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CEMENT CONCRETE PORTABLE TANK STRUCTURE

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2 SHEETS—SHEET 1

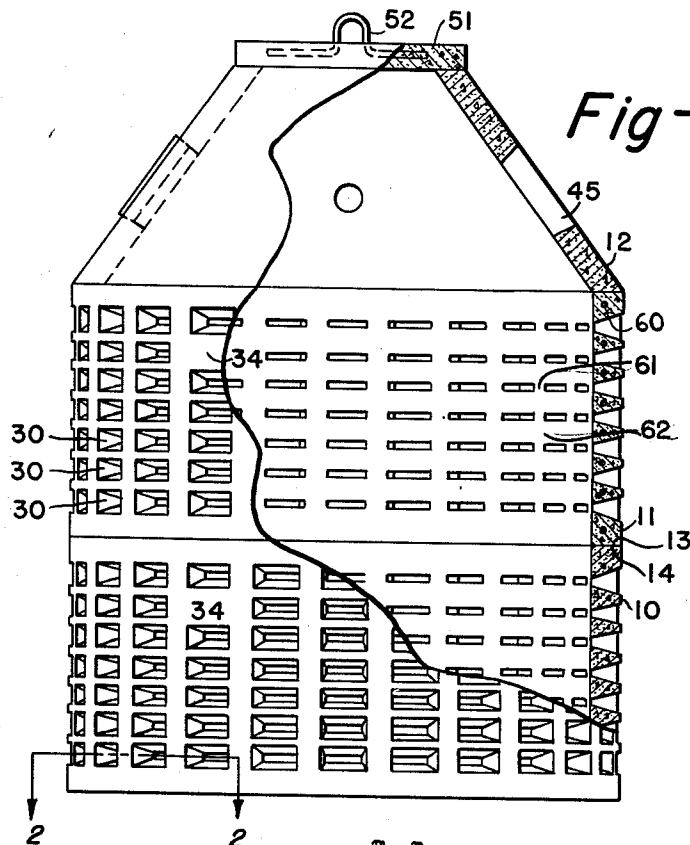


Fig-1-

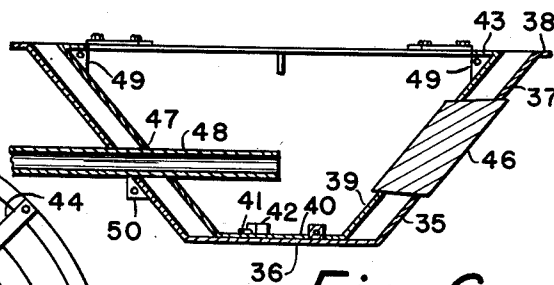


Fig-6-

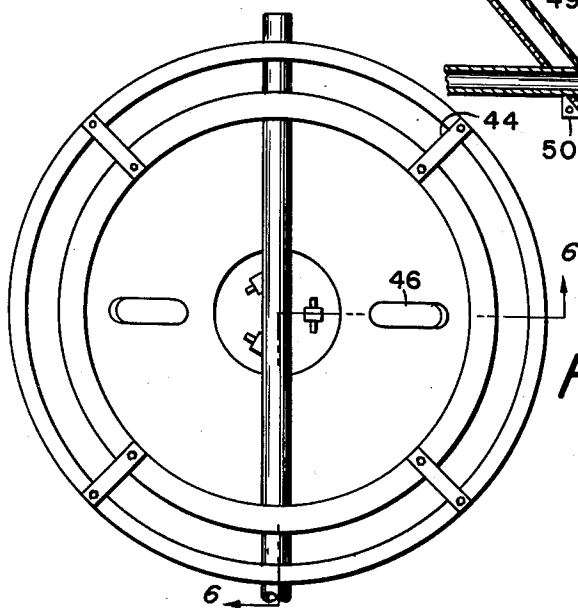


Fig-5-

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2 SHEETS—SHEET 2

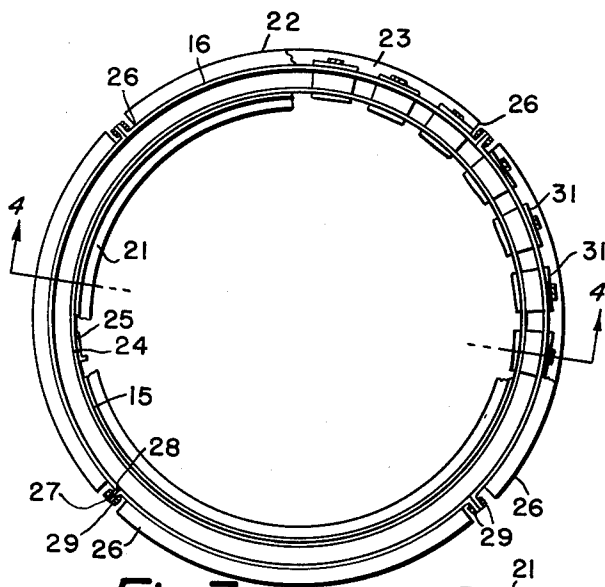


Fig-3-

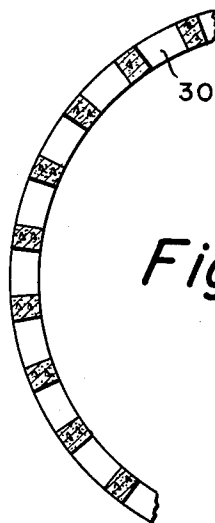


Fig-2-

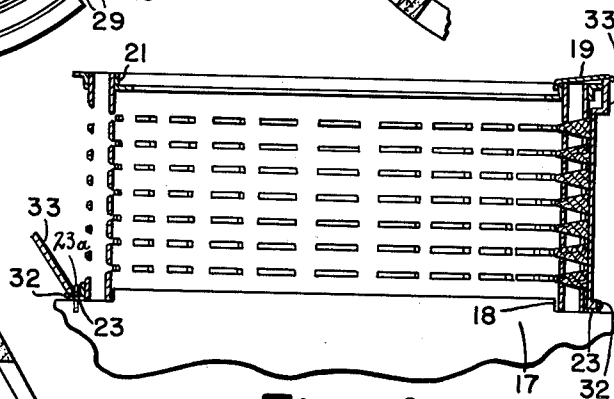


Fig-4-

