SEPTIC TANKS

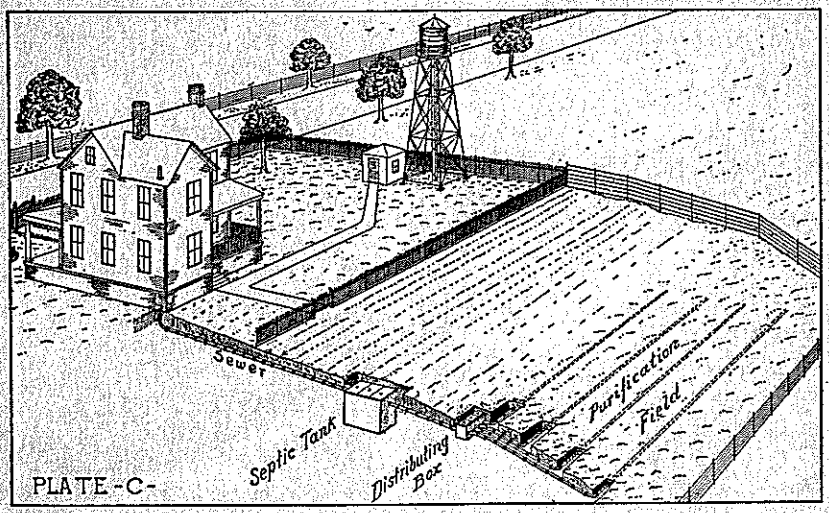


PLATE -C-

For Suburban and Country Homes

Virginia State Department of Health—Richmond, Virginia

1950

SEPTIC TANKS

For Suburban and County Homes

Virginia State Department of Health—Richmond, Virginia

1950

FOREWORD

Your septic tank is an important part of your home, so take good care of it for your own protection. If trouble occurs, call your county health department for an inspection and instructions. The local sanitation officer can help you with the location, construction, and methods of cleaning a septic tank. Call upon him for advice.

Septic Tank Maintenance Suggestions

See that the area around your drainfield is well drained. An open drainage ditch should be dug to take off surface water if the land is low and flat. A ditch made two feet deep or more will lower the ground water level below the drainfield and will improve the efficiency of the systems.

If the land is high and well drained, it should be graded to eliminate low areas which will collect water in extremely wet weather. Water allowed to stand over the drainfield will seep into the drain tile and fill up the entire system, thus causing water to break out to the surface or to back up into the house.

* * *

Keep area over drainfield clear of trees and shrubbery. The roots of Willow, Cottonwood, Dogwood, Gum or Elm trees cause damage to sewer lines. A sod over the drainfield is desirable but a cultivated area is satisfactory.

* * *

Home systems should be cleaned at least once every five to seven years upon the advice of the health department. Septic tanks at some public establishments should be cleaned yearly or more frequently. A grease trap should be cleaned at least once a month.

* * *

Use bleach solutions, lye. drain-o, etc., sparingly. The effect of these on the operation of the septic tank is questionable.

* * *

Do not make alterations to the system without first consulting your health department.

* * *

Do not allow heavy machinery to run over the system because it may cause considerable damage by breaking the tile or the septic tank.

* * *

Do not make a drive-way over the drainfield or cover any part of it with a building. This will pack the ground to such an extent that the efficiency will be greatly impaired. It might also cause the tile to be crushed, especially during wet weather.

* * *

Do not depend upon "jack-legs" to construct or repair your septic tank; they may cause considerable trouble and expense.

* * *

The septic tank will not cause offensive odors either in the house or under the house if the line is sealed, trapped, and vented properly.

* * *

If you have your septic tank cleaned by a TRANSIENT septic tank cleaner, it is at your own risk. When your tank needs cleaning, your health department can recommend qualified local personnel.

CARE OF THE DISTRIBUTION BOX

The distribution box is the first place to check when looking for sources of trouble. When the distribution box is full of water, any of the following conditions may exist:

The high ground water-level land needs drainage.

There may be obstructions from roots or sludge. Trees causing trouble should be removed, draintile cleaned and relaid or drainfield replaced.

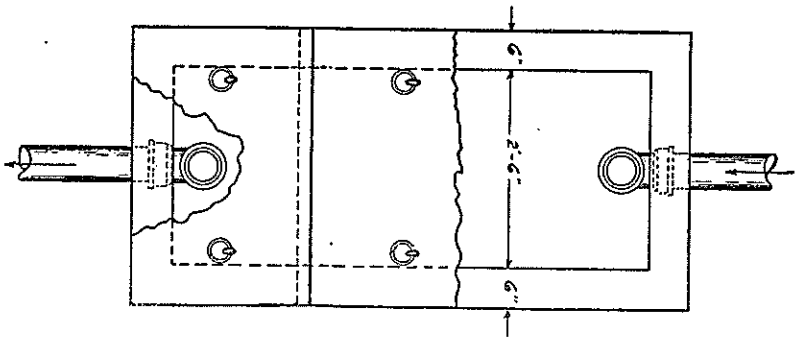
There may be a broken draintile which should be located and replaced.

