

J. E. WILLIAMSON.
 FILTER BOTTOM CONSTRUCTION.
 APPLICATION FILED AUG. 17, 1921.

1,429,477.

Patented Sept. 19, 1922.

2 SHEETS—SHEET 1.

Fig. 1

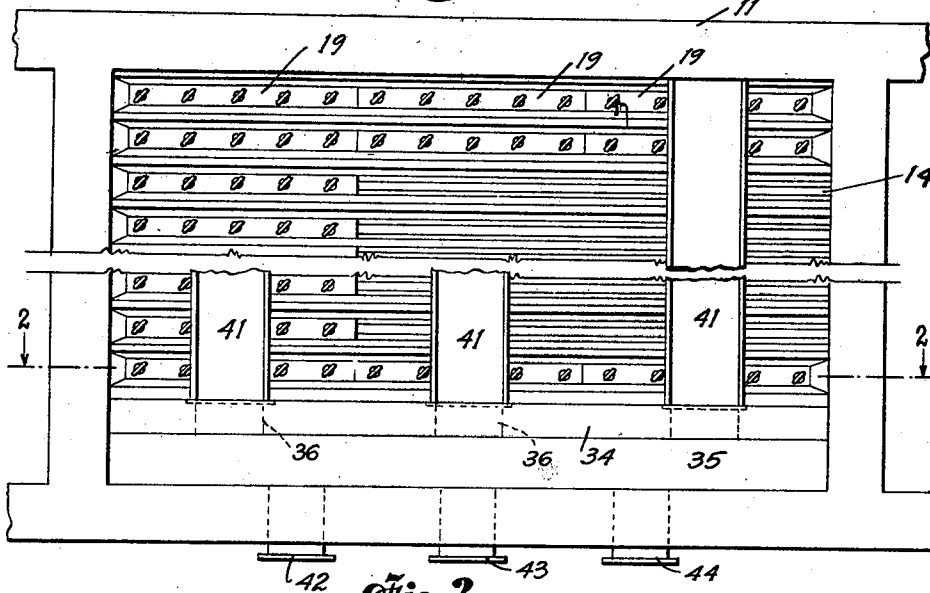
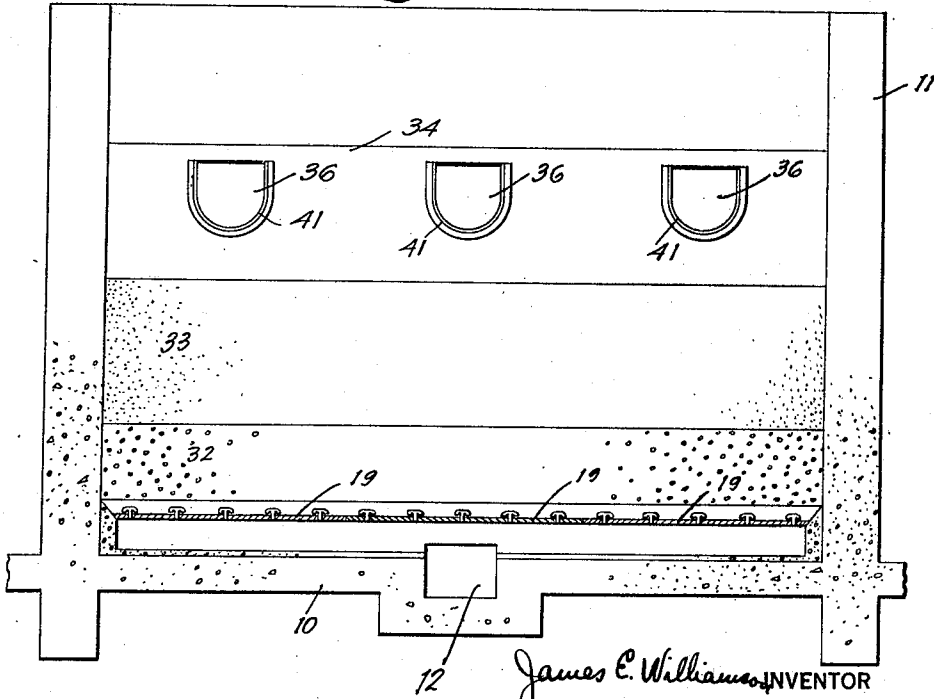