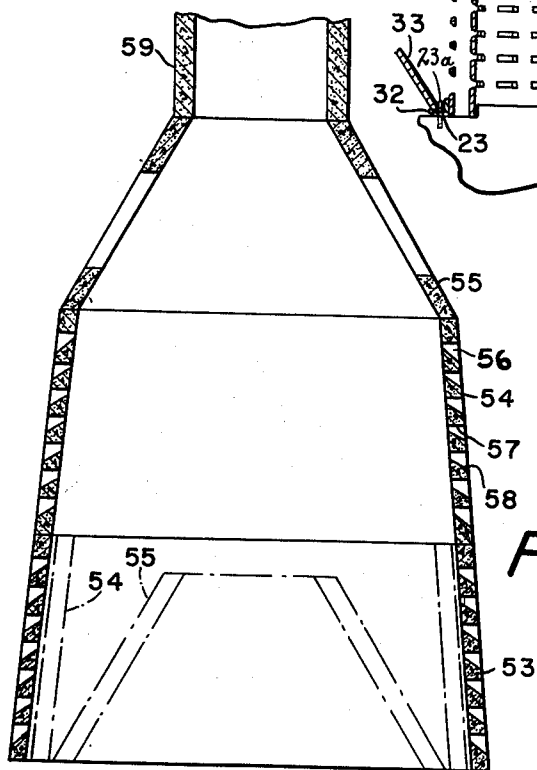


Fig-7-

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CEMENT CONCRETE PORTABLE TANK
STRUCTURE

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2 Claims. (Cl. 182-2)

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This invention relates to walls suitable for cesspools and to processes and forms for producing the same, and is herein illustrated as embodied in a wall adapted to be molded in a few units and to be transported on an ordinary truck and in processes and forms for economically producing the same.

