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REINFORCED CONCRETE TANK

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Fig. 1.

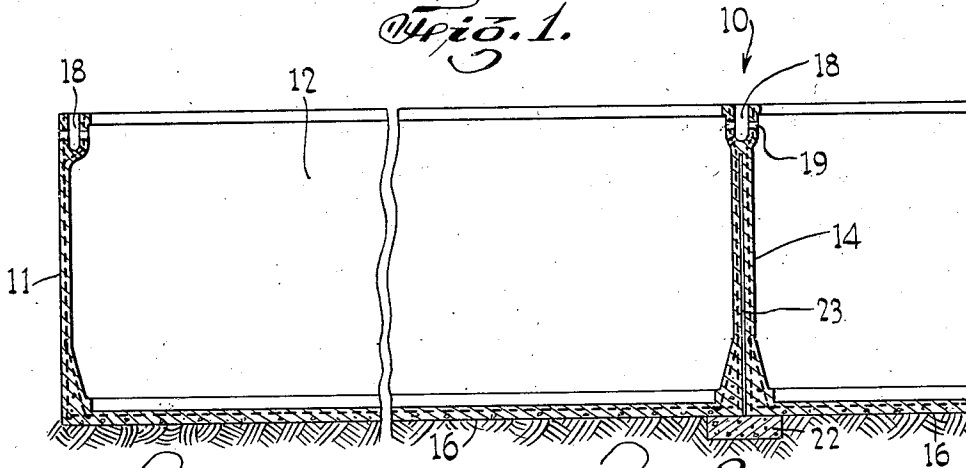


Fig. 3.

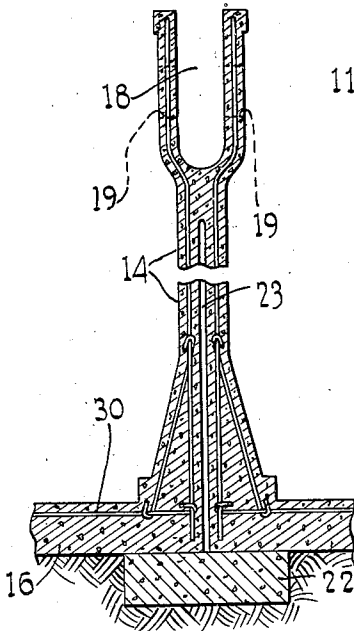


Fig. 2.

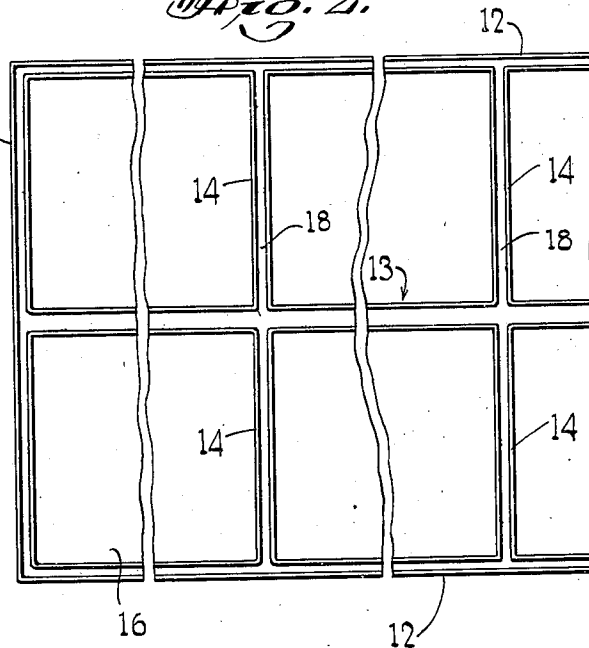
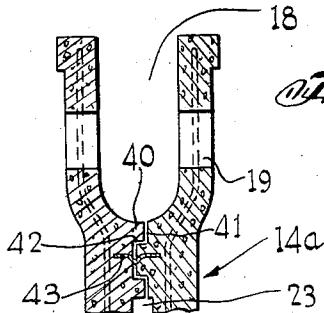


Fig. 4.



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REINFORCED CONCRETE TANK

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16 Claims. (Cl. 72-13)

This invention relates to reinforced concrete tanks such as settling tanks or aeration tanks for sewage treatment or the purification of water and for similar purposes.

