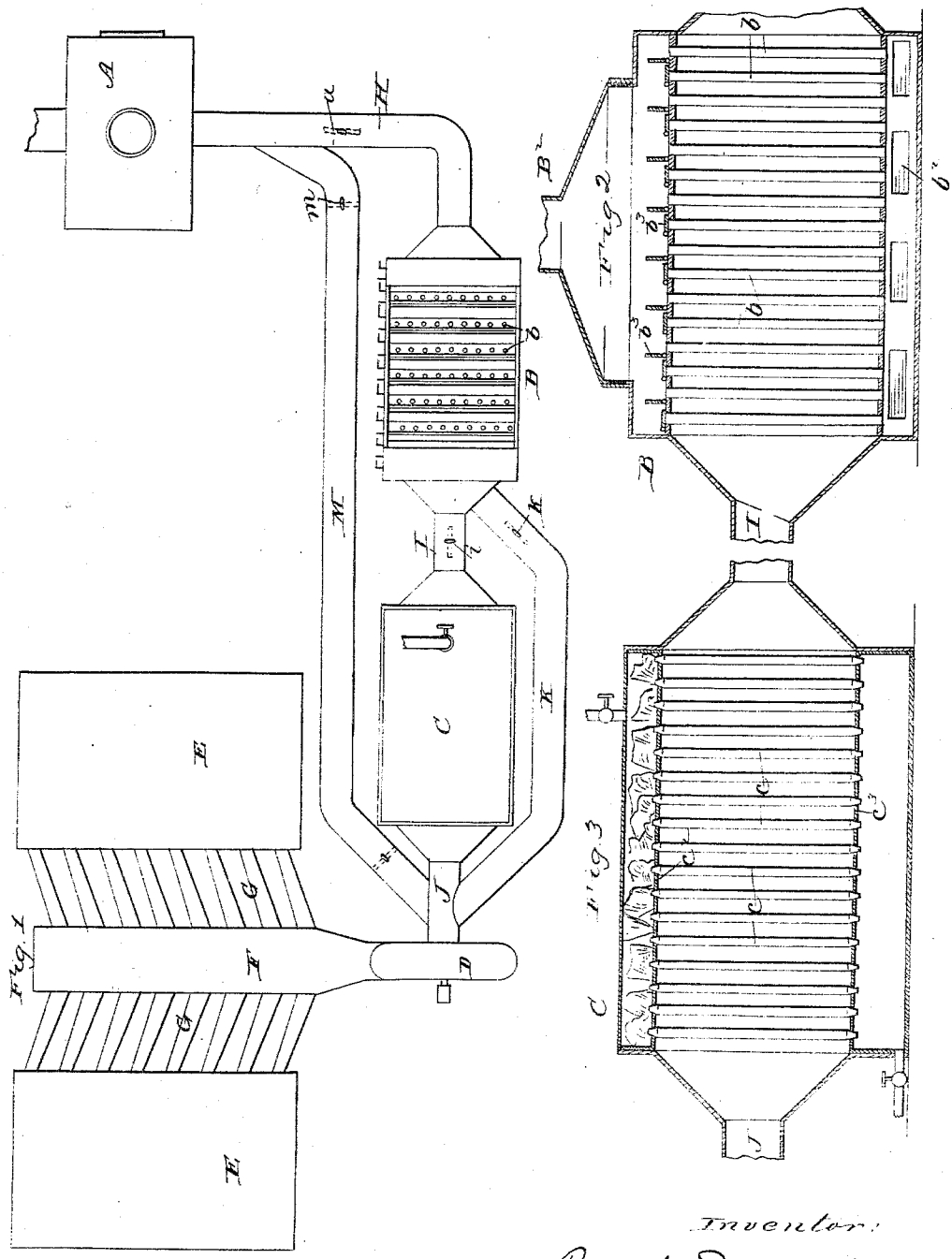
(No Model.)

R. S. JENNINGS.

APPARATUS FOR TREATING AIR TO BE USED IN DRYING.

No. 303,164. Patented Aug. 5, 1884.



Witnesses
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UNITED STATES PATENT OFFICE.

RALPH S. JENNINGS, OF BOSTON, MASSACHUSETTS.

APPARATUS FOR TREATING AIR TO BE USED IN DRYING.

SPECIFICATION forming part of Letters Patent No. 303,164, dated August 5, 1884.

Application filed March 8, 1883. (No model.)

To all whom it may concern:

Be it known that I, RALPH S. JENNINGS, a citizen of the United States, residing at Boston, in the county of Suffolk and State of Massachusetts, have invented certain new and useful Improvements in Apparatus for Treating Air to be Used in Drying, of which the following is a specification, reference being had therein to the accompanying drawings.

