

No. 628,987.

J. A. MAIGNEN.
FILTER.

Patented July 18, 1899.

(No Model.)

(Application filed Nov. 12, 1898.)

FIG. 1.

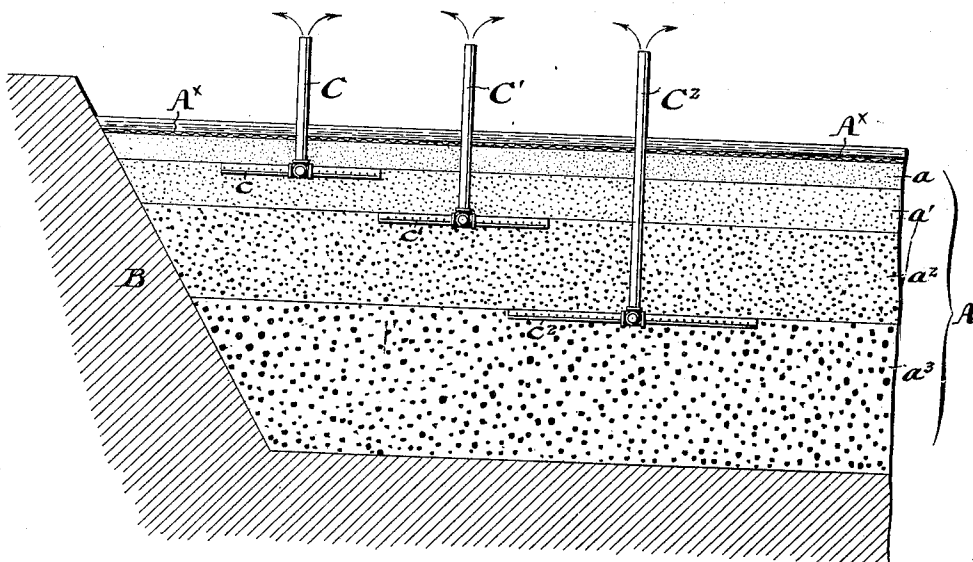
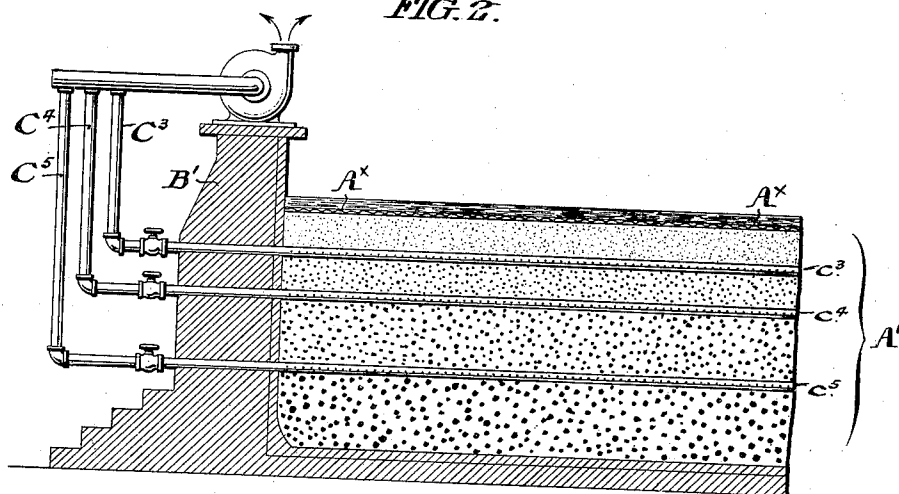


FIG. 2.



WITNESSES:

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FILTER.

SPECIFICATION forming part of Letters Patent No. 628,987, dated July 18, 1899.

Application filed November 12, 1898. Serial No. 696,205. (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. The sand, gravel, charcoal, coke, &c., of which such filters are ordinarily composed contain in the voids or interstices of their mass a very large proportion of air, which is displaced by the initial influx of water to the bed. Such filters usually comprise several layers of granular material arranged in particular order with respect to the size and nature of the granules, and great care must be taken in the primary saturation of the mass to avoid the relative displacement and intermingling of the respective materials by the air which is forced from mass to mass under pressure of the inflow of water. Of course the disastrous effect of forcing air through the mass may be minimized by limiting the rate of influx of water to effect the slow initial saturation of the entire bed; but such a method of operation to be successful not only requires much care and skill upon the part of the operator, but more time than can be economically expended.

