(No Model.)

L. L. BENSON & W. T. STILWELL.

SEWER VENTILATOR.

No. 387,134. Patented July 31, 1888.

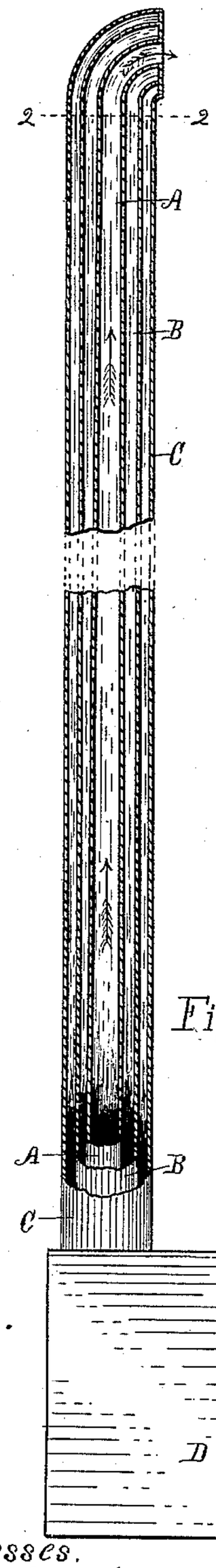

Fig. 1

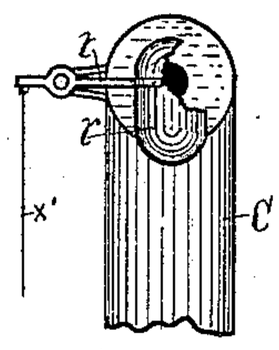

Fig. 2

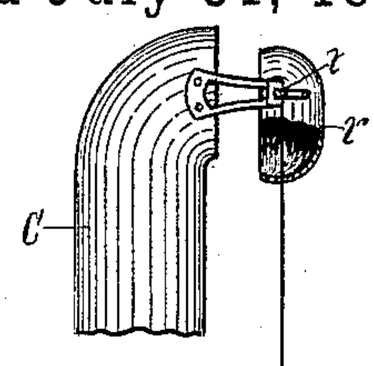

Fig. 3

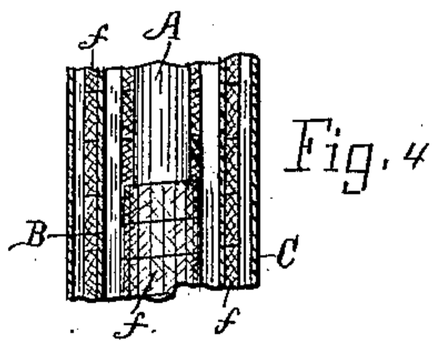

Fig. 4

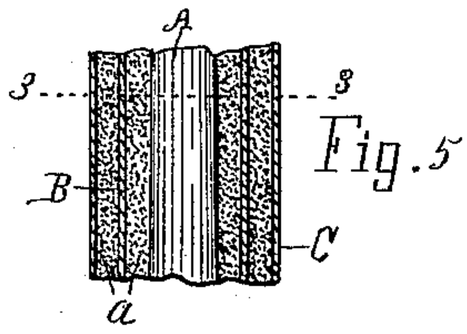

Fig. 5

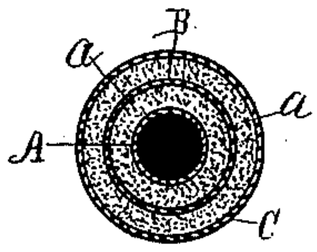

Fig. 6

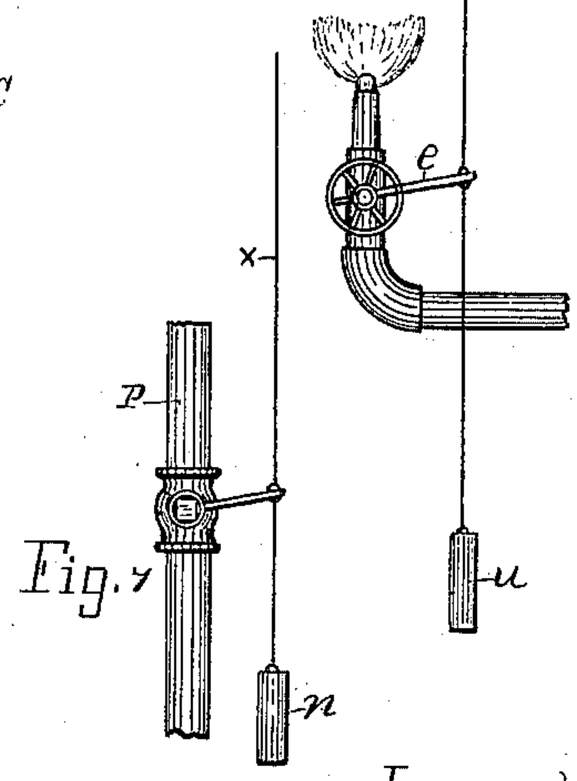

Fig. 7

Witnesses.
John C. Perkins
Geo. W. Hall

Inventors.
Lyman L. Benson
William T. Stilwell
By Lucius C. West
Atty.

UNITED STATES PATENT OFFICE.

LYMAN L. BENSON AND WILLIAM T. STILWELL, OF KALAMAZOO, MICHIGAN; SAID BENSON ASSIGNOR TO ELIZABETH I. BENSON, OF SAME PLACE.

SEWER-VENTILATOR.

SPECIFICATION forming part of Letters Patent No. 387,134, dated July 31, 1888.

Application filed June 17, 1887. Serial No. 241,578. (No model.)

To all whom it may concern:

Be it known that we, LYMAN L. BENSON and WILLIAM T. STILWELL, citizens of the United States, residing at Kalamazoo, county of Kalamazoo, State of Michigan, have invented a new and useful Sewer-Ventilator, of which the following is a specification.

This invention relates to a system of expelling noxious gases from sewers and drain-pipes, in which system are employed a furnace, a flame or flames in said furnace, an induction-pipe from the sewer and leading into the furnace, and an upcast draft-pipe leading from the furnace up into the open air through the roof of a building.

The objects of the invention consist in certain improvements set forth in the following description and claims.

In the drawings forming a part of this specification, Figure 1 is an elevation with parts in section; Fig. 2, a view looking from a point at the right of Fig. 3; Fig. 3, a view looking from a point at the left of Fig. 2 and showing certain parts below. Figs. 4 and 5 are broken parts of the draft-pipe in vertical section enlarged and showing changes from Fig. 1; Fig. 6, a section on line 3 3 in Fig. 5, and Fig. 7 an elevation of certain features below described.

