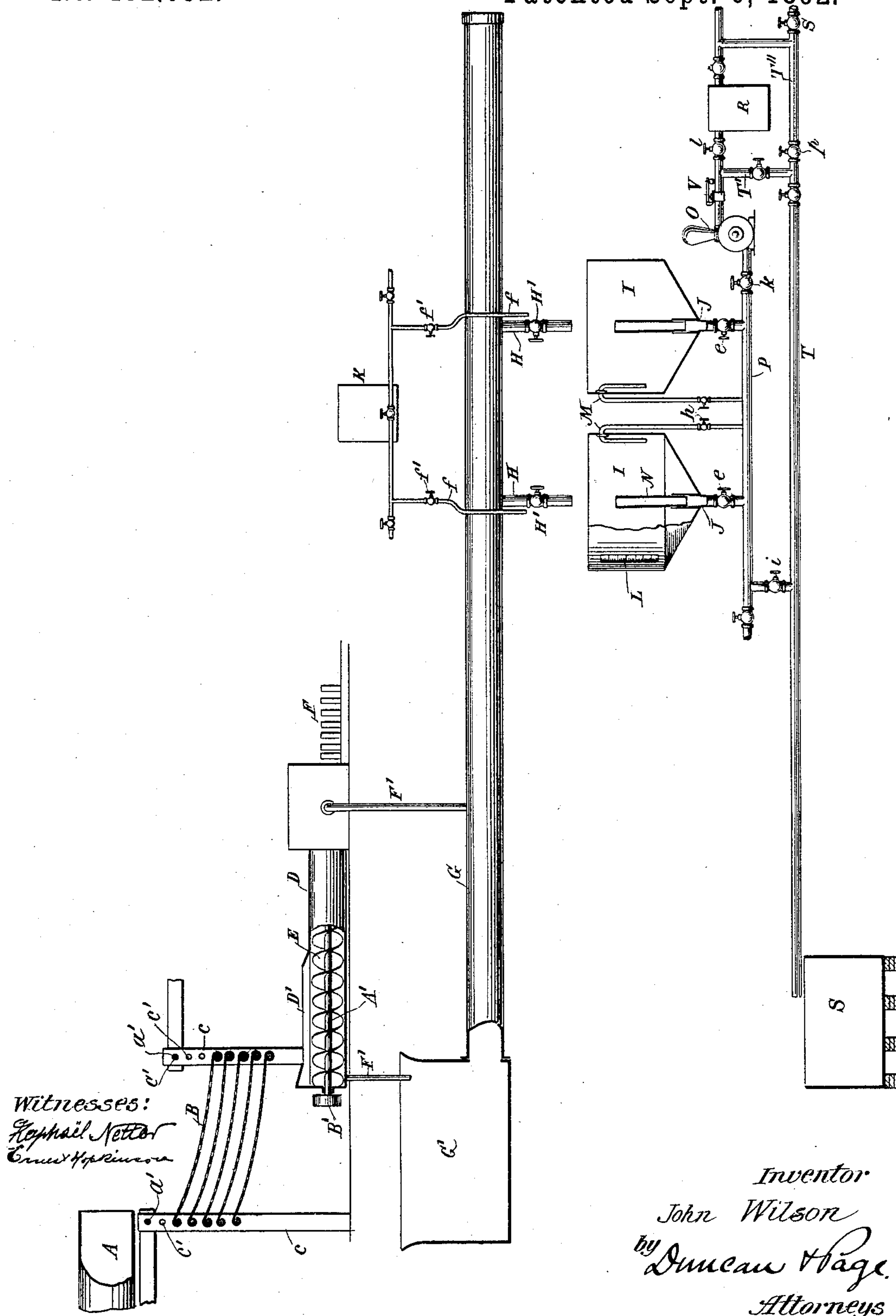


(No Model.)

J. WILSON.
APPARATUS FOR PURIFYING SEWAGE.

No. 482,052.

Patented Sept. 6, 1892.



