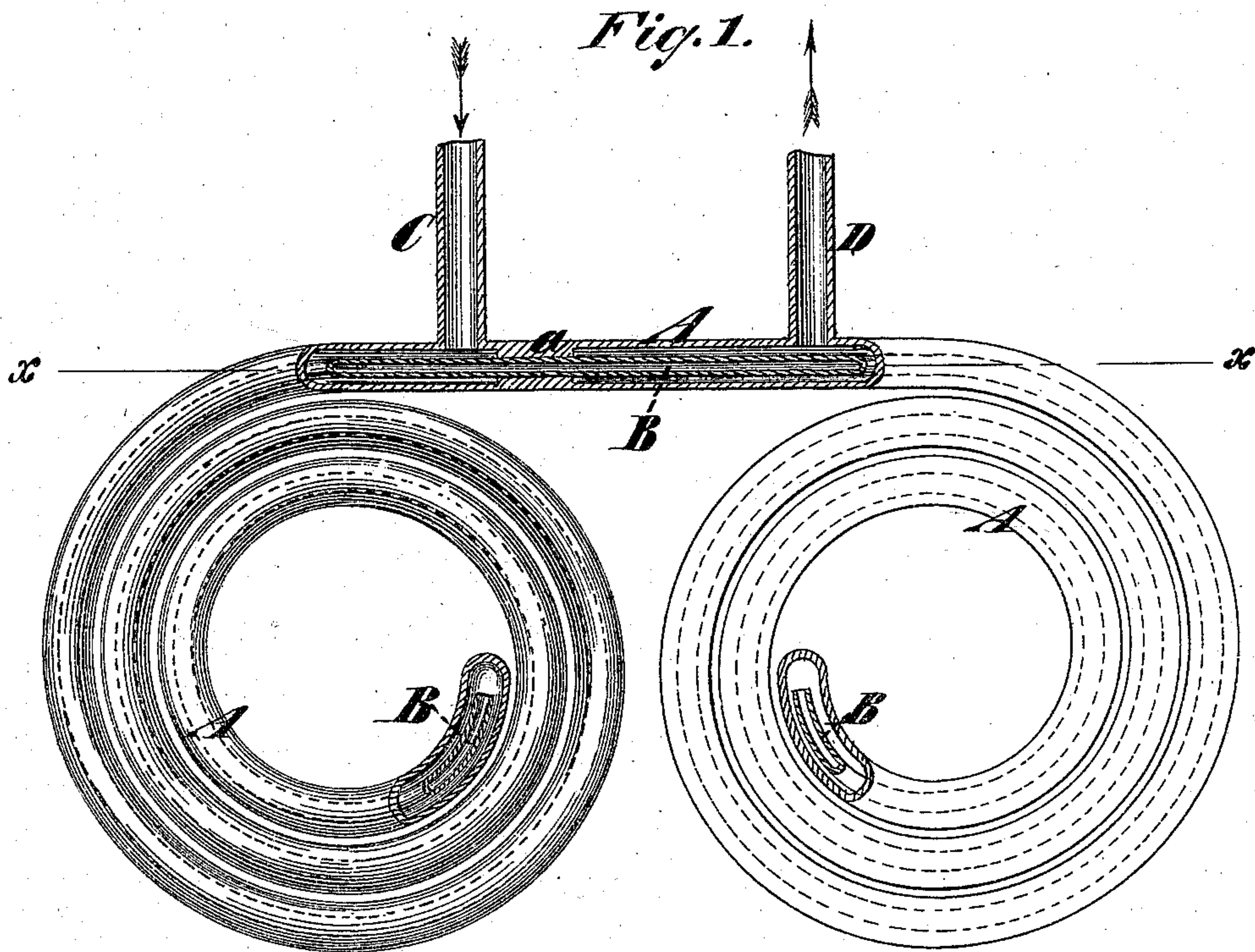


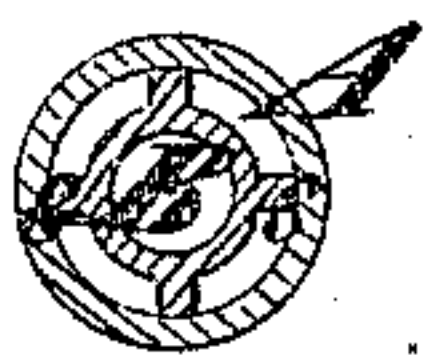
**W. GEE.**  
**Cooling-Coils for Liquids.**

No. 143,689.