In the past it has been customary to build cesspool walls in situ of loosely laid blocks, with the result that the walls are often injured when filling dirt is dumped in, and they not infrequently cave in under unequal pressure, as when heavy trucks pass by on one side. Thus, unless the blocks are laid by skilled and expensive labor, the results are likely to be unsatisfactory.

Sometimes, such blocks have been laid in cement mortar to produce a stronger wall, but that is also expensive and requires expensive supervision.

It has been proposed to make one-piece cesspool walls with vertically elongated openings, but such walls are of limited size and the openings had to be small in breadth to keep outside dirt from falling through.

According to the present invention, the foregoing and other difficulties have been overcome, and units are provided which may be economically molded or prepared at a central point, which are of a size and strength that makes them transportable over ordinary roads, which withstand not only all ordinary strains of setting up but also the blows and vibrations of ordinary transportation, yet are light enough to transport economically, are easily handled with a small derrick crane, are easily and rapidly set in place, have larger proportions of wall openings, and provide several usable sizes either singly or in series.

In the form disclosed herein in some detail the units are shown as molded between cylindrical inner and outer forms provided with openings, and, while casting or pouring, the openings are plugged with tapered removable cores.

The inner form may consist of a single sheet of commercial steel, fitting around a raised ledge on a base, stiffened temporarily at the top by a removable flange, and with abutting edges, one of the edges, carrying, on the interior face, a projecting flap adapted to overlie the other abutting edge and prevent leakage of concrete.

The outer form is shown as built of four steel segments having vertical edge flanges adapted to be bolted together and stiffened at the upper and lower edges by welded-on flanges.

The cores have been found most satisfactory

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when in the form of wedge-shaped wooden forms, held against being pressed outwardly by vertical straps hinged to the bottom outer flange and caught by suitable hooks to the top flange.

The wall of the finished cesspool usually consists of one or more of such unit walls, honeycombed by the openings left by the cores.

The top is usually a truncated cone, with a nearly continuous outer wall, and made by casting or pouring cement mortar between an outer form which rests with its small end on the ground, where it includes a flat plate, and an inner form set within the outer form and including a flat end plate closing the small end and resting on the aforesaid flat plate, and preferably adapted to be temporarily locked thereto to prevent the inner form from floating up when liquid cement concrete is poured in.

The forms may be braced apart at the top to insure centering them properly.

Preferably the forms include aligned round holes adapted to receive a rod or pipe transversely near the center of gravity, so that the ends of the rod may be engaged by crane or derrick cables and the derrick enabled to lift the cast cone top and invert it.

Usually it is preferable, after the concrete is poured and set, to release the lock holding the forms together and lift out the inner form, then invert the outer form, still carrying the cast cone, and then remove the outer form, releasing it by taps of a hammer if it tends to stick.

To enable the cylindrical element of the cesspool to be safely and easily handled by a derrick it is advisable to omit two or more spaced cores in one horizontal row, thus providing sections of extra strength in the honeycombed walls. In a unit of 7 feet 8 inches outside diameter (within the maximum width legal on many roads) and about 3 feet high, the walls may consist essentially, in one useful form, of horizontal bars of concrete about four inches wide and four inches deep, and of vertical bars of concrete of about the same dimensions, the two sets of bars forming a mesh of openings between them.

For short hauls, on ordinary roads, a structure of those dimensions has proved strong enough to transport and to handle without breakage. Where long hauls over rough roads are faced and the possibility of rough handling must be faced, it may prove advisable to insert metal reinforcing wires or bars in the concrete.

The truncated cone top is usually provided with long oval openings to permit a siphon or other pipe to be readily inserted through any of them,

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and the open top is usually closed by a flat cover, which is easily made of cement concrete having transverse reinforcing, bent so as to leave a central-projecting loop for a derrick to lift by.

The oblong or oval openings may be closed by suitable plugs or small shapes of concrete. The openings in the vertical walls are left open, but keep out dirt because the bottoms slope upwardly toward the interior.

Where a cesspool is to be deeply buried the truncated cone top may carry a cylindrical upward extension so as to carry the flat top cover at the level of the ground surface.

It is possible to economize on shipping by building a cesspool of slightly tapered units so that a bottom unit may be set down on a truck so as to embrace an upper tapering unit already on the truck, and that upper tapering unit may embrace a conical top placed first on the truck.