It is the object of my present invention to provide means whereby the full force and flow of water may be initially introduced within the dry material comprising the filter-bed without disturbing the relative position and relation of the various layers comprising the mass thereof. To this end I embody air-outlet pipes in the mass in such relation therewith as to receive and discharge without disturbing the respective layers of the mass any air displaced by the water or separated therefrom.

I have found that the efficiency of operation of a granular-bed filter is dependent in large measure upon the maintenance of a homogeneous natural or artificial membraneous deposit upon the particular surface of the bed through which the water is introduced to the mass. Such a membrane, which is naturally formed by the silt and other matter deposited from the water, not only screens the bulk of solid matter from the water, but also effects

the even distribution of the water to the mass. If said membrane is perforated at any point, the water percolates therethrough, with its solid matter in suspension, to distribute itself and deposit said matter over a considerable area surrounding such perforation, a pin-hole being sufficient to occasion a deposit several feet in area between said membrane and the subjacent surface of the granular material.

It is well known that during the continuous operation of filters of the type specified a considerable portion of the air ordinarily contained in water is separated therefrom during its passage through the granular material, finds its way in columns of bubbles to the upper surface of the mass, and escapes by perforating the aforesaid membrane. My invention is therefore advantageous in that means are provided for the continued discharge of said air-bubbles during the filtering operation, said membrane being thereby preserved intact.

In the accompanying drawings, Figure 1 shows the embodiment of my invention in the ordinary simple type of embanked granular-bed filter. Fig. 2 shows a modified form of my invention embodied in a filter provided with lateral retaining-walls.

Referring to Fig. 1, A is the filter-bed, consisting of distinct layers of granular material, as indicated at a a' a^2 a^3 . The membrane upon the top of said bed, which, as above noted, it is one of the objects of my invention to preserve intact, is indicated at A^x . B is the retaining-embankment for said mass A, and C C' C^2 are air-discharge pipes provided with perforated branches c c' c^2 , disposed at respectively different levels in the mass A.

Referring to Fig. 2, B' is the lateral retaining-wall for the mass A', through which are extended pipes C³ C⁴ C⁵, which lie respectively at different levels in said mass and are perforated, as indicated at c^3 c^4 c^5 , to receive the air to be discharged therefrom.

The air-discharge pipes may extend above the level of the water in the filter and be opened to the atmosphere, as shown in Fig. 1. I prefer, however, to connect said pipes with a pump, whereby a vacuum or partial vacuum may be maintained to facilitate the discharge of the air.

I do not desire to broadly claim a perforated pipe located in a mass of a granular-bed filter, for I am aware that pipes have been heretofore placed in such beds for the introduction of water in such relation with the mass as to facilitate the cleansing of the latter. However, I believe it to be new to combine with a granular filtering mass means to discharge the air contained therein without disturbing the successive layers of the filtering material by the passage of the discharged air there-through. I therefore do not desire to limit myself to the precise arrangement which I have shown and described, as it is obvious that various modifications may be made therein without departing from the spirit of my invention.

I claim—

1. In a granular-bed filter the combination with a mass of granular material, of an air-outlet pipe embedded therein, substantially as and for the purpose set forth.

2. In a granular-bed filter the combination with a mass of granular material, of a series of air-outlet pipes, fixed at different levels

therein, substantially as and for the purpose set forth.

3. In a granular-bed filter the combination with a mass of granular material, of an air-outlet pipe embedded in said mass, and means to produce a partial vacuum in said pipe, substantially as and for the purpose set forth.

4. In a granular-bed filter the combination with a mass of granular material, of a series of air-outlet pipes embedded therein at different levels, and a vacuum-pump connected with said pipes to produce a partial vacuum therein, substantially as and for the purpose set forth.

5. In a granular-bed filter the combination with a mass of granular material comprising a series of layers of respectively different-sized granules, of a series of air-outlet pipes respectively embedded in said layers, and means to produce a partial vacuum in said pipes, substantially as and for the purpose set forth.

JEAN A. MAIGNEN.

Witnesses:

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