Sept. 13, 1932. K. J. HENDRICKS 1,877,507

KNOCKDOWN TANK

Filed June 20, 1925

Fig. 1

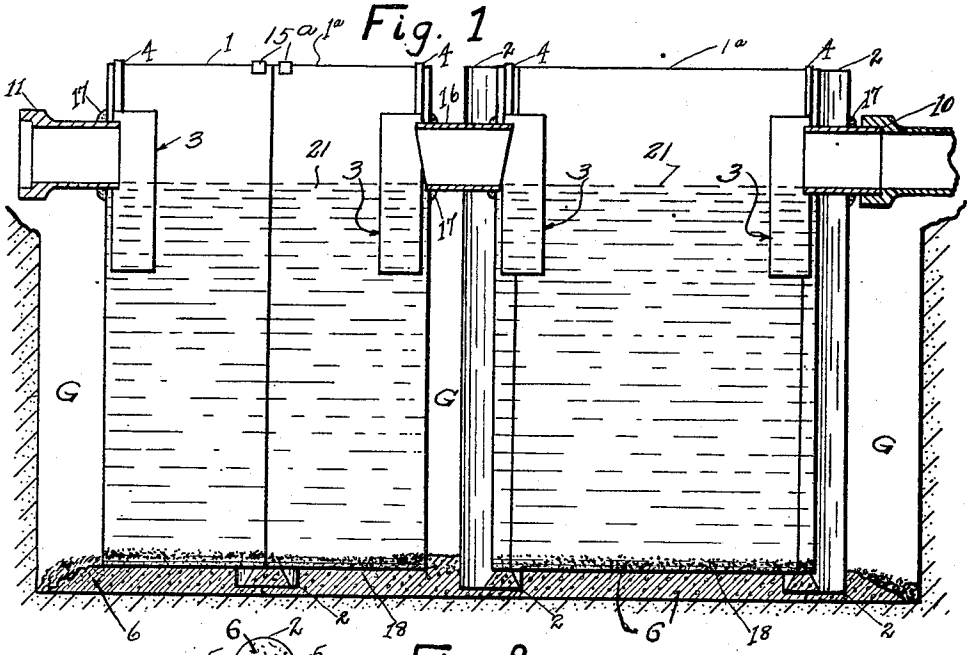


Fig. 2

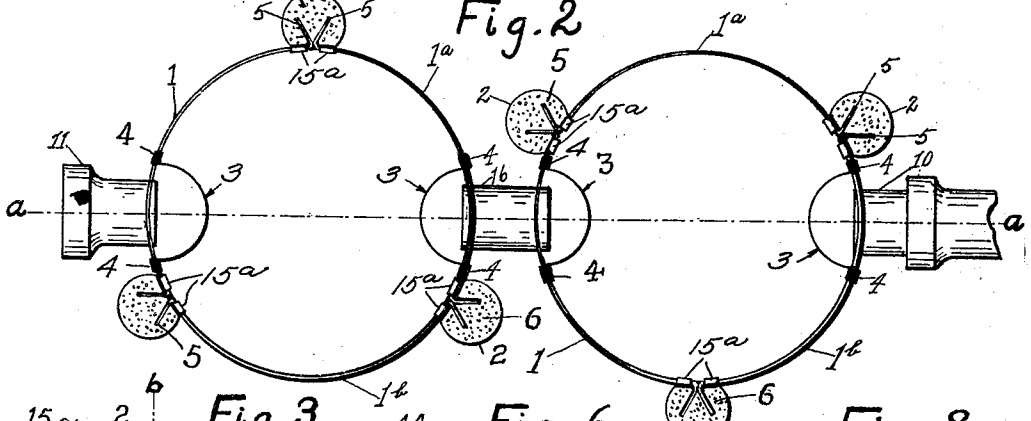


Fig. 3

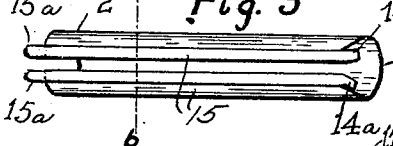


Fig. 4

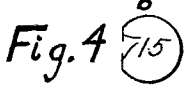


Fig. 5



Fig. 6

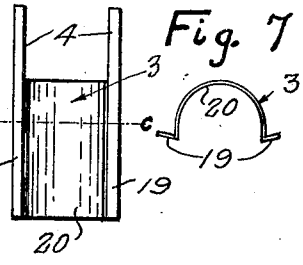
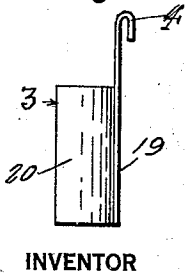


Fig. 7

Fig. 8



WITNESSES

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Patented Sept. 13, 1932 1,877,507

UNITED STATES PATENT OFFICE

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KNOCKDOWN TANK

Application filed June 20, 1925. Serial No. 38,433.