Fig. 2



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Fig. 3

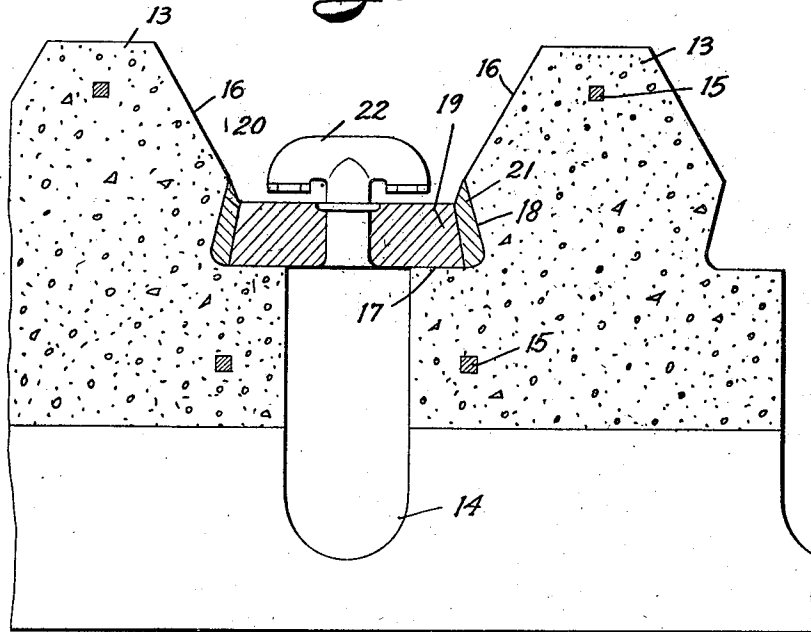


Fig. 4

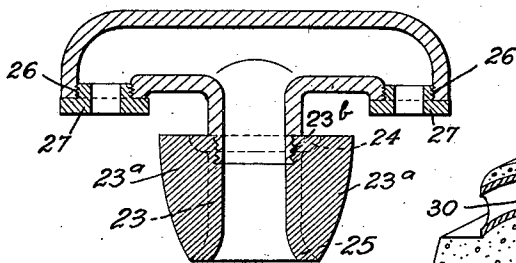


Fig. 6

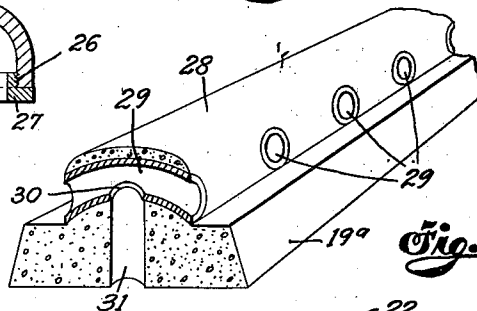


Fig. 5

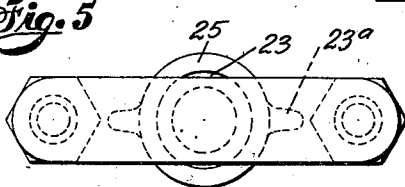
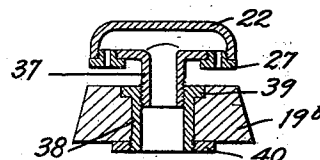


Fig. 7



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UNITED STATES PATENT OFFICE.

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FILTER-BOTTOM CONSTRUCTION.

Application filed August 17, 1921. Serial No. 492,956.

To all whom it may concern:

Be it known that I, JAMES E. WILLIAMSON, a citizen of the United States, and a resident of South Orange, county of Essex, and State of New Jersey, have invented an Improvement in Filter-Bottom Constructions, of which the following is a specification.

This invention relates to the construction of filter bottoms, particularly for filters of the type employed for filtering or purifying water.

One of the objects of this invention is to provide a simple and practical filter bottom construction capable of rapid installation and of convenient and easy inspection during the process of construction or installation. Another object is to provide a construction of the above type in which the amount of exposed metal employed is reduced to a minimum thereby to eliminate or reduce undesirable corrosive action and thus making for greater durability when in use. Other objects will be in part obvious or in part pointed out hereinafter.

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

In the accompanying drawings, in which is shown one of various possible embodiments of this invention,

Figure 1 is a plan view; and

Figure 2 is a vertical section taken on the line 2—2 of Fig. 1 of a filter embodying the bottom construction of this invention.

Figure 3 is a vertical section on an enlarged scale showing certain details of the bottom construction, certain parts being shown in elevation.

Figure 4 is a vertical section; and

Figure 5 is a plan view of a nozzle incorporated in the bottom construction of this invention, both views being on an enlarged scale to show the construction more clearly.

