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CYLINDRICAL CONTAINERS OF SHAPED CONCRETE BLOCKS

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FIG. 1.

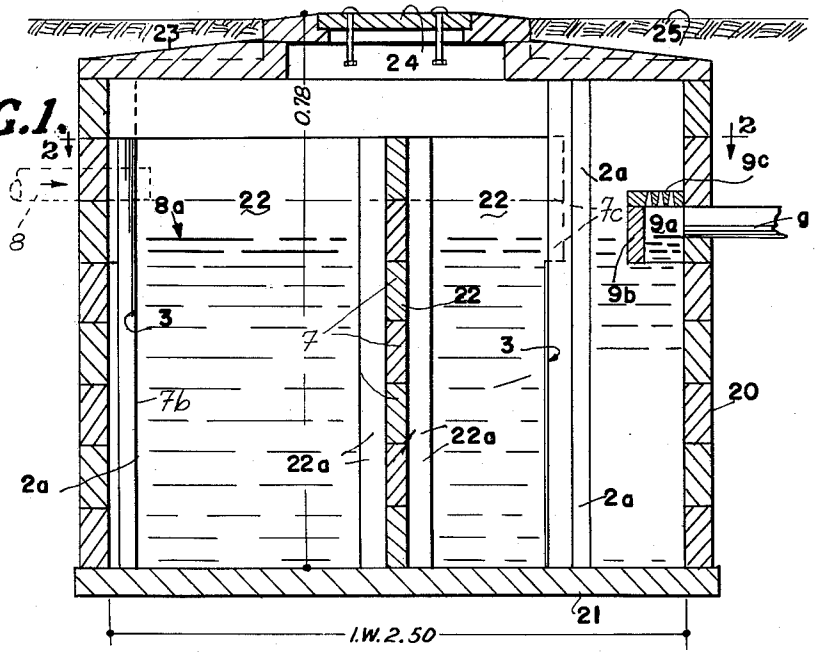
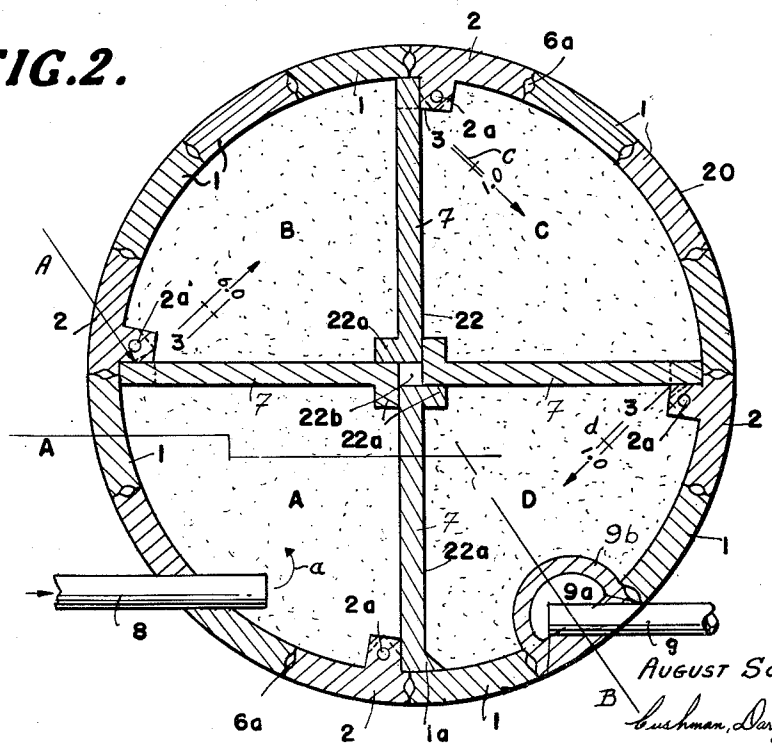


FIG. 2.



INVENTOR

AUGUST SCHREIBER

Cushman, Darby & Cushman

ATTORNEYS

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CYLINDRICAL CONTAINERS OF SHAPED CONCRETE BLOCKS

August Schreiber, 45 A. Bahnhofstrasse, Hannover-Vinnhorst, Germany

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This invention relates to cylindrical containers or tanks of shaped concrete block and more particularly to settling tanks for treating sewage or other liquids containing solid matter. This application is a continuation-in-part of my application Serial No. 327,191, now abandoned.

Cylindrical containers of the kind mentioned before are generally constructed of masonry, or are cast from concrete and reinforced with steel. Containers, as above described, in diameters up to 1 meter, are also made of non-reinforced concrete rings; and containers up to 2.5 meters in diameter have been made from reinforced concrete rings.

Now, the inventor proposes to construct multichambered settling tanks of the like for the treatment of sewage or waste water or other liquid media, from smooth curved cemented concrete blocks and smooth curved concrete blocks with unsymmetrically arranged columnar projections. These segmented blocks are placed one on top of the other to produce curved walls having pillars, and the blocks are secured together with concrete mortar.

