2 Sheets—Sheet 1.

H. J. ENNIS.
Water-Filter.

No. 208,579. **Patented Oct. 1, 1878.**

Fig. 1.

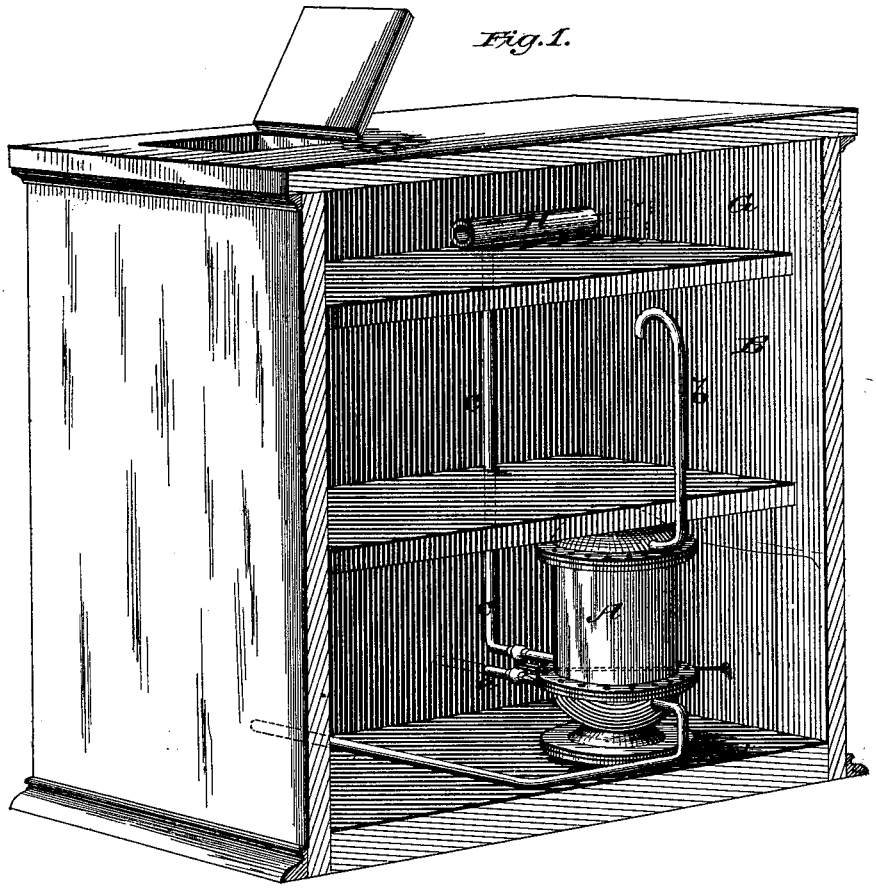
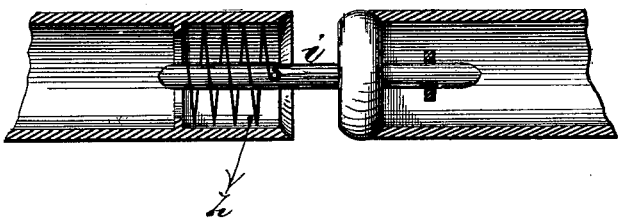


Fig. 2.



WITNESSES

John A. Ennis.

John A. Donoghue.

INVENTOR

Henry J. Ennis

2 Sheets—Sheet 2.

H. J. ENNIS.
Water-Filter.

No. 208,579. **Patented Oct. 1, 1878.**

Fig. 3.