Referring to the lettered parts of the drawings, D is the furnace, in which are gas-burners or other suitable burners. For a full understanding of this furnace reference may be had to Letters Patent granted to us in the United States January 4, 1887, No. 355,360. The induction-pipe E from where it joins the sewer F, grows smaller as it approaches and enters the end of the furnace D. By this means the flow of the gases and air from the sewer F is accelerated at the delivery into the furnace and a greater suction from the sewer is created and an increased volume drawn therefrom, and hence less flame is required in the furnace. The draft-pipe proper, A, also diminishes from the furnace to the top. The reason for this is that the temperature in the lower portion of the pipe A is warmer than at the upper end, and the upwardly-flowing air is expanded to a greater degree at the lower portion than at the upper, and thus the pipe is adapted to these conditions, and a stronger up-current is established than would be the case were the upper portion of the pipe A as large as the lower portion. This condition of the eduction from the furnace nicely conforms to those of the induction into the furnace, and hence better results are secured with a given amount of flame in the furnace.

For instance, if the updraft-pipe were all the way of the same size, the flow of the gases and air would be irregular and sluggish; but by employing a tapered updraft-pipe in conjunction with a tapered induction-pipe a great volume of gases and air flow from the sewer, which is compressed as it nears the small delivery-mouth of the pipe, and in order to enter the space in the furnace above the flame it must flow rapidly, so as not to retard the volume pressing behind, and it does flow more rapidly and forcibly (because of the tapered form of the updraft-pipe) to that degree that we have given the name "blower" to the induction-pipe. The flame is thus supplied with sufficient air to feed it without being blown out, which danger would be likely to happen were not the flow of the air and gases over the flame instead of through or against it. This peculiar furnace, thus associated with these induction and eduction pipes, as shown, accomplishes more now with a single gas-jet than could be done with a number in the old way shown in our prior patent above referred to.

