

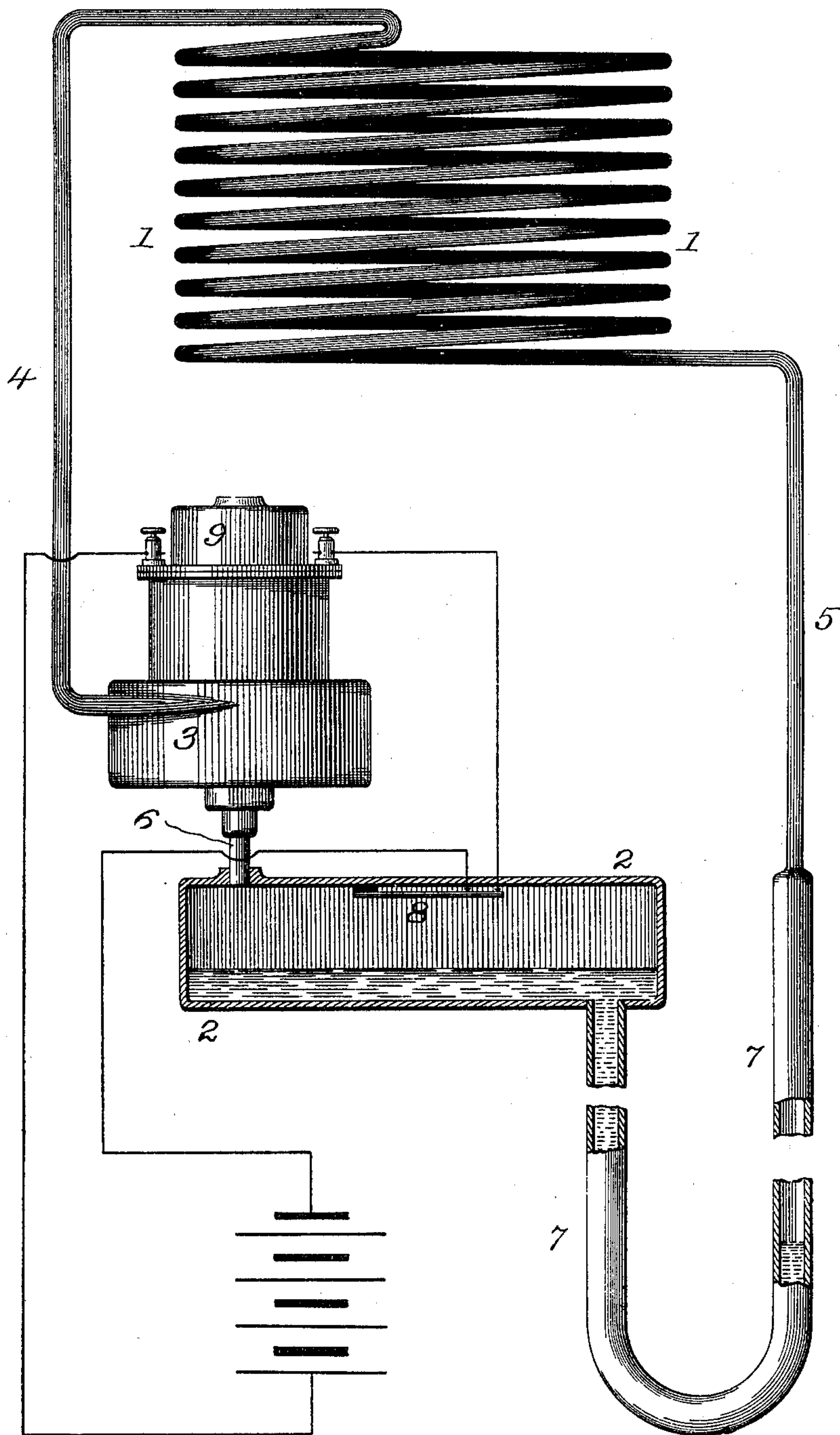
No. 670,915.

Patented Mar. 26, 1901.

C. W. COLEMAN.
REFRIGERATION SYSTEM.

(Application filed June 13, 1900.)

(No Model.)



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UNITED STATES PATENT OFFICE.

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REFRIGERATION SYSTEM.

SPECIFICATION forming part of Letters Patent No. 670,915, dated March 26, 1901.

Application filed June 13, 1900. Serial No. 20,176. (No model.)

To all whom it may concern:

Be it known that I, CLARENCE W. COLEMAN, a citizen of the United States of America, and a resident of Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Refrigeration Systems, of which the following is a specification.

The present invention relates to that type of refrigeration systems which is known as the "vacuum" system and in which a refrigerant medium which is capable of being liquefied at less than atmospheric pressure is solely employed and in which the vacuum is maintained within the closed or sealed circuit of the system.