Other features and advantages will hereinafter appear.

In the accompanying drawings:

Fig. 1 shows a cesspool tank inside view partly broken away.

Fig. 2 is a section on the line 2—2 of Fig. 1.

Fig. 3 is a top view with a ring 21, partly broken away, of one section with the mold forms still in place.

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

Fig. 5 is a top view of a conical top section with the mold forms still in place.

Fig. 6 is a section on the line 6—6 of Fig. 5.

Fig. 7 is a sectional side view of a modified form suitable for shipping with the parts nested.

In the form shown the cesspool structure is built with two (or more) identical cylindrical sections 10, 11, and a top truncated cone section 12. It is found that sufficient rigidity is obtained in ordinary Portland cement concrete structures if the flat bottom 13 of the section 11 rests upon the flat top 14 of the section 10.

In the form shown the cylindrical sections 10, 11, were separately molded in a set up inner form 15 and a set outer form 16, the inner form 15 resting on a concrete platform 17 and embracing a shoulder 18 of the platform 17, while the outer form 16 is held in place by hooks 19 described below.

In the type shown, the top of the inner form 15 is temporarily reinforced by a removable loose top collar 21 adapted to lie within its top, and the outer form 16 is reinforced by a top welded-on outer flange 22 and a bottom welded-on outer flange 23.

The outer form may be held by dowels 23a in the concrete floor and fitting in openings in the bottom flange 23.

To remove the inner form 15 the cast concrete is lifted as described below together with the form 15 and set down, as on the ground. The top collar 21 is removed, and the inner form 15 may be collapsed sufficiently to free it from the cast concrete by bending in its vertical edge 24 so that the welded-on flap 25 is pushed inward and the edge 24 slips behind the opposing edge. The flap 25 served during pouring to close the crack between the facing edges at the edge 24.

The outer form 16 is usually made in four arcuate panels 26, each with a vertical flange 27 along each vertical edge 28, so that the form is stiff and is readily held together and readily released by bolts 29.

The type of cesspool shown includes tiers and rows of identical openings 30 about four inches high on the outside and about eight inches long,

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tapering to about one inch in height and seven inches long on the inside. Such an opening, even with equal outward slope of top and base, is found satisfactory in most soils.

To mold the cesspool with such wedge-shaped openings it has been found most satisfactory to pierce the outer form with openings 4 x 8 inches and to pierce the inner form with aligned openings 1 x 7 inches and to place in these openings solid wooden cores 31 that project beyond both mold or forms.

To prevent displacement of the wooden cores the bottom flange 23 is shown as provided with ears 32 to which are pivoted springable straps 33 adapted to be caught by their hooks 19 over the top of the form 15 and bear against outer bases of the cores 31, holding them in place until the straps 33 are released and swung back out of the way.

The resulting molded structure consists essentially of vertical posts 61 four inches square joined by horizontal peripheral bands 62 less than four inches wide between the openings 30 so as to form the desired openwork wall.

To give strong points to be grasped by lifting hooks it is usually advisable to omit three or four of the openings 30 spaced apart in one of the upper rows, so that a set of hooks will safely catch there and lift the structure as at 34.

To enable the structure to be transported it is usually best to make it of outside diameter of slightly less than 8 feet, say seven feet eight inches.

That structure made of a standard concrete mix 1:2:4 using a fine aggregate known as grit or using minus half-inch gravel, is found to withstand lifting by hooks and transportation for many miles in standard motor trucks over rough roads.

The truncated cone top section 12 was molded in the forms shown in Figs. 5 and 6, in which is seen an outer form in the shape of an inverted truncated cone or cone frustum 35 resting on its flat closed bottom 36, with spreading sides 37 and strengthening outer flange 38 at the top.

In this outer form 35 is set the inner inverted truncated cone 39 having a flat bottom 40 adapted to lie on the bottom 36 and to be locked down on the bottom 36 by wedge pins 41 passing through ears 42 that project upward through the bottom 40.

The inner form 39 is strengthened by an inwardly projecting top flange 43, and is held or steadied by removable spanning elements 44 at the tops of the two forms.