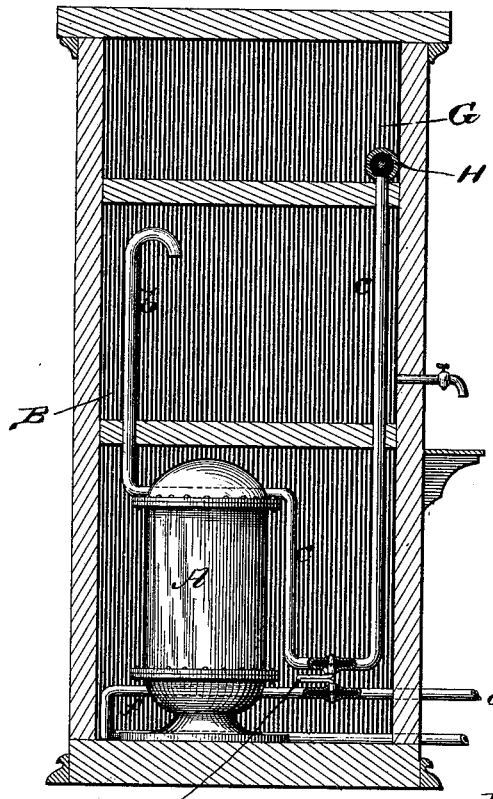
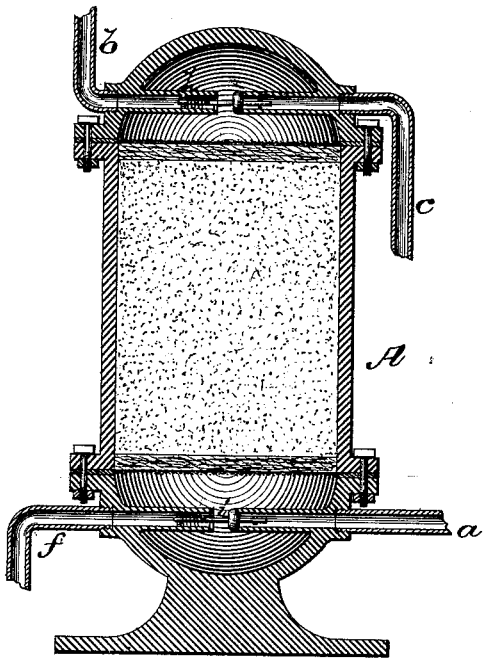


Fig. 4.



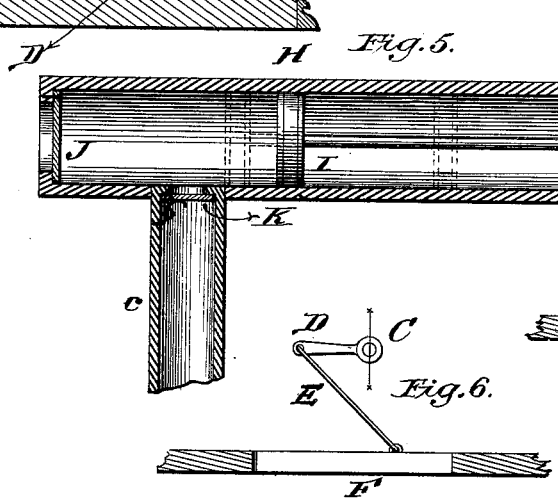


Fig. 5.

Fig. 6.

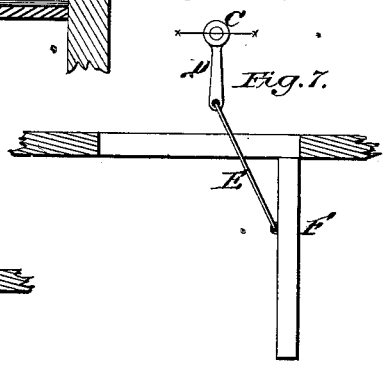


Fig. 7.

WITNESSES

John A. Ellis.
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UNITED STATES PATENT OFFICE.

HENRY J. ENNIS, OF WASHINGTON, DISTRICT OF COLUMBIA.

IMPROVEMENT IN WATER-FILTERS.

Specification forming part of Letters Patent No. **208,579**, dated October 1, 1878; application filed September 25, 1878.

