

W. EBERHARDT.

COOLER OR REFRIGERATOR FOR ICE MACHINES.

No. 294,977.

Patented Mar. 11, 1884.

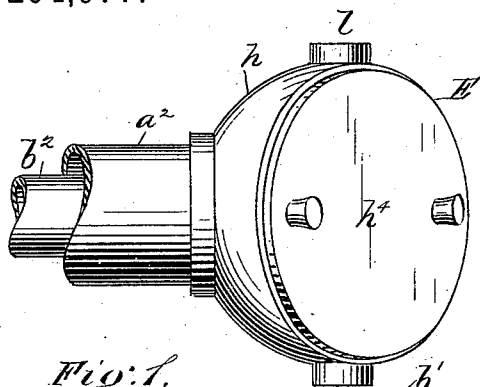


Fig. 1.

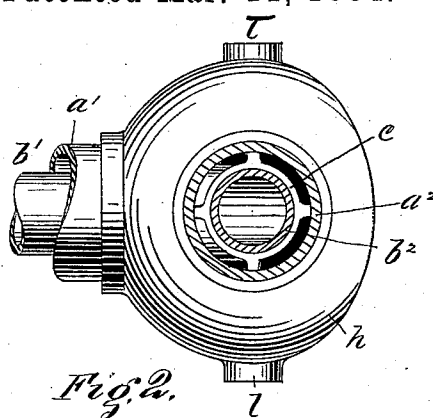


Fig. 2.

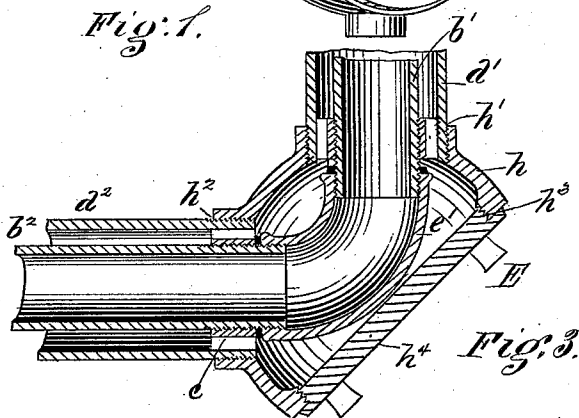


Fig. 3.

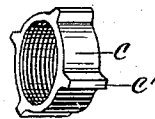


Fig. 6.

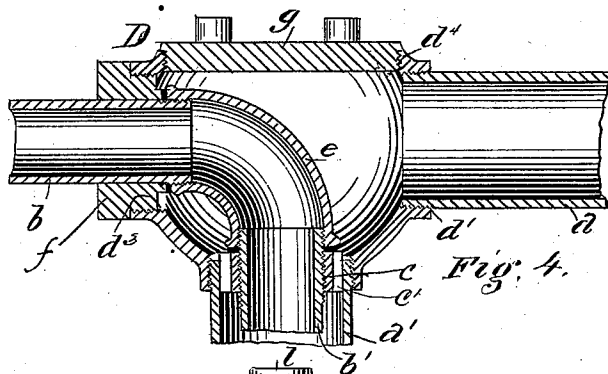


Fig. 4.

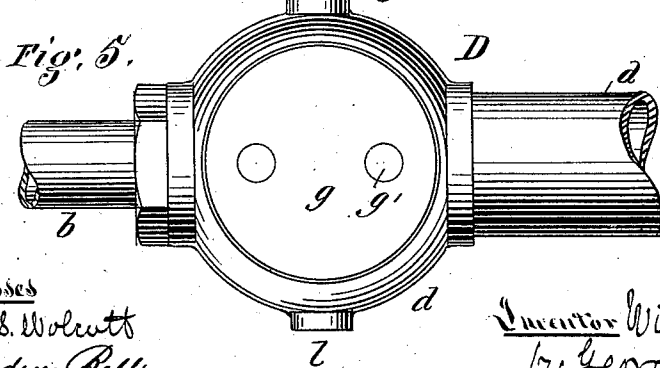


Fig. 5.

