No. 630,249. Patented Aug. 1, 1899.

J. A. MAIGNEN.

FILTER.

(Application filed Nov. 12, 1898.)

(No Model.)

FIG. 1.

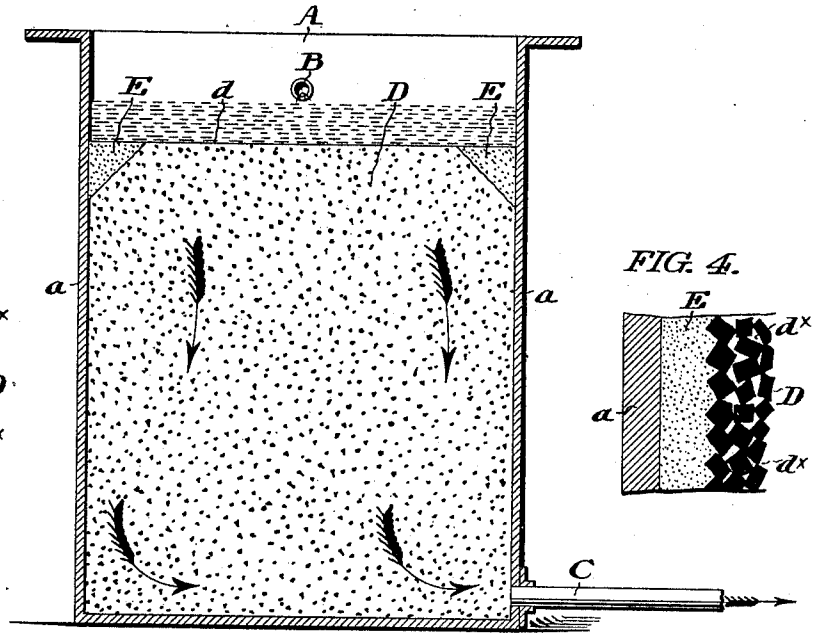


FIG. 3.

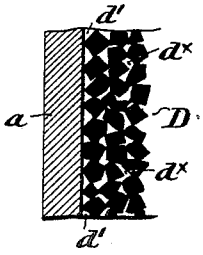
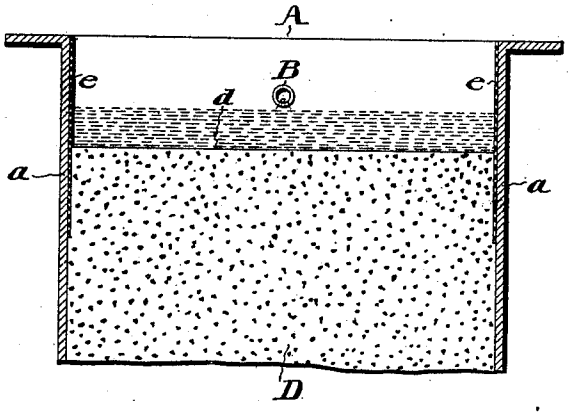


FIG. 4.

FIG. 2.



WITNESSES:

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FILTER.

SPECIFICATION forming part of Letters Patent No. 630,249, dated August 1, 1899.

Application filed November 12, 1898. Serial No. 696,202. (No model.)

To all whom it may concern:

Be it known that I, JEAN A. MAIGNEN, of Philadelphia, in the State of Pennsylvania, have invented certain new and useful Improvements in Filters, whereof the following is a specification, reference being had to the accompanying drawings.

My invention relates particularly to granular-bed filters. It is the ordinary practice in the construction of filters of said type if the bed is of small mass to maintain the same within a wooden or sheet-metal casing, retaining-walls or embankments, such as are common in municipal reservoir construction, being used if a large mass is to be inclosed. In either event the granular mass is in direct contact with substantially smooth side walls, and no means being provided to fill the marginal voids of the mass existing between the grains of the latter and such walls less resistance is offered to the passage of water thereat than through the body of said mass. Consequently the filtrate issued therefrom is contaminated by a large proportion of water which has passed unfiltered at the junction of said granular mass and walls.

It is the object of my present invention to provide means whereby the flow of water through the margin of the granular mass shall be restricted, so as to be substantially equal to that through any other similar area in the body of the mass, whereby a uniform gravitative flow of the water is insured at all points in the filter area and a maximum efficiency of the filter is attained.

In the accompanying drawings, Figure 1 shows the preferred form of my invention. Fig. 2 is a modified form of the same. Figs. 3 and 4 are fragmentary detail views.

Referring to Fig. 1, A is the filter-casing. B is the water-inlet pipe, and C the water-outlet pipe. D is the granular bed, at the upper surface *d* of which the initial separation of the impurities from the water is effected. At the junction of the mass D with the smooth side walls *a a* of the casing A a layer of material E is interposed, the effect of which is to fill the voids between the grains of the mass D, which would otherwise exist with the latter in direct contact with the smooth surface of the walls *a*. In said figure E represents a granular material finer than that comprising the mass D, which is suitably compacted to fill the marginal voids of the latter.

In Fig. 2, in lieu of the material E, I have shown the application of sheet material, such as asbestos cloth. Said cloth preferably extends above the water-level and is secured to the walls *a a* in such manner as to prevent the flow of water between the sheet and said wall.

Fig. 3 illustrates the relation between the marginal grains of the mass D and a smooth wall *a*, with which they are in contact. The voids *d'* maintained in regular vertical relation afford much less resistance to the passage of the water than the voids $d^{\times}$, which occur irregularly through the mass.

As shown in Fig. 4, the effect of the insertion of the material E is to fill the voids *d'*, and said material E may for the purpose mentioned be cemented on or otherwise integrally related with said wall *a*.

Having extensively experimented with granular-bed filters incased in glass walls, I believe the passage of unfiltered water at the margin of the granular mass when the latter rests against a smooth retaining-surface to be largely due, as aforesaid, to the voids existing between the grains of the mass and said surface, for the reason that various materials—such as sand of finer grain than that of the body portion of the filter-bed, clay, asbestos cloth, sheet fabric having a granular surface, and other materials similar in respect to the filling of said voids—have the desired effect of restricting said marginal flow. I do not desire to limit myself to the materials named or to the manner of application thereof which I have illustrated, as it is obvious that various modifications may be made therein without departing from the spirit of my invention.

It is to be understood that the term "mass" used in the following claims is comprehensive of any bulk of granular material, whether comprising respective layers of granules of different sizes or a single layer of granules of substantially uniform size. It is, moreover, to be understood that I have used the term "water" herein in a descriptive and not in a restrictive sense, as it is obvious that the precise nature of the liquid filtered is not of the essence of my invention.

I claim—

1. In a granular-bed filter, the combination with a granular mass; of a retaining-wall for said mass; and material filling the interstices between the grains of said mass at the junction of said mass and said wall, and restricting the flow of water thereat, substantially as and for the purpose set forth.

2. In a granular-bed filter, the combination with a granular mass, of a retaining-wall for said mass, and a distinct layer of material between said wall and said mass filling the marginal voids between the grains of the latter and said wall, and restricting the flow of water thereat, substantially as and for the purpose set forth.

JEAN A. MAIGNEN.

Witnesses:
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ARTHUR E. PAIGE.