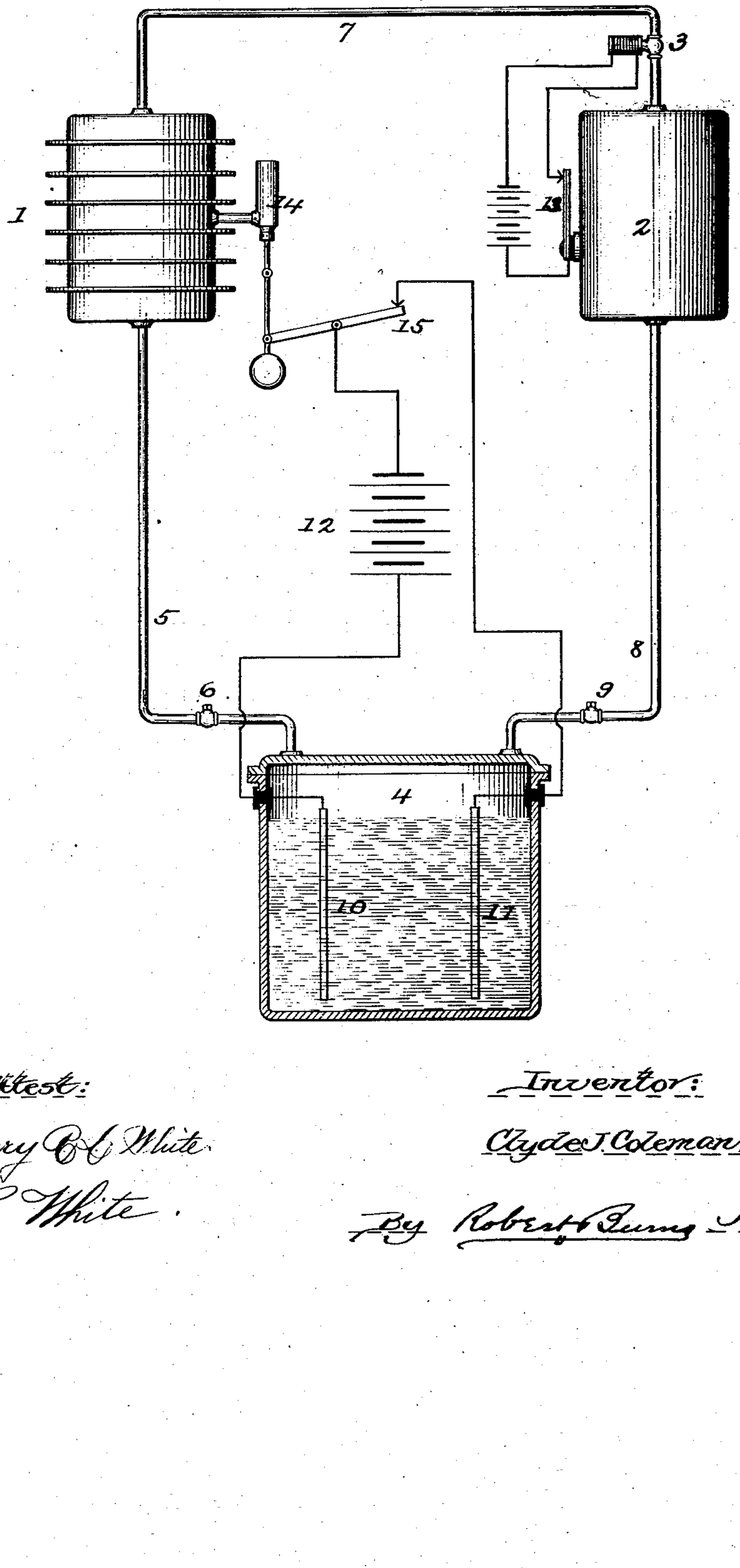
No. 651,827. Patented June 19, 1900.

C. J. COLEMAN.

ELECTROLYTIC SYSTEM OF REFRIGERATION.

(Application filed Oct. 20, 1899.)

(No Model.)



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ELECTROLYTIC SYSTEM OF REFRIGERATION.

SPECIFICATION forming part of Letters Patent No. 651,827, dated June 19, 1900.

Application filed October 20, 1899. Serial No. 734,240. (No model.)

To all whom it may concern:

Be it known that I, CLYDE J. COLEMAN, a citizen of the United States, and a resident of Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Electrolytic Systems of Refrigeration; and I do hereby declare the following to be a full, clear, and exact description of the same, reference being had to the accompanying drawing, forming a part of this specification.

The present invention relates to that class of refrigeration systems and apparatus in which the respective operations automatically follow each other in succeeding cycles.

The object of the present improvement is to provide a simple and efficient electrolytic system of refrigeration, and which also involves a simple and efficient means of automatic control, whereby the operation of the system is rendered continuous as well as responsive to changes in conditions during continued use, all as will hereinafter more fully appear.

The accompanying drawing, illustrative of the present invention, is an elevation, partly in section, of a refrigerating apparatus embodying the present invention.

