No. 699,032. Patented Apr. 29, 1902.

L. E. SMITH.

WATER SUPPLY AND FILTERING SYSTEM.

(Application filed Nov. 6, 1901.)

(No Model.) 2 Sheets—Sheet 1.

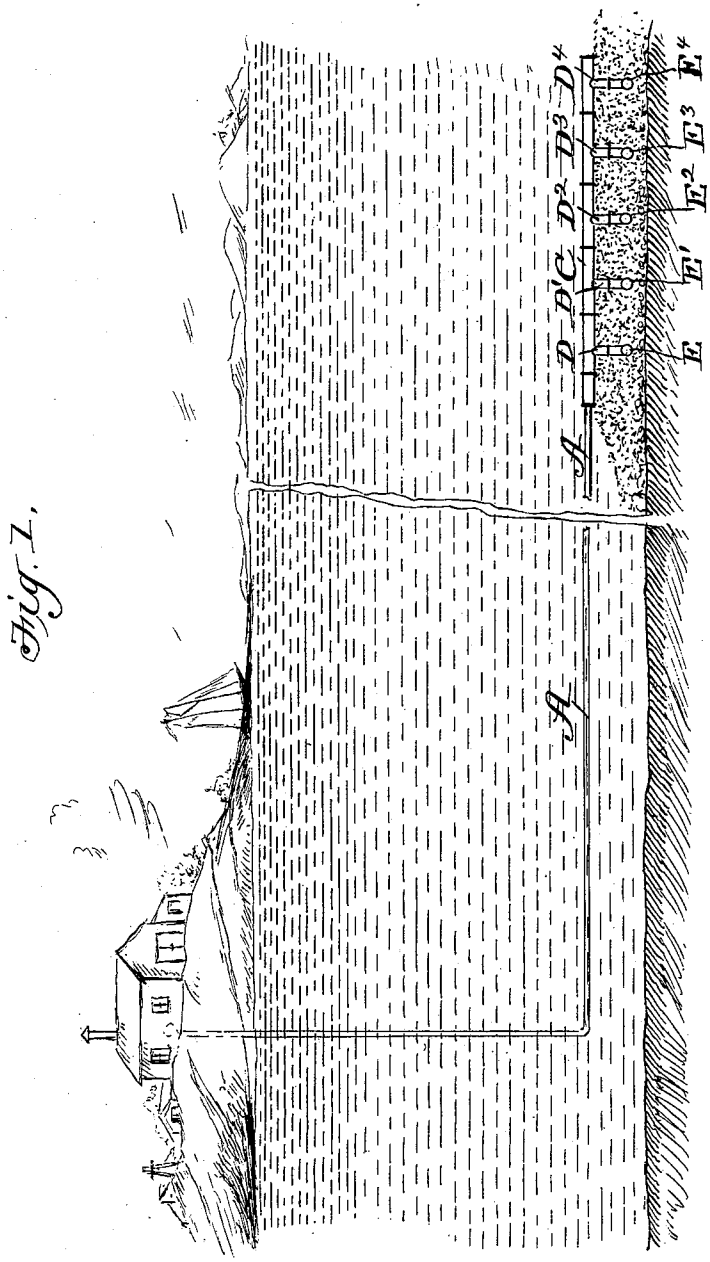


Fig. 1.

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Fig. 2.

