

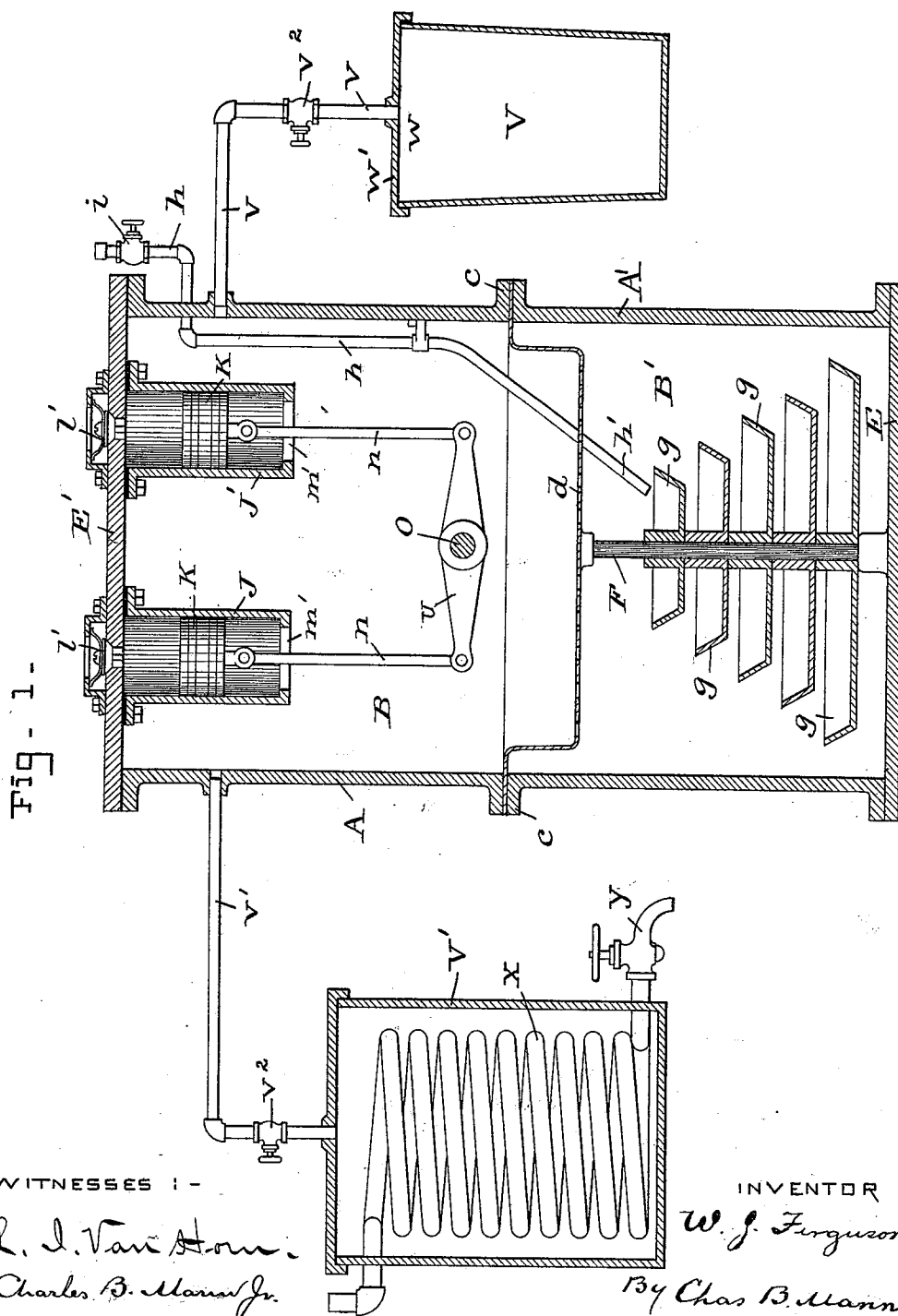
(No Model.)