Figure 6 is a perspective view of a modified form of bottom member and nozzle construction partly in section.

Figure 7 is a vertical sectional view on a smaller scale of a modified form of nozzle construction.

Similar reference characters refer to similar parts throughout.

Referring now to the drawings and more

particularly to Figs. 1 and 2, there is shown a single filter unit comprising a main chamber preferably built of reinforced concrete and formed by the main bottom 10 and the side members or walls 11, the chamber being made in suitable dimensions commensurate with the quantity of water, for example, which it is desired that a single unit should handle. The depth of the chamber is similarly made of such extent as to be commensurate with the degree of filtering to which it is desired to subject the fluid, as will be made clear hereinafter. The main bottom 10 is provided with a main channel 12 of suitable cross section extending longitudinally of the unit, this main channel being conveniently formed during the pouring of the concrete of which the main bottom 10 and the wall members 11 are made, suitable reinforcing being used throughout.

Considering now the detailed construction of the interior bottom or what may be termed the auxiliary bottom of this unit, it will be seen that there is provided a plurality of transversely extending ribs or abutments 13 suitably spaced apart so as to form therebetween a plurality of transverse channels 14 connected with the substantially centrally and longitudinally extending main channel 12. The ribs 13 are preferably so formed as to provide substantially vertical or parallel adjacent faces which thus form the side walls of the transverse channels 14. The latter are preferably provided with rounded bottoms, the construction being more clearly shown in Fig. 3 on an enlarged scale. In order to obtain greater durability and rigidity, the transverse ribs or abutments 13 are preferably reinforced by means of suitable reinforcing rods 15 as shown in Fig. 3. The ribbed bottom construction is preferably cast separately after the casting of the main bottom 10, suitable forms and molds being used to give the desired form and shape to the parts as hereinafter described, or it may if desired be cast at the same time as the main bottom 10 is formed. However, each ribbed section 13 may be cast separately, the cross-section being more clearly shown in Fig. 3, and of a length substantially equivalent to the width of a single filter unit. The ribbed sections 13 thus individually cast may then be inserted in the filter unit individually and cemented in place.

The upper ends of the transverse ribs 13

are preferably beveled as at 16, and intermediate of the vertical walls of the channels 14 formed thereby and the beveled portions 16, the ribs 13 are provided with stepped portions forming horizontal supporting surfaces 17 and inwardly extending faces 18 for a purpose to be hereinafter more clearly described.

It will be noted that in the bottom construction thus far described the formation of the parts is such that they may be readily cast and that after the casting of the concrete and upon the removal of the molds, the parts forming the transverse channels are all open at the top and are thus readily inspected before the completion of the installation.

The transverse channels 14, thus far open at the top are closed by means of cover portions or slabs 19 which may similarly be cast of a suitable material such as concrete and reinforced if desired, and in such manner as to provide beveled lateral faces 20, the maximum width of each slab 19 being such as to pass readily between adjacent inwardly sloping faces 18 of adjacent ribs 13. The slabs 19 are thereupon supported by the horizontal faces 17 in the stepped sides of the ribs 13 and are secured in position by means of cement or mortar indicated at 21 by means of which and because of the relative obliqueness of the adjacent faces 18 and 20 of the respective parts the slabs 19 are securely fastened in position. The manner of thus securing the slabs 19 in place is well adapted to withstand pressure in an upward direction and because of the ample supporting surface provided by the horizontal faces 17, the cover portions or slabs 19 are well adapted to withstand pressure in a downward direction. Furthermore, the slabs 19 may be made of a length convenient for handling, and by making them in short lengths they may be readily adapted for insertion in units of varying widths.

Spaced at suitable intervals throughout the length of each cover portion or slab 19 are nozzles 22 forming the connection between each transverse channel 14 and the main chamber of the filtering unit. The nozzles 22, the construction of which is more clearly shown in the enlarged views in Figs. 4 and 5, are preferably made of bronze or a like material having like qualities of resistance to corrosion and are so formed as to provide a main tubular portion or neck 23 provided with a suitable collar 24 and preferably flared outwardly at the lower end thereof as at 25 to permit of the casting of the slab 19 with the nozzles properly positioned, and to provide further suitable securing means for holding the nozzles in position after the slab has been cast. The nozzle 22 is preferably formed in two parts as indicated with a threaded connection at 23^b thus facilitating

