

A. S. LYMAN.

Air Cooler.

No. 14,510.

Patented March 25, 1856.

Fig 1

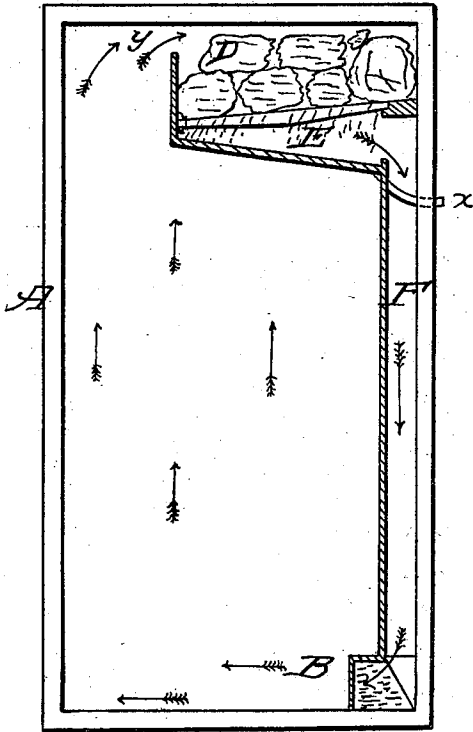
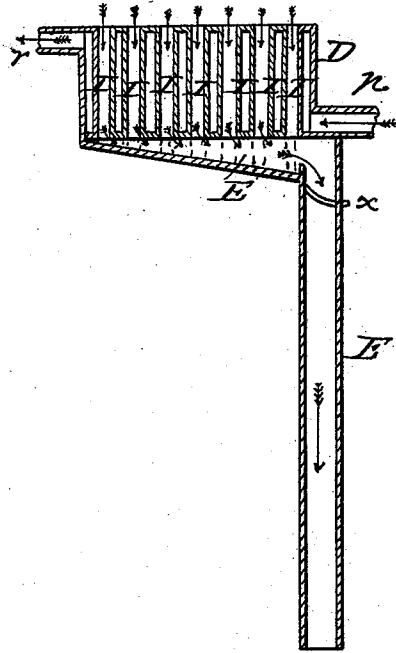


Fig 2



# UNITED STATES PATENT OFFICE.

AZEL STORRS LYMAN, OF NEW YORK, N. Y.

IMPROVED METHOD OF COOLING AND VENTILATING ROOMS, &c.

Specification forming part of Letters Patent No. 14,510, dated March 25, 1856.

*To all whom it may concern:*

Be it known that I, AZEL STORRS LYMAN, of the city, county, and State of New York, have invented certain new and useful Improvements in Cooling, Drying, and Disinfecting Rooms; and I do hereby declare that the following is a full, clear, and exact description of the same, reference being made to the annexed drawing, making a part of this specification—that is to say:

My improvement in cooling, drying, and disinfecting consists in the peculiar construction of the box or reservoir for holding the ice or other cooling material. The object sought to be accomplished by this construction is the production of a blast or current of cool air in a determined direction without mechanical aid and irrespective of place. The principle I employ is that which is exemplified in the hydrostatic column, and my use of it may be understood by the following comparison: If we suspend a cake of ice freely in the air and near to the ceiling of a closed room, slight currents would soon be produced by the disturbance of the equilibrium consequent upon the cooling of the air in contact with the ice. These currents would be feeble, because the cold descending air would spread out over a wide base and the temperature soon become equalized by mixture with warm air. If, however, we should place under the ice a pipe of sufficient size to surround the ice, the air as it cooled would fall down and soon fill the pipe, but still have a tendency to spread laterally in consequence of its gravity, and therefore it would exert pressure on all sides similar to a non-elastic fluid. If a plug were now pulled out of the bottom of the pipe, this air would pour out with a certain force, due to the difference of temperature outside and inside and to the height of the column, obeying precisely the same laws which would govern a non-elastic fluid. The construction of a refrigerating-box on this principle enables me to employ it to various useful and valuable purposes—such as the preservation of meats and vegetables, ventilating, cooling, drying, and disinfecting apartments in hospitals, sleeping and other rooms—all of which will appear in the following description of the construction and operation of my refrigerating apparatus.

