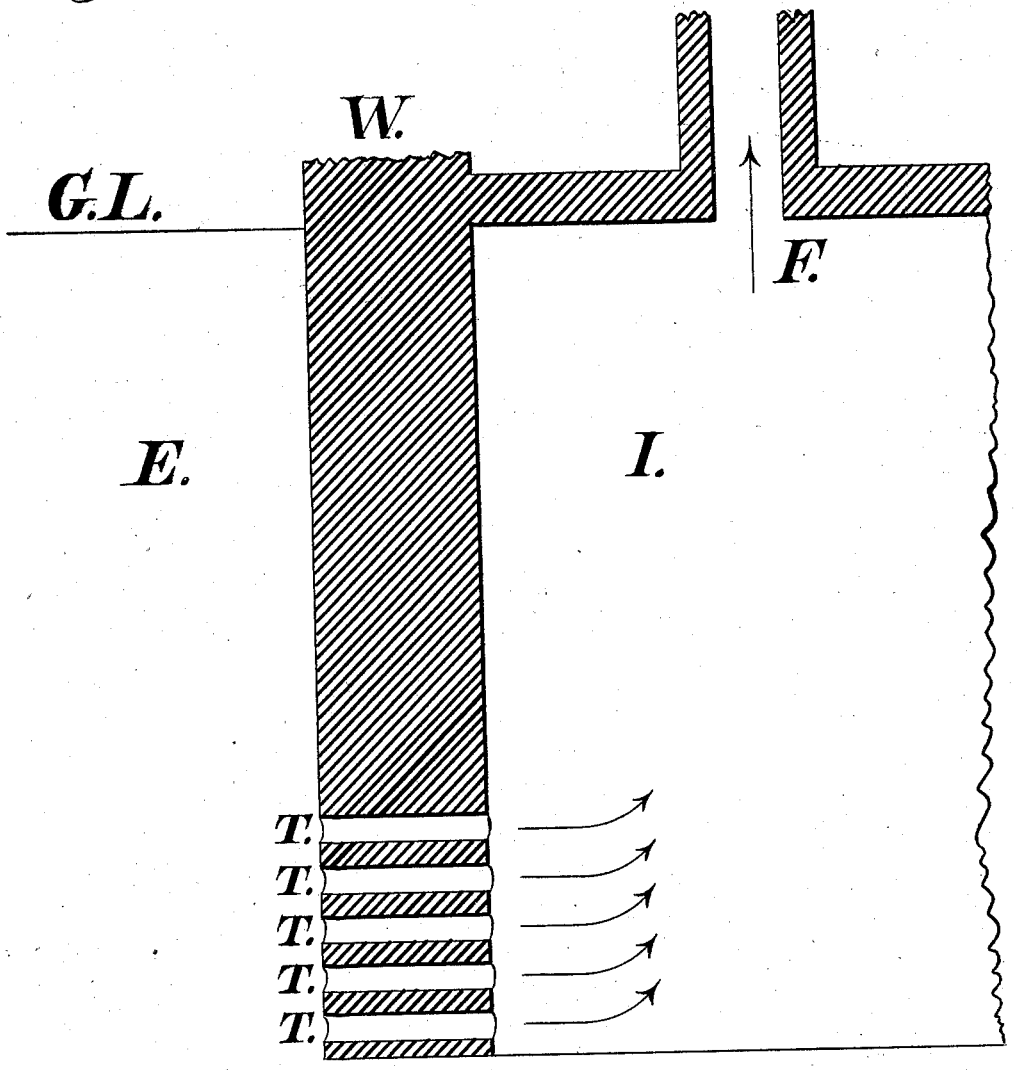
2 Sheets--Sheet 1.

J. K. FRICK.

Constructing, Ventilating, and Cooling Cellars.

No. 165,486. Patented July 13, 1875.

Fig. 1.



WITNESSES:

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Fig. 2.