Witnesses
Samuel S. Wolcott
J. Thorden Bell.

Inventor William Eberhardt
by George H. Christy
Att'y

(No Model.)

2 Sheets—Sheet 2.

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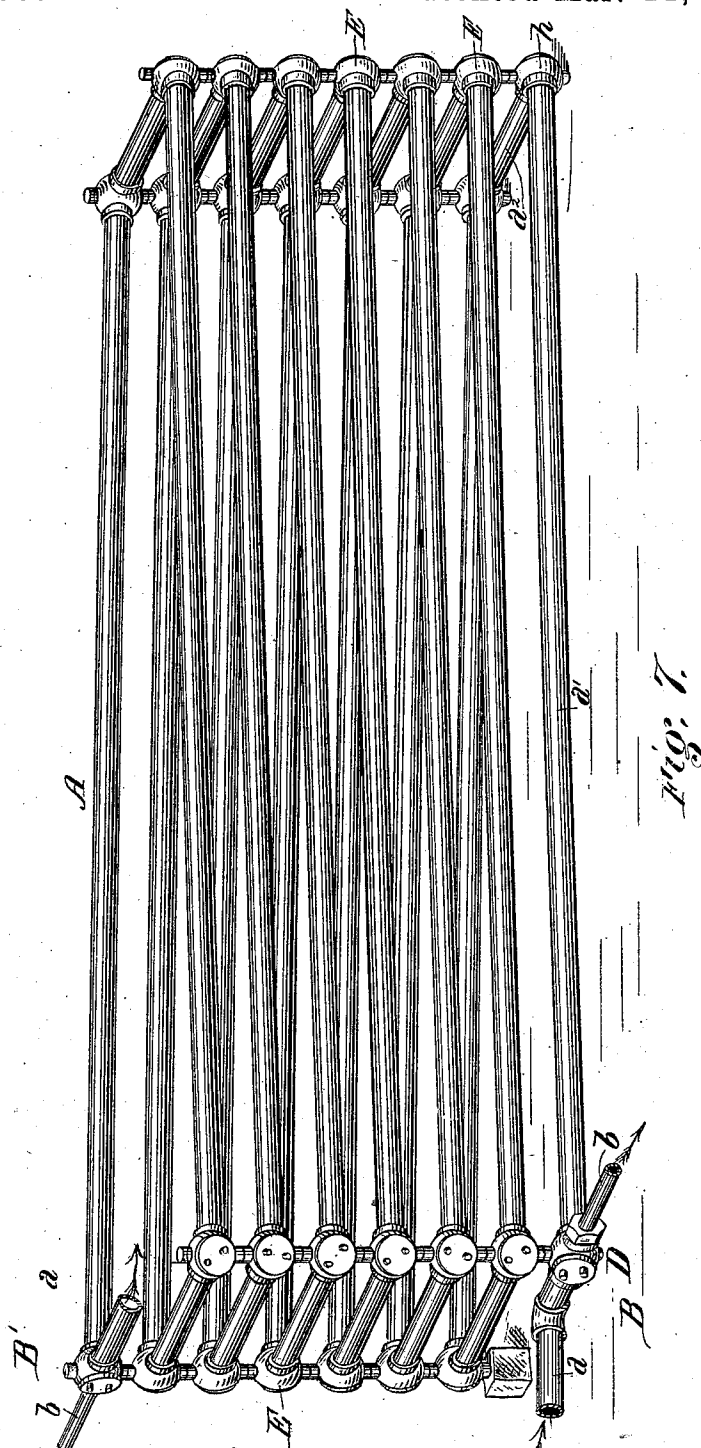


Fig. 7.

Witnesses.
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UNITED STATES PATENT OFFICE.