Referring to the drawing, 1 represents the storage or condensing coil or chamber; 2, the expansion or cooling coil or chamber, in which the refrigerant medium is expanded to effect the cooling operation of the system; 3, the expansion-valve, by means of which the refrigerant medium is admitted to the expansion-chamber 2 in an automatic manner, depending upon the condition thereof, and 4 the power apparatus, by which the refrigerant medium is taken from the expansion-chamber and transferred into the condensing or storage chamber in a closed and continuous cycle of operations.

The above-described members or portions of a refrigeration system and apparatus are in a broad sense common to the present type of refrigeration system and apparatus and may be of any usual and approved construction and coupled together in any usual and suitable manner.

In the accompanying drawing, illustrative of the present system, the upper and outlet end of the motive-power portion 4 of the system is connected, by pipe connection 5, with the condensing or storage chamber 1, such pipe connection being provided with a check-valve 6 to prevent a return flow of the refrigerant medium from such condensing-chamber into the motive-power portion 4 of the present system.

The condensing-chamber 1 is connected to the expansion or cooling chamber 2 by a pipe connection 7, in which is arranged the expansion-valve 3, heretofore described, and the expansion or cooling chamber 2 is in turn connected to the upper and inlet end of the motive-power portion 4 of the system by the return-pipe connection 8, provided with a check-valve 9 to prevent backflow from such motive-power portion of the system into such expansion or cooling chamber.

The first part of the present invention involves, broadly, as a means for transferring the refrigerant medium from one part of the system to the other and for maintaining the required degree of pressure or vacuum in the same of a closed electrolytic cell or vat containing as an electrolytic bath any suitable body or liquid—such, for instance, as chlorid of ammonium or chlorid of sodium—that is adapted by electrolytic decomposition to afford a gaseous medium adapted to act as the refrigerant medium of the system.

In the type of apparatus shown in the drawing as illustrative of the present invention the closed electrolytic cell or vat 4, constituting the motive-power apparatus of the system, will be arranged intermediate of the storage or condensing chamber 1 and the expansion or cooling chamber 2 and will be provided with the proper terminals or anodes and cathodes 10 and 11, connected with the electric battery 12 or other suitable source of electromotive force.

Chlorid of sodium is given as an example of a decomposable body suitable to the present system, in that it affords under electrolytic decomposition a gaseous body (chlorin) adapted to act as the refrigerant medium of the system and at the same time leave a solid base behind which will reabsorb said refrig-

erant medium or gas as it comes from the expansion or cooling chamber and in so doing aid materially in maintaining the desired degree of vacuum therein.

Another part of the present invention involves an automatic regulation of the operations of the present system, in which the action of the cooling or expansion chamber is continuous and responsive to the varied demands arising during continued use, while the action of the storage or condensing chamber and the electrolytic cell or vat is of an intermittent nature and responsive to the actions and requirements of the cooling portion of the system.

In the construction illustrated in the drawing for attaining the above-described results, 13 is a thermostat under the influence of the expansion or cooling chamber 2 and adapted with variations in temperature in the said chamber to open or close the circuit of the electromagnetically-actuated expansion-valve 3 of the system.

14 is a pressure gage or engine connected to the condensing or storage chamber and adapted with a predetermined degree of pressure in the storage-chamber 1 to open the circuit of the electrolytic cell or vat 4 by means of the circuit-breaker 15 to prevent the further generation of the gaseous refrigerant medium and at the same time permit the contents of such cell to act as an absorbent for the gaseous refrigerant medium from the cooling or expansion coil 2. With a predetermined drop in the pressure within the storage chamber the circuit of the electrolytic cell will be again closed to recommence a generation of the refrigerant gas, and so on in continued and succeeding cycles during the continuance of the present process.

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

1. The herein-described electrolytic system of refrigeration, the same comprising the generation of the refrigerant medium by electrolytic action, the storage of such refrigerant medium under pressure, and the subsequent expansion thereof to effect a cooling action, substantially as set forth.

2. The herein-described electrolytic system of refrigeration, the same comprising the generation of the refrigerant medium by electrolytic action, the storage of such refrigerant medium under pressure, the expansion of such stored medium to effect a cooling action, and the subsequent reabsorption of such expanded refrigerant medium for reuse, substantially as set forth.

3. The herein-described electrolytic system of refrigeration, the same comprising a controllable generation of the refrigerant medium by electrolytic action, the storage of such refrigerant medium under pressure and a controllable expansion of such stored medium to effect a cooling action, substantially as set forth.

4. The herein-described electrolytic system of refrigeration, the same comprising a controllable generation of the refrigerant medium by electrolytic action, the storage of such refrigerant medium under pressure, a controllable expansion of such stored medium to effect a cooling action, and the subsequent reabsorption of such expanded refrigerant medium for reuse, substantially as set forth.

In testimony whereof witness my hand this 2d day of September, 1899.

CLYDE J. COLEMAN.

In presence of—

ROBERT BURNS,

H. A. NOTT.