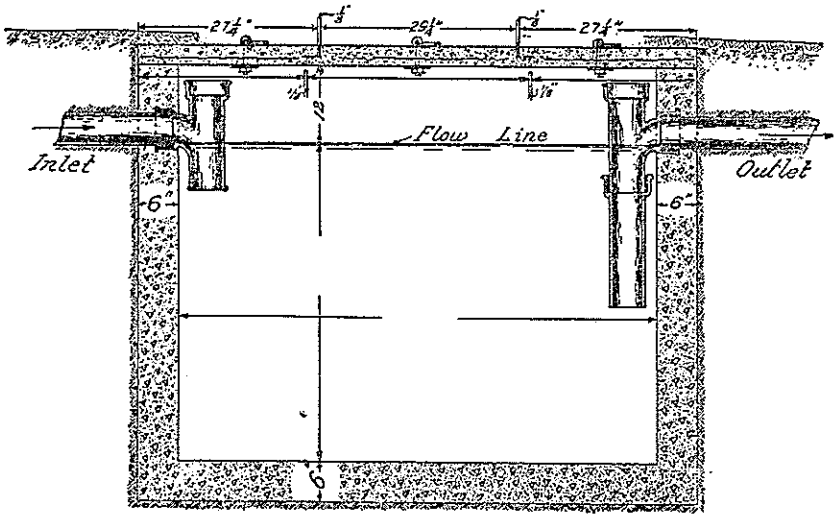
There may be an insufficient drainfield for the amount of water used, in which case, more drainfield is needed.

If water is not running into the distribution box, any of the following conditions may exist:

Obstruction in outlet tee in tank, obstruction in inlet tee in tank, or obstruction in the sewer line between the septic tank and fixtures in the house. These require the services of a plumber or a competent septic tank man.

The distribution box should be inspected and cleaned at least once a year to remove the sludge. If this inspection is made periodically, the owner will be in a better position to determine when the tank is in need of cleaning. Thus, the life of the drainfield will be prolonged.





Concrete Septic Tank

PLATE F-1

Refer to table on last page for minimum dimensions and specifications for Septic Tank.

A concrete Septic Tank is shown, but under certain circumstances it may be made of hard brick, or 6" or 8" cinder or concrete blocks.

Before constructing a septic tank system, a septic tank permit must first be secured from the local health department.

Design of a Septic Tank

Septic tanks shall be rectangular in shape and the length shall be not less than twice nor more than three times the width. The liquid depth shall be not less than 4 feet and the freeboard or airspace shall be not less than 1 foot.

How Large Should the Septic Tank Be?

The size of a septic tank should be based on the potential capacity of a home. For offices, industrial plants, and schools the size must be based on the greatest anticipated number of persons served. In no instance, however, will a septic tank of less than 450 gallons actual working capacity be permitted.

See table on the last page for minimum dimensions.

Built in Place and Ready-Made Septic Tanks

The descriptions and detailed cuts contained in this bulletiin will be helpful to the home owner who anticipates the installation of a septic tank.

Ready-made tanks are available and may be used if they conform in design and specifications to the standards set forth in this bulletin.

Location of Septic Tank and Purification Field

The location of the septic tank and the purification tile system must be selected with care in relation to the water supply; they should never be closer than fifty feet to the well or spring. If the ground is level there is no way to tell the direction in which the underground water flows. Therefore, if the well does not have a tight casing for a depth of 50 feet or more, the farther away the tank and tile system are located from the well, the less will be the danger of polluting the water supply. On the other hand, if the ground has a gradual slope for a long distance, the chances are that the underground water flows in the same direction as the slope. Therefore, if the tank and tile system are located down hill from the well there should be very little danger of contaminating the water supply.

In addition to taking care not to pollute some other person's water supply, the owner must not forget about his own spring or well. The sewer line from the house to the septic tank must have tight joints so there shall be no leakage. The plumber should be required to extend the cast-iron soil pipe to a point five feet outside the building line and this is where the tile should begin, unless the well is located within 50 feet of this point, in which case the cast-iron pipe should be extended more than 50 feet from the well before it joins the tile.

THE SEWER LINE FROM HOUSE TO SEPTIC TANK

Tile sewer pipe is furnished in 2-foot lengths. It should be a vitrified clay or concrete pipe of good quality, with bell and spigot ends.

When the sewer line cannot be laid straight all the way from the house to the tank, it should be laid as far as possible in a straight line and then a one-eighth or one-sixteenth bend put in. The next section should be laid straight as far as conditions will permit and another bend put in. The point where bends are made should be marked in some way so that the line can be found easily in the future should there be any trouble. If it is necessary to make a bend of more than 45 degrees there should be a manhole.

LEAST FALL ALLOWABLE IN SEWER LINE

How much or how little fall shall be used in the sewer line from the house to the septic tank so that it will be self-cleaning, is a question which often is asked. For a 4-inch sewer the fall or grade should not be less than 20 inches per 100 feet, which is 2 inches for each 10 feet in length. The fall for a 6-inch sewer may be one-half the above figures, namely 10 inches per 100 feet or 1 inch for each 10 feet of length. These are the safe minimum grades, although there are many sewers with grades less than the above which are giving very little trouble.

Tree Roots Clog Sewers

Roots of trees clog sewers, especially cottonwood, maples and willows. Certain fast growing shrubs and undergrowth often cause considerable trouble, especially if the joints are not tight. In seeking for moisture, a root will find its way through a very small opening and after it once gets in, it will grow rapidly, filling up a section of the sewer and also forcing the mortar out of the joints. It even can wrap around tile pipe and by contraction break it. If the sewer line cannot be laid far enough away from trees and shrubs so that roots cannot reach it, more than usual care should be taken to see that the joints are well made and plenty of mortar is used. In such a situation or to safeguard a near-by water supply it is best to use cast-iron pipe with leaded joints. While this costs more in the beginning it usually proves a saving in the end.

