J. GAMGEE.

Ice-Machine.

No. 208,304. Patented Sept. 24, 1878.

Fig. 1.

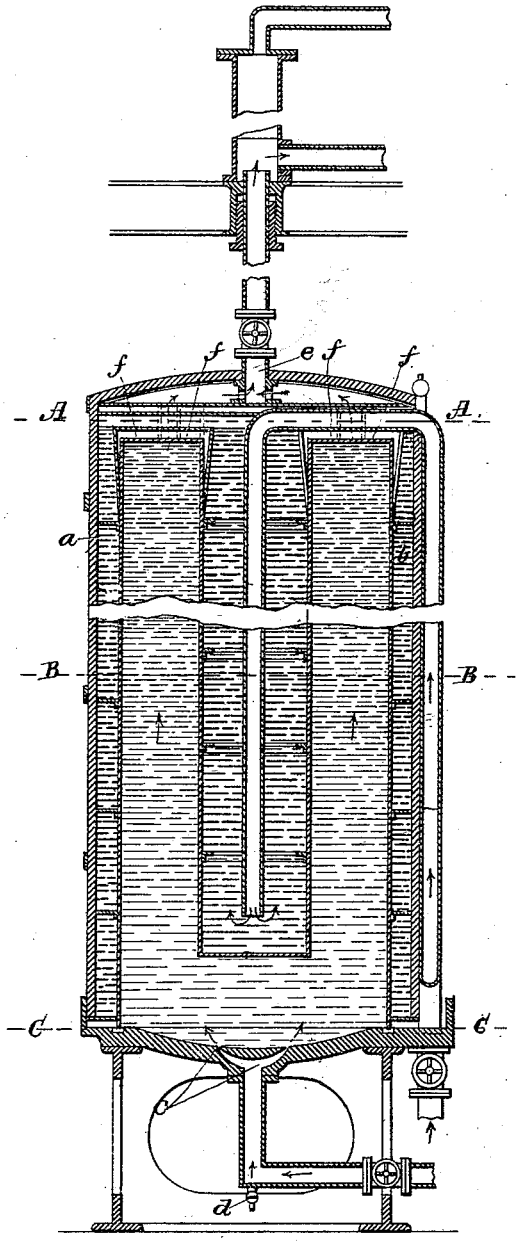


Fig. 2.

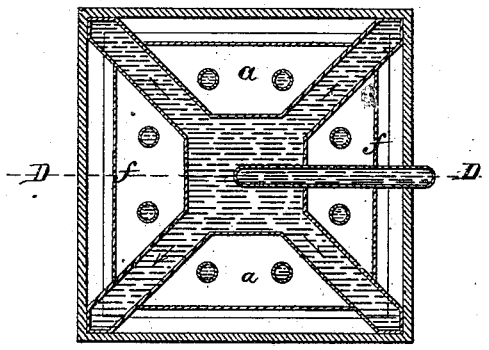


Fig. 3

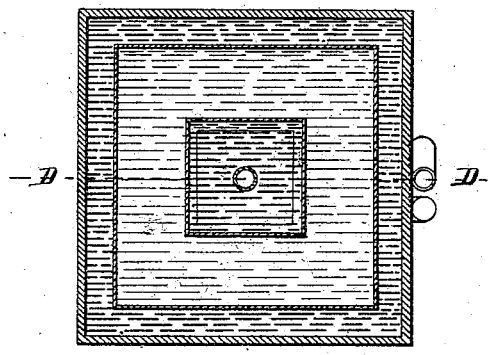
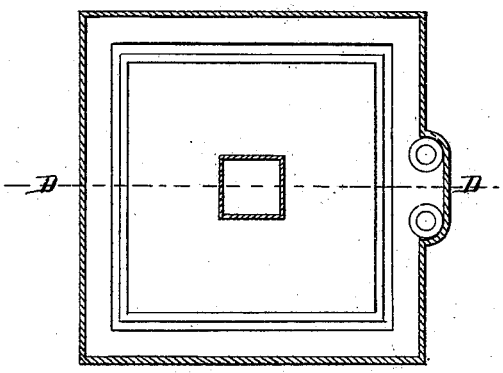


Fig. 4.



Attest.

Jno. T. Pickett

Joseph J. Stewart.

Inventor.

John Gamgee

2 Sheets—Sheet 2.

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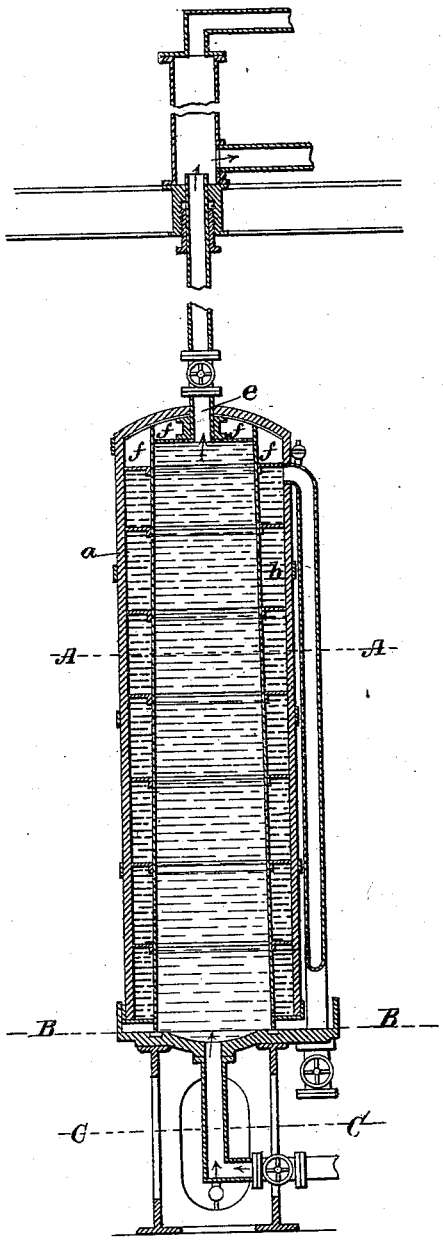
Fig. 5.



