

(No Model.)

W. H. WOOD & G. RICHMOND.

GAS PUMP FOR REFRIGERATING AND ICE MACHINES.

No. 268,348.

Patented Nov. 28, 1882.

FIG. 1.

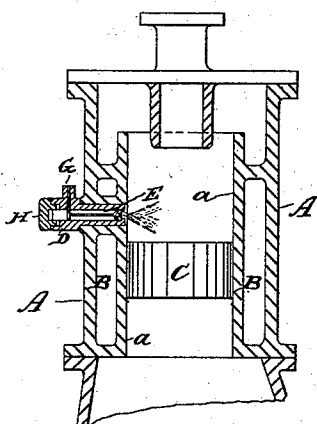


FIG. 2.

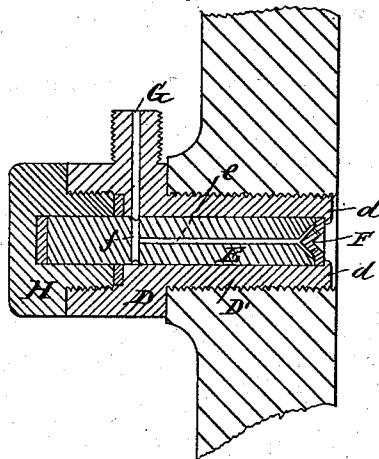
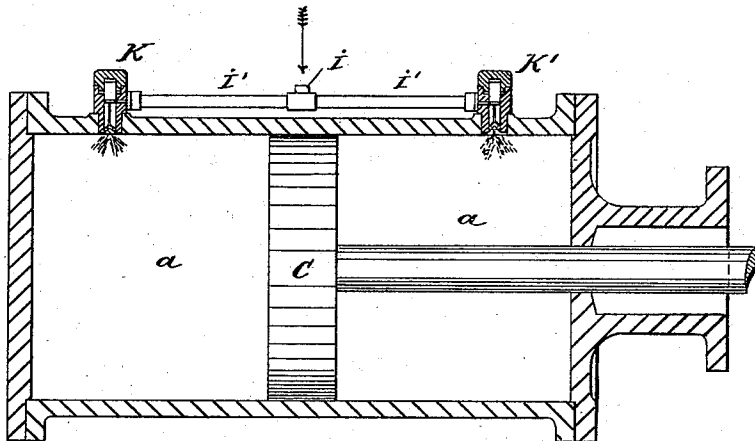


FIG. 3.



WITNESSES:

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GAS-PUMP FOR REFRIGERATING AND ICE MACHINES.

SPECIFICATION forming part of Letters Patent No. 268,348, dated November 28, 1882.

Application filed September 5, 1882. (No model.)

To all whom it may concern:

Be it known that we, WILLIAM H. WOOD and GEORGE RICHMOND, of Brooklyn, in the county of Kings and State of New York, have invented certain new and useful Improvements in Gas-Pumps for Refrigerating and Ice Machines; and we do hereby declare that the following is a full, clear, and exact description of the invention, which will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, which form a part of this specification.

Our invention has relation to the gas-pumps of refrigerating and ice machines—that is to say, the pumps by which the volatilized ammonia, ether, or benzole (as the case may be) is forced into the condensing apparatus, there to be again liquefied in the manner and for a purpose well understood to those familiar with this class of machines. In compressing a liquefiable gas (such as ammonia-gas) considerable heat is generated, the temperature rapidly rising and seriously affecting the packing and other vulnerable parts of the apparatus, besides causing undue expansion of the metallic parts, by which leakage is apt to occur, and which is also apt to affect the smooth and gas-tight working of the pump piston or follower within its appropriate cylinder.

In an application of even date herewith for Letters Patent for improvements in refrigerating and ice machines invented by us we have treated this subject fully, and described various means for cooling the pump-cylinders below a point or degree where deleterious results would ensue from the heat generated by the compression of the gases; and it is the object of this present application to claim one of the alternative constructions and arrangements of parts as therein shown—to wit, the injecting of liquid (of the same kind as that which is being compressed) into the cylinder of the pump in which the compression is effected.

In the accompanying drawings, Figure 1 represents a vertical sectional view of one of our improved pump-cylinders with the injecting apparatus. Fig. 2 is a sectional view, on an enlarged scale, of the injecting apparatus, and

Fig. 3 is a sectional view illustrating a modified arrangement of the injecting apparatus.

Similar letters of reference indicate corresponding parts in all the figures.

A designates the outside casing of the pump-cylinder *a*, by which an annular space or jacket, B, is formed, surrounding the pump-cylinder on all sides. This jacket may be filled with cold or flowing water for the purpose of aiding in the cooling of the inside cylinder, *a*, and its follower C.

The several parts of the injecting apparatus and their combination will readily be understood by reference to Fig. 2 of the drawings. The letter D in said figure represents a cylindrical barrel, the reduced end D' of which is screw-threaded and screwed into a corresponding threaded bore or aperture in the wall of the cylinder. At the inner reduced end of the barrel is an annular flange, *d*, which forms a seat for the spraying-disk F, the latter being clamped against flange *d* by the forward end of a cylindrical plug, E, which is inserted into barrel D, and is provided with a central longitudinal bore or channel, *e*. At its extreme rear end is another channel, *f*, intersecting the former at right angles. These several parts are held together by a screw-cap, H, and the liquid to be injected into the cylinder is fed to the channels *f* and *e* through a bore, G, in barrel D by means of suitable tubing, which is screwed tightly upon the threaded inlet G and suitably packed, if necessary.

In the modified arrangement shown in Fig. 3 two injectors, K and K', are used, which are fed by branches I' from a common inlet, I, which communicates with the liquid tank or reservoir. Where this construction is employed the injector-nozzles must not be placed too close to the ends or heads of the cylinder, nor yet so far from them as to allow of the injection through them of liquid on the under side of the piston or follower.

The liquid tank or reservoir used in this connection with the injector, irrespective of the detailed construction and arrangement of the latter, is formed or constituted by the condenser of the machine to which the apparatus is applied; and it follows that the injector, during the operation of the machine, will con-

tinue to inject spray or atomized liquid into the cylinder until equilibrium of pressure between the pump-cylinder and the condenser has been established. The effect of the spray during the inflow of gas into the pump-cylinder is to supersaturate it, for the spraying-liquid or injected liquid can only be vaporized by taking up heat, and thus reducing in exactly the same proportion the heat in the cylinder.

In this connection we desire it understood that we do not restrict ourselves to the precise construction of the mechanism as shown, for it is obvious that this may be changed or modified in its details without in any essential part deviating from the spirit of our invention.

We claim and desire to secure by Letters Patent of the United States—

1. The combination, with a cylinder of a gas or compressing pump for refrigerating-machines or ice-machines, of a device or appara-

tus for injecting atomized liquid into the body or gas-chamber of the cylinder, substantially as set forth.

2. The combination, with the cylinder of a gas or compression pump for refrigerating-machines or ice-machines, of an atomizing and injecting device connecting the body or gas-chamber of the cylinder with the apparatus in which the gas is condensed or liquefied, and adapted to inject the liquefied vapor, in the form of fine spray, into the pump-cylinder, substantially as and for the purpose shown and set forth.

In testimony that we claim the foregoing as our own we have hereunto affixed our signatures in presence of two witnesses.

WILLIAM H. WOOD.
GEORGE RICHMOND.

Witnesses:

C. F. POST,
JOSEPH L. CONTRELL.