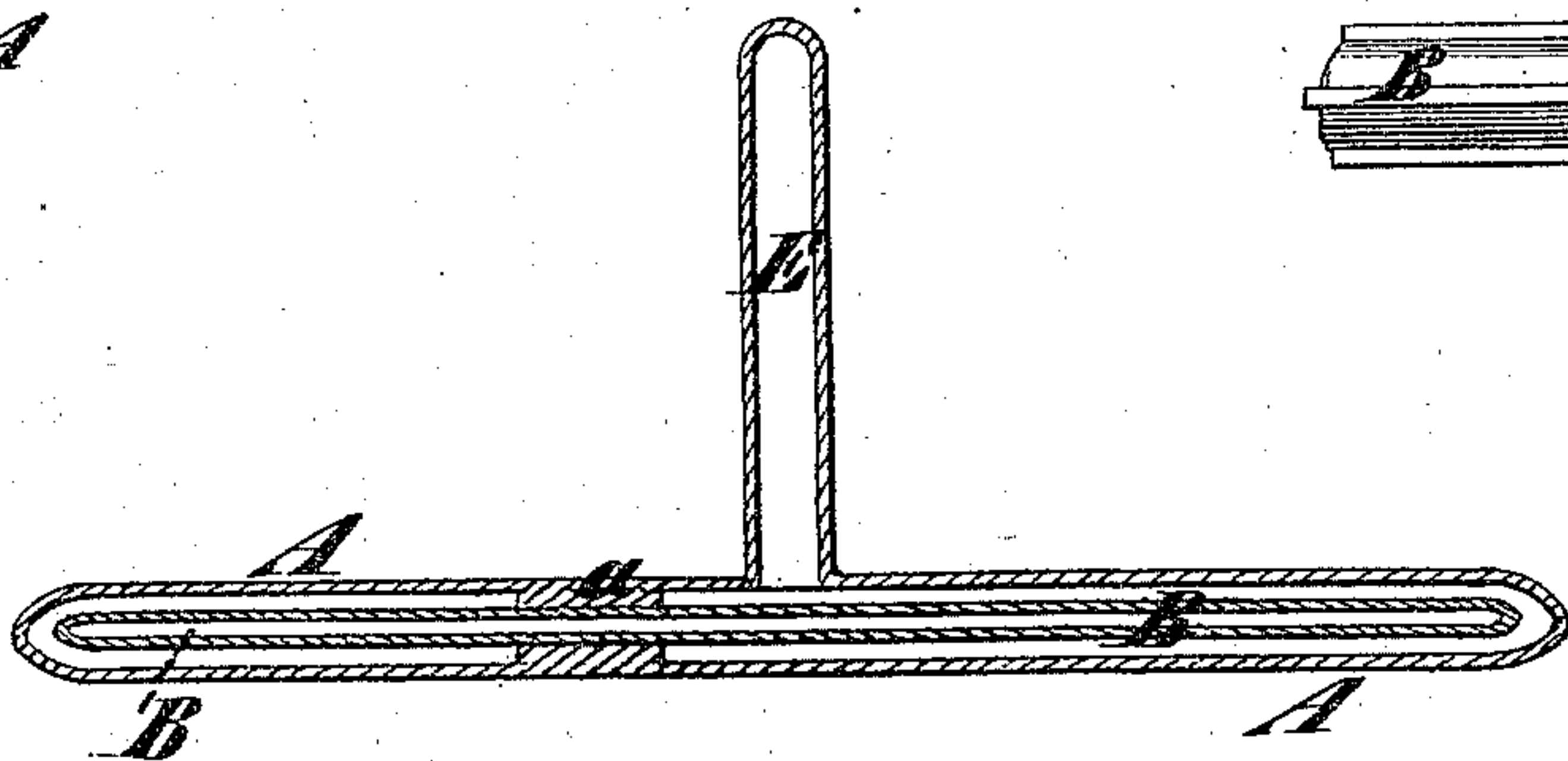
Patented Oct. 14, 1873.



