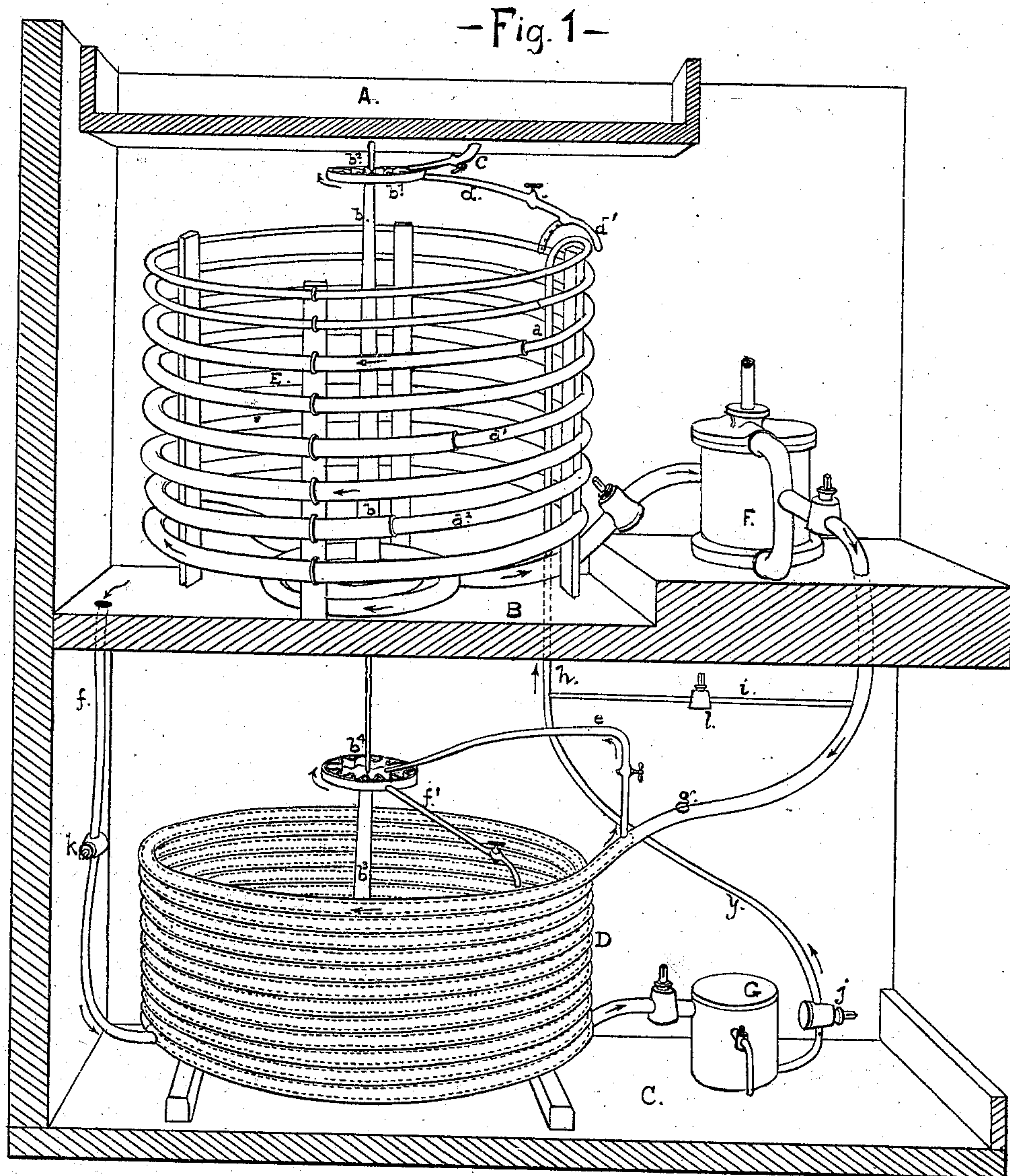


S. B. MARTIN.
Ice-Machines.

No. 150,477.

Patented May 5, 1874.



Witnesses:

G. W. Smith
Byron. Jackson.

- Fig. 2 - Inventor:



Saml B. Martin

UNITED STATES PATENT OFFICE.

SAMUEL B. MARTIN, OF SAN FRANCISCO, CALIFORNIA.

IMPROVEMENT IN ICE-MACHINES.

Specification forming part of Letters Patent No. 150,477, dated May 5, 1874; application filed October 20, 1873.