My invention relates to knockdown tanks, and in particular to septic tanks.

Among the objects of the invention are the provision of a septic tank construction, having the structural elements thereof formed for ready transportation, in disassembled form; the provision of a knockdown septic tank construction having means for locking and sealing the tank joints against escape of fluid matter therethrough; the provision of a collapsible sectional septic tank construction having means for anchoring the joints of the tank sections and adapted to form supporting columns for a tank and cover; and the provision of a simple and novel construction and arrangement of baffle members to be disposed on the interior of the tank in such manner that a defined circulation of sewage is procured therein.

With these objects in view and such others as will be apparent from the description, the invention resides in the novel construction, combination and arrangement of parts hereinafter described and claimed and illustrated in the accompanying drawing, in which—

Figure 1 is a vertical section through a septic tank assembly on the line A—A of Fig. 2;

Fig. 2 is a top plan view of the assembly;

Fig. 3 is a perspective illustration of the concrete column form;

Fig. 4 is a section on the line B—B of Fig. 3;

Fig. 5 is an end view of the member shown in Fig. 3;

Fig. 6 is an elevation of a suspension baffle member employed;

Fig. 7 is a sectional view therethrough on the line C—C of Fig. 6;

Fig. 8 is a side elevation of the baffle shown in Fig. 6.

The function and operation of septic tanks is well understood to those skilled in the art, and is a matter of common knowledge. Heretofore in the construction of such tanks and sewage disposal systems, it has been customary to provide ground pits lined with concrete bottoms and siding, or tank units have been constructed in various forms of reinforced concrete, brick, and sewer pipe. Necessarily such constructions are bulky and hard to install, and are very often faulty due to lack of proper care in their installation.

In order to operate efficiently, septic tanks must be capable of air venting through the delivery and discharge lines and across the interior of the tank so that no syphoning action can take place. They must, as far as is possible, receive the sewage influx without any surface disturbance of the contents of the tank, as such disturbance is detrimental to the formation of a bacteria mat, popularly so called, on the surface of the liquid therein. They must also be capable of discharging the digested tank contents without breaking the surface mat, and in a quiet, even flow, at a rate corresponding to the rate of influx. They must be well covered and installed in pits, and yet easily accessible and capable of ready installation, with due regard to minimum requirements of time and labor. They must be leak proof and impervious to seepage through the walls and bottom. It is of utmost importance that they be provided with internal means for directing the flow of sewage through the tank to secure the utmost digestive bacterial action on the contents, and that the bacteria mat be mainained intact regardless of the character and rate of the influx and discharge, as well as the liquid level within the tank. Care must be taken to prevent the formation of air cushions above the bacteria mat, as under fluctuations of the liquid level, the alternate compression and expansion will break the mat.

These are but some of the many factors to be considered in a study of the problem, and there is also to be considered the demand for a cheap, sectional tank, capable of being shipped or mailed parcels post to the user, which can be assembled and installed within a very short time and by one man without assistance.

It is only within the last few years, comparatively speaking, that the sectional tank idea has been developed. Heretofore the installations were of the vault type, being concrete or brick lined vaults, with or without

waterproof facings, and employing built in partitions for dividing the vault into settling chambers. Such installations necessitated great care in setting pipes and levels, requiring much time and labor. In a comparatively short time, due to settling and other causes, the structure would crack, the pipes become disaligned and broken, and the whole installation become a menace to health, if not ceasing altogether to function.

The present invention has been designed to overcome these objections and to provide a collapsible septic tank of few parts, without bolts or rivets; so simple in construction that it can be installed by unskilled labor; light in weight; strong, rigid and not liable to breakage and that will last indefinitely.

