

No. 612,567.

Patented Oct. 18, 1898.

W. M. MIXER.

PUMP SYSTEM FOR CIRCULATING REFRIGERATING LIQUORS.

(Application filed Mar. 10, 1897.)

(No Model.)

2 Sheets—Sheet 1.

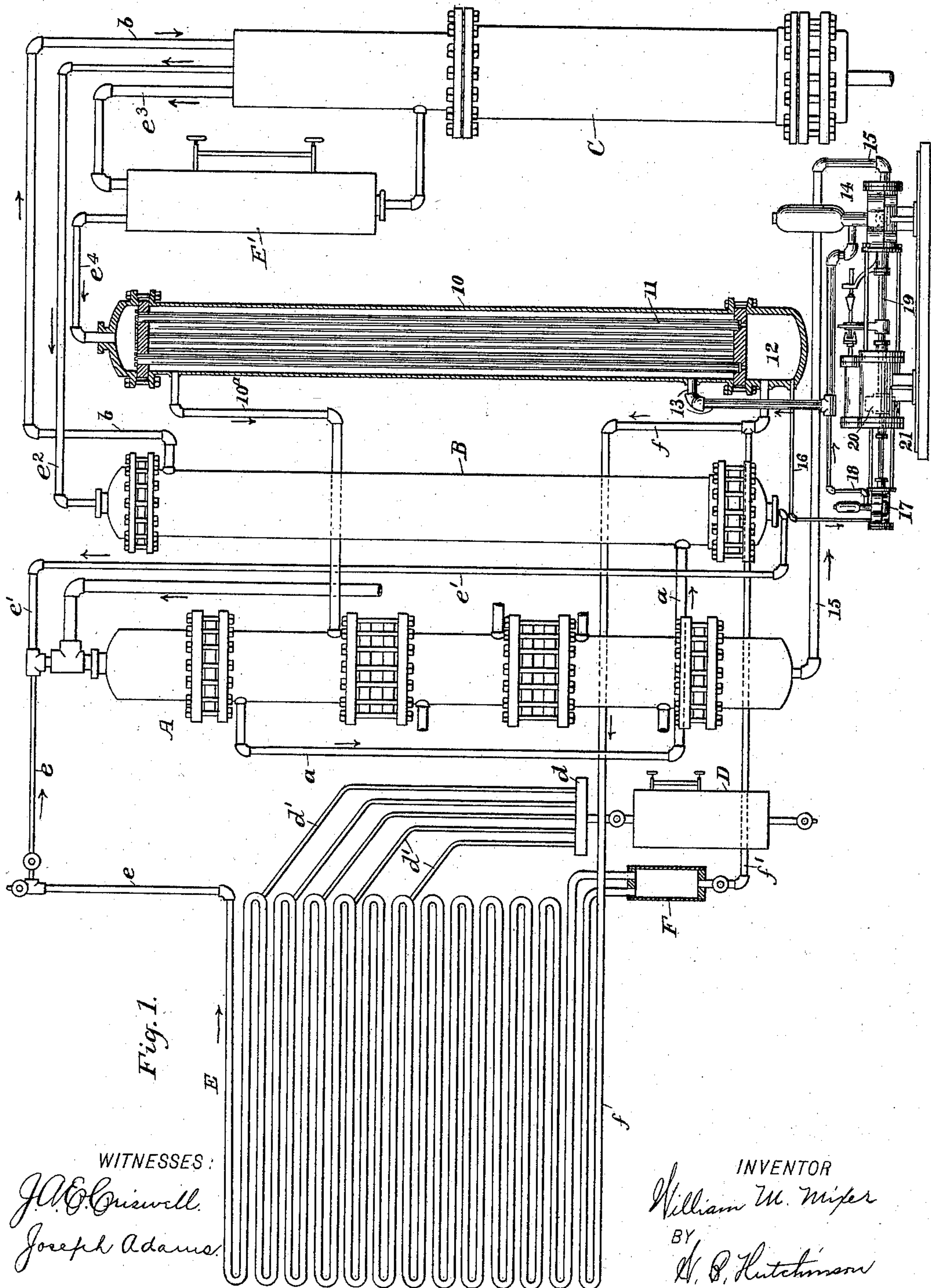


Fig. 1.

