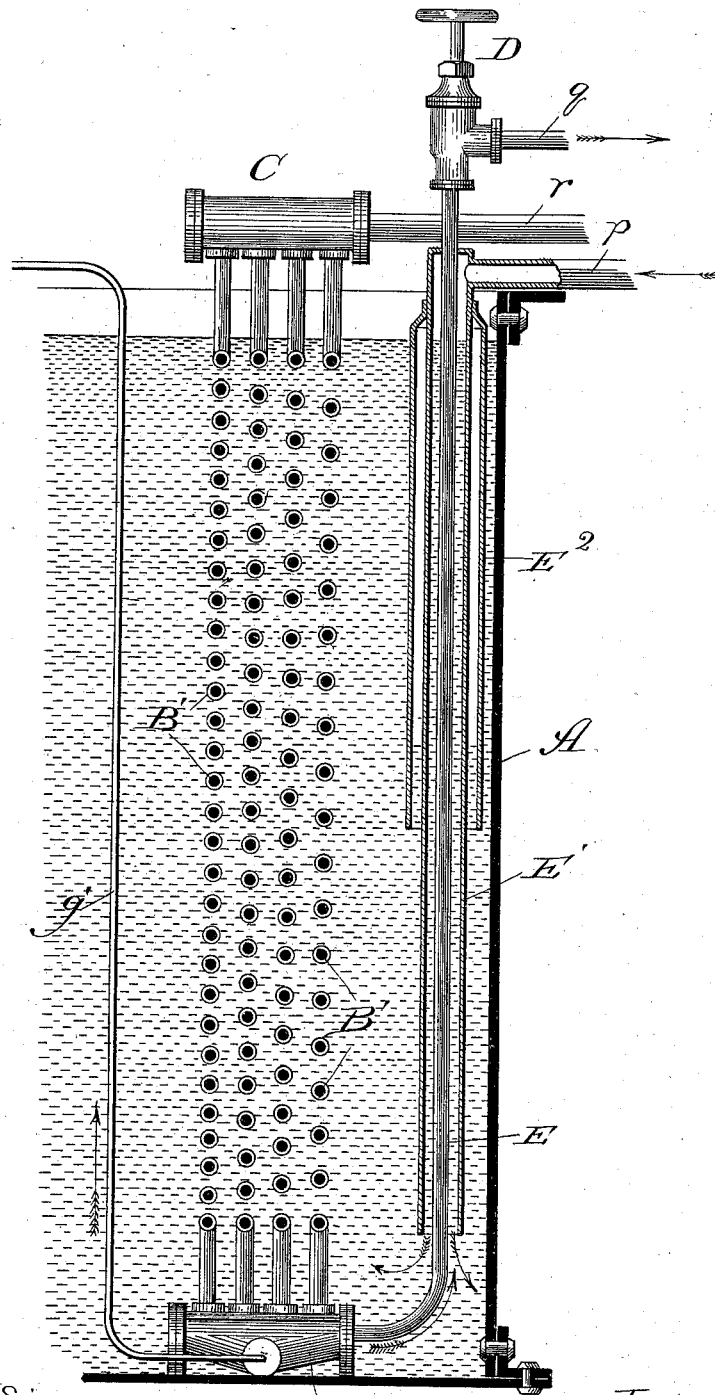


(No Model.)

F. W. WOLF.  
ICE OR REFRIGERATING MACHINE.

No. 385,157.

Patented June 26, 1888.



Witnesses:  
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# UNITED STATES PATENT OFFICE.

FREDERICK W. WOLF, OF CHICAGO, ILLINOIS.

## ICE OR REFRIGERATING MACHINE.

SPECIFICATION forming part of Letters Patent No. 385,157, dated June 26, 1888.

Application filed April 9, 1888. Serial No. 270,061. (No model.)

*To all whom it may concern:*

Be it known that I, FREDERICK W. WOLF, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented a new and useful Improvement in Ice or Refrigerating Machines, of which the following is a specification.

My invention relates particularly to an improvement in the submerged condensers of ice or refrigerating machines employing a gas liquefiable under mechanical compression and requiring after compression to be cooled in the condenser before being admitted to the refrigerator, where its expansion is utilized to absorb heat from a surrounding body to produce cold.

