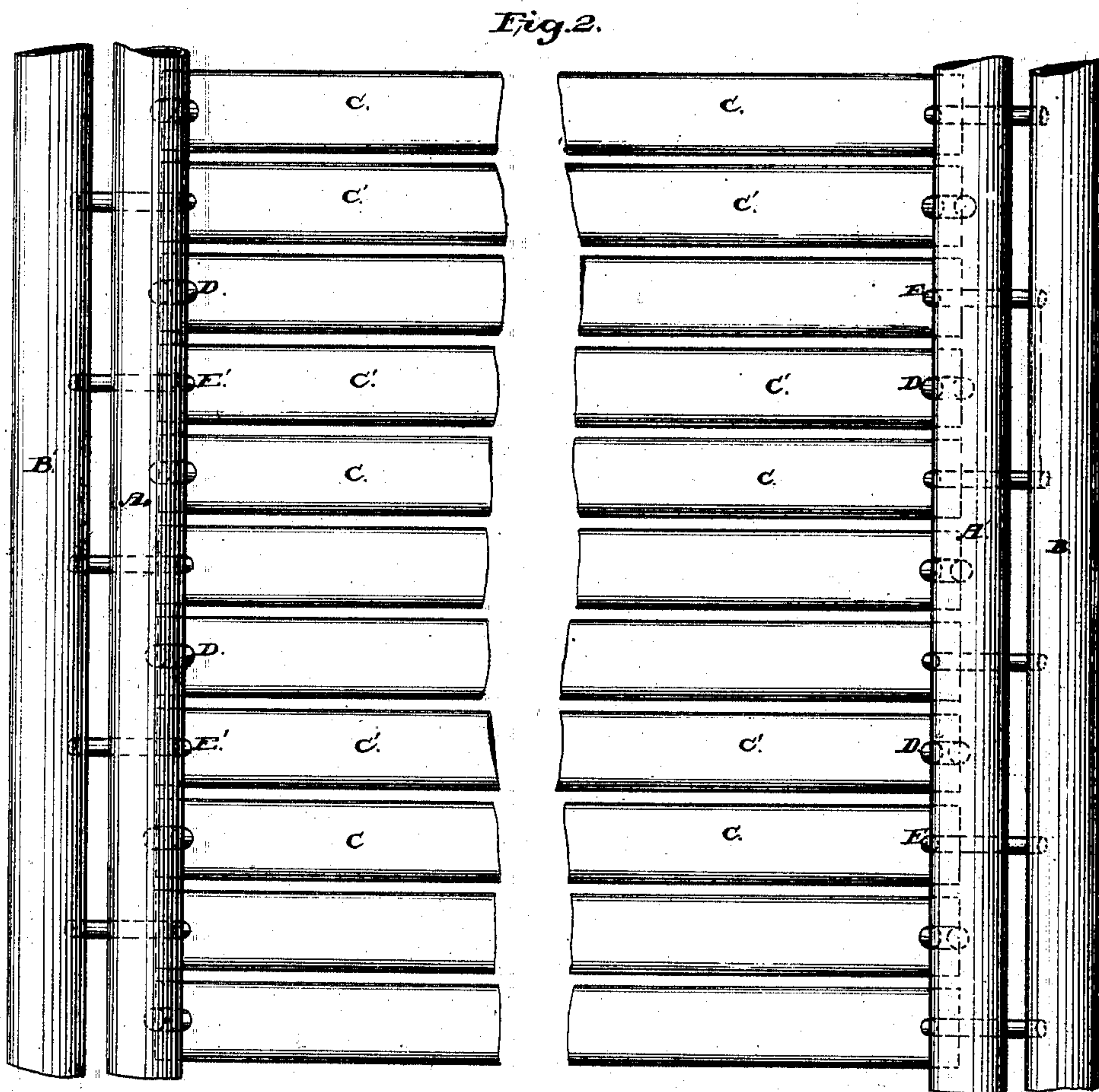
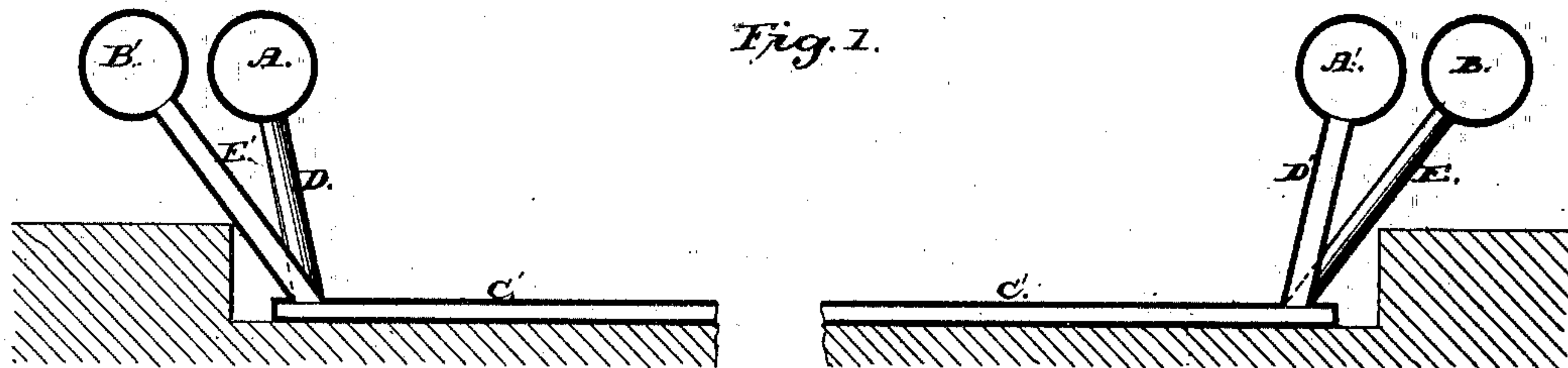


Method of Producing Evenly Congealed Ice Surfaces.

