Feb. 3, 1925. 1,525,095

W. S. JOSEPHSON

THERMOSTATIC VALVE

Filed Jan. 18, 1923

Fig. 1.

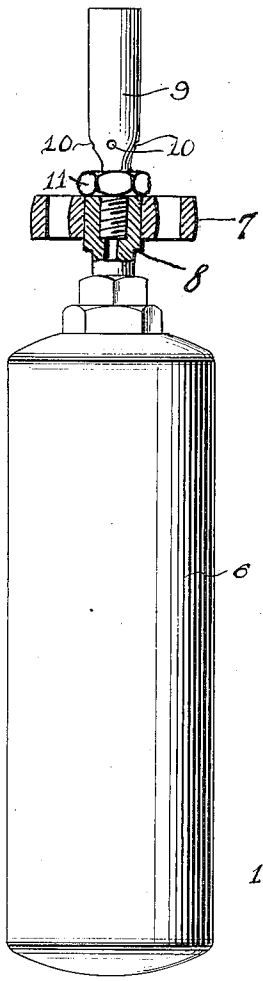


Fig. 7.

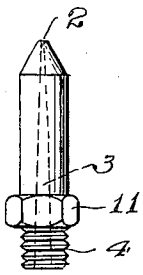


Fig. 2.

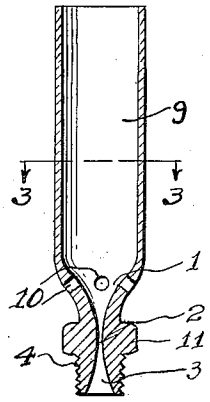


Fig. 8.

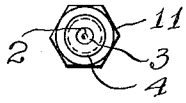


Fig. 3.

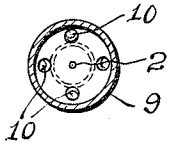


Fig. 6.

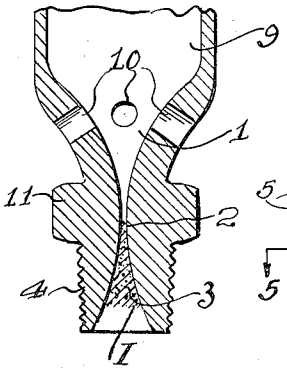


Fig. 4.

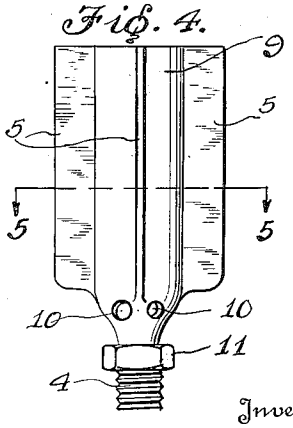
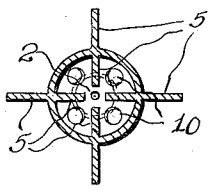


Fig. 5.



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UNITED STATES PATENT OFFICE.

WALTER S. JOSEPHSON, OF NEW YORK, N. Y., ASSIGNOR TO B. M. J. UTILITIES, INC., OF NEW YORK, N. Y., A CORPORATION OF NEW YORK.

THERMOSTATIC VALVE.

Application filed January 18, 1923. Serial No. 613,500.

To all whom it may concern:

Be it known that I, WALTER S. JOSEPHSON, a citizen of the United States, residing at New York, in the county of New York and State of New York, have invented a new and useful Thermostatic Valve, of which the following is a specification.

The object of my invention is to provide a novel valve adapted to be readily attached to a container of carbon dioxide to make practical the use of the liquefied gas as a refrigerant by thermostatically regulating the escape of the gas from the containers in the novel manner hereinafter described. I attain the objects of my invention by the mechanism illustrated in the accompanying drawings, in which—

Figure 1 is a side elevation of my invention attached to a container in position for use conventional hand wheel 7 and mouth 8 of the container being shown in section, these elements not being a part of the invention disclosed in the present application;

Fig. 2 is an enlarged longitudinal section of my device;

Fig. 3 is a section on line 3—3 of Fig. 2;

Fig. 4 is a view of my device provided with radiating fins;

Fig. 5 is a section on line 5—5 of Fig. 4;

Fig. 6 is an enlarged detail sectional view, similar to Fig. 2, showing the ice block I formed in the conical mouth 3 of the valve;

Fig. 7 is a side elevation of the initial form of my invention; and

Fig. 8 is an end elevation of Fig. 7.