The cone forms are provided with elongated openings 45 adapted to be blocked by cores 46 while the concrete is poured, and also provided with elliptical openings 47 for holding a projecting pipe length 48 or rod used for handling the hardened cone.

The same cement concrete mixture used for the cylindrical forms is usually used for the cone form being cast around the pipe 48 so the pipe 48 and pins 41 hold the form 39 against floating up.

When the cement has hardened the pipe 48 and elements 44 removed, the pins 41 are removed, and the form 39 is lifted by derrick hooks caught in the lifting ears 49 and swung out of the way.

Then the pipe 48 is reinserted, the form 35 and cement cone are lifted by hooks caught around the pipe, and the cone and outer form 35 inverted and set on the ground.

Then the pipe 48 is removed and the outer

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form 35 lifted off by the lifting ears 50. If this outer 35 form tends to stick, as by adhesion or suction, it is easily released by tapping on the outside with a hammer.

The pipe 48 is preferably so located in the form that the cone element turns on it as on its center of gravity.

Thus a second section 11 is easily set on the first section 10 by lifting by a derrick which seizes the section 11 by hooks at the solid parts 34, and setting it in place. Then a cone section 12 is lifted by a derrick by a short pipe and set in place, the pipe usually going through the holes 46.

Usually a cesspool is closed by a closed circular flat top member as shown at 51 placed on top of the cone section 12, and made of the same cement concrete, and provided with a central projecting top loop 52 formed as an outward loop of heavy interior metal reinforcing. It is found that the mere weight of the top member 51 is usually sufficient to hold it in place.

Fig. 7 shows an alternative form of cesspool structure in which the bottom section 53 is shown as tapering from a maximum outside diameter of 7 feet 8 inches to, say, 6 feet 8 inches, and the upper section 54 is shown as tapering from 6 feet 8 inches to 5 feet 8 inches, or thereabouts, and the cone section 55 is shown as having a maximum diameter such that it may rest solidly on the top of section 54.

The top of section 55 is shown as carrying a cylindrical extension 59 well adapted to carry a top 51 level with the surface of the ground if the body 53, 54, 55 is deeply buried.

The sections 53, 54 are shown as having modified openings 56 well adapted to keep soft soil from being pressed inwardly, for this purpose having horizontal tops 57 and bottoms 58 that slope downwardly and outwardly.

Fig. 7 shows in broken lines how the whole structure of that figure can be loaded nested on a truck so as to carry the structure in a single load, thus economizing transportation expenses.

Peripheral reinforcing in the form of rods 60 is shown in Fig. 1 but is usually unnecessary.

The elongated openings 45 provide for the insertion of pipes for plumbing or, if desired, for cesspools in series so that a second receives the overflow of the first through a pipe set in an opening 45.

Having thus described in some detail certain embodiments of the invention, what is claimed is:

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1. A cement concrete self-sustaining portable tank structure having a circular peripheral wall reticulated with a plurality of circumferentially and vertically spaced rows of aligned rectangular openings that regularly expand outwardly having their minor dimension extending vertically, and the major dimension extending circumferentially, leaving unbroken vertical columns nearly square in cross section between vertical rows of openings in the wall, said columns narrower than the circumferential dimensions of said openings, and unbroken peripheral concrete bands between horizontal rows of the openings, said bands being narrower than the height of the openings on the outer face.

2. A cement concrete self-sustaining portable tank structure having a circular peripheral wall reticulated with a plurality of circumferentially and vertically spaced rows of aligned rectangular openings that regularly expand outwardly having their minor dimension extending vertically, and the major dimension extending circumferentially, leaving unbroken vertical columns nearly square in cross section between vertical rows of openings in the wall, said columns narrower than the circumferential dimensions of said openings, and unbroken peripheral concrete bands between horizontal rows of the openings, said bands being narrower than the height of said openings on the outer face, a plurality of peripherally and symmetrically spaced vertical rows of said rectangular openings each interrupted by a solid portion between two bands separated elsewhere by said rectangular openings, and other vertical rows of said rectangular openings extending uninterruptedly from top to bottom of the structure in uniform reticulated pattern.

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