In detail the invention comprises one or more tanks, preferably two, formed of a plurality of side sections, 1, 1*a* and 1*b* wherein shown as arcuate in form. The side sections of the tanks are made of a slightly flexible strong rust proof and acid proof material, such as the well known Robertson protected metal, or any other suitable acid or element resisting material, and while in the preferred embodiment of the invention I have illustrated the tanks as formed of three arcuate side sections, any number and any shape of side sections may be employed as desired. Each side edge of the tank sections is formed with a reversely bent flange 5 which is extended laterally outwardly of the tank structure at each joint. When assembled the wall or side sections 1, 1*a* and 1*b* are placed in edge to edge abutting relation with the flanges 5 extending outwardly and diverging slightly as illustrated in Fig. 2.

As a means for anchoring the joints of the side sections, I provide tubular forms of metal 2, split longitudinally, the portion *a* being, preferably, longer than sections 1, 1*a*, 1*b*, and with integral flanges 15—15 bent inwardly, and which extend beyond the upper end thereof to form hooked suspension strap members, 15*a*—15*a* for engagement over the upper edge of the tank walls. The lower portion *a* is, preferably, cut away or V-shaped, as shown in Figure 3, so that the flanges 15—15 may be bent inwardly to form lugs or seats, 14*a*—14*a*, for the bottom edge of the side section flanges 5, which enables said sections to be raised above the bottom of the excavation for the purpose of permitting the concrete mixture 6 to flow beyond the periphery of said sections 1, 1*a*, 1*b*, and tubes 2, and form a fluid proof bottom 18. When said sections are in upright assembled position, the tubes 2 are engaged over the flanges 5 in the manner illustrated in Fig. 2, and forced downwardly to force the edges of the sections together and bind the side sections in locked position with the split edge flanges 15 of the tubes engaged behind the edge flanges 5 of the side sections, holding said sections in position until the concrete sets.

In assembling a septic tank construction in accordance with the principle of my invention, an excavation G is first made and the assembled tanks positioned therein so that the inlet and outlet openings are in proper line for the pipe connections, preferably lying in a common level. The tank sections 1, 1*a*, and 1*b* should be set about one and one-half inches above the bottom of the excavation, the ends of the tubular forms 2 resting upon the bottom, as above described. A concrete mixture 6 is then poured into each tank to form a bottom 18 therefor, and the tubular forms 2 are also filled with a concrete mixture up to the level of the top of each form. After the concrete fill hardens it will be apparent that any leakage of fluid matter through the tank wall joints and bottom is absolutely prevented. The tubular form 2 constitute reinforced concrete columns disposed on the outside of the tanks and are integral with the concrete base, whereby a suitable cover structure (not shown) may be supported over the top of the tanks, the weight thereof being carried by the reinforced column, so that no buckling strain is imparted to the tank walls.

One side section of each tank is apertured adjacent its upper end for the reception of sewer inlet and outlet pipe connections as shown in Fig. 1 wherein the side section 1*b* of the right hand tank is equipped with the inlet sewage pipe connection 10 extending thereinto, and the other tank is provided with the sewer outlet pipe connection 11 extending thereinto, the joints being secured by a cementing composition 17. At the sewer flow line, the tanks are connected by the intermediate connecting pipe 16 which extends through the side walls of the two tanks. Within the interior of each tank, directly in line with the sewer connecting pipes 10 and 11 and intermediate connecting pipes 16, baffle plates 3 are removably suspended over the upper edge of the tank walls. These baffles each comprise a body 20 formed with a top edge disposed below the top of the tank and spaced from contact with any wall structure thereof. The baffles further have side edges formed with portions such as flanges 19—19 which are defined relative to the body portion and bear against the walls of the tank at opposite sides of the openings, cooperating with hooked strap members 4—4 formed at the upper ends of continuations of the flanges for removably suspending the baffles over the upper edge of the tank walls. The bottom edges of the baffles extend downwardly in the tank below the lowest liquid level therein as determined by the openings and may take any desired shape or form for effecting a defined flow of liquid through the tank in a

direction other than a direct flow from one opening to the other. The body portion of each baffle is formed so that it substantially converges from opposite sides of its adjacent opening across the shortest line of flow between the openings. These baffles are shown in this embodiment as being of substantially arcuate shape but it is within the province of the invention that they may be of any desired configuration and may extend to any distance downwardly in the tank and transversely of the tank which may be best advisable for accomplishing their function. They function to direct the sewage flow from the inlet opening downwardly in the tank and in a tortuous path across the tank, the outlet flow being directed upwardly along a wall of the tank to the outlet opening.

