

F. Laughlin,

Filter.

No. 103,206,

Patented May 17, 1870.

Fig. 1.

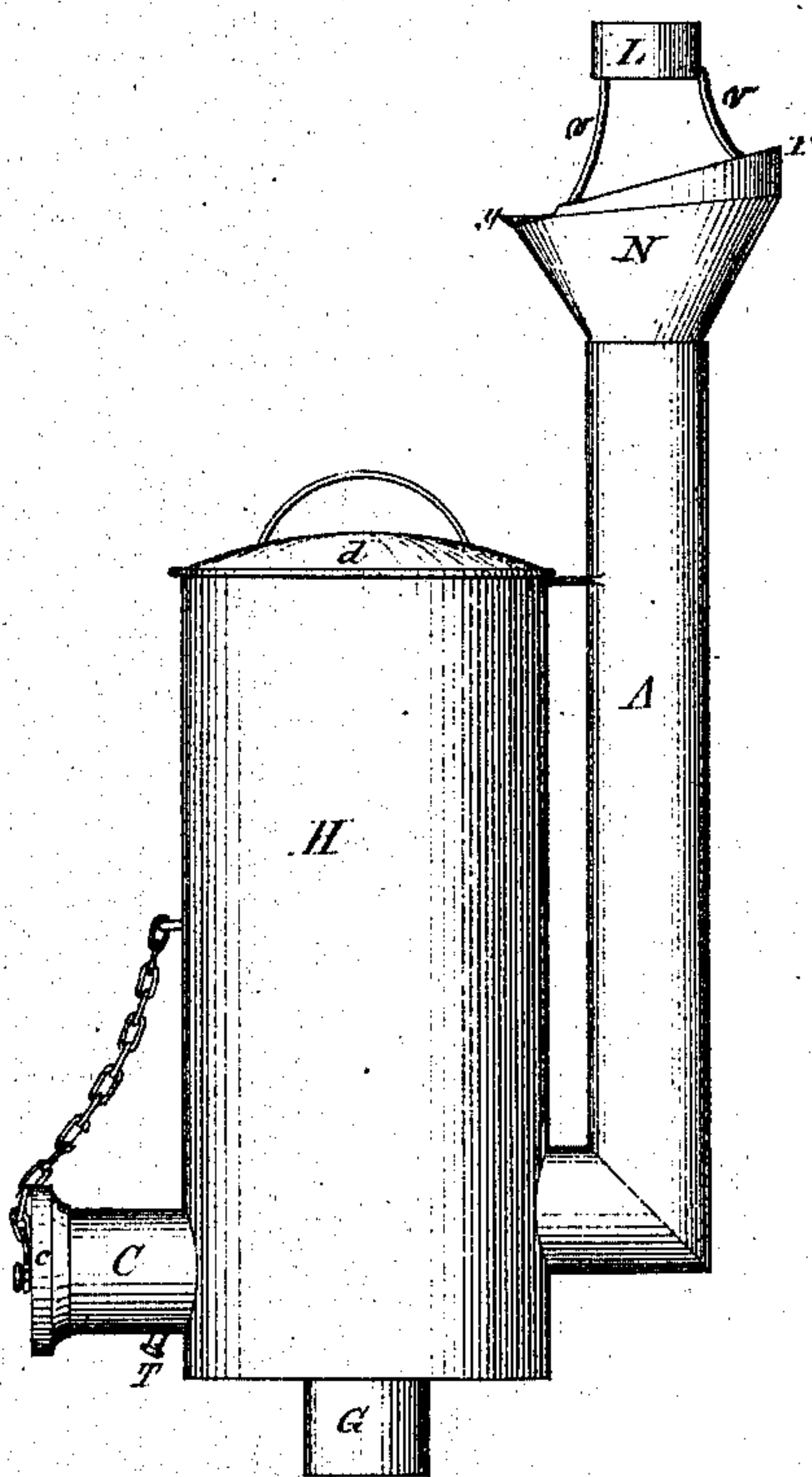
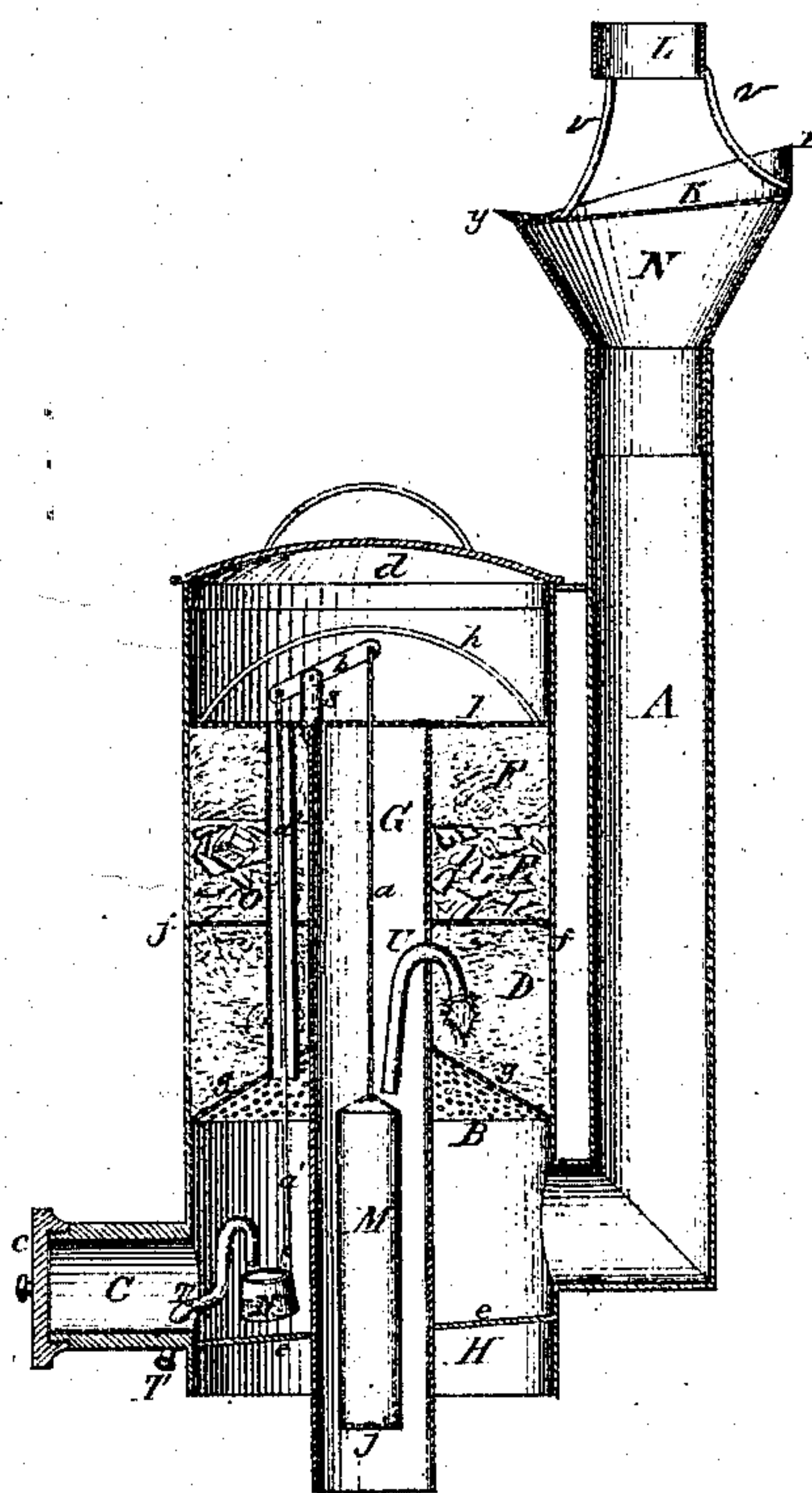


