

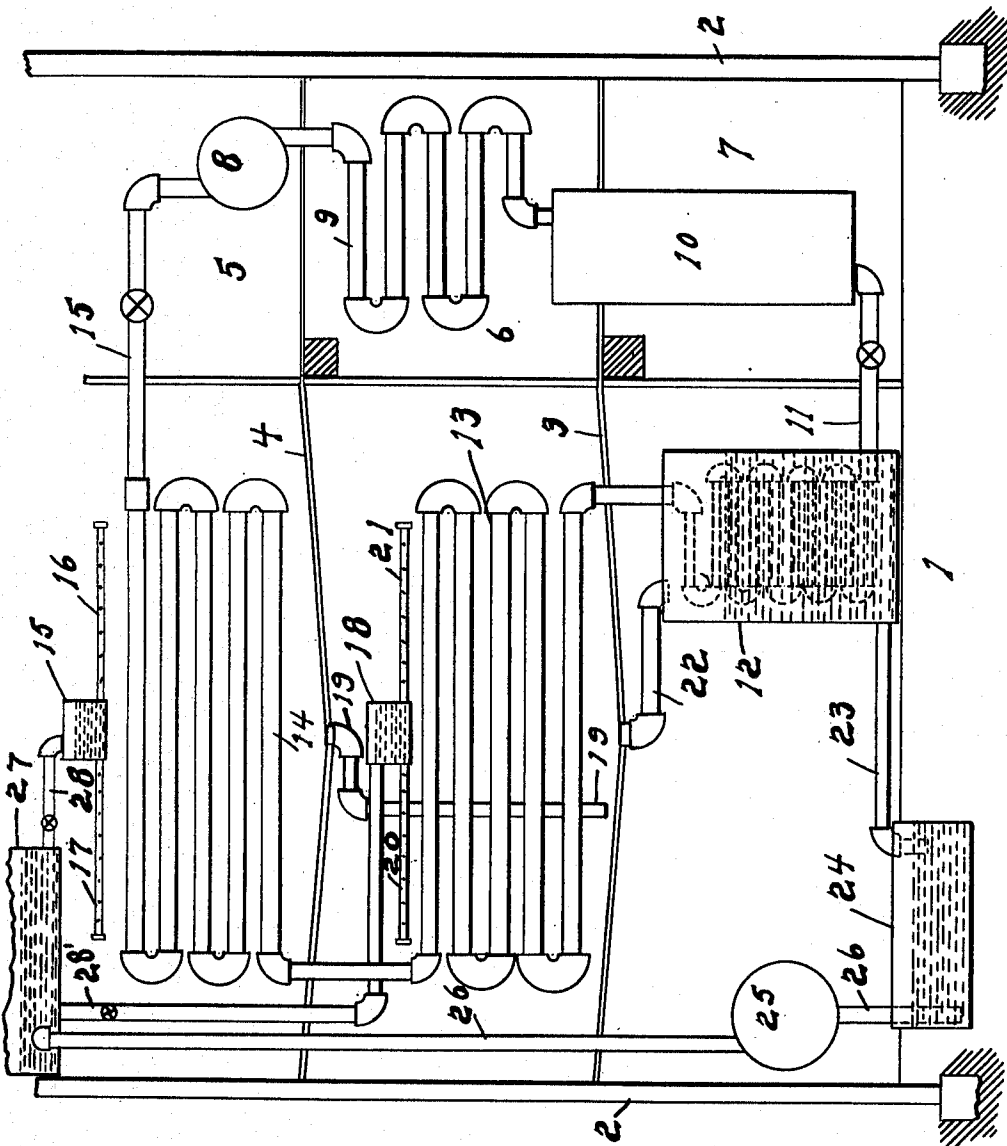
A. FAGET.

APPARATUS FOR ECONOMIZING POWER IN PRECOOLING PLANTS.

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970,807.

Patented Sept. 20, 1910.



Witnesses.

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UNITED STATES PATENT OFFICE.

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APPARATUS FOR ECONOMIZING POWER IN PRECOOLING PLANTS.

970,807.

Specification of Letters Patent. Patented Sept. 20, 1910.

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To all whom it may concern:

Be it known that I, ARTHUR FAGET, citizen of the United States, residing at San Francisco, in the county of San Francisco and State of California, have invented a new and useful Apparatus for Economizing Power in Precooling Plants, of which the following is a specification in such full and clear terms as will enable those skilled in the art to construct and use the same.

This invention relates to an apparatus and method of economizing power in precooling plants, the object being to provide means for preventing the indefinite accumulation of frost on the ammonia pipes, and to make an economical use of the waste ice thus produced.