It is desirable to preserve as near as possible an equal temperature throughout the draft-pipe A. To this end we employ a suitable number of tubes, B C, (one or more,) separated from each other and concentric with the draft-pipe A, Fig. 1. These tubes are closed at the lower end, so as not to communicate with the furnace interior, and are closed at the upper end as well. In lieu of the dead-air spaces between these concentric tubes, as in Fig. 1, in some instances we fill them with sawdust or other suitable filling, as at *a*, Figs. 5 and 6; or the pipe A and tubes may be wrapped with asbestus or other suitable material, as at *f*, Fig. 4. If preferred, both the filling and wrapping may be employed at the same time. By thus protecting the draft-pipe A the exterior cold is prevented from causing a condensation of the heated air in the upper portion of the pipe exposed to the weather, (or

in the entire pipe, if entirely exposed,) and thus forming moisture, which, without a protection to the draft-pipes, either drips down into the furnace or, when the temperature of the weather is sufficiently low, congeals, filling the pipe with a honey-comb of ice, and thereby preventing a proper updraft and escape of noxious elements out of the said draft-pipe.

The draft-pipe and its concentric tubes may terminate perpendicularly at the upper end—as, for instance, at the dotted line 2 2 in Fig. 1—or it may elbow over, as shown in said figure; but in either instance the end of the concentric spaces would be closed and the draft-pipe A alone remain open.

In Figs. 2 and 3 we have shown a receptacle, *r*, attached to a fulcrumed lever, *t*. The receptacle is opposite the mouth of the elbowed end of the draft-pipe, and is a little removed from said mouth. A wire or rod, *x'*, is attached to the end of the lever *t*, beyond the fulcrum of said lever, and a weight, *u*, is attached to the lower end of said wire, so as to counterbalance the weight of the receptacle *r* and hold it in the normal position in the high temperature here shown. The wire *x'* is connected with the throttle *e* of a gas burner or burners, (see lower end of Fig. 3,) or it may also be attached to the lever of a damper in the downdraft-pipe P, Fig. 7. The gas-burner when thus in use is of course in the furnace D; but we have simply detailed the burner and damper-lever in this manner to illustrate their automatic control by the counterbalanced receptacle and the congealed moisture therein, as below explained, not wishing to limit ourselves to any particular construction and arrangement so long as the following result is attained: When the temperature is at a freezing-point, the warm air from the delivery-mouth of the draft-pipe first condenses in the receptacle *r* and then congeals, and when sufficient ice has accumulated in the receptacle it will tilt down, and this action automatically opens the throttle *e* of the burner farther, and thus more flame is supplied in the furnace when needed, and this action would also regulate the supply of air from the downdraft-pipe, provided the damper was attached to the wire *x'*.

When the temperature of the weather becomes sufficiently warm to thaw the ice out of the receptacle *r*, the latter will automatically resume its normal position, and said action will shut off the excess of flame, which will not then be needed.

Having thus described our invention, what we claim is—

1. The combination of the sewer-furnace having the space between the flame and the upper inclosure, a sewer-pipe, an induction-pipe diminishing in size from its connection with the sewer to its connection with the end of the furnace at the top, and an eduction-pipe diminishing in size from its connection with the top of the furnace at the other end to the delivery end of said pipe, whereby the results and advantages are effected substantially as set forth.

2. An updraft-pipe of a sewer-furnace, elbowed at its delivery end, a fulcrumed receptacle in position to receive the escaping heated air from said pipe, a furnace-burner, a suitable connection between said receptacle and the throttle of the burner, and a counter-balance to the receptacle, combined to effect the results substantially as set forth.

In testimony of the foregoing we have hereunto subscribed our names in presence of two witnesses.

LYMAN L. BENSON.
WILLIAM T. STILWELL.

Witnesses:
W. S. WHITEHEAD,
J. V. TALLMAN.