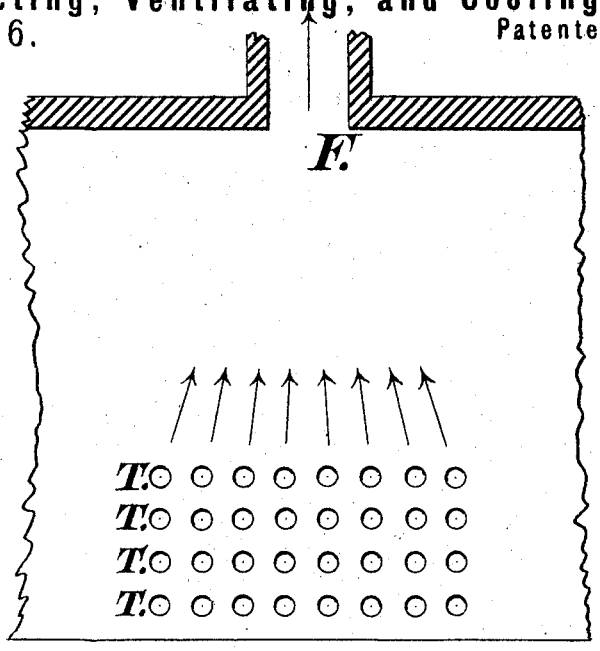
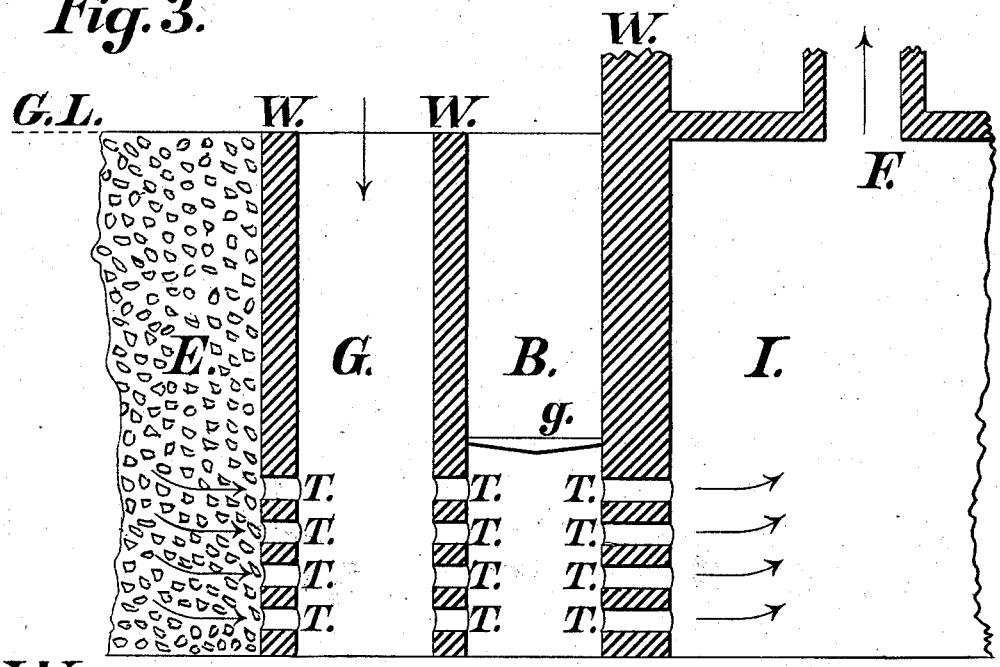


Fig. 3.



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UNITED STATES PATENT OFFICE.

JOSEPH K. FRICK, OF EVANSVILLE, INDIANA.

IMPROVEMENT IN CONSTRUCTING, VENTILATING, AND COOLING CELLARS.

Specification forming part of Letters Patent No. **165,486**, dated July 13, 1875; application filed March 16, 1875.