Fig. 2.



Witnesses:

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PATRICK LAUGHLIN, OF DANVILLE, KENTUCKY.

Letters Patent No. 103,206, dated May 17, 1870.

IMPROVEMENT IN FILTERS FOR CISTERNS.

The Schedule referred to in these Letters Patent and making part of the same

I, PATRICK LAUGHLIN, of Danville, in the county of Boyle and State of Kentucky, have invented certain Improvements in the Construction of Water-Filters for Cisterns, of which the following is a specification.

The first part of my invention relates to the devices which I employ for purifying water when flowing from a roof or any elevated position down into a cistern or other receptacle, by using the weight of the column of water descending through the pipe, on its way to the cistern, to force the water, after it has nearly reached the bottom of the filter, to rise up against the force of gravity through a series of beds of purifiers, such as charcoal, sand, gravel, and broken rock, and thus have these beds of purifiers to act upon the water, not only chemically but mechanically, inasmuch as they arrest and hold back a part of the impurities by mere mechanical action.

The second part of my invention relates to the easy and effectual removal of such impurities as shall become lodged in and adhere in the beds of materials themselves, by opening a discharge-pipe situated near the bottom of the filter, and conducting a stream of water into the top of the filter, so that it may flow down through the beds of purifiers and cleanse them.

The third part of my invention relates to the use of two siphons in the body of the filter, in such a manner as to act automatically, and effect the discharge of almost all the water left in the body of the water at the time the water from above ceases to flow into it, so that it may not become blocked up with ice in freezing weather.

The fourth part of my invention relates to the use of a peculiarly constructed and arranged strainer in the pipe, conducting the water into the filter in such a manner as to effectually exclude leaves and other trash which might otherwise accompany the water into the body of the filter, and choke it up, and render it inoperative.

In the drawings—

Figure 1 represents a side view of a cistern standing properly upright with my improvements embodied, while

Figure 2 is a vertical sectional view of the same in the same position.

A is the pipe leading the water from above down into the chamber B.

In the lower part of the body H of the filter *ee* is the flow of that chamber; and

g g is a perforated plate sustaining the purifiers above.

C is the discharge-pipe, through which is passed the dirty water when the filter is cleansed.

c is a cap, with a female screw to fit a corresponding male screw on that pipe, to close the same when the apparatus is in use.

This pipe should be inserted a little below the point at which the pipe A is inserted into the body H, as shown in the drawings.

As before intimated, the column of water in the pipe A, by its weight, forces the water up through the strainer *g g*; thence up through a layer, D, of one of the aforesaid purifiers; thence up through the strainer *ff*; thence through another layer, E; thence through a thickness of sponge; and thence through a strainer, I; and then it would fall into the upper end of the pipe G, which is open at both ends, the lower end discharging into the cistern.

d is the cover of the cistern, and

h is the handle of the strainer I, by which it can be removed.

Thus far the parts described are substantially the same with the whole of those described in my patent of March 1, 1870. My filter covered by that patent seems to be defective when used in cold climates, because of the fact that, when the water ceases to flow into the pipe A from above, the water in the body of the filter remains even with the top of the pipe G, and, in the event of a freeze in the night-time, or at any time, unless the cap *c* were removed and the water allowed to run out, it would freeze into a solid block of ice, and of course render the filter useless for a time. The two siphons before mentioned prevent such a contingency, so that my cisterns as now improved can never freeze up.

The siphon U is provided with a strainer, made up of a perforated plate or a piece of wire-cloth in a globular or oval form on the end which is outside of the pipe G and near the strainer *g*, while the other hangs considerably lower, and in the inside of that pipe. The siphon has the form, and is hung as shown in the drawings.

The other siphon, T, is formed as shown in the drawings, and is made fast when it passes through the shell of the body H, near the pipe C, to discharge outside the filter and cistern.

To operate them, the long cup M, with a small hole in its bottom, suspended by the rod *a* from one end of the lever *b*, which has for its fulcrum the standard S, which is made fast to the side of the pipe G, is provided, as shown in fig. 2.

The rod is attached to the lever *b* by a hinge-joint, so as to work freely, and the rod *a'* is attached to the other end of the lever *b* in a similar manner, and to the lower end of the rod *a'* is attached, by means of a screw or otherwise, a weight, N, having a piece of cork of proper form fitted into its top.

