nitrification and oxidation. The effluent is best taken care of through absorption in the ground by means of drain tile. The effluent should never be allowed to pollute wells, springs or running streams.

### **DETAILS OF TANK**

The septic tank as shown in Figure 1 is of the continuous discharge type and its dimensions are such as to suffice for the farm home with 10 persons. There should be at least four cubic feet of space in the receiving chamber for each person. When the chamber is filled to its water line depth of about 2 feet, it will hold 40 cubic feet. The capacity of the second chamber is usually half that of the first, as the greater part of the bacterial action takes place in the first chamber. A study of the cross section and dimensions as shown will enable the reader to understand the general plan of construction.

### **DETAILS OF CONSTRUCTION**

The septic tank should be placed at least 20 feet from the dwelling because it is difficult to construct absolutely water and gas-proof cement tanks. The tank should never be constructed within a building. Warmth and uniformity of temperature is necessary for proper nitrification of sewage materials. For this reason the tank should be placed deep enough to prevent freezing. The slope from the outlet in the basement of the house to the tank should be at least 2 inches to every 25 feet, and 4-inch bell-end soil pipe should be used. This pipe should be well laid with tight joints so that it will not be obstructed by roots or soil.

## DESIGN OF FORM

Forms for the tank, as shown in Figure 2, should be placed in the excavation leaving 4 inches all around for thickness of the wall. The forms should rest on bricks set edge-wise. The pipes are then set in the form.

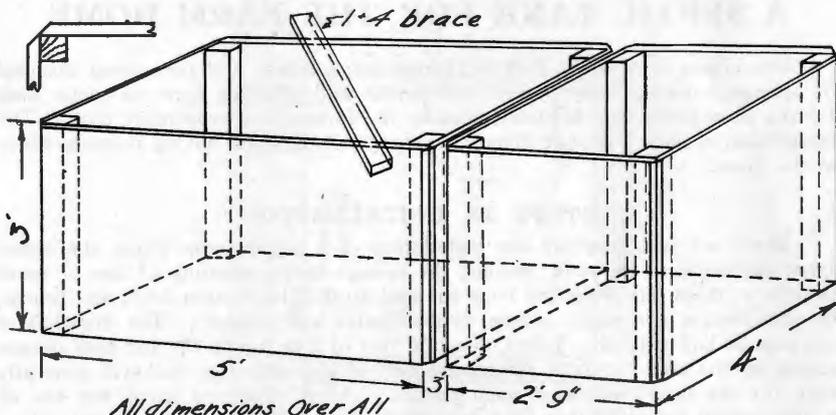


Fig. 2. Diagram of form construction for septic tank shown in Fig. 1.

Enough braces should be used to keep the form square and in shape. The form should be nailed together with six or eight-penny nails making it strong enough to stay in place.

The following pieces of lumber will be needed for the form:

- 6 pieces 1" x 12", 16 feet long, cut as shown in diagram.
- 2 pieces 2" x 4", 12 feet long, cut three feet long for posts.
- 1 piece 1" x 4", 12 feet long, for braces.

Old lumber suitable for forms may often be picked up around the farm.

## OUTLET PIPE AND EXCAVATION

The outlet pipe connecting the soil pipe of the tank to the distribution field should be 4-inch vitrified sewer tile, well cemented. All outlet pipes should have a grade of at least 3 inches to 100 feet, and should be laid below freezing depth. A general plan for the distribution field is shown in Figure 3. Ordinarily the excavation for the septic tank can be dug down smoothly and straight, the sides being firm enough to hold the wall for the outside form. If the ground is loose and will not stand up, the excavation must be made larger and an outside form used. All forms should be placed in the excavation and carefully levelled up true. A 4-inch space must be left all around between the earth and the inside form, and a 3-inch space between the forms for the partition wall between the chambers. The soil pipe elbows and short pieces should be connected before hand, set as shown in the diagram, and the concrete poured around them.

## CONCRETE MIXTURE AND POURING

Concrete should be made of a mixture of one part cement, two parts clean sand and four parts small gravel, thoroughly mixed and moistened to about the consistency of thick plaster. The floor should be poured first letting the mass ooze out around the bottom of the form into the wall space.

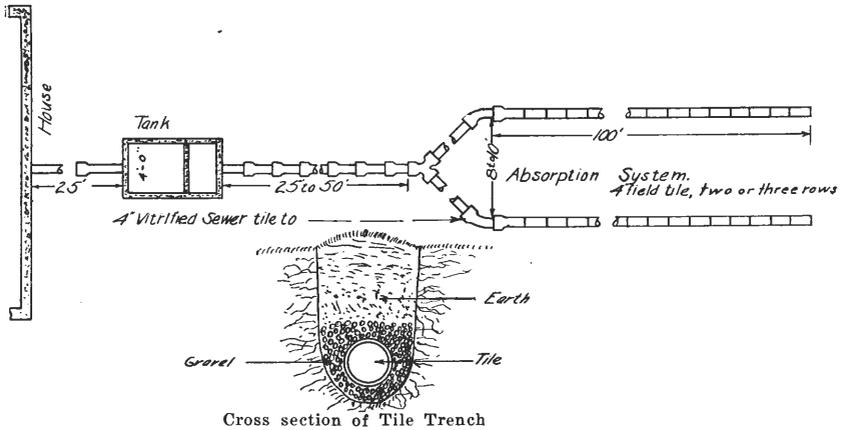


Fig. 3. Diagram showing general plan of distribution field. (Note) Open joints in absorption system.

The floor should then be tamped and smoothed with a tamping block. The walls should be poured before the floor sets to insure a water tight union, and the gap between the ground and the form should be filled to the top of the wall. Care should be taken to have the pipe all well set in the concrete. After the concrete has set three days, the form can be taken out. The four posts should be knocked loose with the hammer and the boards can readily be removed.

