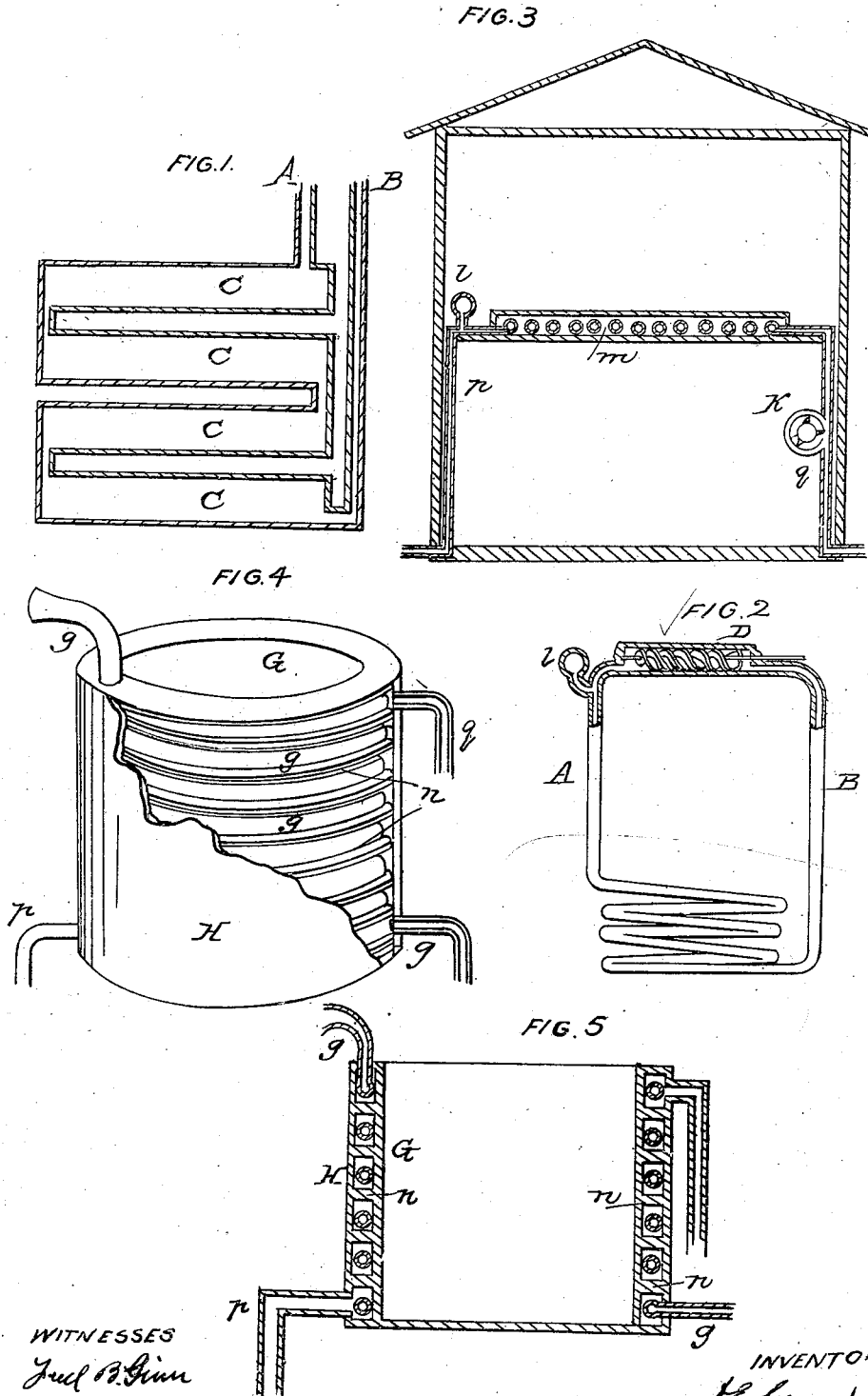


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Cooling and Condensing Apparatus used in Brewing and Distilling.

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WITNESSES
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IMPROVEMENT IN COOLING AND CONDENSING APPARATUS USED IN BREWING AND DISTILLING.

Specification forming part of Letters Patent No. 46,591, dated February 28, 1865.

To all whom it may concern:

Be it known that I, DANIEL E. SOMES, of the city of Washington, in the District of Columbia, have invented a new and useful Improvement in Cooling and Condensing Apparatus Used in Brewing and Distilling; and I hereby declare that the following is a full and exact description of the same, reference being had to the annexed drawings, making a part of the specification.

The nature of my invention consists in the use, in cooling and condensing apparatus employed in breweries and distilleries, of a current of water cooled in the manner hereinafter more fully set forth, so that the water used in such cooling apparatus may always be obtained at a sufficiently low temperature, and when there is not an abundant supply of water it may be used over and over again, and its power of cooling constantly restored without the necessity of using ice or other expensive material for artificial cooling.

It is well known that the temperature of the earth at comparatively short distances below its surface is nearly constant throughout the year, and is about the same as the mean annual temperature of the place. The depth at which this constant mean temperature is to be found varies in different latitudes and somewhat with the nature of the soil. It is, however, generally to be found at depths of, from thirty to fifty feet, and at less depths the temperature varies but little during the year.

Wells of thirty to fifty feet depth show nearly the same temperature in winter as in summer. If water from the surface of the earth is passed in tubes passing for some distance through the earth at the point of constant mean temperature, it will soon gain that temperature. If a stream of water at the surface of the earth is conducted by means of a tube or close channel made of good conducting material down into the earth and caused to remain there for a sufficient time, it can be made to rise in another tube to nearly the level from which it started, and will be found to issue from the latter tube with the temperature of well or spring water. In the drawings, Figure 1 will serve to illustrate this principle.