To all whom it may concern:

Be it known that I, JOSEPH K. FRICK, of Evansville, Indiana, have invented a new Mode of Constructing, Ventilating, and Cooling Cellars, of which the following is a specification:

The object of my invention is to cause a current or currents of cool air to pass from the earth, stones, or gravel outside of cellar-walls through the cellar upward or outward into the open air. By means of tubes open at each end and extending through the cellar-wall, I obtain the air from the earth where the air naturally exists whenever the soil is porous, light, or sandy. The outside end of the tubes, or those ends toward the earth, may either bear directly against the earth, so that these ends may appear to be stopped up by the earth, or, as is preferable where the nature of the soil will admit, they may be inserted in holes bored in the earth a short distance, or, where that is not practicable, the earth may be removed a little from the immediate vicinity of the outside ends of the tubes. By either inserting the outside ends of the tubes in holes bored in the earth, or removing the earth a little ways from the ends of the tubes so as not to be in immediate contact with them, there will be less danger of the tubes stopping up with earth and thereby lessening the draft of air thus obtained from the earth. The filling of the tubes, however, with porous soil will not destroy the draft of air, but may to some degree impede it. I provide also for openings or flues from the cellar to the exterior atmosphere, as hereinafter to be named.

Although I believe it is not generally known that atmospheric air exists to such an extent in a state of nature in loose porous soils as to be sensibly felt through openings in the walls of cellars, underground vaults, or tunnels, when provisions are made for a draft to the external air, yet such is the fact. I do not know that I am the first discoverer of this phenomenon, but I certainly am the first to apply this discovery to cellars, and in the same manner it is equally applicable to all underground vaults, or to tunnels, where, from any cause, tunnels cannot otherwise be conveniently ventilated.

Where the walls of the cellar are surrounded by a heavy clay soil, I dig a well or rectangular-shaped shaft outside of and adjoining the cellar-wall, so that the outside face of the cellar-wall shall constitute one side or wall of the shaft also. This rectangular shaft should generally and preferably extend parallel with the wall of the cellar, and may, if necessary, go entirely around the walls of the cellar; but it may be simply a well or hole outside the cellar-wall. Its shape or extent is not material in the application of my invention. It is preferable that it should be about as deep as the cellar. I fill it with sand, gravel, porous earth, or stones, and I obtain my cool currents of air from and through the sand, gravel, porous earth, or stones which have been so placed in the hole, well, or shaft. I make such shaft or well with or without a wall or walls, as circumstances may requre. Where the earth is wet and seepy, walls and even a floor may become necessary in the construction of the shaft. The object of the shaft in the clay soil is to afford a receptacle for the sand, gravel, stones, or porous earth from which the cool air is to come by means of the tubes through the cellar-wall as I have described. While the air thus obtained from this artificial receptacle of porous earth or stones may not always be as cool as that obtained where the soil is such that the receptacle may be dispensed with, yet it is nevertheless cool and affords a good draft into the cellar. It is not absolutely essential that tubes be used in obtaining the cool air from the porous earth outside. Instead of tubes, openings of any sort may be made in the cellar-walls, although tubes made of terra cotta are generally preferable. Nor is it absolutely essential that these openings be made in the wall. The tubes may be inserted in the bottom of the cellar through the impacked earth of the floor down into the looser and more porous earth below, with the same effect in kind, though generally to a less degree. Usually, it is preferable to insert the tubes or leave the openings near the bottom of the cellar-walls; but in cities, where party-walls interfere, it may sometimes become necessary to obtain the cool air, by means of my invention, from the earth underneath the floor of the cellar.

My invention is also applicable to beer-cel-

lars and other cellars where ice is used in hollow walls around the cellar to keep it cool. In such cellars I take the air, first, from the earth in the manner before described, and pass it by tubes or openings into a vault or cell made cold by ice; and, secondly, pass it by means of another set of tubes or openings from the ice-cell into the interior of the main cellar, so that the cool air obtained from the porous earth, gravel, or stones is made cooler by passing through an ice-cell. It is preferable that the ice in the ice-cell should rest on a grating just above the currents of cool air. Such a grating is shown at G in the drawing, Figure 3.