CONCRETE SEPTIC TANKS

To build the tank of concrete, it is first necessary to dig the hole of sufficient size and depth and then provide forms for holding the concrete until it becomes thoroughly set. Where the soil is tight and firm, it is possible to dig the hole the exact size of the outside dimensions of the tank and allow the earth sides of the hole to serve for the outside form for the concrete. It is necessary then to use only one wood form for the inside with just a narrow outside wood frame around the top. On the other hand if the soil is loose and "crumbly" or sandy, both inside and outside forms made of wood should be used.

Materials Required to Build the Tank*

To build the tank, the following list of materials is necessary:

150 square feet tongue and groove boards or rough boards 12-ft. lengths.

8 pieces 2 x 4, 12-ft. long, dressed 4 sides.

2 pounds 6 d. nails.

1 pound 10 d. nails.

Concrete Materials

16 bags Portland cement.

1½ yards sand.

2½ yards gravel or crushed stone up to ¾-inch size.

Fittings

2 4-inch cast iron soil pipe tees.

3 18-inch length cast iron pipe. These three pieces of pipe are for inlet, outlet and for addition to outlet tee as shown in cut.

Six ring bolts, two for each section of top.

*The materials listed are for the minimum size tank. Refer to table last page of Bulletin for specific capacities and materials required for each size septic tank.

Note: For specifications of different sizes of sewage disposal plants, see Table on last page of this bulletin.

After the necessary materials are secured and on the ground the hole for the tank should be laid off 7 feet long and 3½ feet wide and should be dug very carefully with square corners and straight up and down sides. The depth should be 4 feet 6 inches below the point where the bottom of the house sewer will enter the tank.

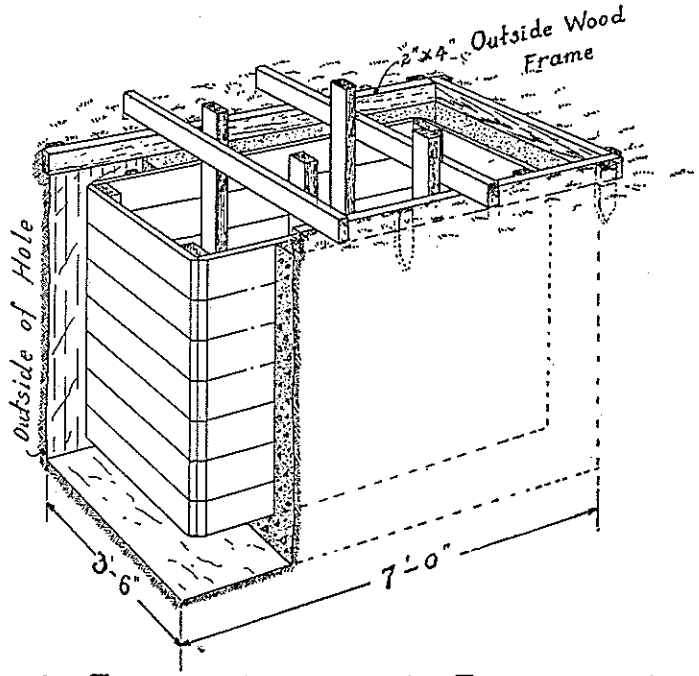
THE WOOD FORMS

After the hole is completed, the narrow outside wood frame should be made and placed around the top of the hole as shown in Plate F. This frame may be made of pieces of 2 x 4 with an inside dimension of 7 feet long and 3½ feet wide and should be placed in a level position with the top 5 feet 10 inches above the bottom of the hole. It may be necessary to drive stakes at the outside corners and nail fast to the frame to hold it in position.

The four parts of the inside wood forms should be made as shown in Plate F, but before placing in the hole they should be put together on the ground, using only about six 6 d. nails at each corner.

Next, the two 2 x 4 cross pieces should be placed across the top of the form and nailed securely with 10 d. nails to the outside edges of the upright pieces on each side as shown in Plate F.

The cross pieces should be 4 feet 6 inches long and should be placed so that the bottom edges are 5 inches above the top of the form at each side and so that they project exactly one foot at each end. The form then may be lowered in the hole and is supported by allowing the projecting ends of the cross pieces to rest on the edges of the outside wood frame previously placed. The form should be adjusted until the sides are plumb and there is a 6-inch space for concrete under the bottom and between the form and the earth all the way around at sides and ends. After adjusting, the cross pieces should be toe-nailed to the outside wood frame; also the bottom cross braces of the inside form should be attached.



Inside Form, No Outside Form required.

PLATE-F-

A. WAGNER

THE CONCRETE MIXTURE

To secure a practically water-tight septic tank it is particularly important to make the best concrete possible. This only can be done by accurately measuring and proportioning the cement, sand and gravel and by mixing carefully according to approved methods. It is necessary therefore to have a mixing platform and a measuring box. The mixing platform should be made of tongue and grooved boards nailed on 2 x 4 cleats and should be about 6 feet square with strips around the edges. (Lumber sufficient included in previous list of materials.) The measuring box should be made with an inside dimension of 2 feet long, 1 foot wide and 1 foot deep, with substantial strips nailed on the sides and projecting from the ends for handles. This box will hold 2 cubic feet. The mixture for this should be 1-2-4 and the concrete should be mixed in "batches" requiring one bag of cement at a time. To prepare each "batch" of mixed concrete, first measure out a box of sand and spread it out to a thickness of about 2 inches on the mixing platform. Then spread the contents of one bag of cement evenly over the sand and mix the two together "dry" until a uniform color shows that they are thoroughly mixed. Next add water slowly and mix until a uniform mortar is secured, which should then be spread out on the platform to a thickness of about 2 inches. Before adding the stone or gravel it should be wet thoroughly with water, and then two boxfulls should be emptied evenly on top of the mortar and the whole mass thoroughly turned and mixed, adding more water as required until a good "quaky" mixture is secured.