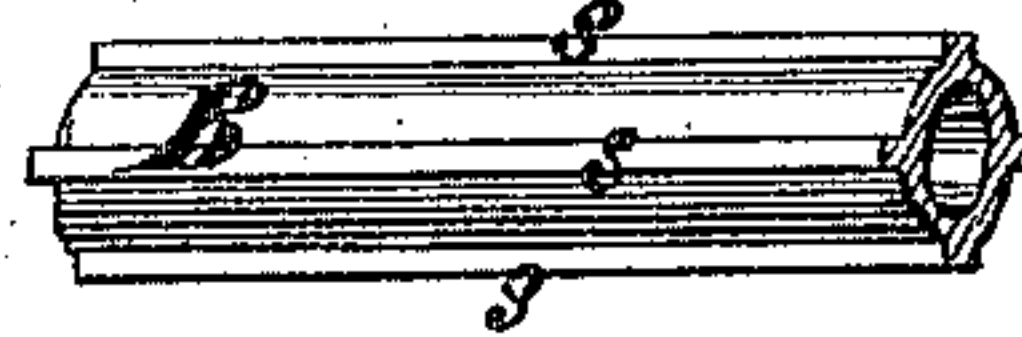
*Fig. 3.*



*Fig. 2.*



*Fig. 4.*



*Witnesses.*

*John Decker.*  
*Fred Hayner*

*William Gee*  
*by his Attorneys*  
*Brown & Allen*



# UNITED STATES PATENT OFFICE.

WILLIAM GEE, OF NEW YORK, N. Y.

## IMPROVEMENT IN COOLING-COILS FOR LIQUIDS.

Specification forming part of Letters Patent No. 143,689, dated October 14, 1873; application filed August 21, 1873.

*To all whom it may concern:*

Be it known that I, WILLIAM GEE, of the city, county, and State of New York, have invented an Improved Coil-Cooler for Liquids, of which the following is a specification:

This cooler is composed, essentially, of two pipes, arranged one within the other, and coiled spirally into one or more coils, whereby the liquid is made to traverse one pipe first from end to end, and then return through the other, and, if there be another coil, is circulated directly through its same pipe, and is afterward returned through the other pipe. The pipes are embedded in ice or ice-water, and are thereby refrigerated. A very simple and efficient cooler is thus produced, and one, moreover, that occupies very little space, for the reason that a given length of cooling-surface is afforded in half the external length of pipe. It is very suitable for cooling soda and mineral waters.

In the accompanying drawing, Figure 1 is a top view of the cooler, showing it partially in section. Fig. 2 is a section of the same taken at the line *xx* in Fig. 1. Fig. 3 is a transverse section of the two pipes, showing the manner of preserving the two concentrics; and Fig. 4 is a perspective view of a portion of the inner pipe.

Similar letters of reference indicate corresponding parts in both figures.

A and B are the two pipes composing the cooler. They are arranged, the one B within the one A, and their two ends are coiled correspondingly into two spiral coils, as shown in Fig. 1. On the exterior of the inner pipe B there are a series of ribs, *s s*, which extend throughout its length, and retain it concentric within the pipe A. Between these two coils the outer pipe A is stopped up by a plug, *a*, so that the liquid cannot circulate through it directly from one coil to the other, and it is closed at the ends. The inner pipe B, however, is unobstructed throughout its entire length. Its ends are open, and terminate a short distance from the ends of the outer pipe A. The inlet C to the cooler is arranged on one side of the plug *a*, and the outlet D on the other side. Adjacent to the outlet is an air-

vessel, E, which compensates for irregularities in the gaseous pressure of the soda-water or other liquid in the cooler, and renders it uniform. The cooler thus formed is arranged in an ice-box.

The liquid first traverses the pipe A of the left-hand coil to its end, and then circulates back through the inner pipe, and thence, through the same pipe, it courses the right-hand coil and returns through the outer pipe. Thus it has three circulations, and is therefore very thoroughly cooled. The capacity of the inner pipe is much greater than that of the outer, and consequently the liquid moves through it more slowly. It is owing to this that the contents of the inner pipe are cooled, and to the more rapid circulation in the outer pipe that the liquid therein is not warmed by its proximity to the contents of the inner pipe, which, being more remote from the ice, are of course less thoroughly cooled.

This cooler is remarkable for its compactness, as well as for efficiency, for it occupies in length of pipe but half the length of refrigerative surface, because one-half is within the other.

For small coolers one coil may be sufficient, and then the inlet and outlet will be so arranged that the liquid will traverse the inner pipe B first, and return through the outer pipe.

What I claim as my invention is—

1. The combination, in a coil-cooler, of two pipes, A B, arranged one within the other, substantially as herein described, whereby the liquid to be cooled will circulate through the two pipes in succession, and in reverse directions.

2. The cooler composed of the two coils, each consisting of an inner and outer pipe, and connected substantially as herein described, whereby the circulation is first through the outer pipe of one coil, then through the inner pipes of both, and afterward through the other outer pipe.

WILLIAM GEE.

Witnesses:

D. MISELL,  
EDWIN H. BROWN.