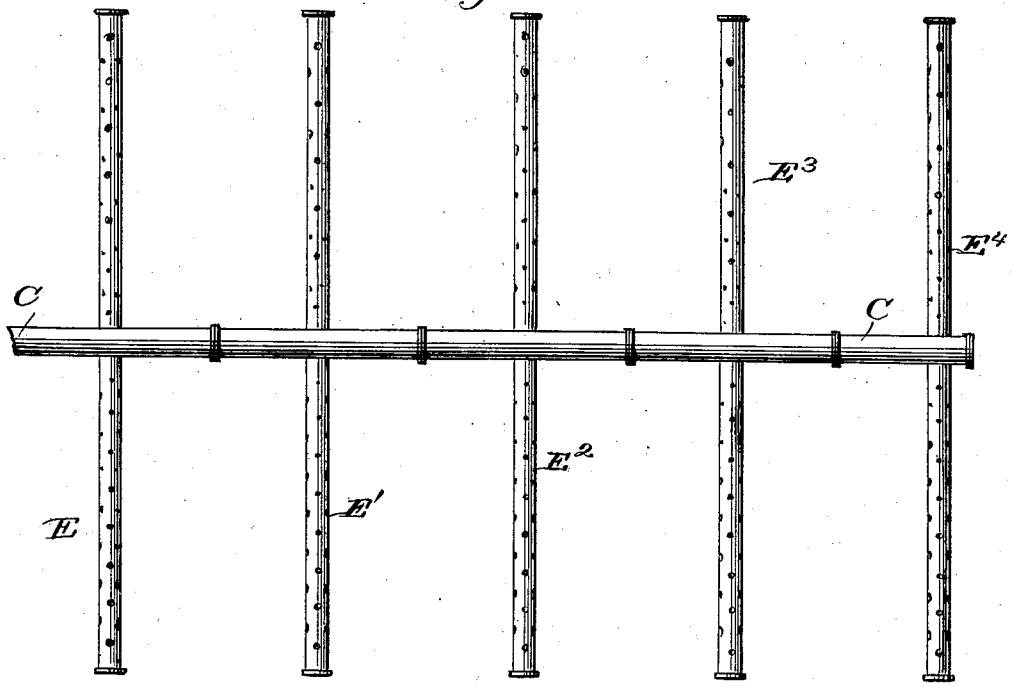


Fig. 3.

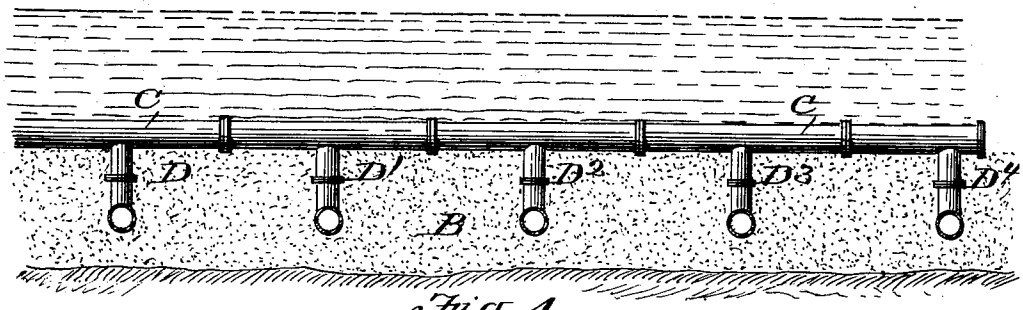
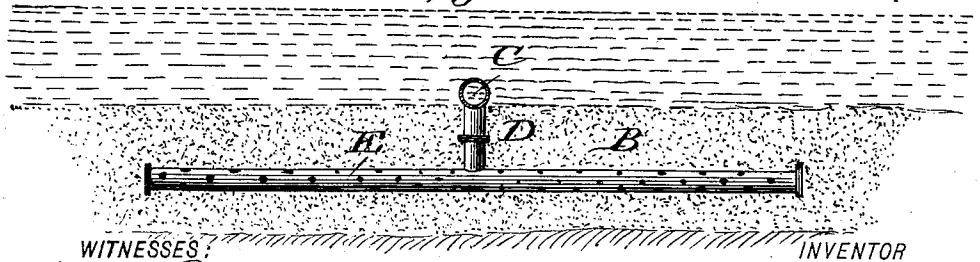


Fig. 4.



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UNITED STATES PATENT OFFICE.

LLOYD E. SMITH, OF PORTSMOUTH, OHIO.

WATER SUPPLY AND FILTERING SYSTEM.

SPECIFICATION forming part of Letters Patent No. 699,032, dated April 29, 1902.

Application filed November 6, 1901. Serial No. 81,341. (No model.)

To all whom it may concern:

Be it known that I, LLOYD E. SMITH, a citizen of the United States, and a resident of Portsmouth, in the county of Scioto and State of Ohio, have made certain new and useful Improvements in Water Supply and Filtration Systems, of which the following is a specification.

The chief requisites of water-supply systems for cities or towns are due quantity, maximum purity, and moderate cost for installation and repairs. I have devised an apparatus or system of pipes so constructed and so located as to fulfil these requirements to the highest degree.

My invention is an improvement in the class of supply and filter systems in which a natural bed or deposit of sand or fine gravel in a river or lake bottom is availed of as a filtering medium.