The segmented blocks with the columnar projection are suitable not only for the constructions of vertical pillars. According to the basic idea of the invention the columnar projections in a container wall are used as support for separating members, partition or baffle walls arranged inside the container. They are also used as anchors or supports for one or more concrete layers which may be cast inside the vessel, as well as being suitable as carriers or supports or abutments for a concrete casing, or for the concrete cast into such casing. They serve also as anchors or abutments for an additional cylindrical concrete casing which may be constructed from similar segmented blocks, or which may be cast monolithically inside the concrete vessel constructed from the segmented blocks.

Bearing in mind the purpose for which the structure is to be used, the segmented blocks with columnar projections will be placed in the structure of the container wall in addition to the segmented blocks which are intended to form the vertical pillars.

Generally speaking, therefore, the objects of the invention include the provision of curved segmented concrete blocks with or without projections so that in the construction of a vessel pillars may be provided which will be integral with the wall construction. A further object of the invention is to provide a construction for sewage settling tanks and the like which will be simpler and less expensive than any heretofore known.

These and other objects of the invention which will be pointed out in more detail hereinafter, or which will be apparent to one skilled in the art upon reading these specifications, I accomplish by that certain construction and arrangement of parts, of which I shall now describe certain exemplary embodiments.

Reference is made to the drawings forming a part hereof, and in which:

FIGURE 1 is a vertical diametral sectional view through a multi-chambered sewage treatment tank according to the invention on line A—B of FIG. 2;

FIGURE 2 is a horizontal cross-sectional view taken on line 2—2 of FIGURE 1.

Briefly, in the practice of my invention I provide shaped

concrete blocks formed generally as portions of a circle, some of which blocks are provided with inward projections. The blocks may be provided with horizontal grooves in their upper and lower edges, or in just their upper or lower edges, and they may be provided with grooves in their end edges. The projecting portions may be provided with vertical holes. Thus, when a series of these blocks are arranged in a circular configuration and successive courses of blocks are placed in superposed condition, reinforcement may be provided in the horizontal grooves and also in the vertical grooves, and reinforcement may be provided through the projections so that a cylindrical vessel is built up having columnar projections extending inwardly. These projections may serve as buttresses, as well as serving for the spacing of an inner shell from the outer shell, and they may also serve as anchors for internal partition walls, baffles and the like.

The settling tank of FIGURES 1 and 2 has the cylindrical wall **20**, the floor **21** which may be in the form of a monolithic slab, and the partition walls **22**. It will also be provided with a roof **23** and a member **24** at ground level **25** to close an access opening.

The tank has 4 compartments or settling chambers indicated in FIG. 2 by references A, B, C, D. The sewage to be treated is introduced into chamber A through the inlet **8** arranged in the upper part of said chamber above the level *8a*.

The dividing walls **22** are arranged in the form of a cross and are constructed of smooth slabs or blocks **7** having columnar projections *22a* on one end. It will be observed that each slab **22** is provided with a columnar projection *22a* so that when a series of courses of members **7** are superimposed there will be formed a square passage *22b*, which may then be filled up with concrete or a suitable mortar and/or reinforcing means.

As shown in FIGURE 2, one of the dividing walls **22** is suitably cemented over its entire height to a series of columnar projections *2a*, as indicated at *1a*. The other dividing walls **22** terminate in their lower part *7b* short of the columnar projections *2a* and form with said projections narrow passageways **3** which end in a certain distance below the level *8a*, while the other partitions **22** are joined in their upper part *7c* to the walls **20** and the projections *2a*, e.g. by cementing as indicated at *1b*. It will be understood that, depending upon the purpose for which the structure is intended, some or all of the lower, and some or all of the upper slabs of the dividing walls may be joined to the respective cylinder walls.

One or all of the projections *2a* may be tapered as shown at *2a'* in FIG. 2 left side, e.g. in order to enlarge the free area of passage **3**.

As to details of the construction of a curved wall consisting of one or more courses of concrete blocks as indicated e.g. in FIG. 2, each course consists of certain blocks **1** which are smooth, and other blocks **2** which are provided with the projections *2a*, see FIG. 2. The ends of the blocks may be provided with the grooves *6a*, such grooves and other vertical holes (not shown) in said blocks, when a series of blocks are assembled will be provided for reinforcement purposes in a vertical direction. The blocks may also be provided with the grooves **6** in their upper surfaces, and these grooves serve for reinforcement in a horizontal direction. Likewise the columnar projections *2a* may be provided with vertical holes so that when a series of courses are superimposed a continuous passage is provided for reinforcing the column constituted of the projections *2a*.