Pouring the Concrete Bottom and Side Walls

The first two "batches" of mixed concrete should be lowered in a bucket or "coal scuttle" and emptied in a pile down through the middle of the bottom. As each "batch" is emptied the concrete should be tamped until the water comes to the top and the mass spreads out to a 6-inch thickness through the middle portion of the bottom and tapers off toward the sides and ends. The third "batch" should be poured outside the form and tamped until sufficient concrete runs under and joins that previously poured, forming a uniform 6-inch thickness for the bottom of the tank. The remaining "batches" necessary should be poured evenly around the outside of the form and thoroughly spaded as poured.

The inlet pipe and outlet pipe should be placed as shown in Plate F-1 when the wall at both ends of the tank is built up to the level of 4 feet above the floor. All walls then should be completed up to the level of the top of the inside form. The green concrete must be allowed to "set" for a period of about 48 hours before any further work is done on the tank. After the concrete is sufficiently "set" the inside forms should be removed. This is done by prying off the top and bottom braces, and the corner pieces of the form, and taking out the sides and ends separately. This leaves the tank ready for the construction of the cover.

THE CONCRETE COVER

Pour the concrete top of the tank in three, independent sections with half-lap joints, any or all of which sections may be removed, thus exposing the entire inside of the tank. This type of top is shown in Plate F 1.

DISTRIBUTION BOX SHOULD BE USED

Where several lines of drain tile are used, unless there is an arrangement for distributing the flow of the sewage as near equally as possible to the various lines, the purification system will not be satisfactory. The best arrangement is a distribution box. Plate H shows two types made of concrete.

Distributing boxes may be made of either concrete or brick, with one inlet pipe and as many outlet pipes as desired. The important point is to see that the outlet pipes are placed at exactly the same level. The inlet pipe should be placed at least one inch higher than the outlet pipes.

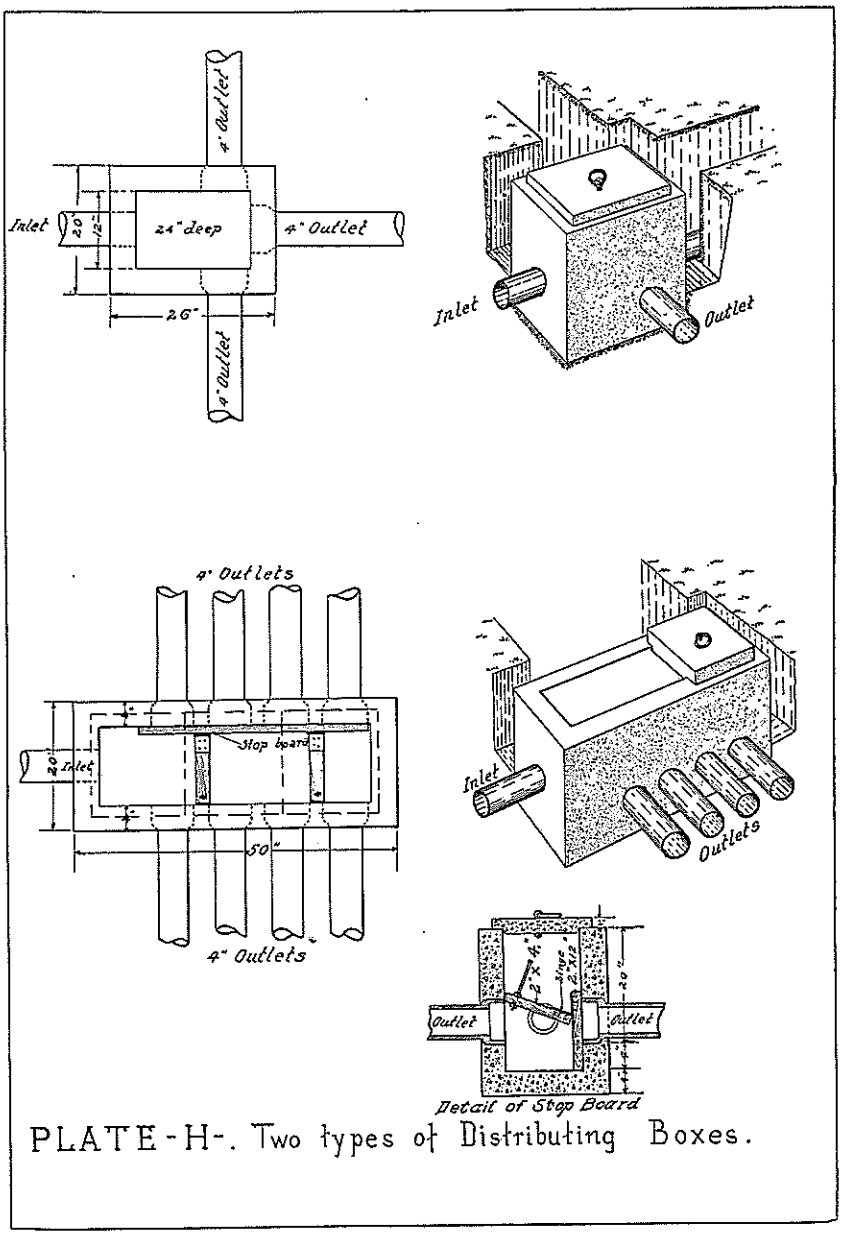
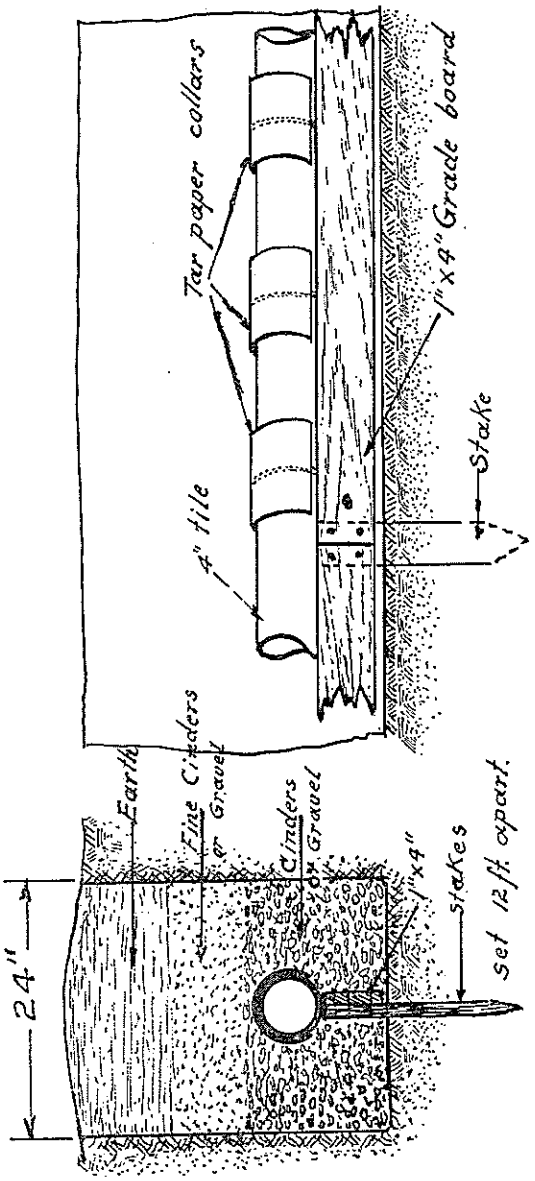