As commonly practiced, the cooling of the refrigerating agent introduced by the compressor into the condenser coil or coils at the top of the latter is accomplished by cold water circulated through the condenser-tank around the coil or coils, which water is ordinarily admitted at or near the base of the tank and allowed to escape from the upper part thereof, while the connecting-pipe for the refrigerating agent of the condenser-coils with the coils of the refrigerator (to prevent its passing through the air, which, for obvious reasons, is undesirable) passes from the manifold or "header" at the base of the former to that at the upper end of the latter through the condenser-tank, and consequently through the water therein. This arrangement is objectionable, for the reason that, inasmuch as the condenser-water is warm or warmer toward the upper part of the tank than toward the bottom, at or near which it enters, as aforesaid, the refrigerating agent, after having reached the lower manifold immersed in the coldest part of the condenser-water, to reach the refrigerator, has to pass in the connecting-pipe through the warmest portion of the condenser-water, where a material portion of the necessary cooling effect is counteracted, or, in other words, whereby what has been done toward cooling the compressed refrigerating agent is more or less undone.

The object of my improvement is to provide means for protecting the connecting-pipe which conducts the refrigerating agent from the condenser to the regulating-valve, controlling the supply to the refrigerator, from

the effect of the warmer water in the upper part of the condenser-tank, and thereby subject the connecting-pipe only to the influence of the condenser-water in its coldest condition.

To this end my invention consists in the general construction of my improvement; and it also consists in details of construction and combinations of parts.

The drawing shows an ice or refrigerating machine submerged condenser in broken sectional elevation and provided with my improvement.

A is the tank. B are the coils within the tank, leading at their upper ends into a suitable manifold or header, C, into which the refrigerating agent—as anhydrous ammonia—is forced from the compressor (not shown) through the conduit or eduction-pipe *r*. At their lower ends the coils B lead into a manifold or header, C', preferably of the synclinal form shown and described in my pending application for Letters Patent of the United States for an improvement in the oil-extracting and gas-saving apparatus for ice and refrigerating machines, Serial No. 256,767, filed December 2, 1887, and the pipe *g'* corresponds with that similarly designated in my said pending application and serving to afford communication between the manifold and an oil-extractor therein described, but not shown in the present connection, as it forms no part of my present invention.

D is a regulating-valve at the junction of a pipe, *g*, leading therefrom to the refrigerator, (not shown,) and a pipe, E, which connects the manifold C' of the condenser with the valve D. This pipe E passes from the manifold C' upward through the condenser and water therein, and obviously, without means to prevent, the refrigerating agent passing through the pipe is affected by the temperature of the water. Thus, when the refrigerating agent enters the coils B in a heated condition from the compressor by way of the pipe *r*, it is cooled and liquefied by the time it reaches the manifold C'; but before it reaches the regulating-valve D on its way to the refrigerator through the pipe E it absorbs warmth from the surrounding water in the upper part of the tank, and is thus materially reheated. To obviate this I surround the pipe

E, from beyond the water-line in the condenser to that portion of the base of the latter at which the temperature of the water does not exceed or materially exceed the normal or temperature at which it is introduced, with a jacket, E', preferably of metal, and lead the water for cooling through the pipe p into it near the upper end thereof, whereby it enters the condenser-tank through the jacket E', and thus envelops the pipe E initially, besides affording the advantage, which is well known, of flowing against the stream of the refrigerating agent in the pipe. To prevent the jacket (thus also affording the supply-water pipe) from conducting the heat or warmth of the upper portion of the surrounding water to the water passing through it into the tank, I surround it by an air-jacket, E<sup>2</sup>, preferably of metal, and extending from near the water-level in the tank to or about to the depth at which the temperature of the water is below where it would tend to heat the water passing through the jacket E, and the air in the jacket E<sup>2</sup> is compressed by the water in which it is submerged, and affords a non-conductor of heat, whereby the jacket E', where it is surrounded by the jacket E<sup>2</sup>, is protected from the influence of the warmer water in the tank.

What I claim as new, and desire to secure by Letters Patent, is—

1. In combination with the condenser of an ice or refrigerating machine, a pipe, E, connecting the lower end of the condenser-coil through the condenser-tank with the regulating-valve D, and provided with a jacket, E', communicating from near its upper end with the water-supply, substantially as described.

2. In combination with the condenser of an ice or refrigerating machine, a pipe, E, connecting the lower end of the condenser-coil through the condenser-tank with the regulating-valve D, and provided with a jacket, E', communicating from near its upper end with the water-supply, and an air-jacket, E<sup>2</sup>, in the tank surrounding the jacket E', substantially as described.

3. In combination with the condenser of an ice or refrigerating machine, manifolds C and C' at opposite ends of the condenser-coils, and a pipe, E, connecting the manifold C' through the condenser-tank with the regulating-valve D, and provided with a jacket, E', communicating from near its upper end with the water-supply, and an air-jacket, E<sup>2</sup>, in the tank surrounding the jacket E', substantially as described.

FREDERICK W. WOLF.

In presence of—

J. W. DYRENFORTH,  
CHAS. E. GAYLORD.