The chamber D of the settling tank shown in FIG. 1 and 2 is connected to the discharge means comprising a discharge pipe **9** passing the tank wall **20** and connected outside to the piping system (not shown) for transporting the effluent clarified liquid for further treatment or use,

and a collection compartment 9*a* formed by a curved partition 9*b*, attached to one of the blocks 1. Said partition 9*b* ends below the level 8*a* so that all solid matter or foam swimming on the surface of the sewage in the tank will be retained. The top of compartment 9*a* is above the level 8*a* and is closed by a perforated cover 9*c*.

The sewage, entering the chamber A through inlet pipe 8 flows from said chamber A in the direction of the arrows *a*, *b*, *c*, *d* through the passage 3 and chambers B and C into chamber D from which it is discharged to pipe 9 as a clarified effluent.

It may be noted that all partitions 22 are supported by the projections 2*a* of the blocks 2 against the hydraulic pressure of the liquid flowing through the tank.

It will be understood that numerous minor modifications may be made without departing from the spirit of the invention, and that I therefore do not intend to limit myself otherwise than as set forth in the claims which follow.

Having now fully described my invention what I claim as new and desire to secure by Letters Patent, is:

1. A tank for treating sewage, waste water or the like, comprising an essentially cylindrical wall consisting of curved concrete blocks laid in break-joint relationship, each layer of said wall consisting of alternating curved blocks having smooth inner and outer faces and of blocks having vertically disposed rib-like projections extending over the entire height of said blocks on the inner face thereof, said projections being offset laterally with respect to the vertical center lines of said blocks, said wall being formed with the blocks having rib-like projections superposed and bonded together with the said projections in vertical alinement so as to form vertical reinforcing pillars, the wall zones between said vertical reinforcing pillars consisting of curved concrete blocks having a smooth inner and outer face, vertical partitions arranged in the interior of the tank, all of said partitions extending transversely of the tank so as to overlap a pillar for a part of their height, and some of said partitions terminating along a portion of their height short of the wall of the tank and of the vertical reinforcing pillars so as to provide vertical passageways between said some partitions and the vertical reinforcing pillars formed by the rib-like projections of said concrete blocks.

2. A tank for treating sewage or the like comprising tiers of segmental shaped blocks laid to provide a generally cylindrical tank wall, certain of said blocks having a projection extending from the inner face thereof, said certain blocks being arranged so that the projections form substantially vertical pillars integral with and spaced about the inner circumference of said wall, a plurality of substantially upright partitions within said tank, a vertical edge of each of said partitions along at least a part of its height being adjacent to and overlapping a pillar, and means securing the overlapping portion of each said edge to its adjacent pillar so that the partitions are supported by the pillars against the hydraulic pressure of the sewage being treated.

3. A tank as in claim 2 wherein one of said partitions overlaps its adjacent pillar along its entire height.

4. A tank as in claim 2 wherein one of said partitions overlaps its adjacent pillar along its entire height, and

another of said partitions overlaps its adjacent pillar along a part of its height and is spaced therefrom along the remainder of its height, so as to provide a vertical passage between the other partition and the tank wall.

5. A tank according to claim 2, wherein said blocks are provided with vertical slots in their end walls and vertical holes through said projections and vertical reinforcement in said slots and holes.

6. A tank for treating sewage or the like comprising tiers of segmental shaped blocks laid to provide a generally cylindrical tank wall, certain of said blocks having a projection extending from the inner face thereof, said certain blocks being arranged so that the projections form substantially vertical pillars integral with and spaced about the inner circumference of said wall, diametrically disposed vertical partitions in the interior of the tank, the length of one of the partitions being such that its outer vertical edge overlaps an adjacent pillar, the other partitions being for the greater part of their height of such a length as to terminate short of the pillars so as to provide vertical passages between the partitions and the inner wall of the tank, said other partitions being for a part of their height of such a length as to overlap an adjacent pillar, and means securing the overlapping parts of the partitions to the adjacent pillars so that forces exerted on the partitions are transmitted to the pillars.

7. A tank as in claim 6 wherein the vertical passages terminate below the surface of the sewage in the tank.

8. A tank as in claim 6 wherein only the upper portions of said other partitions overlap the pillars.

9. A tank as in claim 6 wherein the projections are beveled vertically to increase the area of the flow passages between the partitions and tank wall.

10. A tank for treating sewage and the like comprising tiers of segmental-shaped blocks laid to provide a generally cylindrical tank wall, certain of said blocks having a projection extending from the inner face thereof, said certain blocks being arranged so that the projections form substantially vertical pillars integral with and spaced about the inner circumference of said wall, a plurality of substantially upright radial partitions forming sealing compartments within the tank, one of said partitions arranged adjacent to one of said pillars and overlapping laterally said pillar along its entire length and the others of said partitions overlapping its adjacent pillar along a part of its length only and forming on the other part of its length a vertical passage between its adjacent pillar and one of its edges, and means securing the overlapping portions of each of said partitions to its adjacent pillar so that the partitions are laterally supported by said pillars.

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