It will be understood by those skilled in the art that in precooling refrigerator cars preparatory to shipment, it is necessary to make use of considerable quantities of air cooled to a low temperature. This is accomplished by passing the air over ammonia coils, which are maintained at as low a temperature as possible, and the air is blown directly to the cars to be cooled. The result of this operation is that large quantities of frost collect on the cooling pipes, and when this accumulation of frost gets too thick, the efficiency of the pipes in cooling the air is very much reduced, owing to the fact that the coils are more or less insulated by the accumulation of ice around them, thus making it difficult to cool the air to a point below that of the formation of ice. It therefore becomes necessary to periodically cut the ice off the coils in order to reduce the air passing across the coils to the desired low temperature. Since this accumulation of ice is quite considerable, its loss becomes an important matter in a refrigeration plant. Means are therefore provided in the invention herein disclosed to remove the ice from said pipes by means of a solution of some kind which does not readily freeze. Such salts as calcium chlorid or sodium chlorid or other salts of such character, are used for this purpose. The cold solution thus produced is made use of in cooling the refrigerant supplied the cooling coils.

In the drawing, in which the same numeral of reference is applied to the same portion throughout the several views, there is shown a side elevation of a precooling plant equipped with the means herein mentioned for removing the frost from the cool-

ing coils, and for making use of the cold solution thus obtained.

The numeral 1 represents the ground on which the building 2 is erected, said building having floors 3 and 4, separate apartments 5, 6 and 7 being provided for the installation of the compressor 8, the condenser coils 9 and the ammonia receiver 10. From the ammonia receiver a suitably valved pipe 11 leads to the liquid cooler 12, to the lower set of cooling coils 13, and from there to the upper set of cooling coils 14. This latter set of cooling coils is then connected by means of a valved pipe 15 with the compressor 8. This system of precooling forms the subject matter of another application for patent, and is not claimed herein.

The fluids to be cooled are passed over the coils 13 and 14, and since the warm air contains considerable quantities of moisture, a thick layer of frost accumulates on the pipes 13 and 14. This layer of frost soon becomes so thick that the air cannot be cooled much below the freezing point of water, and means must be provided to cut the frost off the pipes in order that the bare iron may be exposed to the passing fluid. This means consists of a box 15, having drip pipes 16 and 17 extending over the coils 14, a second box 18 having pipes 20 and 21 leading from the box 18 over the coils 13. The floor 3 is inclined toward the center in the same manner as the floor 4, from which latter the pipe 19 delivers the solution from that floor to the floor below. A pipe 22 leads to the liquid cooler 12 from the floor 3, and a pipe 23 leads from the liquid cooler to a sump 24. A pump 25 lifts the water from the sump 24 through a pipe 26 to a tank 27 from which tank pipes 28 and 28' returns the solution to the boxes 15 and 18.

The solution used to cut the frost off the pipes is calcium or sodium chlorid, or other salts of this character, which form solutions which do not readily freeze. When the layer of frost on the pipes 13 and 14 becomes too thick, the solution is allowed to drip over the coils from the drip pipes, and the considerable quantity of cold solution thus formed is allowed to pass into the liquid cooler 12.

It will be understood that the ammonia coming from the compressor 8 is quite hot, and it is necessary to pass it through the condenser 9 to bring it down to the atmospheric temperature. It is then collected in the liquid receiver 10, but is still quite warm.

If this warm liquid ammonia were then allowed to pass to the coils 13 and 14, it would mean a considerable loss of power in reducing the temperature thereof to that of the coils. Therefore the cold solution formed in removing the frost from the coils 13 and 14 is used to reduce the temperature of the liquid ammonia in the cooler 12 to a temperature as near that of the coils as possible, before it is permitted to pass into said coils 13 and 14. It will be understood by those skilled in the art that the solution passed over the coils will require additions of the substance used to prevent it from freezing whenever it becomes too weak to be effective; or the solution may be strengthened by evaporation, as desired.

Having thus described my invention, what I claim as new and desire to secure by Letters Patent of the United States, is as follows:

1. In an apparatus for economizing power in refrigeration plants, a series of cooling coils, means to supply said coils with a refrigerant, a liquid cooler through which said refrigerant passes on its way to the cooling coils, drip pipes over the cooling coils, and pipes to pass the solution from the drip pipes through the liquid cooler, substantially as set forth.

2. In an apparatus for economizing power in refrigeration plants, a series of cooling coils, means to supply said coils with a re-

frigerant, a cooler through which said refrigerant passes on its way to the cooling coils, means to periodically remove accumulations of ice from the cooling coils, and means to deliver the ice and solution from said coils to the cooler to utilize the cold stored in such accumulations of ice to cool the refrigerant on its way to the cooling coils, as described.

3. In an apparatus for economizing power in precooling plants, a series of cooling coils, means to compress the cooling agent, a liquid cooler connected with said compressor and said coils, drip pipes over the coils, and means to pass the solution from the drip pipes through the liquid cooler, as set forth.

4. In an apparatus for economizing power in precooling plants, a series of cooling coils, means to compress the cooling agent, a liquid cooler connected with said coils, drip pipes over the coils, means to pass the solution from the drip pipes through the liquid cooler, and means to return said solution to the drip pipes, as described.

In testimony whereof I have hereunto set my hand this 8th day of January A. D. 1910, in the presence of the two subscribed witnesses.

ARTHUR FAGET.

Witnesses:

C. P. GRIFFIN,
J. W. MAC INNIS.