PLATE-H-. Two types of Distributing Boxes.

The bottom of inlet pipe should be 5 inches or greater above the floor. The outlets must be set at the same level and 4 inches above the bottom, so that equal amounts of sewage will go to the several lines.



Method of laying Drain Tiles.

PLATE -J-

THE PURIFICATION FIELD

The purification system following the septic tank usually consists of a 4-inch terra-cotta "feed line" from the tank to a "distributing box" with a number of short "distributing lines," also, of 4-inch terra-cotta pipe, connecting with an equal number of "drain tile lines." The drain lines are made of 4-inch farm tile and are laid open joint, the joints to be covered with strips of roofing paper, in parallel lines, and covered with from 12 to 18 inches of earth. The lines of terra-cotta pipe with cement joints merely convey the sewage to the open-joint drain tile lines and should have a fall of not more than ½ inch in 12 feet. The open-joint drain tile lines should have a fall of not less than 2 nor more than 4 inches to the 100 feet. The drain lines should be laid 6 feet apart as shown in cut on the next to the last page of the bulletin.

Upon the width and depth of the drain tile ditches depends the efficiency of the purification field. These ditches should be 2 feet wide and deep enough to allow at least a 6-inch layer of cinders or other approved material under the tile. In tight non-absorbent soil, cinders should also be placed around and over the tile. If only a 6-inch layer of cinders underneath the tile is used, 4 yards of cinders will be required for each 100 feet of tile laid.

No exact rule can be given as to the number of feet of drain tile which should be put in, but the following suggestions will be helpful: Under the most favorable conditions, where there is a light porous soil and the ground water level is several feet underneath the surface, 50 feet of tile for each person may be enough. IN NO CASE, HOWEVER, SHOULD LESS THAN 200 FEET OF TILE BE USED. In every case, locate the lines so that they may be made longer, or more lines may be added in the future, if necessary. The owner can soon tell whether the system is working all right by noting whether any seepage over the tile lines appears at the ground surface.

Straight Edge for Securing Right Grade for Drain Tile

Since the success of the whole disposal plant will depend a great deal on the accuracy with which the drain tile lines are laid, it is very important to secure the right grade. Where an engineer's or architect's level is available, the matter is simple, but in the absence of such aid, it is necessary to make use of things commonly on hand. A straight edge to be used with carpenter's level is recommended for determining grades for drain tile. This should be made of a straight board 12½ feet long with a little strip ½-inch thick and about 6 inches long, nailed on the under edge of the board at one end. This is the forward end of the straight edge. A carpenter's level placed on the top edge of the board completes the arrangement. Ordinary grades are marked by setting a line of stakes at intervals along the course where ditches are to be dug and driving the stakes down until the tops represent the

desired grade line. To get the desired grade with the straight edge, the stakes in any line should be set 12 feet apart and the first stake should be driven down to the required level. After the first stake is placed the level for the top of the next one is secured by laying the straight edge from one to the other with the right end forward and driving the second down until the straight edge will rest on the two with the top level. The level for the top of the third stake is found by using the second for a guide in the same manner, so on down the line until all the stakes are set. Placed in this manner the top of each stake in line will be ½-inch lower than the last one and the whole line will have the desired fall of ½-inch in each 12 feet.