2 Sheets—Sheet 1.

W. J. FERGUSON.
VACUUM REFRIGERATING MACHINE.

No. 544,273.

Patented Aug. 6, 1895.



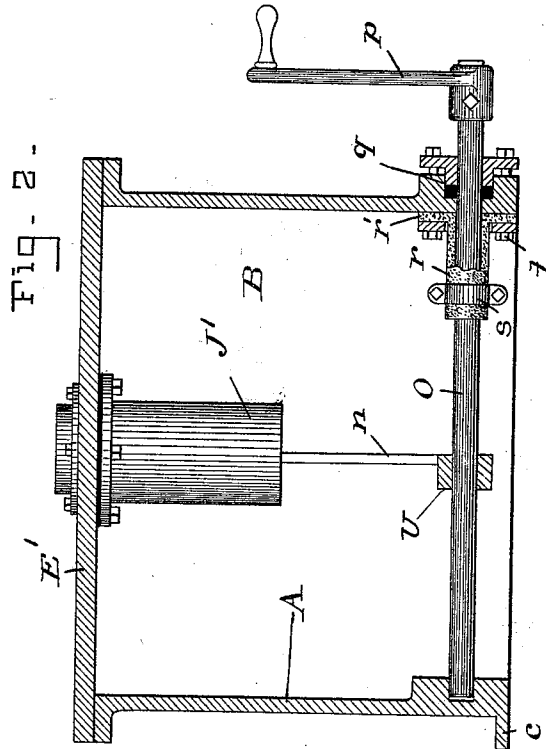
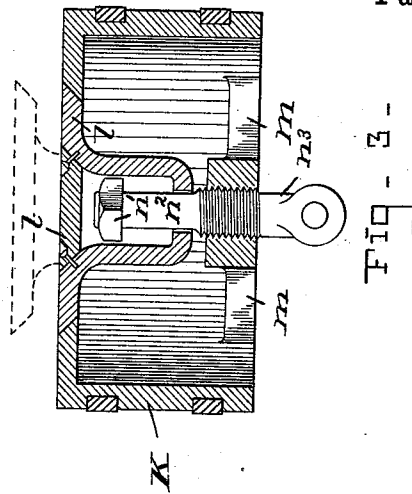
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Patented Aug. 6, 1895.



WITNESSES :—

L. J. Van Horn.
Charles B. Mann Jr.

INVENTOR :

W. J. Ferguson
By Chas B. Mann

ATTORNEY.

UNITED STATES PATENT OFFICE.

WILLIAM J. FERGUSON, OF BALTIMORE, MARYLAND, ASSIGNOR OF ONE-
HALF TO WILLIAM G. H. STUMP, OF SAME PLACE.

VACUUM REFRIGERATING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 544,273, dated August 6, 1895.

Application filed January 7, 1895. Serial No. 534,104. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM J. FERGUSON, a citizen of the United States, residing at Baltimore, in the State of Maryland, have invented certain new and useful Improvements in Refrigerating Apparatus, of which the following is a specification.

This invention relates to a refrigerating apparatus, and has for its object to provide a machine of the vacuum class, having improved construction for such purposes as making ice and cooling liquids.

An apparatus illustrating my invention is shown in the accompanying drawings, in which—

Figure 1 is an elevation showing a sectional view of the apparatus. Fig. 2 is a vertical section of the upper cylinder, taken on the line of the rock-shaft. Fig. 3 shows, on an enlarged scale, a section of the piston of one of the suction-pumps.

The letters A A' designate two cylinders, each having a flange c, which are secured together with a perforated or wire-screen diaphragm d between the two. A bottom head E and a top head E' close the cylinders and form a vacuum-chamber divided into upper and lower compartments B B' by the screen-diaphragm.

In the lower part of the chamber is a standard F, which supports a number of pans g for sulphuric acid. These pans are one above the other and are graduated in size, the largest being at the bottom and each one above being smaller than the one next below. A supply-pipe h on the outside passes through the upper cylinder and then down on the inside, and its end h' is in position above the smallest or uppermost pan g. This pipe supplies the sulphuric acid to the pans. When the acid fills the topmost pan it overflows into the pan next one below, and when this one is full the acid overflows, and in this manner all the pans are supplied. A cock i in the supply-pipe serves to open or close the pipe.