Now, when the water is flowing into the filter, and even until the siphon U has discharged so much of the water in the body of the filter that its surface falls below the lower end of that siphon U, the cup M is considerably heavier, by reason of the quantity of

water in it, than the weight, and it therefore draws that weight, with its smooth, soft, cork top up against the upper end of the siphon I, and thus effectually closes it, so that it cannot act. But, so soon as the siphon U ceases to discharge water into the cup M, the latter discharges and empties itself through the hole *j* in its bottom. That hole should be graduated in size, so as not to discharge faster than the cup receives, while it does receive, but to empty it pretty soon after it ceases to receive. Then, when the cup is relieved of its weight of water, the weight N becomes decidedly the heavier of the two, and falls away from the mouth of the siphon T, and it at once commences to discharge the remaining unfiltered water outside the cistern, until so little remains that its freezing would do no injury.

When about to cleanse the layers of purifying materials in the manner before described, the cover *d* may be removed, and the top of the pipe G closed by any simple stopper, and a stream of water discharged upon the strainer I.

The funnel-shaped strainer N, before mentioned, is so formed that its lower part slips down into the upper end of the pipe A, while the perforated plate or sheet of wire-cloth K, with a dip or inclination downward on the side next the body H, is fastened in the body N, and, by reason of that dip of the sheet of wire-cloth, the left side of the funnel extends a little above that sheet at *y*, and is flared outwardly to facilitate the throwing out such leaves and trash by the action of the falling water as may come down through the pipe conducting it. The dip of the sheet of wire-cloth is to co-operate in doing the same thing; but if there was no rim on the side at *y*, the water itself might glance off without passing down through the wire-cloth K.

By reason of this construction of the strainer for the throwing out of the leaves and trash, more or less water is also liable to be thrown out and wasted, and, in order to limit such waste and the splashing out of the water as much as practicable, I solder or otherwise fasten upon the top of the funnel the extra rim *r*, extending three-fourths or four-fifths around it, so as to leave merely room for the discharge of the leaves and trash.

The wide, flat ring L stands, as shown in the drawings, upon three legs, which are made fast on the inner side of the funnel. It may be constructed with any suitable form, width, and diameter, so as to receive the pipe or pipes discharging water from one or more roofs at the same time.

This strainer will be found to be very useful, if not indispensable, where the buildings from the roof of which water is to be obtained and filtered is surrounded

with shade trees. But it may be detached and not used at all where there is no necessity for its use, and its place supplied by a plain joint of pipe connecting with the pipe or pipes conducting the water from above.

My filter, with the new improvements herein described, in combination with those improvements covered by my patent of March 1, 1870, will be found cheap and simple in its construction, and easily repaired, when out of order, by unskilled mechanics, and the materials of which the different parts are made may be tin, iron, or any others that are suitable.

I will add to this description that, as the siphon U cannot filter the water very thoroughly which passes through it into the cup M, and thence into the cistern, its capacity should be as small as possible consistently with its effecting the object designed, which is that, after the water has ceased to flow from A into the chamber B, it shall discharge the water left in the purifiers above the strainer *g g*, and keep the cup M full, until the water sinks below its reach. Its duty is then done for the occasion. Then, when the cup M empties itself, the weight N is allowed to fall away from the mouth of the siphon T, which, by reason of the dip in the floor *e e*, is enabled to discharge nearly all of the unfiltered water left in the chamber B.

Freedom of vertical motion is secured to the rod *a* by the tube O, which acts as a sleeve for it, and extends from the perforated plate I down to the plate *g g*.

What I claim as new, and desire to secure by Letters Patent, is—

1. The strainer, composed of the funnel N, the wire-cloth sheet K, flared rim *y*, the extra rim *r*, and the ring L, with its legs *v v v*, constructed and arranged substantially as and for the purpose described.

2. The siphon T, weight N, rod *a*, sleeve O, lever *b* with its fulcrum S and rod *a*, cup M, in combination, when constructed and arranged substantially as and for the purpose described.

3. The siphon U, in combination with siphon T, weight N, rod *a*, sleeve O, lever *b* with its fulcrum S, rod *a*, and cup M.

4. The pipe A, water-chamber, B, pipe C with its cap *c*, perforated plates *g g*, *f f*, and I, layers D E F, and body H, in combination with siphon U, siphon T, weight N, rod *a*, sleeve O, lever *b* with its fulcrum S, rod *a*, and cup M, when constructed and arranged substantially as and for the purposes described.

PATRICK LAUGHLIN.

Witnesses:

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