METHODS OF LAYING TILE WHEN GROUND IS NEARLY FLAT

Figure 1. Plate I shows the common arrangement for a small family of three or four persons where a maximum of only three lines of tile is needed. For a larger family the arrangements shown in Figure 2 should be used with four, six or eight lines of tile, according to the conditions. Before starting to dig trenches the field should be staked off by placing stakes at the points where the drain tile lines will begin and at the ends of the lines. Starting from the septic tank and from the distributing box the ditches for the bell and spigot pipe should be dug first and the pipe laid in the bottom of the ditch with an even fall of ½-inch in 12 feet or more. As this pipe is laid the earth should be scooped out from underneath the bells so that the barrels of the pipe will rest on the firm earth. Beginning at the ends of the terra cotta lines the ditches for drain tile should be dug about 6 inches deeper than the tile will be laid. In flat ground the grades for the bottom of these ditches usually can be gauged by the eye. After the ditches are dug a line of stakes should be set 12 feet apart down through the bottom of the ditches. These stakes should be made of short pieces of 1 x 3 about one-foot long and sharpened at one end. They should be driven in line just to one side of the center line down through the bottom of the ditch and with their flat surface in line with the ditch. To get the right grade the first stake should be set near the end of the terra cotta pipe and should be driven so that when the first joint of farm tile is placed on top of it the tile will be flush with the end of the terra cotta pipe. The remaining stakes should be driven down to the right level by using the straight edge as previously described. It has been found that farm tile may be laid more accurately and more rapidly if it may be placed on boards in the bottom of the ditches. Consequently, after all stakes in each line have been driven to the right level, 1 x 4 boards 12 feet long should be placed edgewise extending down the center of the ditches and toe-nail on one side of the flat surface of the stakes flush with the top. After the boards have been nailed on, cinders, gravel or other porous material should be filled back in the ditches even with the top edge of the boards. Beginning with the ends of the terra cotta pipe the farm drain tile should be laid on the top edge of the boards down

through the ditches, and as each joint is laid some earth or cinders should be thrown in and packed on each side of the pipe to hold it in position. A space of about ¼-inch should be left between the ends of the pipes as they are laid and the open joints should be covered with strips of tar paper or sheathing lapped around the top and sides of the pipes as shown in Plate J. As the paper collars are placed, some cinders should be packed in on either side to hold them in position. The paper strips usually are cut 10 inches long and 6 inches wide. It is best not to fill the trench above the line of pipe until after all the tile in each line is laid. When the ditches are filled the earth should be well rounded up above the surface of the ground so as to allow for settling. If this is not done there will be sinks along the line of the trenches after the earth has settled and these will collect surface water and interfere with the working of the tile.

METHOD OF LAYING TILE IN SLOPING GROUND

Where the tile must be laid on a hillside or sloping ground it is necessary that the lines be placed at different levels. Plate I, Fig. 3 shows arrangement for distributing box and lines. From the points where the terra cotta lines end it is necessary that the ditches for drain tile be dug along the side of the hill or slope so that the bottoms will have the required fall of ½-inch in 12 feet and still be practically 17 inches in depth throughout. Before digging it is best to lay out and stake the grade of the drain tile ditches on the surface of the ground. This can be done by using the straight edge and level, except that for this purpose, it is better to nail some short upright strips at each end of the straight edge for "legs," having the "leg" at the forward end ½-inch longer than the other. To proceed with each layer a stake should be driven at the point where the drain tile will begin. Then place the "leg" at the back end of the straight edge on the ground by the side of the first stake and try for the position of the second stake, by moving the forward end of the straight edge up or down the slope until it is level. When it is level, drive the second stake by the side of the forward "leg" and proceed to set the remaining stakes in the line in the same manner. When completed the ground surface along this line of stakes will have a fall of ½-inch in 12 feet. Owing to the uneveness of the ground surface the line of the stakes may follow a more or less zig-zag course and if so the ditch should be dug as evenly as possible from the first to the last stake following the general line of the stakes in between. After the drainage field has been laid out in this manner the ditches should be dug and tile laid as has been described for flat or level ground.

NOTE.—*Remember drain tile should be laid in the top soil just deep enough to permit the ground over it being plowed without striking the tile. An average of about 12 inches from the top of the tile to the surface of the ground is best. In no case should the tile be buried more than 18 inches. Also, whenever possible, the drainage field should be laid on the sunny side of the hill.*