A is a pipe which descends, say, from thirty to fifty feet into the earth, where it enters a series of tanks or coils, C C C. In flowing

through the tanks C C C the water acquires the temperature of the earth at this point and then rises by hydrostatic pressure in the tube B. Since, however, the water has been cooled in passing through the cooling-tanks C C C, the column of water in B will not rise to as high a level as it was in A. Instead of the tanks C C C, tubes may be used, or a reservoir of any suitable shape. When tanks or reservoirs are used, the pipes bringing down the water to be cooled should enter the tank or reservoir at the upper part, and the pipes leaving the tanks to ascend should leave from the bottom, since the cold water will occupy the lowest point in the tank. If, now, instead of having a current of water constantly entering the tube A, the tubes A and B are connected, as shown in Fig. 2, and any suitable means, as a pump or propeller-screw, is interposed, as shown at D, and the whole apparatus being filled with water, a constant circulation of the water can be kept up—that is, a current passing down on one side and up on the other. If the water is warm as it goes down, it will be cooled before it comes up. To prevent the bursting of the pipes, one or more air-vessels should be inserted, as shown at I, Figs. 2 and 3.

With this explanation of the general principles employed by me, I now proceed to indicate the means necessary in applying said principles in the construction of the apparatus used by brewers and distillers for cooling and condensing.

In Fig. 3 is shown the common brewer's cooler with my invention. In the bottom is placed a coil, *m*, which is connected at *p* with a pipe leading to the well or to the subterranean cooling pipes or tanks. If the water for cooling is furnished by water-works, all that is necessary is to connect the pipe *p* with the subterranean tanks C C C, which are connected with water-main, and also the pipe *q* with the same water-main at a more advanced point in its course, so that the water flowing through the water-main is compelled to pass first down into the pipes deep in the earth, so as to be cooled, then through the beer-cooler, and then pass off into the main. When the cooler is not in use, valves or stop-cocks should be provided, so that the water may flow on through the main without passing through the cooler.

When no water-mains are convenient, then the cooling must be effected in the manner described under the description given of Fig. 2—that is, by means of a pump or other suitable device the water is made to circulate from the subterranean cooler to the beer-cooler. Since the ascending and descending columns of water nearly balance each other, only a small force will be required to cause the rapid circulation of the water.

Instead of using the open pan-cooler, as shown in Fig. 3, any other suitable apparatus may be employed. Thus the water-pipes may be arranged in a coil and the wort made to flow over them; or concentric tubes may be arranged so that water flows on the outside of the tubes containing the beer, or the beer and water may change places. Another convenient form of cooler may be made by forming narrow parallel channels by means of plates of metal arranged either in a coil or other form, so that the wort to be cooled shall flow through one channel and the cooling water in another on one or both sides of the beer-channel.

For causing the water to circulate from the cold well or cold earth to the beer-cooler, a rotary pump, as shown at K, Fig. 3, placed at any point in the circuit, will answer; or a propeller-screw may be employed to keep up the circulation, as shown in Fig. 2, or any other suitable means of propelling the water through such pipes may be employed.

In order to apply my invention to stills, all that is necessary, is that any suitable or convenient form of condenser should be substituted for the beer-cooler, as already explained above. A form of condenser is shown in Figs. 4 and 5, which will be found very convenient for the purpose. It consists of two shells, tubs, or tanks, G and H, placed the one within the other, and a spiral partition, *n*, between the two. If these tubs are made of cast-iron, the spiral partition *n* may be cast on the outside of the tank G', and the condensing-worm of the still is to be placed in the spiral channel thus formed.

Fig. 5 shows a vertical section of the condenser, in which G' and H are the tanks, *n* the spiral partition, and *g* the worm of the condenser to be connected with the still-head. This form of condenser may be used for alcohol or for oils. This form of condenser may also be used as a beer-cooler by using the worm for the beer to flow through; or the cold water

may flow through the tube *g* and the beer in the spiral channel.

The condenser shown in Figs. 4 and 5 may be modified as follows: Instead of two concentric tubs, G and H, two plates with flanges on the side of one or both may be joined together as plates of tubs G' and H are making channels in which the condensing-worm may be placed; or instead of tubs boxes made of sheet metal may be used. When the coolers or condensers are made of plates of metal, they may be fastened together with bolts and screws, so as to be readily taken apart for the purpose of repairs or for cleansing.

Having thus described my invention, I wish it to be understood that I do not limit myself to the several coolers and condensers shown in the drawings, as these are only designed to illustrate the mode in which my invention may be applied in condensers and coolers of these forms. It is obvious, however, that my invention is applicable to all kinds of coolers and condensers in which a current of cold water is made to cool by contact with the walls or sides of the condenser or cooler, and persons skilled in the making of such apparatus may readily, from the explanation given above, apply and use my invention.

What I claim, and desire to secure by Letters Patent, is—

1. The manufacture and use of coolers and condensers for use in brewing and distilling, constructed and operating substantially as herein set forth and described.

2. A cooling apparatus for cooling worts, beer, and other similar liquids, composed of one or more subterranean tanks, reservoirs, pipes, or their equivalents, for cooling water, in combination with suitable apparatus for using the water thus cooled, for the purpose of cooling worts, beer, or similar liquids.

3. The combination of a subterranean cooling apparatus for cooling water, with suitable apparatus for condensing and cooling distillates, substantially as set forth and described.

4. The combination of the subterranean cooling-vessels, the apparatus for cooling and condensing liquids or distillates with a pump, propeller-screw, or other suitable means for causing a circulation of the water in apparatus constructed according to the principle of Fig. 2, as herein set forth and explained.

Witnesses:

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