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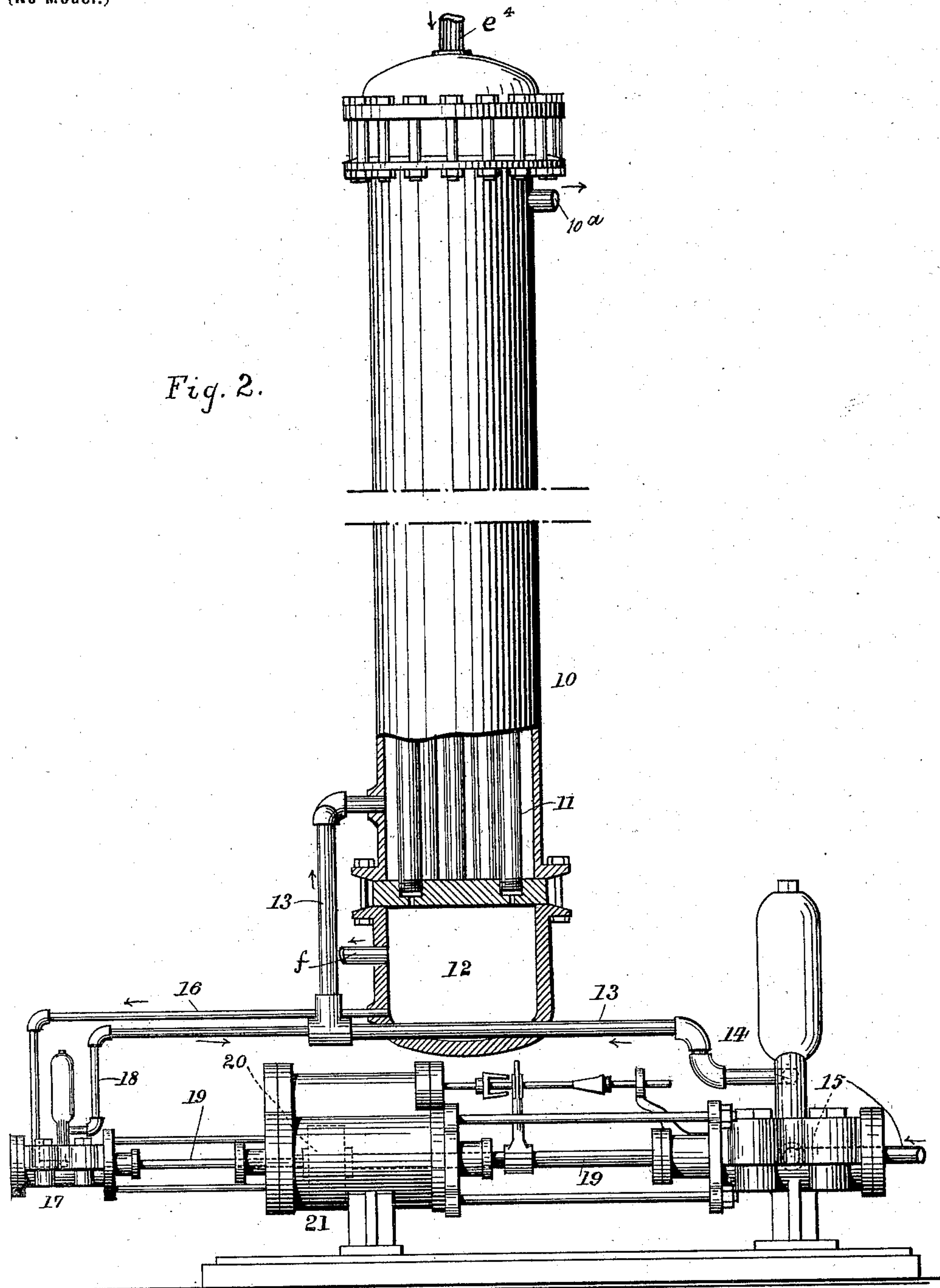
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2 Sheets—Sheet 2.



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WILLIAM M. MIXER, OF NEW YORK, N. Y., ASSIGNOR TO WARREN B. HUTCHINSON, TRUSTEE, OF SAME PLACE.

PUMP SYSTEM FOR CIRCULATING REFRIGERATING LIQUORS.

SPECIFICATION forming part of Letters Patent No. 612,567, dated October 18, 1898.

Application filed March 10, 1897. Serial No. 626,911. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM M. MIXER, of New York, in the county and State of New York, have invented certain new and useful
5 Improvements in Pump Systems for Circulating Refrigerating Liquors, of which the following is a full, clear, and exact description.

My invention relates to improvements in apparatus for circulating the freezing liquor
10 of a refrigerating apparatus and for introducing into the general circulation the strong liquor of condensation accumulated in the form of drippings in the lower chamber of the gas-exchanger. It is a common practice to
15 return such drippings by gravity from the high-pressure side of the machine and then pump the drippings back into the circulation; but this arrangement requires constant care to prevent the gas and liquor from working
20 back and equalizing the pressure in the whole machine. It is a difficult matter to force the drippings at low pressure, say, fifteen pounds, back into the high-pressure circulation of, say, one hundred and fifty pounds.

25 The object of my invention is to produce a simple system of pumps and connections by which the general circulation is effected and by which the drippings of strong liquor are collected on the high-pressure side of the machine and easily forced back into the general
30 circulation; also, to connect the larger and smaller pumps, which operate on the main circulation and on the drippings, so that the piston-rod of the larger pump will also form
35 the piston-rod of the smaller pump, thus preventing the smaller pump from dragging and also causing the whole circulation to be efficiently maintained.

40 To these ends my invention consists in an organization and arrangement of pumps and pipes in combination with an exchanger, all of which will be hereinafter fully described and specifically claimed.