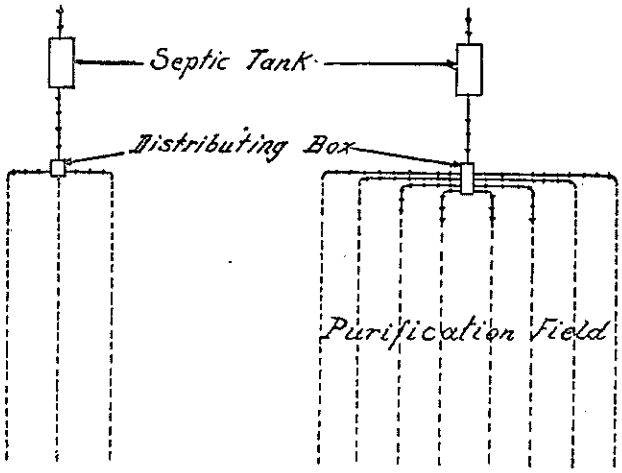


Fig. 1 Fig. 2

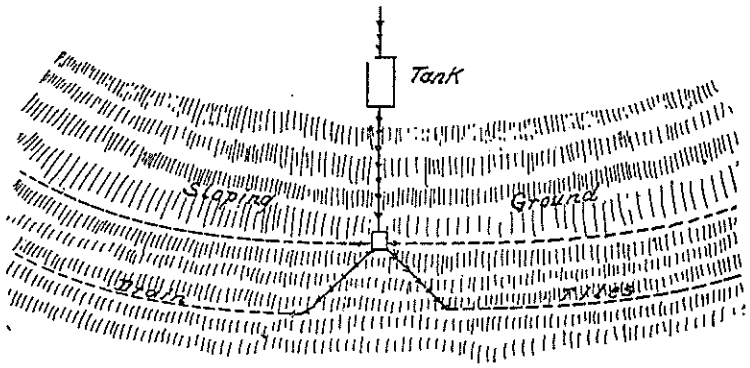


Fig. 3

FINAL INSPECTION

After the completion of the entire disposal plant, before it is used, a final inspection should be made. The distribution box should be checked by filling with water to be sure that the overflow is distributed equally to the several outlets of the distribution box.

SEPTIC TANK WITH AUTOMATIC SIPHON

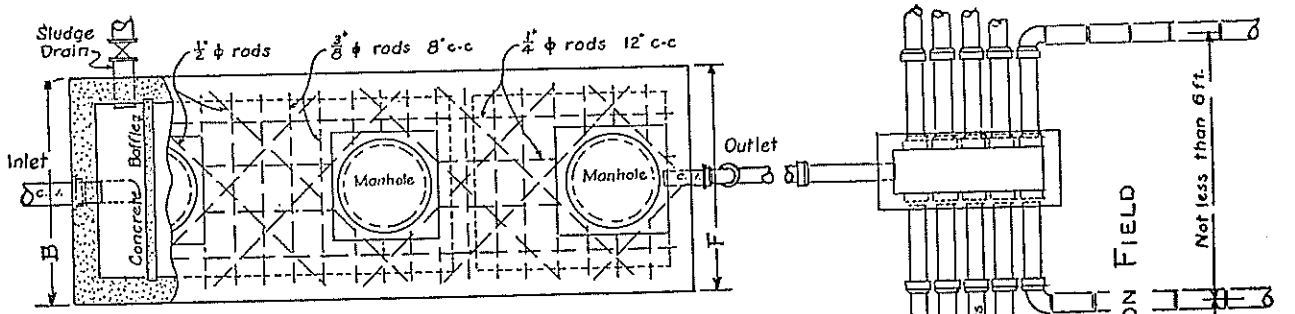
When the number of persons served by the sewage disposal plant exceeds twenty, an automatic sewage siphon should be used.

The advantage of an automatic siphon lies in the fact that the sewage overflow from the septic tank is discharged intermittently and in such quantity at one time as to insure that all the drain tile lines in the purification field are at least partially filled at each overflow. In this manner the sewage is practically equally distributed throughout the entire purification field, and no portion of the field is overloaded, as most often happens when a siphon is not used.

The illustration which follows shows the general arrangement of a sewage plant with an automatic siphon. The overflow from the septic tank gradually collects in the siphon chamber, and as the liquid level rises, the air retained under the bell of the siphon is gradually compressed until a point is reached where the pressure is sufficient to cause the siphon to operate and nearly all the liquid is discharged rapidly into the drain tile lines. When the siphon chamber is nearly empty, the siphon ceases to operate and remains idle until sufficient liquid collects in the siphon chamber to cause it to act again. During the interval while the siphon is idle, the liquid in the tile lines gradually seeps into the soil throughout the entire purification field.

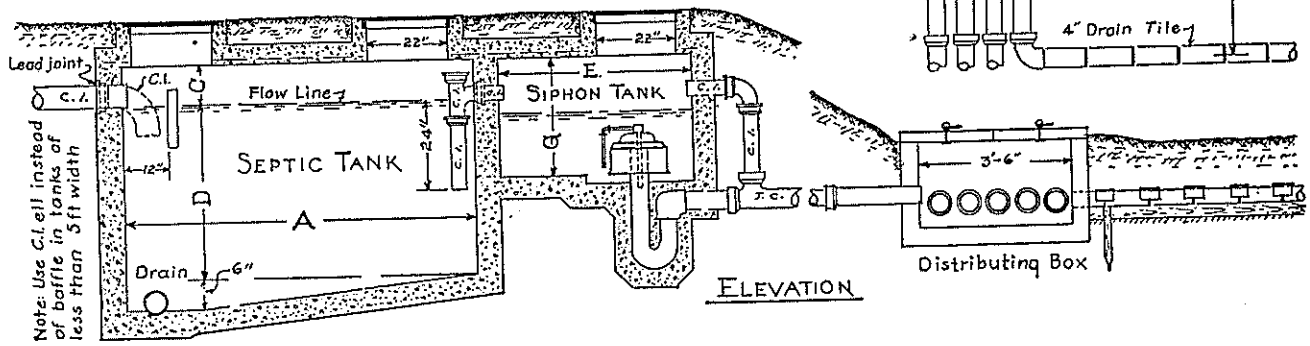
Specifications for Different Sizes of Sewage Disposal Plants