To all whom it may concern:

Be it known that I, HENRY J. ENNIS, of Washington city, in the District of Columbia, have invented certain new and useful Improvements in Water-Filters; and I do hereby declare that the following is a full, clear, and exact description thereof, which will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to letters of reference marked thereon, which form a part of this specification.

Figure 1 is a view, in perspective, of filter and cabinet or case having filter-chamber, filtered-water reservoir, hot-water reservoir, and doors or openings for access to the hot-water reservoir and filter-chamber, the rear of the cabinet being removed to show the interior of the cabinet or case. Fig. 2 is an enlarged sectional view of the pipes, and the valve-connection for opening and closing the same. Fig. 3 is a vertical lateral sectional view, showing the interior from the end of the cabinet or case. Fig. 4 is a vertical section of the filter, showing the hot and cold water pipes in section, to expose the valves to view in their respective positions. Fig. 5 is a sectional view of a pump, pipe, and valves employed in connection with the hot-water reservoir in this cabinet-filter. Fig. 6 is a detail view of the double cock employed in this filter, showing it connected by a lever to the door of the filter-chamber, in a position to permit the cold water to flow through the filter, the door to said chamber being closed; and Fig. 7 shows a detail view of the same, showing the door to the filter-chamber open, the cold water being at this time cut off, and hot water running through the filter from the hot-water reservoir.

In the filters now in use, wherein hot water is employed to cleanse them, the hot water has been either forced through the filter in a direction the reverse of that in which the cold water passes, by connecting the boiler with the filter, and employing the pressure of the water from the street-connection to drive it through, or else a fire-box has been constructed around a coiled pipe in one end of the filter, and the water heated as it passed through the coils, the same pressure being used in this case as in the former. This pressure, it has been found by experiment, differs materially in different cities and at different times in the same city, and is by no means uniform and reliable. In many instances where the filter has been neglected, the pressure has been insufficient to force the hot water through the clogged filtering material in the filter, and the filter needs to be taken to pieces to clean it—an operation almost as expensive as a new filter would be. Besides, hot-water boilers are not found in all houses where water-pipes are used, and in order to use the filters employed in connection therewith, the expense of a boiler must be incurred. On the other hand, where the fire-box is employed in the filter, time is wasted in building the fire to heat the water for the purpose of cleaning the filter. Extra fuel has also to be used, and should it happen that the filter was clogged the pressure from the street-connection might be insufficient to force the hot water through the filtering material, and the filter would need to be taken to pieces to be cleaned. These are some of the serious defects in the filters now in use.

To remedy these defects, and to produce a filter that may be placed in any house where water-pipes have been introduced, as well as to make the filter ornamental, are the objects of my invention; and to these ends it consists in a filter placed within a cabinet or case having a filter-chamber, filtered-water reservoir, hot-water reservoir, suitable pipes connecting them with the filter, and valves, cocks, and lever, and a pump for forcing the hot water through the filter when too badly clogged to be overcome by the gravity of the water itself, constructed, arranged, and operating in the manner and for the purposes hereinafter fully described, and particularly pointed out in the claims.

In the accompanying drawings similar letters of reference indicate corresponding parts in the several figures.

A represents a filter of ordinary construction, having the cold-water-inlet pipe *a* and the outlet-pipe *b* for the filtered water, which is emptied, by means of pipe *b*, into the filtered-water reservoir B. *c* is the hot-water-inlet pipe. The pipes *a* and *c* come near together at the lower end of the filter A, and a double