With the tanks is assembled position and the joints sealed in the manner described, the earth refill in the excavation G may be completed and the tank is ready for operation, the liquid content 21 thereof being carried off through the sewer flow line of the pipe connection 11.

Being collapsible and flexible tank capacity can be increased by adding segments or sections, and be easily adjusted to sewer outlet.

Among the advantages that may be noted are—Few parts; flexibility of construction that permits adding the number of sections necessary to produce the desired capacity; can be easily packed into compact form; weight much lighter than any other septic tank and, therefore, saves freight and haulage charges; can be installed by unskilled labor in very short period of time; rigid, strong, flexible, non-breakable, cheap, and will last indefinitely. The provision of removable suspended baffles eliminates the punching of holes in the tank body and the use of rivets or other attaching means, which are liable to become loosened or broken off. The use of removable suspended baffles also enables the tank sections, tubes and baffles to be packed in smaller space than would be possible if the baffles were riveted, bolted or otherwise made a permanent part of the wall structure.

While in this preferred embodiment of the invention I have illustrated and described a septic tank with certain details and materials entering into the construction and operation theerof, I desire it to be understood that the invention is not to be limited thereto, but that any desired changes and modifications may be made in the structural details as will fall within the scope of the invention as claimed.

I claim:

1. In a septic tank, a plurality of side wall sections adapted to be disposed in edge to edge abutting relation, one having an outlet opening and another an inlet opening, reversely bent flanges extending from each edge of said sections, a split tubular member adapted to be applied over the flanges of said sections for locking said sections in assembled position, and plastic setting means in said tubular members for preventing leakage of tank contents through the joints and securing said tubular members as a permanent unit of the tank, and to reinforce the wall sections with supporting columns.

2. The improvement in the manufacture of knockdown tanks which consists in making a plurality of arcuate sections having laterally extending longitudinal flanges adapted to be engaged by tubular concrete column forms when placed in vertical relation with each other, said forms being provided with retaining means at a predetermined distance above the floor level to prevent the arcuate sections from touching the ground, the lower edge of said forms being cut away diagonally below the retaining means to permit free flow of concrete between the form and the ground to form the bottom of the tank and binding the column with the bottom, thereby providing supporting columns for the tank sections integral with the bottom of the tank and locking said sections in position.

3. As a new article of manufacture a knockdown tank having a plurality of laterally extending longitudinally flanged arcuate sections and a split tubular concrete column form adapted to engage said flanges, the form having inturned lugs for engaging the sections at a predetermined distance above the floor level and the lower edge of the split form cut away diagonally from below the lugs toward the opposite sides thereof.

4. In a knockdown tank, a plurality of side wall sections, adapted to be disposed in edge to edge abutting relation, lateral flanges carried by said sections at the meeting edges thereof, substantially tubular members adapted to be fitted over said flanges for binding and locking said sections in assembled position, and a plastic setting material to form supporting columns and prevent leakage of liquid at the joints of said wall sections.

5. In a tank, a plurality of arcuate side wall sections, arranged in edge to edge abutting relation; laterally projecting flanges formed on the edges of said sections; a plurality of substantially tubular members adapted for holding said sections in assembled position, a plastic setting material to form supporting columns and prevent leakage of liquid at the joints of said wall sections, and a plastic setting material forming a bottom into which said wall sections and supporting columns are embedded and anchored to make a fluid proof receptacle.

6. In a septic tank, a plurality of side wall sections adapted to be disposed in edge to edge abutting relation, reversely bent flanges extending from each edge of said sections, a

split tubular member adapted to be applied over the flanges of said wall sections for holding and locking said sections in assembled position, a plastic setting material within said tubular members for preventing leakage of tank contents through the joints and forming supporting columns, inlet and outlet openings in the upper part thereof, and baffles disposed on the interior of said tank directly in line with the inlet and outlet openings.

7. In a septic tank, a plurality of arcuate side wall sections, arranged in edge to edge abutting relation, laterally projecting flanges formed on the edges of said sections, inlet and outlet openings in the upper part thereof, a plurality of tubular forms, having plastic setting material therein to form supporting columns at the joints of said wall sections, baffles having means on the upper end of each baffle for removably suspending same upon the upper edge of said receptacle, and a plastic setting material forming a bottom into which said wall sections and supporting columns are embedded and anchored to form a fluid proof receptacle.