This invention relates to an improved process and apparatus for withdrawing moisture from air. The method or process is one purely mechanical—that is to say, does not require the use of any chemical agents of a hygroscopic nature—such as sulphuric acid or lime—and therefore the air is left pure. Heretofore it has been customary to employ iron tubes for condensing moisture from the air, said tubes being adapted to have currents of water passed through them for the purpose of keeping them cooled. The tubes have been of the character of ordinary gas-tube, being drawn or lap-welded, and therefore are necessarily made of comparatively thick metal. Hence the cost of a condensing apparatus of this sort has been very great, for it is well known that it requires a large number of feet of tubing to make a condenser of any appreciable efficiency.

One of the objects of my invention is to provide a much cheaper, and at the same time a more efficient, apparatus for this purpose of removing moisture from air.

Figure 1 is a top plan view of an apparatus embodying my improvements. Fig. 2 is a vertical longitudinal section of the apparatus, in which the air is cooled by means of currents of other air. Fig. 3 is a similar view of a cooler in which use is made of a liquid refrigerant.

In the drawings, A represents a furnace or heating apparatus.

B represents, generally, a cooling apparatus having tubes through which air passes as a cooling agent.

C represents a cooler having tubes through which passes a liquid refrigerant.

D represents a fan for inducing a current of air through the above-mentioned parts.

E E are dry-rooms, and F G the ducts, through which the air passes from the fan to said rooms.

H is a duct, through which air passes through the furnace or heater to the cooler B.

I is a duct, which connects the cooler B with the cooler C, and J the one connecting the latter with the fan D.

B^2, Fig. 2, represents a chamber or duct, which may, if desired, be utilized to collect the air that rises in the air-cooler, in order that it may be carried to the heater for a subsequent heating, as clearly shown in my application No. 65,006, filed June 23, 1882.

M represents a duct communicating with the duct H near the furnace, and communicating with the fan D at a point beyond the cooler C, and through this duct M the air can be carried without its passing through the coolers.

It is sometimes desirable to heat a drying-room to a comparatively high temperature, even when said room is to be subsequently used for the drying of articles which cannot be subjected to a high heat. Thus, in cold weather it is necessary, when starting the apparatus, to bring the temperature of the drying-room up rapidly, and this can be done easily by cutting the air off from the ducts which run through the coolers and taking it directly through the duct M.

a represents a damper, by means of which the duct H can be closed, and *m* a similar damper for the duct M.

The coolers are used to temper the air when delicate materials are being dried, or when it is not desirable to deliver air at a high temperature to the drying-room; and the direct passage through the duct M is used when a a higher degree of heat is essential.

The cooler B has a suitable number of pipes, *b*, situated therein, they being supported at the upper ends in a partition across the casing of the cooler, and the lower ends being held in a similar partition at or near the bottom of the casing. The partitions produce three apartments within the casing, the central one being that through which the heated air passes around the tubes *b*, the lower being the one into which air from the outside is first received, and from which it passes to the uppermost one.

To regulate the admission of air to the tubes, the lower chamber can be provided with doors, as at b^2, of any suitable number,

or dampers b^3 can be hinged above the tubes or below them and used to stop the air passing upward through any tube or series of tubes.

At *i* there is a damper in the duct I, by means of which the air can be prevented from passing through said duct and caused to pass through the duct K, directly to the fan D.

In winter or when the air is at a low temperature, the cooling or condensation effected in the apparatus at B will be found sufficient for many purposes; but in the warmer parts of the year, when the temperature of the air is higher, I have found it advantageous to combine with the cooler described another of the character shown generally at C and illustrated in detail in Fig. 3. At the top and bottom it is provided with water-tight chambers or ducts with which communicate pipes C, secured at the upper ends in a diaphragm, C^2, and at the lower in a diaphragm, C^3. Water, or ice and water, are placed in the upper compartment, and as the water flows down through the tubes *c* the air passing through the cooler is affected thereby, the water being received in the lowermost chamber below the diaphragm c^3.

I do not in this case claim any of the matters set forth in the claims in my other pending applications, Serial Nos. 65,006, 86,026, 86,318, 86,319, 121,265, 87,469, 121,424, 98,699, 73,148, and 97,493, preferring in this case to claim the matters which are specifically set forth in the following claims:

What I claim is—

1. In an apparatus for treating air, the combination of a water-cooler, an air-cooler provided with two independent ducts, one connecting it with the water-cooler, the other with the drying-room, and means whereby the air may be passed to the water-cooler or directly to the drying-room, substantially as set forth.

2. In an apparatus for treating air to be used in a drying-room, the combination of the following elements, namely: an air-heater, an air-cooler, a duct for taking air from the heater to the cooler, a duct for taking the air from the cooler to the drying-room, a duct by which the air can be taken directly from the heater to the drying-room independently of the cooling apparatus, and suitable controlling-dampers, substantially as set forth.

3. In an apparatus for treating air, the combination of a furnace or air-heater, a duct which takes the air from the furnace, a cooler having ducts through which passes cold air, said cooler communicating with the duct from the furnace, a duct leading from the cooler to the drying-room, and dampers adapted to shut off more or less of the air, which effects the cooling of the heated air, substantially as set forth.

In testimony whereof I affix my signature in presence of two witnesses.

RALPH S. JENNINGS.

Witnesses:
C. E. PRATT,
H. I. NASH.