To all whom it may concern:

Be it known that I, SAMUEL B. MARTIN, of San Francisco, in the county of San Francisco and State of California, have invented an Improved Process and Apparatus for the Manufacture of Ice and other like purposes; and I do hereby declare that the following is a full, clear, and exact description of the same, reference being had to the accompanying drawings and to the letters of reference marked thereon.

The object of my invention is to provide a machine for cooling and refrigerating rooms, manufacturing ice, and like purposes, by sprinkling or spraying water over coils of pipe, and afterward applying the surplus water passing over the coils for condensing the freezing agent employed in the apparatus. This agent may consist of any volatile fluid or gas, from which cold is continuously produced by the vaporization, liquefaction, and return for continuous use.

In the drawings, Figure 1 represents a side elevation of a machine embodying my invention with sides of tanks removed. Fig. 2 is a transverse view of the double condensing-pipe of the coil.

My apparatus consists of a supply-tank, A, above, and a shallow tank, B, underneath, the refrigerating-coil of pipes, and also a tank, C, of like description under the condensing-coil D. The congealer or refrigerator E is composed of a coil of pipes of graduated diameter, that nearest to the top being the smallest in diameter, and extends to the point *a*, from whence it connects with a pipe of greater diameter to the point *a*¹, from thence still larger to the point of connection *a*², from which point the size is maintained, forming one or more coils upon the bottom of the tank, and passing to the pump F. The upper end of this coil passes down through the bottom of the tank to the receiver G. By thus constructing the congealer-coil of pipes of different sizes, it is intended to equalize the flow of gas and liquid throughout the coil by providing room for the expansion of the gas, which follows from contact with the temperature of the water to be

cooled or frozen, and thereby effect a uniform temperature over all parts of the coil. In the center of this coil is an upright post, *b*, on the top of which is placed a wheel, *b*¹, which, by means of water from the tank A through a pipe, *c*, impinging upon the radial vertical arms *b*², causes it to rotate and carry with it a pipe, *d*, having a crescent-shaped sprinkler, *d*¹, whereby water is caused to flow out and sprinkle the surface of the congealer-pipes, upon which ice is gradually forming.

The condensing-coil D is of peculiar construction, and I intend to make it a part of the subject-matter of a new application, and, therefore, do not desire to elaborate upon it in this connection. Suffice it to say that it consists of a double coil, or a smaller pipe within or inclosed by a pipe of larger dimensions.

In the center of this coil is also placed, upon an upright post, *b*³, a wheel, *b*⁴, similar to the one above described. This wheel derives its supply of water from the tank B through the pipe *f*, which passes up through the inner pipe of the double condensing-coil and the pipe *e* upon the wheel, which causes it to rotate, and expel the refrigerated water from the tank upon the said coil through the pipe *f*¹. This water, being of still lower temperature than when leaving the tank A, may be conveyed back to the tank to be used over again.

In operating my machine, the refrigerating or congealer coil is charged with a volatile fluid or gas from a retort. (Not shown.) The machinery and pump being put in motion, the vapor is drawn through the coil E by the pump F, and forced out through pipe *g* into the double condensing-coil, through which it passes to the receiver G, which it enters in a liquid state. When a sufficient charge of the liquid is accumulated in the receiver—say, to the extent of about two-thirds of the capacity—cock *j* being opened, the liquid flows through pipe *h* to the refrigerating-coil, is there vaporized, extracting heat from the water flowing over the coil, and is again returned in the same manner, and liquefied, as before, for use continuously. When it is desired to loosen the ice formed on the congealer-coil, it is only neces-

sary to open the cock *l* on pipe *i*. This allows the warm gas to pass into the congealer-coil under the high pressure of the condenser, when, by working the pump slowly, the object will soon be accomplished, and the ice, after being divided into blocks of the size desired, may be removed.

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

1. The congealer *E*, consisting of a coil of pipes gradually increasing in diameter, to permit the expansion of freezing liquid into gas, substantially as described.

2. The congealer *E*, and the spraying apparatus *d d'*, combined and arranged as described, for the purpose set forth.

3. The combination of the tank *B* and pipe *f* with the condenser *D*, wheel *b⁴*, and pipe *f'*, the parts being so arranged that the refrigerated water is discharged upon the condenser, substantially as and for the purpose described.

4. The described process of making ice, consisting in spraying water upon coils of pipe containing volatile fluid, and employing the surplus water to assist in the condensation of the gas, as described.

In witness whereof I have hereunto set my hand and seal.

SAML. B. MARTIN. [L. S.]

Witnesses:

F. J. THIBAUT,
JAS. MASON.