

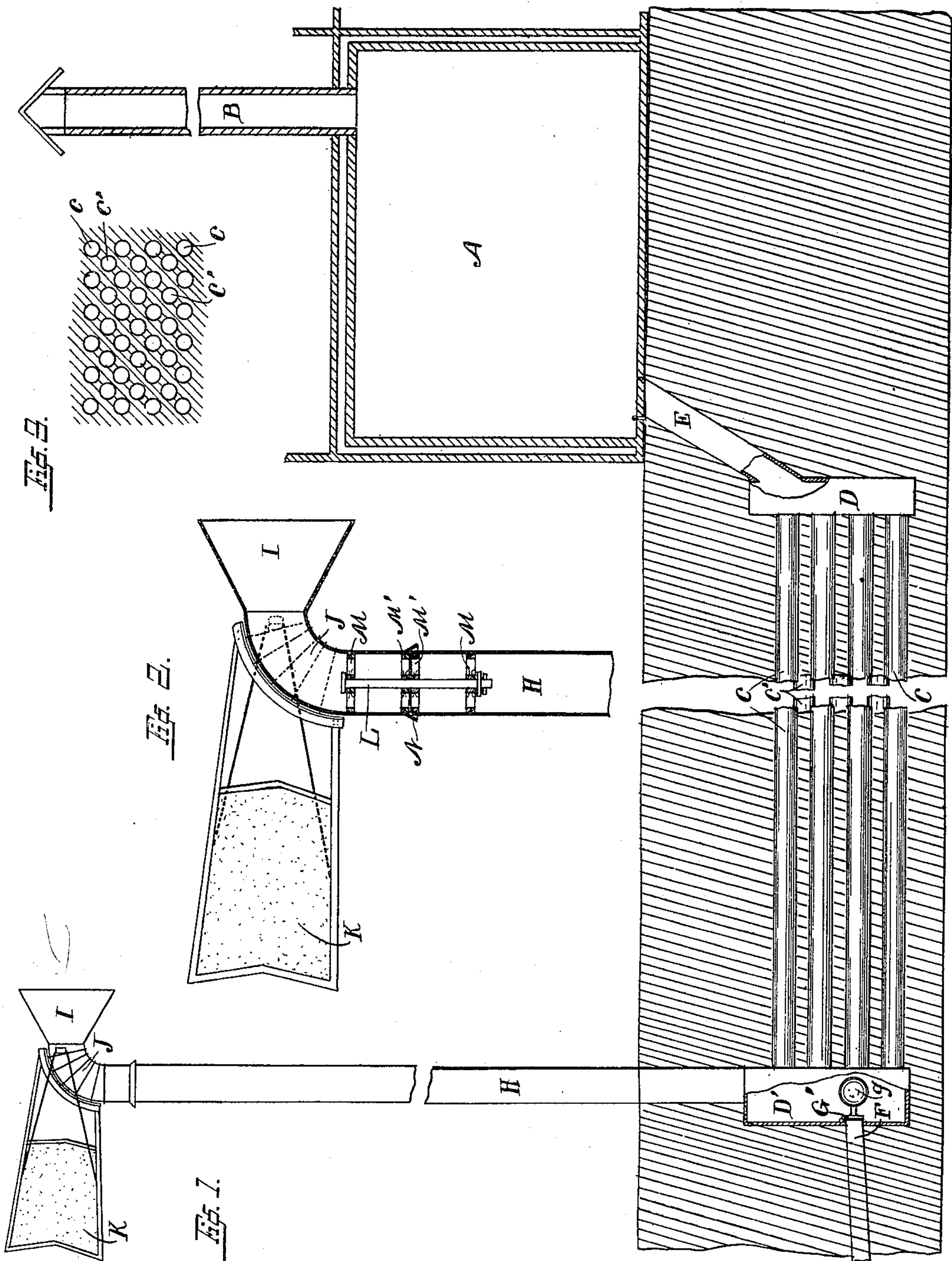
No. 654,264.

Patented July 24, 1900.

O. F. LUEDER & H. C. ALVES.
AIR COOLING AND VENTILATING SYSTEM.

(Application filed May 7, 1898.)

(No Model.)



Witnesses.

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UNITED STATES PATENT OFFICE.

OTTO F. LUEDER, OF PLYMOUTH, AND HUGO C. ALVES, OF SHEBOYGAN FALLS, WISCONSIN.

AIR-COOLING AND VENTILATING SYSTEM.

SPECIFICATION forming part of Letters Patent No. 654,264, dated July 24, 1900.

Application filed May 7, 1898. Serial No. 679,983. (No model.)

To all whom it may concern:

Be it known that we, OTTO F. LUEDER, residing at Plymouth, and HUGO C. ALVES, residing at Sheboygan Falls, in the county of Sheboygan and State of Wisconsin, have invented new and useful Improvements in Air-Cooling and Ventilating Systems, of which the following is a specification.

Our invention relates to improvements in air-cooling and ventilating systems for cheese-factories and similar places in which it is desired to secure a uniformly cool and damp atmosphere.

The object of our invention is to provide means for automatically introducing moist air at a uniformly-cool temperature into the curing-room of a cheese-factory or any other storage-chamber.

We are aware of the fact that numerous attempts have heretofore been made to utilize the air from underground chambers for the purpose of refrigeration; but such attempts have not been successful, owing to the fact that no means were provided for absorbing the heat units of the air which must necessarily be introduced into such chambers to take the place of the cool air which is withdrawn. Our invention, however, contemplates the use of such chambers in connection with the chamber to be refrigerated, in combination with a series of subearth ducts or passages into which the moisture of the soil is freely permitted to enter, such moisture tending to constantly distribute itself by capillary action on the interior walls of the ducts or passages, where it is taken up by air-currents automatically introduced from the exterior atmosphere, with the result that the evaporating liquid takes up the heat of the air and increases its humidity, thus furnishing the storage-chamber with a continuous supply of moist cool air without any expense other than the initial cost of installing the plant.