In the upper part of the chamber B are two exhaust-pumps J J'. Each pump has a piston k provided with an upwardly-opening valve l and a cross-bar m, to which the piston-rod n^s is rigidly secured. The rod has at its end a head n' and a smooth neck n^s, on which

the valve l is free to slide when it opens and closes. The head n' retains the valve from sliding off the neck. The lower end of the cylinder of each pump is open, as at m', while the upper end has a check-valve l', which opens to the atmosphere on the up movement of the piston and closes automatically on the down movement of said piston.

A rock-shaft O is mounted in the chamber B and extends diametrically, and one end passes through the wall or shell of the cylinder to the outside, and on the outer projecting end is a lever or crank arm p. The shaft passes through a stuffing-box q. Surrounding the shaft o on the inner side of the cylinder is a flexible sleeve r, one end of which is tightly clamped around the shaft by means of a collar s, while the other end, which has a flange r', is fitted tightly against the inner surface of the cylinder and secured by bolts t. This sleeve may be made of rubber or some other flexible impervious material. This flexible sleeve allows the rock-shaft o to have the requisite rocking movement, while at the same time insuring a perfectly-tight joint between the shaft and wall of the chamber.

The rock-shaft carries a lever U, one end of which is jointed to the connecting-rod n attached to the piston-rod n^s of one pump, and the other end to the other connecting-rod n attached to the piston-rod n^s of the other pump. By grasping the lever or crank arm p a person can give oscillatory motion to the rock-shaft and thus work both exhaust pumps J J'.

The refrigerating-receptacle has connection with the vacuum-chamber B by means of a pipe. In the present instance two refrigerating-receptacles V V' are shown, each connected to the cylinder A by a pipe v v'', each pipe having a cock v^s. One of the receptacles V is tapered and its large open end w is closed by a head w', to which the pipe v is attached. The receptacle may be readily attached and detached from the head by any well-known fastening. The other receptacle V' contains a coiled pipe x, provided at its lower end with a draw-off cock y on the outside. The upper end of this coil projects outside, and may be attached to a beer-supply, a water-supply, or any other liquid supply.

The operation is as follows: The pans g

having been filled with suitable acid, the receptacles V V' supplied with water, and the cocks *v*² being open, the exhaust-pumps are set to work to first exhaust air from and create
5 a vacuum in the chamber B B'. Owing to this vacuum in the chamber, the water in the freezing-receptacles V V' is relieved of the pressure of air and rapidly gives off vapor, which passes into the vacuum-chamber. The
10 acid in the pans *g* then absorbs the water-vapor in the chamber rapidly, thereby further relieving the pressure on the water in the two refrigerating-receptacles and causing further rapid volatilization of the same. This operation continues until the water is so chilled by
15 constant carrying off of heat by vaporization that it is frozen.

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

1. In a refrigerating machine, the combination of a vacuum chamber provided with an exhaust pump at its upper part; acid pans in its lower part; a screen diaphragm separating

the upper and lower parts; and a pipe to supply acid to said pans. 25

2. In a refrigerating machine, the combination of a vacuum chamber provided with an exhaust pump at its upper part; a stand in the lower part supporting a series of acid
30 pans of graduated sizes the largest being at the bottom and the smallest at the top; and a pipe which supplies acid to the uppermost pan.

3. In a refrigerating machine, the combination of a vacuum chamber; acid pans in the chamber; two exhaust pumps in the upper part of the chamber each having a check
35 valve, *l'*, opening to the atmosphere; and a rock-shaft, *o*, provided with a lever, *U*, which
40 connects with the pistons of both pumps.

In testimony whereof I affix my signature in the presence of two witnesses.

WILLIAM J. FERGUSON.

Witnesses:

C. CALVERT HINES,
CHARLES B. MANN, Jr.