WILLIAM EBERHARDT, OF ALLEGHENY, PENNSYLVANIA.

COOLER OR REFRIGERATOR FOR ICE-MACHINES.

SPECIFICATION forming part of Letters Patent No. 294,977, dated March 11, 1884.

Application filed December 3, 1883. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM EBERHARDT, a citizen of the United States, residing at Allegheny, county of Allegheny, State of Pennsylvania, have invented or discovered a new and useful Improvement in Coolers or Refrigerators for Ice-Machines; and I do hereby declare the following to be a full, clear, concise, and exact description thereof, reference being had to the accompanying drawings, making a part of this specification, in which—like letters indicating like parts—

Figure 1 is a view in elevation of my improved pipe-joint, looking at the outside corner. Fig. 2 is a view of the joint, showing the two pipes in section and the winged thimble in elevation. Fig. 3 is a horizontal section through the joint. Fig. 4 is a horizontal section, showing the arrangement of the pipes and joint at the beginning and end of the coil. Fig. 5 is a side elevation of the same. Fig. 6 is a perspective view of the winged thimble. Fig. 7 is a perspective view of a coil of a cooling device.

My invention relates to an improved construction of that part of ice-machines known as the "refrigerator" or "cooler," and to the method of cooling the refrigerating-gas.

The object of my invention is to so construct the coil that all of the gas-pipe may be surrounded by the water-pipe, and thereby utilize the whole of the cooling-surface of the gas-pipe; and, in general terms, my invention consists in the construction and combination of the parts of a cooler, all as more fully herein-after described and claimed.

In the drawings, A represents a coil, which is of rectangular box shape, and is composed of two series of long sections of pipe arranged substantially parallel, one above another, forming the sides of the box, and two series of shorter sections, similarly arranged, forming the ends of the box. Each row of the box is composed of the sections a' a'' , &c., of the outer or circulating pipe, and of sections b' b'' , &c., of the gas-circulating pipe arranged within the water-pipes.

At the beginning, B, of the coil A, where the water and gas pipes are brought together, I arrange a coupling, D. This coupling D consists of a shell, d , whose general shape is hemi-

spherical, and which is provided with the holes or openings d' , d'' , and d''' , internally screw-threaded, as shown.

Into the opening d' is screwed that piece of the fluid-pipe a which connects the coil with the water or fluid supply, and into the opening d'' is screwed a section of the pipe a' , which forms the beginning of the fluid-pipe of the coil, and into this section a' is placed a section of the gas-pipe b' , on the end of which has been previously screwed the thimble c , which is provided with a series of two or more wings or projections, c' , which support the section b centrally within the section a' , and allow the fluid to flow by the thimble. The section b' is screwed into an elbow, e , which is inserted into the shell d through the opening d'' , formed in the flat part of the shell. Into the opposite end of this elbow e is screwed the section b of the gas-pipe, which is connected with the gas-receiving reservoir. After the section b has been screwed into the elbow e , the opening d' in the shell is closed by the plug f , which is bored to fit the section b , and was placed in said section previous to its being screwed into the elbow e . The opening d''' , which is internally threaded, is closed by the exteriorly-threaded plug g , which is provided with the lugs g' , by which the plug can be turned by a suitable wrench.

The joints E E', &c., between the long and short sections of the water and gas pipes or the sides of the box, are formed as follows, (see Figs. 1, 2, and 3:) Onto the end of the section b' of the gas-pipe is screwed one of the thimbles c until it is entirely within the surrounding section a' of the water-pipe. Then onto the projecting end of the section b' is screwed an elbow, e' . Over this elbow is slipped the hemispherical shell h , which is provided with the threaded openings h' and h'' , and is screwed onto the section a' of the water-pipe. Onto another section, b'' , of the gas-pipe I screw another thimble c , and then screw the section b'' into the elbow e' . Over the section b'' is then slipped a section, a'' , of the water-pipe, and is screwed into the threaded opening h' of the shell. The opening h'' in the flat part of the shell is closed by the screw-plug h' . It will be noticed that the openings h' and h'' are formed at right angles to each