Such tanks were heretofore constructed with a single division wall separating the adjacent tanks. Provision for expansion of the floor slab, due to changes in temperature was made by expansion joints in the slab within the tanks. The expansion joints split the tanks longitudinally. In such construction the floor slabs consisted of a series of cantilevers. A portion of the floor slab between the free end at the expansion joint and a vertical wall acts as a cantilever and its construction is less economical than a slab supported at both ends.

When one side of the division wall is empty and the other side full, tension is developed on one face of the slab and wall. When the condition is reversed and the first side is full and the other side empty, the tension is on the opposite face of the slab and wall. This condition requires reinforcing steel in the top and bottom of the slab and on both sides of the wall.

Furthermore the split in the floor slabs weakened the construction, and there was always the likelihood of leaks into and out of the tanks at the expansion joints.

In tank construction as heretofore practiced, if one side of the expansion joint settles more than the other side, a complete rupture might result.

It is therefore an object of the present invention to provide for the construction of settling tanks or aeration tanks or tanks for similar purposes, in which the expansion joints in the floor slabs within the tanks are eliminated by the use of walls between adjacent tanks which are split longitudinally so as to form a split wall or double wall permitting expansion of the floor slab, each tank remains an integral whole unit without any split. With such construction there is economy in material and labor as less steel is necessary in the floor slab and less concrete need be used. Furthermore, each tank is a complete unit in itself instead of being two parts with an expansion joint.

It is another object of this invention to provide a highly improved tank construction of the character described which shall save in expansion joint material, including copper water stops, and in which leakage from and into the tank is eliminated, and which shall be compact and practical and efficient to a high degree in use.

Other objects of this invention will in part be obvious and in part hereinafter pointed out.

The invention accordingly consists in the features of construction, combinations of elements, and arrangement of parts which will be exemplified in the construction hereinafter described, and of which the scope of application will be indicated in the following claims.

In the accompanying drawing, in which is shown various possible illustrative embodiments of this invention,

Fig. 1 is a vertical cross-sectional view through a tank embodying the invention;

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

Fig. 3 is an enlarged, cross-sectional view of one of the division walls and portions of the bottom slabs on opposite sides thereof; and

Fig. 4 is an elevational, cross-sectional view through a division wall, illustrating a modified construction.

Referring now in detail to the drawing, 10 designates for the purpose of illustration only, a settling tank embodying the invention for use in sewage disposal or water purification works, it being understood that the invention may be applied to aeration or other tanks. The tank 10 comprises end walls 11, side walls 12, a transverse wall 13 parallel to the walls 12 forming a series of tanks on either side thereof, and vertical division walls 14 parallel to the walls 11. The floor slabs 16 are monolithically constructed with said walls. The walls may be formed with usual channels or troughs 18 in the top surfaces thereof, and said troughs may be provided with openings for weirs 19.

In tanks as heretofore constructed, the floor slabs 16 were split longitudinally within the tank to form expansion joints. Due to such construction the floor slabs had to be made heavy and reinforcing steel was necessary at the top and bottom of the slab. The reason for the necessity for heavy reinforcement was due to the fact that the slabs between the free end at an expansion joint and a division wall acted as a cantilever. The slabs had to be constructed to resist the stresses when a tank on either side of a division wall was full and the other side empty. For this reason the bottom slabs on such prior construction necessitated steel reinforcement at the top and at the bottom.

Furthermore the expansion joints were subject to leakage as each tank was in fact two part tanks. If one side of the split in such prior constructions settles more than the other side, a complete rupture might result. In the present construction the expansion joint or split in the floor slabs is eliminated. Instead the division

walls 14 are split longitudinally in vertical planes, as at 23 from the bottom upwardly to a point beneath the upper end thereof, thus forming double walls. Expansion in the floor slab is permitted due to the splits 23. With such construction each tank is a complete unit in itself and the tanks are not parts as in prior constructions. Below each division wall there may be a concrete block 22.

Furthermore the floor slabs of the tanks do not act as cantilevers so that there is a saving both in concrete and reinforcing steel. Thus in the present construction reinforcing steel rods 30 need be used only at the top of the floor slabs, eliminating steel from the bottom of said floor slabs.

It will be further noted that there will be no leakage because the expansion joints are eliminated from the inside of the tank and there is no likelihood of a tank rupturing in the middle.

There is furthermore a saving of expansion joint material and the tanks are stronger than prior constructions.

In Fig. 4 there is shown a modified construction in which the division wall 14a is formed with a split 23 as in tank 10, but the wall 40 between the split 23 and the trough or channel 18 is split as at 41 forming an expansion joint which may be provided with a copper water stop 43.

If desired the tanks may be supported on piles should the character of the soil necessitate such construction.