No. 196,653.

Patented Oct. 30, 1877.



Attest:

Pro: J. H. Pickens
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UNITED STATES PATENT OFFICE.

JOHN GAMGEE, OF CHELSEA, GREAT BRITAIN.

IMPROVEMENT IN METHODS OF PRODUCING EVENLY-CONGEALED ICE-SURFACES.

Specification forming part of Letters Patent No. **196,653**, dated October 30, 1877; application filed October 16, 1877; patented in England, October 28, 1876.

To all whom it may concern:

Be it known that I, JOHN GAMGEE, of 379 King's Road, Chelsea, in the county of Middlesex and Kingdom of Great Britain, at present residing at Washington, District of Columbia, in the United States of America, have invented certain Improvements in the Means or Apparatus for Forming and Maintaining Ice-Surfaces and for Cooling-Chambers, of which the following is a specification:

The primary object of my invention is to effect the freezing of a large surface of water more quickly, and to maintain it in a hard frozen state, suitable for being skated upon, or for other purposes, more effectually and regularly than has been accomplished heretofore.

According to my present improvements I cause the cooling-liquid to circulate through the pipes or cells composing the freezing-floor of the ice-surface or rink in a manner which I call "direct alternate circulation," and which consists in causing a supply of the refrigerating-liquid to flow directly from one side or end of the rink or ice floor to its corresponding opposite side or end through each alternate pipe or cell, and thence away to the refrigerator or other cooling or storing chamber, and another and separate supply of the refrigerating-liquid to flow directly from the other side or end of the rink or ice floor to its corresponding opposite side or end, through each alternate pipe or cell placed between the first-mentioned alternate pipes or cells, and thence back to the refrigerator or other cooling or storing chamber. By this arrangement one supply of the refrigerating-liquid flows through a set of pipes in one direction, and a second supply of the refrigerating-liquid flows in the opposite direction through another set of pipes interspaced between those of the first set, whereby the cooling effect is more nearly equalized all over the surface of the ice floor than by the methods of circulation heretofore employed.

In order to carry into effect this part of my invention, I connect one alternate set of floor pipes or cells at one end to an inlet-pipe, and at the other end to an outlet-pipe, and the other alternate set of pipes or cells at one end to a second inlet-pipe, and at the other to a second outlet-pipe, placing, by preference, the inlet-pipe of the first set and the outlet-pipe

of the second set at one side or end of the rink or ice floor, and the inlet-pipe of the second and the outlet-pipe of the first set at the other side or end of the rink or ice floor, the said inlet and outlet pipes being connected to the floor pipes or cells by any suitable or convenient joints or junctions, and arranged with reference to each other, as circumstances may require.

Figure 1 of the annexed drawings represents a sectional elevation of an arrangement of pipes suited for the formation of a rink or ice floor in accordance with the system of direct alternate circulation hereinbefore referred to. Fig. 2 is a plan of the same.

A is the main supply or inlet pipe for the conveyance of the refrigerating-liquid from the refrigerator or other cooling or storing chamber to one side or end of the rink or ice floor; A', the main supply or inlet pipe for the conveyance of the refrigerating-liquid from the refrigerator or other cooling or storing chamber to the opposite side or end of the rink or ice floor; B B', the corresponding return or outlet pipes for the conveyance of the refrigerating-liquid from the rink back to the refrigerator or other cooling apparatus or agent. C C C' are the floor pipes or cells, which I prefer to be of the section shown in Fig. 1^a; D D', the branches connecting the inlet-pipes A A', respectively, with the inlet ends of the said floor pipes or cells C C and C' C'; and E E', the branches connecting the outlet-pipes B B', respectively, with the outlet ends of the said floor pipes or cells C C and C' C'.

It will easily be understood that the refrigerating-liquid brought by the pipe A passes by the branches D D into each alternate floor pipe or cell C C, and, after traversing the latter, escapes by the branches E E into the outlet-pipe B, and that the refrigerating-liquid brought by the pipe A' passes by the branches D' D', into each alternate floor pipe or cell C' C', at the end opposite to that at which the liquid enters the adjacent pipes or cells C C, and, after traversing the said floor pipes or cells C' C', escapes by the branches E' E' into the outlet-pipe B'.

The source of supply to the inlet-pipes A A' must, of course, be elevated above the level of the outlet-pipes B B', or other means must be employed (such for example as pumps) to

force the liquid to circulate through the pipes at the required speed.

In the figures the inlet and outlet pipes are shown placed above the level of the floor pipes or cells, but it will be obvious that they may be placed in any convenient position with reference thereto, and the branch pipes connected to them by any suitable joints or couplings. By these means the circulation of the refrigerating-liquid is direct from one side or end to the other, and back to the refrigerator, and in alternate directions, whereby greater uniformity of effect is obtained than by the ordinary method of circulation.

The drawing illustrates the application of my direct alternate circulating system to the formation of an ice-floor for skating or other purposes, but it will be readily understood that similar arrangements of pipes may be applied to form the floor, walls, and ceiling (all or any

of them) of cooling chambers or rooms, the refrigerating-liquid circulating in such pipes for the purpose of keeping cool the air and other contents of such rooms.

Having now described the nature of my said invention, and in what manner the same is to be performed, I declare that I claim—

In ice skating-rinks, the combination of the freezing-pipes passing through the water to be frozen with independent feeding-mains, adjoining pipes leading from the different mains, whereby the current of refrigerating-liquid occurs from opposite sides for each alternate tube, substantially as hereinbefore described and set forth.

JOHN GAMGEE.

Witnesses:

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GEO. F. GRAHAM.