This apparatus consists of three parts—viz.,

a reservoir or receptacle for the cooling material, a cold-air chamber, and a conduit or blast-pipe. The reservoir, when adapted for holding ice as the cooling material, is a box open at the top, and as shown at D, Figure I. This is divided into two compartments by a grating, the latter serving to support the ice, while the space beneath forms the cold-air chamber E, which allows of the free settling of the cold air from all parts of the grate.

At F is the conduit. This is a trunk or pipe attached to the cold-air chamber, and may be of differing lengths, according as the blast is to be more or less forcible, the higher the column the greater being the weight and velocity of the discharge.

I will now describe the manner of application, together with some of the various uses to which the instrument may be put. When inclosed within an air-tight compartment, as shown in Fig. I at A, and the box D charged with ice, the moisture will be extracted from the air at the same rate that its temperature is reduced, in the following manner: The air in A is at first of the temperature of the surrounding media, and its hygrometrical condition is the same. Ice being now introduced into the box D, the air in contact will be immediately reduced in temperature, condensation takes place, and moisture is deposited. The condensed air, being of greater specific gravity, falls into the air-chamber E, flowing thence into F. Here, as it cannot spread out and commingle with the external and lighter air, it drives that already in the pipe before it and out at the bottom, finally pouring out itself in a continuous stream. Once out it still continues to act similar to the flow of water, spreading over the floor, and in doing so displaces the lighter and warmer air, forcing the latter upward toward the top of the apartment. As it there comes in contact with the ice, the condensation and precipitation of moisture go on until a minimum temperature is reached. Thus a continual circulation is kept up in such manner that the whole of the air must circulate through the ice-box. Of course all articles such as meats and vegetables would be deprived of the moisture in a like degree with the air, the latter being brought to the condition of great purity and dryness. As the water collects, it falls to the bottom of the cold-

air space E, whence it is discharged to the outside by a suitable pipe, as shown at *x*. In cooling living-rooms, dairies, &c., I propose, where the locations allow of it, to employ cold spring or well water as the cooling element for the production of the blast, and for this purpose the refrigerator will be modified in so far as concerns the cooling-box. Such modification is shown in Fig. II, the box D being a tank capable of holding water, having an inlet at *p* and an outlet at *r*. A series of tubes (arranged vertically will be best) is set in the box, as shown at I. These open into the cold-air box E in the same manner as for the ice-box, there being a conduit, F, as before. The cold well or spring water may be made to flow through *p* by a "ram," or otherwise, and, filling up D, discharges at *r*, thus surrounding and cooling all the tubes I. As the air within is cooled, it descends into E, flowing thence through F into the apartment to be cooled, and as the cooling goes on the moisture condensing from the air will be deposited upon the sides of the tubes, and trickling down will fall into the trap in E and be discharged, and the operation will be otherwise as before de-

scribed. By this means a dairy or other room may be kept dry and cool at little or no expense for the cooling element. For disinfecting, a charcoal-box or other suitable agent may be employed, either by combining it with the cold-air pipe in manner shown at B or by placing it at *y*, where the warm and moist air passes over to be cooled and dried.

Instead of a single flue, several may be employed, in combination with one cooling-reservoir; or where the apartment is of considerable size more than one reservoir for the cooling materials and flues in like manner may be arranged either to increase the circulation or to reduce the temperature and drying, or both, as may be required.

I claim as my improvement—

In cooling, drying, and disinfecting rooms, the combination of a descending conduit or cold-air flue with a reservoir for containing cooling materials, substantially in the manner and for the purposes described.

AZEL STORRS LYMAN.

Witnesses:

J. P. PINSSON,  
S. H. MAYNARD.