## TOP OF TANK

After the concrete has set the tank is ready for the top. The most satisfactory cover is made of concrete. The top should be 3 or 4 inches thick and should be braced with enough stiff iron rods or other reinforcing material to make it rigid.

## MAN-HOLES

All septic tanks must be cleaned and inspected at least once a year by means of man-holes. The man-hole should be large enough to facilitate cleaning. These can easily be made by taking an old dish pan, greasing it well both inside and outside with tallow, lard or axle grease, placing it on the floor when the top is being constructed and filling it to the same depth as the top itself. Setting a strong eye-bolt and ring in the center will provide a handle.

## SIPHONS

While a siphon is not an absolute necessity and is not included in the specifications for the septic tank described in this bulletin, it is desirable if the cost is not prohibitive. If spaces in the soil are constantly filled with water, air is excluded and the distribution field is apt to clog with sewage and become sour. A siphon permits intermittent discharge so that the air may enter the soil and a more uniform distribution of the sewage in the field may be secured. A siphon is automatic and gives no trouble when properly made and placed. It is generally better to purchase such siphons rather than attempt making one. A standard siphon is shown in Figure 4.

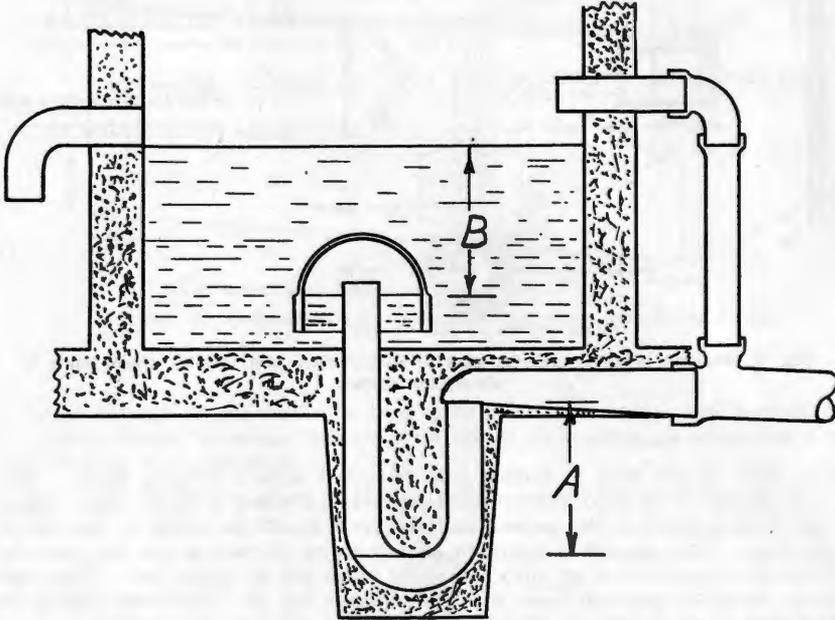


Fig. 4. Diagram of a standard siphon, "A desirable feature in a septic tank."

## COST AND MATERIALS

The cost of the two-compartment septic tank runs from \$20 to \$25 with about 20 per cent more for the cost of labor if hired. The following materials are needed for construction of the septic tank described in this bulletin:

Cement, 2½ barrels	(9 sacks)
Sand, 1 cubic yard	(1 load)
Gravel, 2 cubic yards	(2 loads)
4-inch Soil Pipe, 5 feet	
3 Elbows, 4-inch size	
1 piece 2-inch air vent pipe, 18 inches long	
25 to 50 feet of 4-inch sewer tile	
200 to 300 feet of 3 or 4-inch drain tile	
for distribution field	

### **SMALLER TANKS**

If the house capacity is only five to seven persons, the tank here described may be made only 3 feet wide instead of 4 feet, all of the other dimensions remaining the same.

### **AVOID STRONG CHEMICALS**

No chemical is needed to produce the septic action in the tank. It is the result of life activities of bacteria and develops as needed. Crude lye or other strong chemicals should never be used in cleaning the sink or other basins as lye will kill the bacteria. Soap and mild cleaning powders, being partially neutralized in their manufacture, should be used as cleansers. Grease and greasy scraps should be burned because if they are allowed to run into the tank, they will tend to clog both the tank and pipe connections. Each year the man hole cover for the first chamber should be lifted and the sediment removed. This relieves the tank and keeps it up to capacity. The scum should not be removed, as this tends to seriously reduce the bacterial action.

### **ONE-COMPARTMENT SEPTIC TANK**

A one-compartment septic tank may be made by leaving off the second chamber and using the same specifications as shown in the two-compartment tank described in this bulletin. One-compartment septic tanks are not as efficient as the two-compartment tanks and are not recommended except in sparsely settled communities.

SMALLER TABLE

It is the purpose of this table to show the results of the tests made on the various strains of the bacteria of the genus Bacillus, and to show the results of the tests made on the various strains of the bacteria of the genus Bacillus.

AVOID STRONG CURRENTS

The following table shows the results of the tests made on the various strains of the bacteria of the genus Bacillus, and to show the results of the tests made on the various strains of the bacteria of the genus Bacillus.

ONE COMPARTMENT SAPHIC TANK

The following table shows the results of the tests made on the various strains of the bacteria of the genus Bacillus, and to show the results of the tests made on the various strains of the bacteria of the genus Bacillus.

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DISCUSSION AND CONCLUSIONS

The results of the tests made on the various strains of the bacteria of the genus Bacillus, and to show the results of the tests made on the various strains of the bacteria of the genus Bacillus.