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John Gamgee

UNITED STATES PATENT OFFICE.

JOHN GAMGEE, OF CHELSEA, ENGLAND.

IMPROVEMENT IN ICE-MACHINES.

Specification forming part of Letters Patent No. **208,304**, dated September 24, 1878; application filed October 18, 1877.

To all whom it may concern:

Be it known that I, JOHN GAMGEE, of Chelsea, in the county of Middlesex, England, now residing in the city of Washington, in the District of Columbia, have invented certain new and useful Improvements in the Manufacture of Ice, and in apparatus employed therein; and I 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, and to letters of reference marked thereon, which form a part of this specification.

The object of the first part of my invention is to manufacture transparent block ice; and for the purpose I employ inverted molds, maintained full of water in a state of circulation. I use, in combination with such molds, an air or vacuum pump to remove gases from the water, and to produce a hermetic joint between the bottom edge of the mold and its bed or seat; and I further use, in combination with such molds, a filter, through which the water, in its circulation, is caused to flow, and by means of which impurities and the sediment deposited as the ice-crystals form are removed.

In carrying out this part of my invention, I take a mold or bell, Figure 1, or other suitably-shaped vessel, the sides of which are jacketed, Figs. 1 and 5, the space between the jacket and mold being divided into zigzag or other passages, through which an aqueous solution of glycerine reduced to a low temperature, or other freezing-liquid, is caused to flow. I place this bell-mouth downward upon a bed, C C, Fig. 1, or seat, which may be faced with india-rubber or other suitable elastic material. An aperture, *c*, Fig. 1, in the center of the said bed or seat, communicates, by a pipe, with a pump, by means of which water is forced into and through the mold. This pipe is provided with a small cock, *d*, by means of which air is admitted to the partial vacuum, to allow the cover to be lifted off the block of ice after the ice has been thawed from the mold, thus causing an induced current of water to flow into and through the mold from the filter. From the top of the mold another pipe, *e*, Figs. 1 and 5, conducts the water into a filter-tank, which, in its turn, communicates, by a pipe, with the pump. Thus a continuous circulation of water is kept up from the pump into and through the mold, thence to the filter-tank and back to the pump, and so on. The cold imparted by the freezing-liquid causes a layer of transparent ice to form upon the inside of the mold, and this layer gradually increases in thickness, until finally the mold is entirely filled with a solid transparent block. In order, however, to insure the continued current of water through the open tube at the top, and with a view to prevent the early obstruction of this tube during the process of freezing, air-spaces *f f f f*, Figs. 1 and 5, are provided, to interfere with the conduction of cold by the sides of the tube. As the freezing progresses the air or vacuum pump before named, and which is connected at the top of the mold, removes gases from the water, and at the same time, by the vacuum or partial vacuum it produces within the mold, it causes the edges of the same to be kept by the atmospheric pressure tightly down upon their bed or seat. The impurities in the water and sediment deposited as the ice-crystals form are, as before stated, removed by the filter-tank.

This process of progressive filtration of water, by causing its constant circulation through ice-molds or ice-boxes, insures the production of ice of absolute purity, and which has not been hitherto made by any of the many processes adopted.

When the ice-block has been formed, the necessary parts are disconnected, the mold lifted from its seat, and the block turned out.

Fig. 5 indicates the simplest form of bell block mold, in which ice six or eight inches thick may be readily made; but in order to economize both time and space, large molds, as drawn at Fig. 1, may be made with a hollow inverted core, through which the aqueous solution of glycerine or other freezing-liquid is made to pass, as well as through the outer jacket. By this means blocks two or three feet square are quickly and economically produced.

Special molds are used, as in Fig. 5, to make blocks to fit into the hollow space of the large mold, and by inverting these smaller blocks and pushing them into the center space union

is effected by regelation or natural agglutination of the frozen surface.

Having thus described the construction and operation of my machine, what I claim as new, and desire to secure by Letters Patent, is—

1. The process of producing pure and clear ice in ice-machines, which consists in passing the water to be frozen continuously over and between the refrigerating-surfaces and through a filter, substantially as hereinbefore described.

2. The process of inducing upward currents of water and deaerating the same, which consists in producing a partial vacuum above the water to be frozen, thus preventing the accumulation of air-bubbles in the ice-blocks, substantially as described.

3. The combination, in an ice-making machine, of a bell-shaped mold, the water-induction pipe at the bottom, having air-inlet *d*, the water-outlet pipe *e* at the top, leading to a filter, and from thence to a force-pump, which supplies the water-induction pipe, said water-outlet *e* having connected with it at its highest point a pipe leading to a vacuum-pump, all substantially as hereinbefore described and set forth.

In testimony that I do claim the foregoing as my own I hereto affix my signature in presence of two witnesses.

JOHN GAMGEE.

Witnesses:
JNO. T. PICKETT,
JOSEPH J. STEWART.