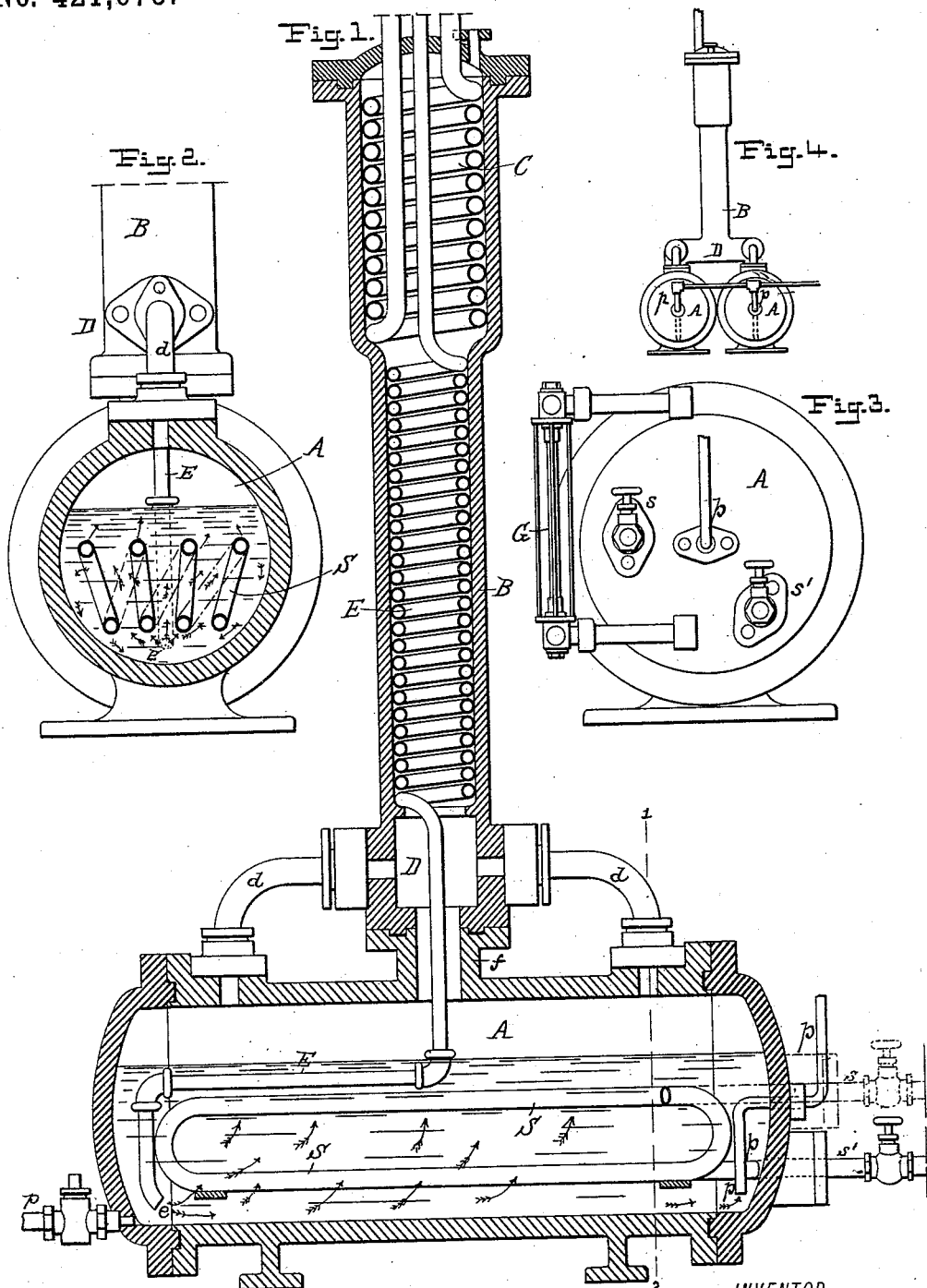


(No Model.)

N. W. CONDUCT, Jr.  
REFRIGERATING APPARATUS.

No. 421,673.

Patented Feb. 18, 1890.



WITNESSES:  
*E. J. Griswold.*  
*Robert T. Sanders.*

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BY  
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his ATTORNEYS

# UNITED STATES PATENT OFFICE.

NATHAN W. CONDUCT, JR., OF JERSEY CITY, NEW JERSEY.

## REFRIGERATING APPARATUS.

SPECIFICATION forming part of Letters Patent No. 421,673, dated February 18, 1890.

Application filed March 7, 1889. Serial No. 302,268. (No model.)

*To all whom it may concern:*

Be it known that I, NATHAN W. CONDUCT, Jr., a citizen of the United States, and a resident of Jersey City, New Jersey, have invented certain Improvements in Stills for Refrigerating by the Ammonia-Absorption Process, of which the following is a specification.

My invention relates to the distilling devices for ice-making or refrigerating machines worked by the ammonia process, and more particularly to that class of distilling devices in which the heat is applied by means of steam or other heating pipes or coils to a body of the liquid ammonia contained in the distilling-vessel.