UNITED STATES PATENT OFFICE.

JOHN WILSON, OF NEW YORK, N. Y., ASSIGNOR TO ROMAN DEBES, OF SAME PLACE.

APPARATUS FOR PURIFYING SEWAGE.

SPECIFICATION forming part of Letters Patent No. 482,052, dated September 6, 1892.

Application filed November 16, 1891. Serial No. 412,093. (No model.)

To all whom it may concern:

Be it known that I, JOHN WILSON, a citizen of the United States, residing at New York, in the county and State of New York, have invented certain new and useful Improvements in Apparatus for the Disposal of Sewage, of which the following is a specification, reference being had to the drawing accompanying and forming a part of the same.

10 This invention consists in an improved apparatus for purifying and disposing of house-sewage or objectionable waste matter of other kinds, whereby the useful portions may be recovered and utilized and the effluent discharged in a pure state.

15 The systems to which the invention relates are now extensively used in cities and towns having no suitable or convenient outlet or discharge for sewage or where precautions are observed not to pollute the streams or bodies of water into which the sewers discharge.

20 The present improvements are applicable to any of such sewerage systems in which the main outlet or discharge is or may be maintained at a point above the level of the stream or body of water into which the effluent finds its way.

25 The object of the invention is, primarily, to separate out the solid matter which is held in suspension in the body of sewage as it is delivered from the mains and to filter and so far purify the effluent that it may be discharged into a stream without polluting the same or reduced to a condition in which it will not be objectionable or unwholesome. This process or step is ordinarily a matter of considerable difficulty, as the solid matter of sewage as it comes from the mains disintegrates easily and is difficult to manipulate.

30 In the accompanying drawing I have illustrated, mainly in vertical section, the disposal and purifying apparatus which forms the subject of my invention, and to the drawing reference is now made in illustration of the principle of operation and construction.

35 At or near the discharge or outlet of the main sewer-pipe A, I place one or more frames of suitable material covered with perforated sheet metal, wire-netting, or textile material, or in fact any kind of foraminous screens or shelves B, more or less "bellied" or curved

downward and then upward at the end or ends remote from the outlet, so as to slightly retard the passage of the sewage which is discharged upon them, but not to such an extent but that the solid matter may be readily removed from them, while the fluid passes freely downward through their meshes. I prefer to use several of these screens with meshes graduated in size, those of the uppermost screen being the largest, and to provide any convenient means for raising or lowering either end of the same. I have shown in illustration of this feature the screens hinged to or suspended from end frames c, provided with a series of holes c', and which may be secured by pins a' at any desired height to the fixed supports. The solid matter after passing or being drawn over the ends of the screens falls into a suitable conveyer. (Shown in the drawing as consisting of a receptacle D, provided with a feed opening or hopper D' and containing a conveyer-screw E on a horizontal shaft A', that is rotated by means of a pulley B'.)

40 By means of this device the solid matter is forced into a suitable press—such as is commonly used in systems of this kind—and compressed into blocks F, which may be taken off to a drying-chamber or to a furnace and burned or disposed of in other suitable manner. Suitable overflow-pipes F' F' are connected with the conveyer and with the press to conduct off any liquid that may be carried along with the solid matter or expressed by the press. One of these overflow-pipes leads into a discharge-pipe G, that runs from a tank G', into which the other overflow-pipe discharges and which is placed below the screens to receive the liquid portion of the sewage as discharged at the outlet of the main. All the liquid from these sources flows along pipe G and finds an outlet through branch pipes H H, containing cocks H'. These branches discharge into tanks I I, the number of which will vary, according to the capacity of pipe G or to other well-understood conditions and which may be either open or closed. The bottom of each tank is contracted toward a central discharge opening or outlet J, controlled by a cock e. Small pipes f f, leading from a reservoir K for containing a coagu-