The thickness of the concrete in the floor slabs may also be reduced due to the fact that the expansion joint has been eliminated in the floor slab.

It will thus be seen that there is provided a device in which the several objects of this invention are achieved, and which is well adapted to meet the conditions of practical use.

As various possible embodiments might be made of the above invention, and as various changes might be made in the embodiments above set forth, it is to be understood that all matter herein set forth or shown in the accompanying drawing is to be interpreted as illustrative and not in a limiting sense.

Having thus described my invention, I claim as new and desire to secure by Letters Patent:

1. A tank structure having side walls and floor slabs and division walls dividing the structure into a series of tanks, said division walls being double and each being formed with a dividing space extending to the bottom surface of the structure.

2. A tank structure having side walls and floor slabs and division walls dividing the structure into a series of tanks, said division walls being double and each being formed with a dividing space extending to the bottom surface of the structure, said division walls being formed with troughs at their upper ends.

3. A reinforced concrete tank structure, including a vertical, intermediate wall to divide the structure into a plurality of tanks, said wall being divided from its lower end upwardly to permit expansion of the floor slab of the tank at opposite sides of the division.

4. A reinforced concrete tank structure, including a vertical intermediate wall to divide the structure into a plurality of tanks, said wall being split from its lower end upwardly to permit expansion in the bottom slab of the tanks at opposite sides of the split, said wall having an expansion joint at its upper end.

5. A reinforced concrete tank structure having side walls and floor slabs, and a vertical divisional wall, said divisional wall being formed with a vertical, longitudinal dividing space extending to the undersurface of the tank, and terminating below the upper end of the divisional wall.

6. A reinforced concrete tank having side and end walls, and bottom slabs, and a vertical division wall, said division wall being formed with a vertical, longitudinal division space extending to the undersurface of the tank, and terminating below the upper end of the division wall, and blocks beneath said division walls.

7. A reinforced concrete tank having side and end walls, and bottom slabs, and a vertical division wall, said wall being formed with a vertical, longitudinal dividing space extending to the undersurface of the tank, and terminating below the upper end of the division wall, the bottom slab of the tank having steel reinforcements at the top only.

8. A multi-tank unit having walls to divide the tank into a plurality of individual tanks, said walls being divided medially thereof to permit expansion of the individual tanks.

9. A tank structure having end and side walls and a bottom slab and transverse vertical walls, said walls being formed with expansion joints extending to the undersurface of the bottom slab whereby the tank structure is divided into a plurality of individual tanks, expansion of the tanks being permitted at said expansion joints.

10. A tank structure having end and side walls and a bottom slab and vertical division walls, said division walls comprising double walls with space between them, said space extending to the undersurface of the bottom slab of the structure whereby the structure is divided into a plurality of individual tanks, expansion of the tanks being permitted at said spaces.

11. A tank structure having end and side walls and a bottom slab and division wall, said division wall being a double wall with a space between them extending to the undersurface of the bottom slab, whereby the tank structure is divided into a plurality of individual tanks, expansion of the tanks being permitted at said space, said division, side and end walls being formed with channels in their upper end.

12. A tank structure having end and side walls and a bottom slab and division wall, said division wall being a double wall with a space between them extending to the undersurface of the bottom slab, whereby the tank structure is divided into a plurality of individual tanks, expansion of the tanks being permitted at said space, said division, side and end walls being formed with channels in their upper end, and said division walls having expansion joints between the channels therein and the spaces therein.

13. A tank structure having side walls and floor slabs and division walls dividing the structure into a series of tanks, said division walls being double and each being formed with a dividing space extending to the bottom surface of the structure, said dividing spaces being less in width than the thickness of said division walls.

14. A reinforced concrete tank structure, including a vertical, intermediate wall to divide the structure into a plurality of tanks, said wall being divided from its lower end upwardly to permit expansion of the floor slab of the tank at opposite sides of the division, said wall being of uniform width.

15. A tank structure having end and side walls

and a bottom slab and division wall, said division wall being a double wall with a space between them extending to the undersurface of the bottom slab, whereby the tank structure is divided into a plurality of individual tanks, expansion of the tanks being permitted at said space, said division, side and end walls being formed with channels in their upper end, said division wall being of the same thickness above said space as it is at said space.

16. A reinforced concrete tank structure including a vertical intermediate wall to divide the structure into a plurality of tanks, said wall being formed with a space extending from its lower end upwardly to permit expansion in the bottom slab of the tanks at opposite sides of the split, said walls being split above said space, and an expansion joint at said split.

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