The object of my invention is to so construct the distilling devices as to produce the ammoniacal gas in a condition as nearly anhydrous as possible, and so dispense with the necessity of employing means for depriving the gas of its moisture after it leaves the still. With this object in view I so construct the distilling devices that the strong liquor brought back from the absorber shall not come into physical contact with the gas, but shall be fed into the bottom of the retort below the heating-coils and near one end, that it may then rise upward, as is its natural tendency, in a free circulation over the heating-coils. The upper part of the body of liquid is thus the strongest and hottest, and the gas is generated and given off at such points that it has not to pass through any large body of the liquor and passes to the rectifier in a comparatively dry condition. At the same time I provide for the continuous withdrawal of the weak liquor from the retort as the distillation proceeds by having the outlet at the bottom below the heating-coils at the opposite end from the inlet for the strong liquor.

Heretofore in steam-heated retorts for refrigerating by the ammonia process, so far as I am aware, the strong liquor has either been fed in at the bottom and the liquor drawn off at the top, or vice versa. In the former case the liquor drawn off would be comparatively strong liquor, while in case the strong liquor is fed in at the top, even below the water-line, the upper part of the body of the liquor would be the coolest and the gas would be given off down below and have to pass up

through this cool liquor under conditions favorable to the saturation of the gas with moisture.

In the accompanying drawings, Figure 1 is a vertical section of a still and rectifier constructed for the carrying out of my invention. Fig. 2 is a transverse section on the line 1 2, Fig. 1; and Fig. 3 is an end view of the still.

I make the still A in the form of a horizontal cylinder of sufficient capacity, and upon the still is centrally supported a reservoir D, which receives the gas on its way to the rectifier B through passages *d*, forming communications between the ends of the cylindrical still and the ends of this reservoir, while the latter is also in communication with the still through the hollow leg *f*, which supports the reservoir. The rectifier B is supported in turn upon the reservoir, and may be of any convenient construction. All this is set forth in and forms the subject of my patent, No. 402,809, dated May 7, 1889.

The pipe E, which supplies the liquid ammonia from the absorber to the still, is coiled within the rectifier, as shown in Fig. 1, and the lower end of the pipe passes down through the reservoir and leg *f* into the still, where its discharge end *e* opens into the bottom of the still near one end below the steam-heating coils S.

From the opposite end of the retort, also at the bottom, leads an outlet-pipe *p* for the discharge of the weak water.

It will be understood that the supply-pipe E for the strong ammonia from the absorber does not open into the rectifying-vessel, but is simply passed through this vessel in the form of a coil, as has heretofore been done.

I have shown a cold-water coil C on the upper part of the rectifier for the further cooling of the gas when it rises upward.

G is a gage to indicate the level of liquid in the retort.

S are the steam or other heating pipes or coils with the admission end *s* and the discharge end *s'* passing out through the end of the retort, as shown in Figs. 1 and 3.

The strong liquor from the absorber entering the bottom of the still at *e* below the steam-coils tends at once to rise upward, as indicated by the arrows, as it is specifically

lighter than the weak liquor, which tends toward the bottom of the still. This strong liquor, being comparatively cold, is heated as it passes the lower line of pipes, and this increases the tendency of the strong liquor to rise to the upper line of pipes, where the liquor is evaporated into gas, which then rises, as indicated by the darts, from the extended surface of the liquor without having to pass through much of the body of the latter. What little liquor the gas has here to pass through is the strongest and at the greatest heat, under which conditions there is the least chance for the gas to carry moisture off with it. From the upper line of piping there is a circulation of the weakened liquor down the sides of the still toward the bottom, whence it is drawn off through the outlet-pipe *p*.

Although I prefer to make the retort of a single horizontal cylinder, simply varying its size with the varied requirements of capacity, yet I do not wish to restrict myself thereto, for more than one retort may be used, provided each one has its own inlet for the strong liquor below the heating-coils near one end and its own outlet for the weak liquor below the heating-coils near the other end. For instance, in Fig. 4 I have illustrated two retorts so combined with one rectifier, these two retorts being, as I have said, each provided with its own inlet and outlet for the liquor below the heating-pipes and at opposite ends of the retort.

I have not shown or described the condenser, absorber, or freezing tanks and other appliances which go to make up the complete refrigerating apparatus, as they form no part of my present invention, and may be of any well-known construction.

The still illustrated in Figs. 1 and 2 of the drawings is shown as having heating-coils with an active heating-surface of from two to three square feet to about one cubic foot of liquor in the still; but this I do not claim in the present application, as it forms the subject of a separate application for a patent filed by me December 14, 1889, Serial No. 333,727.

I am aware of Nishigawa's British patent, No. 813 of 1876, in which the still of the refrigerating apparatus has the inlet for the strong liquor at one end of the retort near the bottom, and the outlet for the weak liquor at the other end of the retort near the bottom; but in that case the heat was applied to the bottom of the vessel, so that the bottom would be the hottest point where the gas would be generated, and it would have to pass up through the whole body of liquid, and in doing so it would take up moisture.

I claim as my invention—

In an apparatus for refrigerating by the ammonia-absorption process, the combination of a still with heating-pipes therein, the strong-liquor-supply pipe from the absorber opening into the bottom of the still near one end below the heating-pipes, and the weak-liquor-discharge outlet at the other end below the heating-pipes, all substantially as described.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

NATHAN W. CONDUCT, JR.

Witnesses:

EDITH J. GRISWOLD,  
ROBERT T. SANDERS.