lant or other suitable chemical, open into the branch pipes H or discharge into the tanks I, so that when any one or more of the pipes H are discharging the liquid passing through them may be mixed with chemicals in proportions determined by the adjustment of cocks *f'* in pipes *f*. The tanks I when properly used serve a useful purpose, saving much in outlay and cost of maintenance, as each is employed as a receptacle for mixing the coagulant or other chemical from the reservoir K with the liquid, for collecting the liquid, for precipitating solid matter, and as a storage or settling tank. Any number of these tanks may be in operation at a time as may be desired. While in the tanks I the liquid may be mixed with lime or earthy matter, or a mixture of the same with or without other chemicals for deodorizing and disinfecting it, and it is then left for a proper time for settling. Each tank is provided with a glass gage L, which shows by the depth of the sludge when it is ready to be emptied. This can be effected by siphon-pipes M, containing cocks *h*, or by a telescoping pipe N, fitted into the discharge-opening in the bottom of the tank. The pipe N is to be pushed or screwed down to a point slightly above the indicated level of the sludge or heavier liquid and the valve *e* opened.

A pump O, connected with the pipe or conduit P, into which the tanks I discharge, is set in operation and the liquid drawn off from the tanks is forced through one or more filtering-chambers R, filled with any well-known filtering material, such as crushed quartz. In case several filters be used one may contain nothing but iron. The liquid effluent discharged from the filters will be purified to an extent which renders it entirely unobjectionable and innocuous. After the liquid has been drawn off from a tank I the telescopic pipe N can be further pushed or screwed down or removed, so that the sludge may be pumped or run out. If it is not necessary to pump it, the valve *i* in pipe branching from P is opened and valve *k* closed, whereupon the sludge runs to a tank or boiler S, when its water is evaporated by heat and where it is solidified by admixture of ashes, clay, earth, lime, or the like. The sludge may, however, be run off elsewhere and treated in any manner desired. If it be necessary to pump the sludge, the cock *i* is closed and *k* opened. The filter is then cut off by a cock *l* and communication established with the pipe T, leading to tank S or elsewhere, through a branch T' and properly-located cocks. A safety-valve V on the pump-discharge is used

to relieve excessive pressure and prevent rupture or injury to the apparatus.

A by-pass around the filter is provided by pipes T' T'', controlled by a cock *p*, and an opening or discharge, which is closed by cock *s*, is provided for washing out the apparatus without passing through the filters.

In the improved system which I have now described but one pump is required, and a great saving is effected thereby. The processes to which the sewage is subjected are such that the effluent or the liquid as finally discharged will be in as pure and unobjectionable a condition as it would or could be brought by any economical and practicable commercial process or apparatus.

What I claim is—

1. A sewage-disposal plant comprising, in combination, the following devices: a series of inclined screens for receiving the sewage discharged from a main and upwardly curved at the ends remote from the discharge, a conveyor and press for receiving and compressing the solid matter, a conduit for carrying off the liquid separated and expressed from the solid matter, tanks into which said conduit discharges, outlets for said tanks at different levels therein for drawing off the liquid or the sludge, and a pump connected with the outlets and ducts or pipes therefrom to a discharging-filter and to a receptacle for the sludge, as set forth.

2. The combination, with a main tank or receptacle for containing the liquid separated and expressed from the solid matter of a sewerage system, of a series of tanks under independent discharge-pipes from the main tank, a reservoir for chemicals connected with the said discharge-pipes or the tanks thereunder, a conduit for liquid from each of the series of tanks, a pump and filter therein, and a discharge-pipe at a lower level for the sludge, as set forth.

3. The combination, in a sewage-disposal plant, with a series of settling or storage tanks for the liquid separated and expressed from the solid matter of the sewage, of a pipe connected with the outlets of said tank and a pump connected therein, a pipe or duct from said pump to and through a filter, another around said filter, another pipe T to a tank or receptacle for sludge, and a pipe or duct from the outlet of the tanks to the sludge-tank direct, and cocks or valves for controlling said pipes or ducts, as herein set forth.

JOHN WILSON.

Witnesses:

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