A. D. PUFFER.

APPARATUS FOR COOLING LIQUIDS.

No. 189,137. Patented April 3, 1877.

Fig. 1.
Reduced.

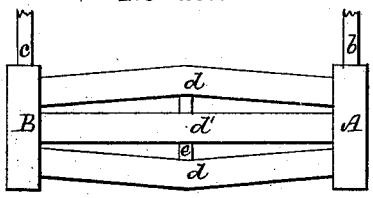


Fig. 2.

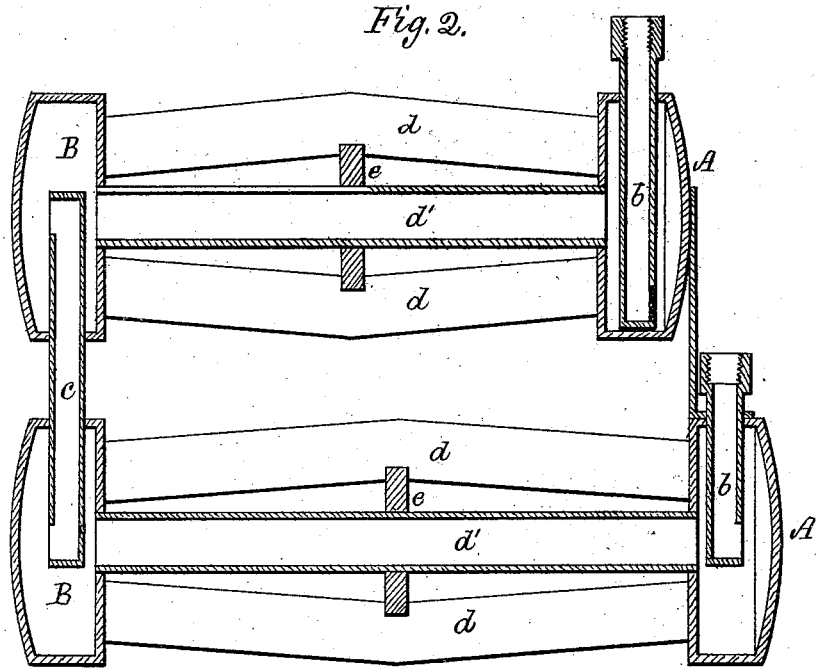
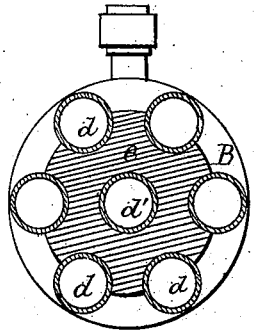


Fig. 3.



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UNITED STATES PATENT OFFICE.

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IMPROVEMENT IN APPARATUS FOR COOLING LIQUIDS.

Specification forming part of Letters Patent No. **189,137**, dated April 3, 1877; application filed March 1, 1877.

To all whom it may concern:

Be it known that I, ALVIN D. PUFFER, of Boston, Suffolk county, Massachusetts, have invented certain Improvements in Apparatus for Cooling Liquids, of which the following is a specification:

My present invention relates to apparatus for cooling soda-water or other aerated liquids, and may be said to be an improvement upon a system shown and described in Letters Patent of the United States issued to me on the 6th day of December, 1870, and the 18th day of August, 1863, respectively, the purpose of the invention shown in the first-named patent being to economize the waste of ice used in cooling liquids; and consists, primarily, in conducting the liquid to be refrigerated through a preliminary or auxiliary series or coil of pipes or cylinders, situated within the ice-water, which accumulates from the melting of the ice with which the primary cylinders or coolers are packed, or otherwise taking advantage of the low degree of temperature of such ice-water to reduce the temperature of the soda-water or other liquid previous to its entering the primary coolers, which receive cold directly from the ice, while the invention embraced in the second-named patent consists in a new or peculiar manner of conducting soda-water through a cooler or refrigerating apparatus, the purpose of the invention being to thoroughly and effectually carry or force the water, in its passage through a series of cooling cylinders, against the refrigerated sides or inner surfaces of such cylinders, or to prevent the formation of a central or inner current through the body of water in such cylinders.

In the apparatus shown in both the above-named patents the liquid to be cooled flows through a series of straight cylinders, the refrigerating surfaces of which are of small area compared with the quantity of fluid.

In my present invention I propose to retain the system of circulation shown in my patent first named, and the method of utilizing the melting of the ice shown in the second, the purpose of my present improvement being to enlarge or increase the effective conducting-surfaces of each cylinder by subdividing it up into a group of pipes of smaller diameter, by which means I present a much smaller column of liquid to a given amount of ice than before.

The drawings accompanying this specification represent in Figure 1 an elevation, and in Fig. 2 a longitudinal section, and in Fig. 3 a cross-section, of a multitubular cylinder embodying my invention, the said Fig. 2 showing a pair of such cylinders connected together.

In the above-named drawings, A and B represent hollow closed heads, which are practically the opposite ends of one of the cooling-cylinders shown in my Letters Patent above named, the connecting or circulating pipe in each head being shown at *b c*.

The two heads A and B are united by a cluster of pipes, *d d*, &c., in number and size, as practice may determine to be most desirable, there being six in the present instance, arranged concentrically about a seventh and central one, *d'*.

The pipes have open communication between the heads, and are (preferably) crowning outward in order that the outer diameter of the cluster shall be about equal to that of the heads A B, for purposes of convenience and strength, while to aid the latter object I employ a collar, *e*, which is secured centrally to the central pipe *d'*, and braces and supports the outlying pipes *d*.

In practice a series of these multitubular cylinders are arranged in the refrigerating-chamber of the fountain, as explained in my second above referred to patent, and practically as shown in Fig. 2 of the accompanying drawings.

When refrigerated liquids are drawn in considerable quantities, in hot weather, from soda-fountains it frequently occurs that they do not remain in the coolers a sufficient length of time to become cold, owing to the limited extent of absorbing-surface of such cylinders.

The operation of the apparatus (shown in said Fig. 2) containing my present improvement is precisely the same as shown in my two patents above enumerated.

It will be seen that, by subdividing or increasing the absorbing-surface of the cooling-

cylinders in proportion to the amount of liquid passing through them, I am enabled to more rapidly and effectually refrigerate such liquids.

I claim—

In apparatus for cooling liquids the multitubular cylinders herein explained, consisting of the hollow closed heads A B, and the connecting-pipes *d d*, &c., with the circulating-pipes *b* and *c*, the multitubular cylinders being arranged in clusters in the refrigerating-chamber of the fountain, as explained, and the whole operating essentially as and for purposes stated.

A. D. PUFFER.

Witnesses:
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