In the following description reference is had to the accompanying drawings, in which—

Figure 1 is a vertical section view drawn on the axis of the air-inlet and ventilating pipes, but showing in full the wind-collecting device and vertical stack of the air-inlet. Fig. 2 is a section view of the wind-collector and up-

per end of the stack. Fig. 3 is a cross-section of the subearth-pipes.

Like parts are identified by the same reference-letters throughout the several views.

A is a storage-chamber, such as the curing-room of a cheese-factory. This should be constructed so as to be but little affected by exterior temperatures. A convenient manner of accomplishing this result is by providing double walls, windows, and doors. From the curing-room a ventilating-stack B leads upwardly to a point above the roof of the building at sufficient height to provide a good draft. The top of the stack may be provided with any suitable form of mouth adapted to facilitate the discharge of air from the storage-chamber. Adjacent to the building we have provided a system of subearth air-ducts C C, preferably formed of tiling or of short sections, if made of metal, so that the ducts will freely admit water from the surrounding soil, and communicating at their respective ends with air-chambers D D'. The air-chamber D communicates with the interior of the chamber A through a passage E, and the chamber D' is provided with a drain-pipe F, which permits the discharge of the water from the air-ducts C and chamber D D'. The drain-pipe F is preferably provided with a float-actuated valve G, which keeps the same normally closed; but it is adapted to be opened by water in the chamber D' whenever the latter accumulates sufficiently to actuate the float *g*. H is an air-inlet stack which communicates with the air-chamber D' and is provided at its upper end with a wind-collecting funnel I, supported on an elbow J, rotatably secured to the stack, as hereinafter explained. The funnel I is held with its mouth to the windward by means of a vane K, secured thereto, as shown in Figs. 1 and 2.

For securing the funnel-elbow J to the stack H we use a securing-bolt L, which runs through centrally-disposed bearings in the internal brackets M M'.

It will be observed that the brackets M' of the elbow and stack, respectively, bear upon each other and furnish an annular support for the elbow and wind-collector, suitable antifriction devices being interposed, if desired. The joint is preferably covered by the

downwardly-diverging collar N, attached to the lower end of the elbow J.

The operation of our invention is described as follows: The funnel I being held with its 5 mouth to the windward by a vane K, the air is collected thereby and driven by the pressure of the wind downwardly through the stack H into the air-chamber D', thence through ducts C, air-chamber D, and up- 10 wardly through the pipe E into the chamber A, carrying with it the moisture which constantly tends to accumulate on the interior surface of the ducts and which by its evaporation takes up the heat of the atmosphere and 15 reduces the temperature. The warm air in the chamber A finds its escape through the ventilating-stack B.

It will be observed that the pipes C C are numerous and are separated from each other 20 by the earth-spaces C'. They are also of considerable length, their number and size depending to a large extent upon the size of the storage-chamber or curing-room to be ventilated. For ordinary rooms we prefer to pro- 25 vide air-ducts C of about three hundred feet in length and with a slight incline downwardly toward the air-chamber D' to facilitate the discharge of surplus water. As the air driven downwardly in the stack H is subdivided in 30 the duct C and as the ducts C are permeable to the water of the surrounding soil which constantly enters and distributes upon the interior walls of the ducts, the air becomes moistened and modified in temperature both 35 by distributing its heat to the surrounding earth and by the evaporation of the moisture. The air therefore enters the chamber A in a moist condition and at a very uniform cool temperature, regardless of exterior condi- 40 tions.

Having thus described our invention, what we claim as new, and desire to secure by Letters Patent, is—

1. The combination of a storage-chamber, 45 such as the curing-room of a cheese-factory; a ventilating-stack adapted to permit the escape of air therefrom; subearth air-ducts in communication therewith; means for permitting the moisture of the soil to percolate 50 through said ducts; and means for automatically directing the natural currents of the at-

mosphere through said ducts, whereby the air is reduced in temperature by intimate contact with the soil and by the evaporation of the moisture in the ducts, the humidity of the 55 atmosphere being at the same time increased by such evaporation, substantially for the purpose set forth.

2. The combination with a storage-chamber, such as the curing-room of a cheese-fac- 60 tory; of means for permitting the escape of warm air therefrom; a series of permeable subearth air-ducts in communication therewith; and an elevated wind-collecting funnel in communication with said subearth air- 65 ducts, at a point distant from said storage-chamber, substantially for the purpose set forth.

3. The combination with a storage-chamber, such as the curing-room of a cheese-fac- 70 tory; of means for permitting the escape of the warmer air therefrom; a subearth air-chamber in direct communication with the storage-chamber; a second air-chamber located at a distance from said first-mentioned 75 chamber; permeable subearth air-ducts communicating between said chambers; and means for automatically directing external air through said chambers and ducts, into the storage-chamber, substantially for the pur- 80 pose set forth.

4. The combination with a storage-chamber, such as the curing-room of a cheese-fac- 85 tory; of a system of permeable subearth air ducts and chambers in communication therewith; a float-actuated valve normally closing the same; and means for exhausting the warmer air from the storage-chamber and automatically directing the currents of the ex- 90 terior atmosphere through said subearth air ducts and chambers into the storage-chamber, whereby the air is moistened and modified in temperature, in passing through the ducts, substantially for the purpose set forth.

In testimony whereof we have hereunto set 95 our hands this 27th day of April, 1898.

OTTO F. LUEDER.
HUGO C. ALVES.

Witnesses:

A. C. SHAW,
H. J. ROONEY.