8. A septic tank comprising a plurality of arcuate side sections adapted to be disposed in edge to edge abutting relation, laterally extending flanges formed integral with each side edge of said sections, said flanges being bent in diverging relation in assembled position of the wall sections, members adapted to be engaged over said flanges for binding and locking said wall sections in assembled position, inlet and outlet openings in the upper part thereof, and baffles disposed on the interior of the tank directly in line with the inlet and outlet openings.

9. In a septic tank, the combination of a plurality of arcuate segments having bent wings, means for engaging said wings to bind and lock said segments in assembled position, inlet and outlet openings in the upper part of said tank, and baffles disposed within the interior of said tank directly in line with the inlet and outlet openings, having means on the upper end for removably suspending same over the upper edge of said tank.

10. In a septic tank, a receptacle provided with inlet and outlet openings in the upper part thereof, baffles disposed on the interior of said receptacle directly in line with the inlet and outlet openings, and having means on the upper end thereof for removably suspending same upon the upper edge of said receptacle.

11. In a septic tank, a receptacle having a plurality of openings in the upper part thereof, baffles having a body portion open at top and bottom, and means on the upper end of each baffle for removably suspending same upon the upper edge of said receptacle.

12. The combination with a septic tank having inlet and outlet openings adjacent the top thereof; of open ended baffles adapted for disposition therein adjacent said openings, and means on said baffles for removable supporting engagement over the upper edge of the tank.

13. A septic tank comprising a receptacle having a sewage inlet opening and a sewage outlet opening in the walls thereof at the upper end, and at a common level to determine the liquid level in the receptacle; and baffles cooperating with said openings for directional flow of sewage without surface disturbance; said baffles being removably suspended from the upper edge of the receptacle.

14. A septic tank having a sewage inlet opening and a sewage outlet opening; a baffle plate having a top edge, a bottom edge, and a flange on a side edge thereof for engagement against a wall of the tank to support the baffle therein; said baffle plate extending across the direct line of flow between said openings; the top edge of said baffle plate being spaced below the top of the tank and out of contact with any wall structure thereof, above the highest possible liquid level therein, and having its bottom edge disposed below the minimum liquid level.

15. A septic tank having a sewage inlet opening and a sewage outlet opening in the walls thereof; a baffle plate adjacent each opening and having side portions formed for supporting engagement with the tank walls to dispose the tops of said baffle plates above the highest liquid level as defined by said openings and out of contact with any portion of the tank structure; the bottoms of said baffle plates extending down in the tank beneath the lowest liquid level; and said baffle plates having portions substantially converging from opposite sides of said openings across the shortest path of flow between said openings.

16. A septic tank having a sewage inlet opening and a sewage outlet opening in the side walls thereof; a baffle plate having a top edge, a bottom edge, side edges, and a flange on a side edge for engagement against a wall of the tank to support said baffle plate therein; said baffle plate extending across the shortest line of flow between said openings with a portion inclined relative to said line of flow; the top edge of said baffle plate being spaced below the top of the tank and out of contact with any wall structure thereof, above the highest liquid level in the tank, as defined by said openings; said baffle plate having its bottom edge disposed below the lowest liquid level as defined by said openings.

17. In a knockdown tank, a plurality of side wall sections adapted to be disposed in edge to edge abutting relation, outturned flanges on the meeting edges thereof, substantially tubular retaining members adapted to be fitted over said flanges for binding and lock-

ing said sections in assembled position, and bendable straps on opposite ends of said retaining members for disposition beneath the lower ends of said outturned flanges at the bottom of the assembled tank, and over the upper edges of said sections at the top of the tank.

18. In a septic tank of the class described, a receptacle provided with inlet and outlet openings in the upper portion thereof, arcuate shaped shields open at their respective ends and adapted for disposition within the receptacle adjacent the inlet and outlet openings respectively for causing the material to flow downwardly into the receptacle, and hooks formed on the upper end of each shield for detachable engagement over the upper edge of the receptacle.

In testimony whereof, I have hereunto signed my name.

KEARNEY J. HENDRICKS.