the formation of the slab with the lower portion of the nozzle in position therein. Means such as a pair of radially extending webs 23^a are integrally formed with the neck portion 23 to prevent the possibility of rotation of the nozzle in the cast slab 19. The nozzles 22 are each provided with a plurality of outwardly directed branches, herein shown as two in number, each formed at the outer end thereof into a downwardly directed opening or aperture, each preferably threaded as at 26 so as to permit the attachment thereto of the orifice bushings 27. The orifice bushings 27 are suitably shaped at their lower outer ends to permit the application of a suitable wrench and, as indicated in Fig. 5, the bushings 27 are hexagonally shaped. The orifice bushings may thus be readily detached and, if desired, may thus be readily replaced by orifices of different dimensions commensurate with the flow desired therethrough.

In Fig. 6 is illustrated a modified form of cover portion or slab in which a modified form of nozzle is employed. The slab 19^a has its base portion substantially similarly shaped as the slab 19 of Fig. 3 so as to permit its application to form the cover for the transverse channels 14 in the manner hereinbefore described and is provided with a raised portion 28 in which suitable tubes 29 are inserted during the casting of the slab 19^a. The tubes 29 are preferably made of a material like porcelain, for example; are preferably arcuate in section, as illustrated in Fig. 6; and each is provided with an aperture 30 substantially centrally positioned with respect to the tube 29 so as to register substantially with the vertically extending channel 31 formed in the cover portion or slab 19^a. The porcelain tubes 29, together with the ducts or passages 31, thus form a series of T-shaped connecting passages between the transverse channels 14 and the main chamber of the filter unit.

In Fig. 7 I have illustrated another nozzle construction which may be found more convenient in building the combined cover and nozzle construction. In this modification, the nozzle 22, provided with a plurality of outwardly directed branches, herein shown as two in number and each branch having an orifice bushing 27 threaded therein, has a downwardly directed nipple portion 37 adapted to be threaded with the tubular base portion 38. The latter is provided at preferably its upper end with a collar 39 and is threaded at its other end to receive a nut 40, by means of which the base portion 37 may be positioned in and locked to the slab 19^b. This construction is particularly advantageous where it is desired to make the cover portions 19^b of stone, for example, the slabs 19^b being suitably drilled and the holes countersunk to permit the at-

tachment thereto of the nozzle construction just described.

It may also be found convenient to flange the lower end of the base portion 38 in a manner similar to the flanged end 25 of the neck portion 23 of the nozzle shown in Fig. 4, when it is desired to embody the structure of Fig. 7 with a cast slab.

Referring now to Fig. 2 of the drawings, it will be noted that upon the auxiliary bottom in which the nozzle construction hereinbefore described is incorporated, there is placed a layer, indicated as at 32, of graded gravel and upon this layer of gravel is placed a layer, indicated as at 33, of sand. While only two layers of filtering material are illustrated in Fig. 2, it will be understood that any suitable number of layers of material of varying filtering properties may be employed and that the depth of the various layers may be adjusted according to the conditions under which the unit is to operate.

As seen in Figs. 1 and 2, the main chamber of the filter unit is provided with a partition 34 of less height than the walls 11 so as to provide an auxiliary chamber or sluice 35. Suitable openings 36, more clearly shown in Fig. 2, form a connection between the auxiliary chamber 35 and the gutters 41, U-shaped in cross-section so as to be open at the top, and extending across the main chamber to the opposite wall thereof, to which they are suitably secured.

In the operation of the unit, the water or other liquid desired to be filtered is passed into the main chamber of the unit through the conduits 36, any suitable means such as the pipe connection 42 being provided to feed the auxiliary chamber 35 with the water to be filtered. As will be understood, the incoming liquid may overflow the partition 34, as during the filtering operation, it is not essential that the gutters 41 be employed. The liquid seeps down through the successive layers of sand and gravel and the solid matter held in suspension is separated from the liquid. The nozzles 22, as indicated at Fig. 1, are preferably set at an angle of approximately 45° or thereabouts during the casting of the cover portion 19 so as to provide a closer approximation to a substantially uniformly distributed series of exit openings through the respective orifices 27 to the transverse channels 14. The fluid passes from the transverse channels 14 into the main channel 12 extending longitudinally of the unit and to which all of the transverse channels 14 are connected, whereupon it is passed for distribution through the pipe connection 43.