In applying my invention to beer-cellars in cases where it becomes necessary to have an extraordinary amount of air and a rapid draft and greater than can be obtained from the earth by reason of the soil not being sufficiently porous, I dig a shaft outside of the ice-cell and fill the shaft with coarser gravel, earth, or stones than is found in the earth immediately outside. Such a shaft between walls is shown at G in Fig. 3. I use such a shaft, when necessary, in combination with and in addition to the use of tubes extending into the earth outside. The tubes from the earth extend, or open, into this shaft, and it also communicates in the same way with the ice-cell shown at B. Should the earth outside the shaft G be heavy clay or wet and seepy, I enlarge the shaft and make its outside wall and its floor tight, and only leave openings into the ice-cell for the purpose of passing in the air.

In combination with my invention for receiving air from the earth, gravel, or stones, as herein described, I employ flues or other openings from the interior of the cellar to the external atmosphere. Such flues or other openings are necessary to produce a draft and constant passage of air from the earth, stones, or gravel in the manner described. Such a flue or opening is indicated at F, in Figs. 1, 2, and 3.

Figure 1 illustrates the main features of my invention.

W is a transverse sectional or edge view of a cellar-wall; I, the interior of the cellar; E, the earth outside the cellar, extending indefinitely; T T T T T, longitudinal sectional view of the open-ended tubes passing from the interior of the cellar to the porous earth, gravel, or stones outside, through which tubes the cool air passes from the earth to the interior of the cellar; F, flue or opening, from the interior of the cellar to the open air; G L, ground-line. The arrows in this, as in Figs. 1, 2, and 3, indicate the course of the cool air in its course to, through, and out of the cellar.

Corresponding letters in Figs. 2 and 3 indicate corresponding parts.

Fig. 2 is a section of the interior side of a cellar-wall, showing the tubes or openings as they appear in the usual mode of construction and as viewed from the interior of the cellar. Fig. 3 illustrates the application of my invention to beer-cellars or other cellars where ice is used in the hollow between double cellar-walls; also its application to cellars where the outside earth is not sufficiently porous to obtain the necessary amount of air. The main cellar-wall in Fig. 3 may be distinguished from the other outside walls by being thicker.

W, wherever it occurs, indicates edge views of walls. B is the ice-cell; *g*, the grating on which the ice rests in its cell; G, receptacle or shaft between wall to be filled with coarser earth, gravel, or stones than may exist in the earth immediately outside, and which may be necessary where an extraordinary draft of air may be required, or which may be necessary where the earth outside is wet or seepy, in which case, the outside set of tubes or openings to the earth must be closed up and a floor made in the shaft and its size enlarged, in order to make up for a deficiency in the supply of air from the earth.

I claim as my invention—

1. Cellar-walls and underground vault-walls, constructed with tubes or other equivalent openings, communicating with the earth outside, as and for the purposes described.

2. Cellar-floors and underground vault-floors, constructed with tubes or other equivalent openings communicating with the porous earth underneath the floor, as and for the purposes described.

3. Cellar-walls and underground vault-walls, constructed with tubes or other equivalent openings extending into the earth, in combination with flues or other equivalent openings from the interior of the cellar to the external air, as and for the purposes described.

4. Cellar-floors and underground vault-floors, constructed with tubes or other openings communicating with the porous earth underneath the floor, in combination with flues or other equivalent openings from the interior of the cellar to the external air, as and for the purposes described.

5. The combination and arrangement of the cell G, with or without tubes or other equivalent openings communicating to the surrounding earth and passing through the outside wall, the ice-cell B, and its tubes or equivalent openings communicating with the cell G on one side and the interior of the cellar I on the other side, the cellar-wall W, constructed with tubes or other openings into the ice-cell B, together with the flues or other openings from the interior of the cellar to the external air, as and for the purposes specified.

JOSEPH K. FRICK.

Witnesses:

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