other, and consequently the pipe-sections a' and a'' , which are secured in these openings, are also at right angles to each other. On diametrically-opposite sides of the shells d and h are formed the projecting lugs l , which, when a series of two or more coils are arranged one above another, act as separating-blocks, the lower projection of the upper joint resting on the upper projection of the lower joint, as clearly shown in Fig. 7. As these projections are of equal length, it follows that the space between each row will be the same throughout the coil. On the end B' of the coil A , where the water and gas pipes diverge, is arranged another coupling, similar in all respects to the coupling D .

It will be observed that by constructing a cooler as above described the whole extent of the internal pipe is covered by the fluid circulating around it in the outer pipe.

The shells d and h may be made without the opening in the flat side; but I prefer to make them with that opening, for convenience in manufacture and in putting the joints together, and also for inspecting the joints in the shell.

In using this cooler, the heated gas is forced into the end B' and escapes at the end B ; but the water is forced into the end B , and in passing up through its pipes around the gas-pipes gradually cools the gas, which, when it escapes from the end B , will be cooled down to the temperature of the water entering the coil at that point, and will be in a liquid condition, and the water escaping from the end B' will have been heated to nearly the temperature of the entering gas.

I claim herein as my invention—

1. In a cooler or refrigerator, the combination of a series of two or more sections of pipe suitably connected and a series of two or more sections of smaller pipe suitably connected, arranged within the first series, and entirely surrounded thereby at and around the joints, as well as throughout their lengths, substantially as set forth.

2. In a cooler or refrigerator, a series of two or more sections of pipe suitably connected, in combination with a series of two or more sections of smaller pipe suitably connected, arranged and supported centrally within the first series, and entirely surrounded thereby at and around the joints, as well as throughout their length, substantially as set forth.

3. In a joint for the pipe-sections forming a cooler or refrigerator, a combination of a shell suitably connected with the water-pipe sections and an elbow located within said shell, and connected with the gas-pipe sections arranged within the water-pipes, substantially as set forth.

4. As a joint for the pipe-sections of a cooler or refrigerator, the hemispherical shell h , having threaded openings h' h'' , the pipe-sections screwed into said openings, in combination with the elbow e' , arranged within the shell, and the gas-pipe sections arranged within the water-pipe sections and connected to said elbow, substantially as set forth.

5. As a joint for the pipe-sections of a cooler or refrigerator, the hemispherical shell h , having a threaded opening, h' h'' , the water-pipe sections screwed into said openings, in combination with the elbow e' , arranged within said shell, the gas-pipe sections arranged within the water-pipe sections and connected to the elbow, and the winged thimbles c , substantially as set forth.

6. As a coupling for uniting gas and water pipes to a cooler or refrigerator, a shell, d , having the threaded openings d' d'' d''' , the water-pipe sections screwed into the openings d' and d'' , in combination with the elbow e , located within said shell, the gas-pipe sections connected with said elbow, one of the sections being arranged within one of the water-pipe sections, and the perforated plug f , surrounding the other gas-pipe section and screwing into the opening d''' , substantially as set forth.

7. As a joint or coupling for a cooler or refrigerator, a hemispherical shell having suitable threaded openings for the reception of pipe-connections, and an opening in its flat side, in combination with a plug or cover therefor, substantially as set forth.

8. The method of cooling gases, which consists in circulating the gas to be cooled in one direction through the pipes of a cooling apparatus, and in forcing the cooling medium in an opposite direction through pipes arranged outside of the gas-circulating pipes, substantially as set forth.

In testimony whereof I have hereunto set my hand.

WILLIAM EBERHARDT.

Witnesses:

DARWIN S. WOLCOTT,
R. H. WHITTLESEY.