Like numerals indicate like parts in each of the several views.

Referring to the accompanying drawings, 6 designates a container of carbon dioxide, the container being provided with a hand wheel 7 for controlling the valve in the threaded nozzle 8 of the container, as shown in Fig. 1. I provide a thermostatic valve having an approximately conical mouth 3, a restricted passage 2, and a flaring approximately conical expanding chamber 1, which terminates in the enlarged, preferably cylindrical chamber or tube 9. Near the base of chamber 1 is provided air passage 10. The expanding and velocity of the gases in the tube 9 creates a vacuum at the point where these openings are positioned, which will draw in a volume of air from the surrounding atmosphere and more quickly bring all of the air contents of the ice box to the refrigerating device. I preferably provide chamber 9 with radiating fins 5, as shown in Figs. 4 and 5, to increase the efficiency of the valve. The valve is provided with a threaded nozzle end 4 of suitable size to mesh with the threads in the nozzle 8 of the carbon dioxide container; and I may preferably provide a suitable nut portion 11 on the valve for more conveniently attaching it to and removing it from the nozzle of the container. In Figs. 7 and 8 is illustrated the initial form of my invention, over which Figs. 1–6 are an improvement.

In operating the device the valve is screwed into place in the nozzle of a container of liquefied carbon dioxide, as shown in Fig. 1, and placed in a suitable portion of any refrigerator or ice-box, in place of ice. The hand wheel 7 is rotated to open the usual valve of the container (not shown) in nozzle 8 to allow the carbon dioxide to flow out from the container. The escaping carbon dioxide vapor flows into mouth 3 and thence through the restricted passage 2 of the thermostatic valve, passage 2 being sufficiently minute so that the carbon dioxide vapor will quickly freeze and close the passageway, thereby forming an ice block I as illustrated in Fig. 6 and thus temporarily shutting off the further flow of gas from the container. Thereafter, as the temperature in the compartment 1 rises it melts the ice in the restricted passage 2 and again allows the gas to flow. This intermittent flow of the carbon dioxide causes a reduction in the pressure of the gas carbon dioxide the container and the body of the container functions as a cooling medium. This thermostatic action of the valve continues until the entire contents of the container has been exhausted. The operation of the thermostatic valve keeps the temperature of the container substantially at freezing, passing below and above the freezing point alternately. By providing the valve with the enlarged mouth 3, the ice-plug which is formed by the freezing of the gas is of such shape that it cannot be blown through the passage 2 by the pressure of the gas from within the container, but effectively stops

the flow of carbon dioxide until the ice-plug has melted for the flow of a new charge of compressed gas.

In the following claims the term "refrigerant" is to be construed to cover any suitable liquefied gas used as the refrigerating medium and which is released from the container in the form of a vapor, particles of the liquid gas evidently being frozen to form the ice block which thermostatically controls the operation of the apparatus.

What I claim is:

1. In combination with a container of a refrigerant of the class described, a thermostatic valve secured to and opening out of the container, said valve having an open passage therethrough, said passage having a reduced opening, said valve passage being reduced in the direction of the flow of refrigerant from the container through the valve to permit the forming of an ice plug in the valve by the refrigerant.

2. In combination with a container of a refrigerant of the class described, a thermostatic valve being detachably connected to the container and having a tapering valve passage reduced in the direction of the flow of refrigerant from the container through the valve to permit of the intermittent forming of an ice plug by the refrigerant in said valve passage, said valve having temperatures radiating fins radiating into and from the walls of the valve.

3. In combination with a container of a refrigerant of the class described, a thermostatic valve detachably secured to the nozzle of said container, said valve having a passage therethrough which is reduced in the direction of the flow of the refrigerant from the container through the valve to permit the refrigerant to intermittently freeze and block the passage in the valve at the reduced portion thereof, for the purposes described in the foregoing specification.

4. In combination with a container of a refrigerant, of the class described, a nozzle detachably secured to said container, said nozzle having a tapered bore extending through the major portion of the nozzle, said bore terminating in a short flared outlet.

WALTER S. JOSEPHSON.