W. H. H. MALLORY.

Congealer or Condenser.

No. 167,182. Patented Aug. 31, 1875.

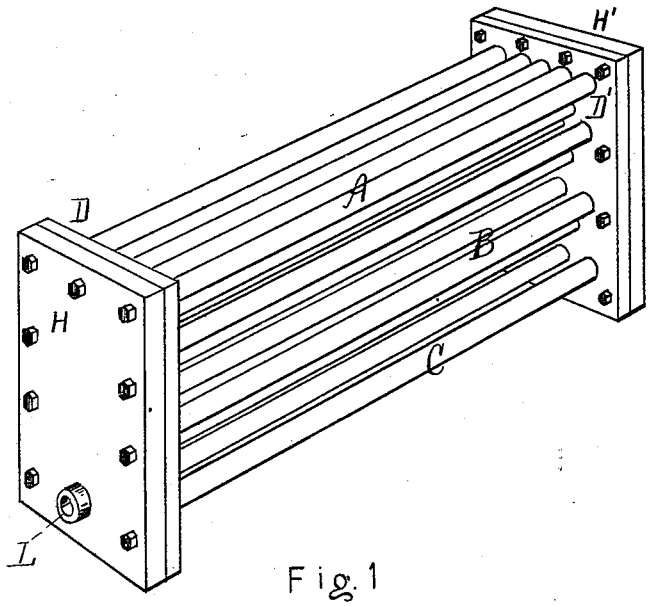

Fig. 1

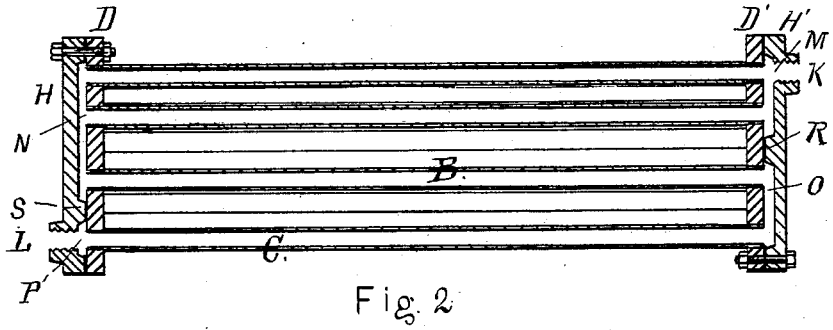

Fig. 2

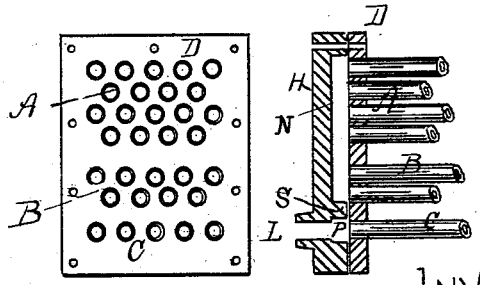

Fig 3

Fig 4.

WITNESSES
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WILLIAM H. H. MALLORY, OF CAMBRIDGE, MASSACHUSETTS.

IMPROVEMENT IN CONGEALERS OR CONDENSERS.

Specification forming part of Letters Patent No. **167,182**, dated August 31, 1875; application filed July 24, 1875.

To all whom it may concern:

Be it known that I, WILLIAM H. H. MALLORY, of Cambridge, in the county of Middlesex and State of Massachusetts, have invented an Improvement in Condensers or Congealers for cooling by vaporous expansion, of which the following is a specification:

The nature of my invention consists in the peculiar arrangement and connections of radiating-pipes in banks, the object being to increase their useful effect, and to guard against injury from expansion and contraction.

Figure 1 is a perspective view, showing one bank of pipes. Fig. 2 is a longitudinal section of the same. Fig. 3 shows the tube-sheet or end plate to which the pipes are attached, the box-plate or head being removed. Fig. 4 is a part section to show the arrangement of pipes and connections with the chambers in the head.

Letters D and D′ represent the tube sheets or plates to which the tubes or pipes are attached, the pipes divided into clusters A, B, and C, as shown in Figs. 3 and 4. The box plates or heads H H′ are recessed, as shown in Figs. 2 and 4, so as to form the chambers M, N, O, and P, the chambers being formed by the webs S and R. K and L, Fig. 2, represent openings for making the necessary connections.

When I use my invention as a condenser I proceed as follows: The bank of pipes is submerged in a tank of water for the purpose of taking away the heat evolved by compression of the volatile agents. The vaporous agents are forced in at the orifice K, Fig. 2, from which point they flow through the cluster of pipes A, which are all connected with the chamber M, Fig. 2; thence they flow through the chamber N to the cluster of pipes B, and from thence through the chamber O to the pipes C and the outlet L. As the gases employed are at the highest temperature and greatest volume when they enter at K, and gradually cool and condense as they flow through the pipes, it is evident that less tube area is required. Herein I lessen the number of the tubes or pipes. Thus the cluster B contains less pipes than the cluster A, while the cluster C contains less pipes than the cluster B. If preferable the pipes of the different clusters may be made of different sizes.

When I use my invention as a congealer or cooler I construct it in the same manner and use it in connection with the condenser, properly connecting the two. The inflowing gaseous agents enter at L, and, as they absorb heat from the vehicle which it is desirable to cool, expand and flow through the several cluster of pipes from smaller to larger, thence to the exit-orifice K, from whence they are again condensed, a continuous circulation of the volatile agents being maintained during the operation of reducing temperature.

As my invention is to be used for ice-forming it is necessary to provide against sudden changes of temperature. Therefore I have made the tube-sheets to which the chambers M N O P are joined independent of each other, as shown in the drawings, so that the pipes may not be injured by contraction or expansion.

In Figs. 1 and 2 it may be seen that the tube-sheets D and D′ are not connected to each other except by the tubes, while in most of devices of this kind the tube-sheets are connected together by an outside covering, as, for instance, the boiler-plates of boilers, or the plates which form the tank or cylinder of ordinary condensers. By my arrangement the tube-sheets are independent of each other, except so far as they are held by the tubes themselves. I therefore call them independent tube-sheets.

I claim—

In a bank of pipes the tube-sheets of which are not connected to each other, except by the tubes themselves, whereby free expansion and contraction are allowed, the combination of the webbed heads H and H′ and the respective tube-sheets, thus forming the chambers M N O P, with the clusters of pipes A, B, and C, all substantially as described, and for the purpose set forth.

WM. H. H. MALLORY.

Witnesses:

NATHL. EVANS, JR.,
WILLIAM EDSON.