45 Reference is to be had to the accompanying drawings, forming a part of this specification, in which similar figures and letters of reference indicate corresponding parts in all the views.

50 Figure 1 is a diagrammatic view, partly in section and partly in elevation, of one form

of plant embodying my invention; and Fig. 2 is a side elevation, on a large scale, of the gas-exchanger and the pump, the exchanger being partly in section.

In Fig. 1 I have illustrated one form of plant
55 or system embodying my invention; but it is obvious that the construction and arrangement of the apparatus may be varied as desired. Here A designates an absorber, through which the strong liquor of circulation may pass
60 and from there be conveyed by means of a pipe *a* to the weak-water exchanger B, from which the liquid passes by means of the pipe *b* to a still C. A liquid-ammonia tank, as at D, may have a multiple connection *d*, from which
65 leads a series of pipes *d'* to different points of a condenser E, which latter is provided with a pipe *e*, leading to the upper portion of the absorber A, and is connected through the pipe *e'* with the lower portion of the exchanger
70 B. This exchanger has a pipe *e*² leading from the upper portion thereof to the still, and from the latter the hot gases pass through a pipe, as at *e*³, into a suitable trap E', and from there enter the pipe *e*⁴, which connects with the
75 upper portion of the gas-exchanger 10.

The condenser E may be provided with a drip-tank F, which is connected through a pipe *f*, forming the lower coil of the condenser,
80 with the drip-chamber 12 of the gas-exchanger 10, the drip-tank also having a pipe *f'*, connected to the pipe *f* or to the drip-chamber direct, in order that all of the strong liquor formed by the drippings from the condenser may enter said drip-chamber.
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The gas-exchanger 10, like the parts hereinbefore referred to, may be of the usual or of any preferred construction; but to enable the invention to be more readily understood the interior pipes 11 are shown, which, as
90 usual, are vertically arranged, and the liquor of condensation formed in the pipes drips downward into the lower chamber 12 of the exchanger. The strong liquor of circulation is forced into the lower part of the exchanger
95 through the pipe 13 and passes out through the outlet 10^a into the absorber A and from there through the pipe *a* to the general system of circulation. The liquor is forced through a pipe 13 by a relatively large pump
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14, this pump being sufficient to maintain the circulation of the refrigerating apparatus, and the liquor comes to the pump through the pipe 15, which may connect with any suitable source, but which usually connects with the absorber, as shown.

It is necessary that the strong liquor formed by the drippings be returned to the general circulation, and can therefore be either introduced into the pipe 13 or gas-exchanger 10, but is preferably introduced into the pipe 13 for reasons of economy. The drippings from the chamber 12 are pumped out through a pipe 16 by the pump 17, the discharge-pipe 18 of which carries the strong-liquor drippings back to the pipe 13 and so to the exchanger and general circulation.

The pumps 14 and 17 need no description, as they are of the usual type, and any ordinary reciprocating pumps will answer the purpose, the only novel feature being in their connections, or rather in the single piston-rod 19, which serves as the piston-rod of both pumps and is impelled by the piston 20 in the ordinary steam-cylinder 21. Only a small pump is necessary to throw the drippings from the chamber 12 back in circulation; but if this pump is independently used it is inclined to drag and imperfectly do its work; but by connecting the two pumps together as illustrated and described they work in unison and the smaller pump is compelled to keep up with the larger one.

As above remarked, the pump 14 is large enough to maintain the general circulation and is speeded so as to keep the liquor circulating at the desired speed, and the size of the pump 17 is proportioned to the chamber 12, so that when operated in connection with the pump 14 the pump 17 will serve to keep the drippings from said chamber.

While it is desirable to have the drip-chamber 12 formed at the bottom of the gas-exchanger, still the chamber can be located and arranged in other parts of the circulation and the drippings can be returned to other parts

of the circulation or even to the still used in connection with refrigerating apparatus without affecting the principle of my invention.

From the foregoing description it will be noticed that the drippings are collected on the high-pressure side of the machine and introduced from this side into the pump 17 and returned to the circulation, so that the pressure is substantially equal on both sides of the pump-piston, and the whole operation is automatic, no attention being required to see that the drips are properly returned.

Having thus described my invention, I claim as new and desire to secure by Letters Patent—

1. In an apparatus of the kind described, the combination with the drip-chamber on the high-pressure side of the machine arranged to collect the liquor of condensation, and the general circulation, of a pump also arranged on the high-pressure side of the machine and having its suction connected solely with the drip-chamber so as to receive the discharge therefrom directly and deliver the drippings into the general circulation, substantially as described.

2. The combination with a suitable drip-chamber and the general system of circulation, which includes said chamber, of the pump maintaining the general circulation, a second pump arranged to draw from the drip-chamber and discharge into the general circulation, and a connection between the two pumps whereby their pistons work in unison, substantially as described.

3. The combination with the gas-exchanger having the usual drip-chamber, of the main pump discharging into the exchanger, a secondary pump discharging from the drip-chamber of the exchanger into the circulating part thereof, and a single piston-rod for the two pumps, substantially as described.

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Witnesses:

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