cock, C, having a lever, D, is operated to alternately open and close the pipes *a* and *c* by a quarter-turn of the lever D, which is connected, by a pivoted arm, E, to the door F. G is the hot-water reservoir, having a door, (shown in Fig. 1,) through which hot water is poured from any suitable utensil when it becomes necessary to cleanse the filter. A pump, H, located in the hot-water reservoir, has the piston I and hinged valve J. The hot-water pipe *c* leads downwardly from the pump H, and has a spring-valve, K, which opens downwardly therein. Within the filter the end of the cold-water-inlet pipe *a* comes directly opposite the end of the hot-water-outlet pipe *f*, leading to the sewer. A valve-connection is made between these two pipes through the valve L, which may have its seat against either pipe *a* or *f*, according to the position to which the double cock C has been turned. A spiral spring, *h*, is connected to the stem *i* of the valve L, is coiled within the hot-water-outlet pipe *s*, and holds the valve against the end of pipe *a*. The pressure of the water from the street-connection is sufficiently strong to open the valve L when flowing through pipe *a*, and to force the valve L against the end of pipe *f* to close it, and cause the water to pass through the filter and discharge into the filtered-water reservoir B through pipe *b*. A similar valve, L′, connects the ends of the filtered-water pipe *b* and the end of the hot-water pipe *c* within the upper end of the filter A, as shown. During the passage of cold water through the filter the pressure of the water closes pipe *f* through valve L, and the pressure of the spring *h* closes pipe *c* through valve L, so that the pipe *b* is open to permit the water to flow to the filtered-water reservoir B. When, however, the double cock C is turned to shut the cold water off, and hot water is poured into the hot-water reservoir G, the water by its own gravity passes through pipe *c*, and closes the pipe *b* by forcing the valve L against it. The spring *h* has already closed *a* by the valve L, leaving the pipe *f* open, and the hot water flows through *f* to the sink or sewer. At this time the pump H may be used if the filter has become too much clogged to be cleaned by the gravity of the hot water itself.

The pump H is connected with the pipe *c*, as shown in Fig. 5. The piston I being drawn back over the pipe *c*, the hinged valve J permits the water in the reservoir G to flow through pump H into pipe *c*. When it is found that the gravity of the hot water itself is insufficient to force its way through the filtering material to the sink, and thereby cleanse the filter of sediment, &c., the pump H is brought into requisition.

By drawing the piston I back and filling the pump with hot water, then driving the piston in, the valve J will close and the spring-valve K will open, forcing the water through the filter to the sink. Of course, the pumping operation can be continued as long as necessary. When the filter has been cleaned the cock C is turned to admit the cold water. By having the cock C connected by the lever D and rod E to the door F there is no danger of having the hot water and cold water come into the filter at the same time.

Having thus fully described my invention, what I claim, and desire to secure by Letters Patent of the United States, is—

1. In combination with a filter, a tank or hot-water reservoir adapted to be filled or furnished with hot water by having the same poured into it and connected to the filter by a pipe, so that the hot water will force its way by its own gravity from the upper end of the filter through the filtering material, and escape through the escape-pipe to the sink for cleansing the filter, as set forth.

2. In combination with a filter having a hot-water reservoir connected therewith by a pipe, which will usually permit the hot water to flow by its own gravity through the filtering material, a force-pump located in the hot-water reservoir, and connected with the hot-water pipe in such a manner that it may be used to receive the hot water and force it through the filter, substantially as and for the purpose set forth.

3. In a filter, the combination of the inlet and outlet pipes, placed directly opposite, with a valve held against its seat in the inlet-pipe by a spring secured to its stem, and placed in the end of the outlet-pipe, so that automatically opening the inlet-pipe will close the outlet-pipe, as and for the purpose set forth.

4. A filter incased within a cabinet having a filtered-water reservoir and a hot-water reservoir, and connected to both with suitable pipes, substantially as set forth.

5. In a cabinet-filter having a filtered-water reservoir and a hot-water reservoir, the combination of the cold-water-inlet pipe and the hot-water-inlet pipe with the double cock, which, when turned, will open the one and close the other, and vice versa, as and for the purpose set forth.

In testimony that I claim the foregoing as my own I affix my signature in presence of two witnesses.

H. J. ENNIS.

Witnesses:
THEO. MUNGEN,
JOHN O'DONNOGHUE.