The tables which follow give specifications for various sizes of sewage disposal plants with and without siphon, to accommodate different numbers of persons. Particular attention is called to the table showing sizes of septic tanks and siphon tanks for schools, etc., where the sanitary fixtures are used only during the day. The sizes given in the table are for schools where there are only the usual flush toilet fixtures. For schools in which there are also shower baths, the capacity of the septic tanks and the amounts of drain tile should be doubled in order to take care of the extra water from the shower bath fixtures. For example: For a school of 200 pupils, where shower baths will be used, the size of the septic tank and quantity of drain tile should be as designated in the table for a school of 400 pupils.



PLAN

SEPTIC TANK
WITH
AUTOMATIC SIPHON & PURIFICATION FIELD



ELEVATION

SPECIFICATIONS FOR SEPTIC TANKS WITHOUT AUTOMATIC SIPHON

POTENTIAL CAPACITY OF HOME, NUMBER OF BEDROOMS	CAPACITY SEPTIC TANK GALLONS	DIMENSIONS							THICKNESS CONCRETE			CONCRETE MATERIALS REQUIRED			SIPHON		LIN.FT.4"DRAIN TITLE RECOMMENDED		
		SEPTIC TANK				SIPHON TANK													
		A Length	B Width	C Air Space	D Liquid Depth	E Length	F Width	G Depth	Walls	Top	Bottom	Cement Bags	Sand Cu. Yds.	Gravel Yds.	Size	Drawing Depth	Sandy Soils	Med'm Soils	Clay Soils
2 OR LESS	450	6'-"	2'-6"	1'-0"	4'-0"				6 in.	4 in.	6 in.	16	1½	2½			200	300	500
3	720	7'-0"	3'-6"	1'-0"	4'-0"				6 in.	4 in.	6 in.	21	1¾	3½			300	400	600
4	1000	8'-0"	4'-0"	1'-0"	4'-0"				6 in.	4 in.	6 in.	26	2½	4¼			400	500	800
5	1250	9'-0"	4'-6"	1'-0"	4'-3"				7 in.	5 in.	6 in.	35	3	5½			500	600	1000
6	1480	9'-6"	4'-8"	1'-3"	4'-6"				8 in.	5 in.	6 in.	42	3½	7			600	700	1200
7	1720	10'-0"	5'-0"	1'-3"	4'-8"				8 in.	5 in.	6 in.	46	4	7½			700	800	1500

SPECIFICATIONS FOR PLANTS WITH AUTOMATIC SIPHON

2 OR LESS	450	6'-0"	2'-6"	1'-0"	4'-0"	3'-0"	2'-6"	3'-0"	6 in.	4 in.	6 in.	22	2	3½	4 in.	17 in.	200	300	500
3	720	7'-0"	3'-6"	1'-0"	4'-0"	3'-6"	3'-6"	3'-0"	6 in.	4 in.	6 in.	29	2¾	4½	4 in.	17 in.	300	400	600
4	1000	8'-0"	4'-0"	1'-0"	4'-0"	4'-0"	4'-0"	3'-0"	6 in.	4 in.	6 in.	34	3¼	5¼	4 in.	17 in.	400	500	800
5	1250	9'-0"	4'-6"	1'-0"	4'-3"	4'-6"	4'-6"	3'-0"	7 in.	5 in.	6 in.	45	4	7¼	4 in.	17 in.	500	600	1000
6	1480	9'-6"	4'-8"	1'-3"	4'-6"	4'-8"	4'-8"	3'-6"	8 in.	5 in.	6 in.	56	5	9	5 in.	23 in.	600	700	1200
7	1720	10'-0"	5'-0"	1'-3"	4'-8"	5'-0"	5'-0"	3'-6"	8 in.	5 in.	6 in.	62	5½	10	5 in.	23 in.	700	800	1500

FOR SCHOOLS, ETC., REQUIRING ONLY EIGHT HOUR DAY SERVICE

No. of Pupils																			
200	2000	11'-0"	5'-0"	1'-3"	5'-0"	5'-0"	5'-0"	3'-6"	9 in.	5 in.	6 in.	74	6½	12	5 in.	23 in.	800	1200	2000
300	3000	13'-6"	6'-0"	1'-3"	5'-0"	6'-0"	6'-0"	3'-6"	9 in.	5 in.	6 in.	93	8	15	5 in.	23 in.	1200	1800	3000
400	4000	15'-6"	7'-0"	1'-4"	5'-0"	7'-0"	7'-0"	3'-6"	9 in.	5 in.	6 in.	112	9¼	18	5 in.	23 in.	1600	2400	
500	5000	18'-0"	7'-6"	1'-5"	6'-0"	7'-6"	7'-6"	3'-6"	10 in.	5 in.	6 in.	140	12	23	5 in.	23 in.	2000	3000	
600	6000	20'-0"	8'-0"	1'-6"	5'-0"	8'-0"	8'-0"	3'-6"	10 in.	5 in.	6 in.	156	13½	25½	5 in.	23 in.	2400	3600	

NOTE: The above specifications are for schools without shower baths. If shower baths are used, sewage plant with specifications for double the number of persons should be adopted. Information concerning septic tank systems for use at offices, industrial plants and public places will be forwarded on request.