The details of construction, arrangement, and operation are as hereinafter described, reference being had to the accompanying drawings, in which—

Figure 1 is a perspective diagrammatic view illustrating my invention as applied in practice. Fig. 2 is a plan view of the main portion of the apparatus. Fig. 3 is a vertical longitudinal section of a portion of a river sand-bed and my apparatus in place therein. Fig. 4 is a section at right angles to that shown in Fig. 3.

A suction-pipe A leads from a pumping station or plant located on a river bank into and along the bottom of a river and to a natural bed B of sand or gravel therein, where said pipe A is connected with a larger one, C, which lies upon the sand-bed B in horizontal position and in the direction of the river-channel.

The pipe C is perforated and provided with vertical pendent pipes D D′ D^2, &c., which connect with laterals or cross-pipes E E′ E^2, &c., having openings or perforations and arranged at right angles to the reservoir-pipe C and arranged in the same horizontal plane in the sand-bed B. The pipes E E′ E^2, &c., are buried at a depth of several feet—that is to say, at such depth as will insure due filtration of water taken into the pipes and avoid all danger of being exposed by shifting of the sand in the natural course.

The fineness of the sand or gravel and its compactness, as well as the location of the bed, are elements in determining the depth to which the pipes shall be placed.

A feature in the construction is the gradation of the openings or perforations in the pipes E E′ E^2, &c., whereby an even flow of filtered water is insured at the several points where the said pipes connect with the pendent pipes D D′, &c., that connect with the central reservoir-pipe C. That is to say, the openings are largest at the outer ends of the pipes E E′, &c., and smallest at their inner ends. By this graduation of size of the openings a uniform and rapid admission and flow of water and a better filtration of the same are insured, for it is manifest that if the openings were of uniform size the admission of water would take place mainly in those openings adjacent to the reservoir pendent pipes E E′, &c., and the filtration would be correspondingly less perfect.

The arrangement of the laterals E E′, &c., relative to the reservoir C—that is to say, at right angles thereto and below the same and at a considerable distance from each other, so that each is separately bedded in the sand—insures great security of the apparatus in situation, as well as a separate filtering-bed for each intake or lateral—that is to say, when the whole apparatus with which the pipe A is connected is buried in the sand the pipe C and its pendants D D′ D^2, &c., resist lateral movement, while said pendants D D′ D^2, &c., and the laterals E E′ E^2, &c., resist sidewise movement, and the said laterals are spaced apart far enough to provide an independent filter-bed for each.

It will be understood that a pump will be dispensed with in case the intake-pipes C D E, &c., are located high enough to allow water to flow by gravity through pipe A to the point of delivery. In either case the relatively small diameter or capacity of the off-take-pipe A to the intake C, or more particularly to the aggregate capacity of the several pipes E, E′, E^2, and C, insures a constant supply upon which to draw and avoids too rapid suction of water into the pipes E E′, &c. In other words, the pipes E E′ E^2, &c., and their connections D D′, &c., and C constitute, in effect, an intake-reservoir, into which, owing to the much smaller capacity of

offtake A, the water enters so slowly that there is no tendency to draw in sand to any extent, and perfect filtration is obtained.

I propose to apply my plant or system chiefly in the Ohio and other similar streams, where compact sand or gravel beds or bars are available at frequent intervals, and thus in reasonable proximity to cities or towns, so that the pumping stations or engines already in use at the latter may be utilized, it being only necessary to connect the same with my offtake-pipe A.

What I claim is—

1. The described water supply and filtering apparatus comprising an offtake extending to a point of delivery, a reservoir-pipe, a series of pipes pendent from the latter, and a series of lateral pipes buried in a sand-bed at the bottom of a natural body of water, and provided with inlet-openings, as shown and described.

2. The described water supply and filtering apparatus comprising an offtake leading to a distributing-station, a reservoir-pipe of greater capacity connected therewith, and laid upon a river sand-bed, a series of pipes pendent from said reservoir-pipe, and a double series of lateral feed and filter pipes arranged at right angles to the reservoir-pipe and attached to such pendent pipes, and having openings which are gradually enlarged in diameter from the inner to the outer ends of said feed-pipes, as shown and described.

3. The described water supply and filtering system comprising a reservoir-pipe having a series of pendent pipes and lateral or branch feed-pipes connected with the latter and extending at right angles and provided with inlet-openings, such intake system being buried at a suitable depth in a sand-deposit in the bed of a natural water-supply, and an offtake-pipe attached to the said reservoir-pipe, but having less diameter, and extending to a distributing-station on the bank, as shown and described.

LLOYD E. SMITH.

Witnesses:
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