The object of the present improvement is, in the main, to provide a simple and effective system continuous in its nature and affording in a closed or sealed circuit a positive maintenance of a differentiated degree of vacuum between the expansion and the condensing sides of the system and with which such differentiation in the degrees of vacuum is attained by the height of a static column of the refrigerant medium employed in the system, all as will hereinafter more fully appear, and be more particularly pointed out in the claims. I attain such object by the construction and arrangement of parts illustrated in the accompanying drawing, which represents an apparatus partly in side elevation and partly in section.

Referring to the drawing, 1 represents the condensing or storage chamber, 2 the expansion or cooling chamber, in which the refrigerant medium is expanded to effect the cooling operation of the system, and 3 the compression apparatus, by means of which the expended refrigerant medium is drawn from the expansion-chamber and forced into the condensing-chamber, from which it returns to the expansion-chamber, to be again expanded in a closed and continuous cycle of operations.

The above-described members of a refrigeration system are in a broad sense usual to the present type of systems and may be of any well-known and approved construction and be connected together in any usual manner, and, as shown in the drawing, the outlet end of the compression apparatus 3 is con-

nected by pipe connection 4 with the condensing-chamber 1. The condensing-chamber 1 is connected to the expansion-chamber 2 by a pipe connection 5, and the expansion-chamber is in turn connected with the inlet end of the compression apparatus by the return-pipe connection 6.

The herein-described type of vacuum refrigeration systems involves, broadly, the combination, with a mechanically-operated compression or pumping apparatus, of a static column of the refrigerant medium, such compression apparatus acting to compress the expanded refrigerant medium against such static column of its own liquid, thus feeding or forcing such liquid column progressively and continuously into the expansion-chamber of the system to replace the refrigerant medium expanded therein by the continued action of the pumping apparatus in effecting the continued cooling operation of the system.

In the form of apparatus shown in the drawing as illustrative of the present invention a gooseneck or U-shaped tube 7 is employed to contain the static column of refrigerant medium heretofore described, and such tube will be located at a lower level than the condenser portion 1 of the system, so as to receive the liquefied refrigerant medium therefrom and convey the same to the expansion chamber or side of the system in an automatic manner and without the usual provisions of mechanically-operating check-valves or other like provisions between the two sides of the system.

In the practical operation of the present improvement under the varying conditions met with in an automatic refrigerating apparatus the static column before described will automatically vary in height to impose a corresponding increase or decrease in the amount of vacuum stress upon the expansion or cooling side of the system to meet the varied requirements met with during a continued use and in so doing will compensate for any short stoppage of the pumping apparatus or any variations in the pumping action thereof.

The present improvement is intended solely for operation in that particular type of refrigeration systems in which a vacuum stress is

maintained upon the expansion or cooling side of the system and under which vacuum stress the liquid refrigerant medium, which also constitutes the static column of the present improvement, is expanded to produce the cooling or refrigerating action of the system.

To render the present system automatic in action, the same will be provided with a thermostat 8, located within the influence of the expansion-chamber 2 and adapted to open or close the electromotive circuit of the electric motor 9, by which the compression apparatus 3 of the system is propelled and in accordance or sympathy with the varying conditions existing in the cooling or expansion side of the system.

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

1. In a vacuum system of refrigeration of the character herein described, the combination with the condensing-chamber and the expansion-chamber, of a compression apparatus arranged intermediate of said chambers, and means for establishing a difference of vacuum between the two chambers the same comprising a static liquid column of the refrigerant medium, interposed between the condensing-chamber and the expansion-chamber, substantially as set forth.

2. In a vacuum system of refrigeration of the character herein described, the combination with the condensing-chamber and the ex-

pansion-chamber, of a compression apparatus arranged intermediate of said chambers, means for establishing a difference of vacuum between the two chambers the same comprising a static liquid column of refrigerant medium interposed between the condensing-chamber and the expansion-chamber, and a casing for such static liquid column formed by a U-shaped tube one end of which is connected to the condensing-chamber and the other end to the expansion-chamber, substantially as set forth.

3. In a vacuum system of refrigeration of the character herein described, the combination with the condensing-chamber and the expansion-chamber, of a compression apparatus arranged intermediate of said chambers, means for establishing a difference of vacuum between the two chambers the same comprising a static liquid column of the refrigerant medium interposed between the condensing-chamber and the expansion-chamber, and means connected with the expansion-chamber for automatically controlling the action of the compression apparatus, substantially as set forth.

Signed by me at Chicago, Illinois, this 8th day of June, 1900.

CLARENCE W. COLEMAN.

Witnesses:

ROBERT BURNS,
HENRY A. NOTT.