When it is desired to clean the filter so as to remove from the filtering material, such as the layers 32 and 33, the matter removed from the water or liquid during the

filtering process, a reverse flow of water is caused to take place by forcing the water through the pipe connection 43, through the channels 14 and through the nozzles. The result of such reverse flow is to float up the sand in the upper layers of the filtering material during which action the lower or coarser layers of filtering material remain substantially undisturbed. The upper layer of sand is, however, during the floating action thereof, effectively washed and the washing water is drawn off through the gutters 41 and the openings 36 into the auxiliary chamber 35 from which the washing water is expelled in any suitable manner, as through a pipe connection 44.

The action hereinbefore described is substantially similar when the nozzle and cover portion construction shown in Fig. 6 is employed. With this latter construction it will be noted that no metal is exposed to the water and that incidental corrosive action is thus entirely done away with. In the case of the preferred type of nozzle construction as illustrated in Fig. 4, corrosion is effectively prevented or minimized by making the nozzles 22 of a suitable material, such as bronze, of suitable resistance to the action of the water.

It will thus be noted that there has been provided in this invention a practical filter unit construction in which the installation and construction thereof may be carried on in such manner as to permit inspection of the parts during each stage of the construction. It will further be noted that the installation may be rapidly made and that the construction is of an exceedingly durable and practical nature.

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

I claim:

1. In construction of the character described, in combination, a main chamber, a bottom therefor, a plurality of spaced ribs extending transversely of said bottom and forming therebetween a plurality of transverse channels open at the top; separate means provided with a plurality of nozzles adapted to be bridged across adjacent ribs thereby to close said transverse channels, and a main channel connecting all of said transverse channels.

2. In construction of the character described, in combination, a main chamber, a bottom therefor, a plurality of individual upwardly extending ribs extending transversely of said bottom, means for spacing adjacent ribs so as to form therebetween transverse channels each open at the top,

means provided with a plurality of apertures adapted to be bridged across adjacent ribs to close said transverse channels, and means for locking said closing means in position.

3. In construction of the character described, in combination, a main chamber, means forming a bottom therefor comprising a plurality of transversely extending ribs in spaced relation to form between adjacent ribs a transverse channel, a horizontal supporting surface on adjacent sides of each of said ribs, an inclined locking surface on adjacent sides of each rib, each of said inclined surfaces forming an acute angle with its associated horizontal supporting surface, means provided with a plurality of apertures and having outwardly inclined lateral faces adapted to be supported on said horizontal surfaces of said ribs, thereby to close said transverse channels, and means interposed between the inclined surface of each rib and the inclined lateral face of each of said means for locking said closing means in position.

4. In construction of the character described, in combination, a main chamber, means forming a bottom therefor comprising a plurality of transversely extending ribs in spaced relation to form transverse channels therebetween, each of said channels being open at the top, separate means adapted to bridge adjacent ribs thereby to close said transverse channels, and a plurality of nozzles mounted in said closing means, each of said nozzles providing a single passage connecting with said transverse channels and a plurality of passages connecting with said main chamber.

5. In construction of the character described, in combination, a main chamber, means forming a bottom therefor comprising a plurality of transversely extending ribs in spaced relation to form transverse channels therebetween, each of said channels being open at the top, separate means adapted to bridge adjacent ribs thereby to

close said transverse channels, and a plurality of nozzles mounted in said closing means, each of said nozzles providing a single passage connecting with said transverse channels and a plurality of downwardly directed openings connecting with said main chamber.

6. In construction of the character described, in combination, a main chamber, means forming a bottom therefor comprising a plurality of transversely extending ribs in spaced relation to form transverse channels therebetween, each of said channels being open at the top, separate means adapted to bridge adjacent ribs thereby to close said transverse channels, and a plurality of substantially T-shaped nozzles mounted in each of said closing means, each of said nozzles providing a single passage connecting with said transverse channels and two passages connecting with said main chamber.

7. In construction of the character described, in combination, a main chamber, means forming a bottom therefor comprising a plurality of transversely extending ribs in spaced relation to form therebetween a plurality of transverse channels, adjacent sides of said ribs being stepped to provide a horizontal supporting surface and an inclined locking surface forming an acute angle with said horizontal supporting surface, and a closing member provided with a plurality of apertures having inclined lateral faces in substantial parallelism with said inclined locking surfaces on said ribs, said closing member being adapted to be supported by said horizontal supporting surfaces, and means interposed between said inclined locking surfaces and said inclined lateral faces of said closing means for locking said closing means in position.

In testimony whereof, I have signed my name to this specification this 12th day of August 1921.

JAMES E. WILLIAMSON.