W. A. RUSHWORTH.

DISTILLING APPARATUS.

APPLICATION FILED JUNE 28, 1919.

1,359,276. **Patented Nov. 16, 1920.**

Fig. 1.

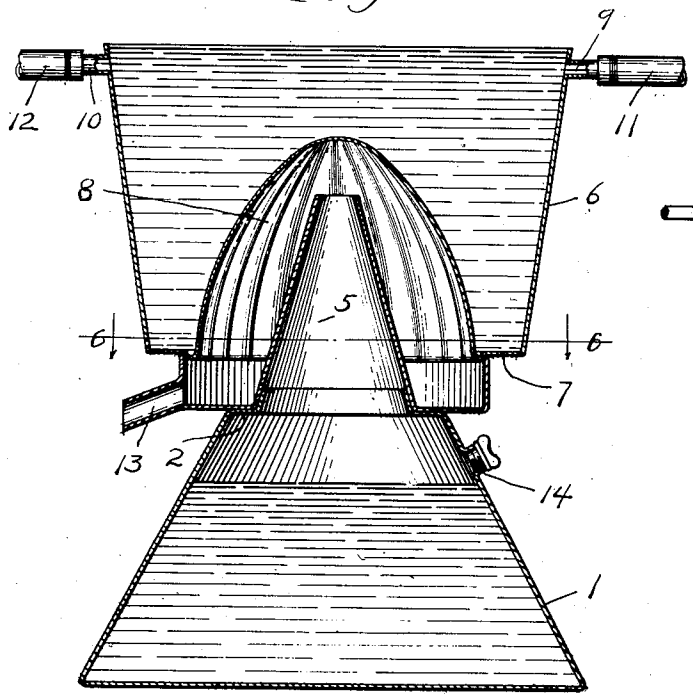


Fig. 3.

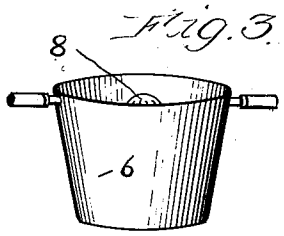


Fig. 4.

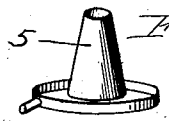


Fig. 5.



Fig. 2.

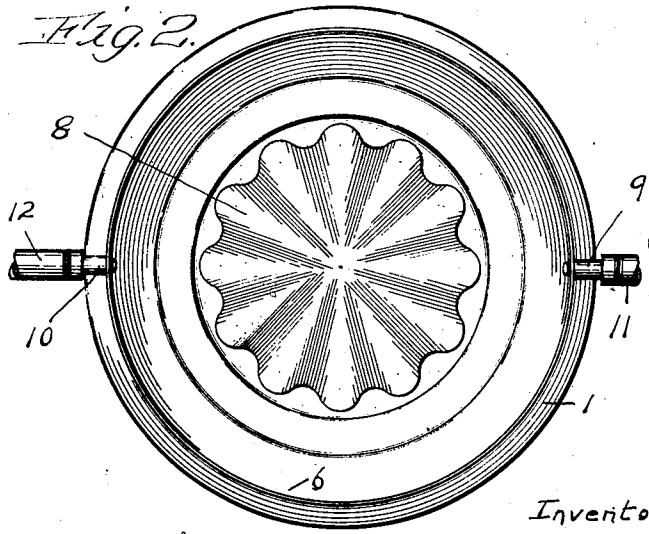
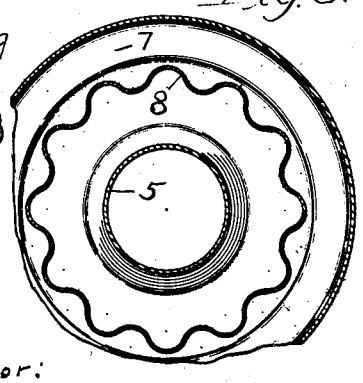


Fig. 6.



Witness:
P. L. Farrington

Inventor:
William A. Rushworth
by Albert Scheible Attorney

UNITED STATES PATENT OFFICE.

WILLIAM A. RUSHWORTH, OF CHICAGO, ILLINOIS.

DISTILLING APPARATUS.

1,359,276. Specification of Letters Patent. Patented Nov. 16, 1920.

Application filed June 28, 1919. Serial No. 307,401.

To all whom it may concern:

Be it known that I, WILLIAM A. RUSHWORTH, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Distilling Apparatus; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

My invention relates to a distilling apparatus, its general objects being to provide a simple but efficient, portable and easily cleaned apparatus of this class suitable for use in households, small shops and the like. In many sections of the country, the available water is so highly alkaline as to be undesirable for drinking purposes unless first purified by distillation, and in other sections the water supply is occasionally contaminated so as to make a distilling of the same equally desirable. Consequently, there is a wide spread need for a simple and effective distilling apparatus suitable for household use. Likewise, the water available in many sections is unsuited by reason of some of its ingredients for other purposes, as for instance for use as a constituent of the solution in storage batteries, so that a similar need exists in a great many battery charging stations.

For such purposes, the ordinary laboratory types of stills are objectionable, both on account of their size and cost and on account of the difficulty of cleaning both the worms and the condensing chambers which house the worms. My invention aims to overcome these and other objections to the stills heretofore in use and to provide a distilling apparatus of simple construction which will be highly efficient in operation, which can readily be used on an ordinary gas or coal stove, and in which the constituent parts can readily be separated from each other to facilitate a thorough cleaning of the apparatus. Illustrative of my invention, I am describing one embodiment of the same in the following specification and am picturing this embodiment in the accompanying drawings, from which further and more detailed objects of my invention will be apparent. In the drawings,

Figure 1 is a central and vertical section through a distilling apparatus embodying my invention.

Fig. 2 is a plan view of the same.

Figs. 3, 4 and 5 are perspective views on a smaller scale showing the three parts of the apparatus when separated from each other.

Fig. 6 is a horizontal section through the condenser dome, taken along the correspondingly numbered line in Fig. 1 and looking upward.

In the embodiment of the drawings, the apparatus of my invention includes as its base portion a boiler with a side wall 1 of a substantially frusto-conical shape, thereby affording a bottom considerably larger in diameter than the mouth of the vessel. The tapering sides of this boiler are desirably drawn in near the top of the vessel to afford an annular shoulder 2 adapted to engage the bottom 3 of a drip pan which forms the second or intermediary portion of the apparatus. This intermediary portion consists of an annular bottom 3 bordered on its exterior by a vertical rim 4, and on its interior by a tapering neck 5 considerably taller than the rim 3 and substantially forming an extension for the sides of the vessel 1, so that the neck 5 coöperates with the upper end of the casing of the boiler to afford a vapor outlet for the boiler.

Supported by the rim 3 of the said intermediary portion, desirably by having shoulders formed near the lower ends of its sides as shown in Fig. 1, is a condenser having a casing 6 which is desirably flared to a larger diameter at its top. This condenser casing has soldered to it, or otherwise secured to it, a bottom comprising a relatively narrow outer portion 7 and a central portion 8 which is arched upward substantially in the form of a dome. The upper section also desirably has near its top a pair of oppositely disposed nipples 9 and 10 adapted to be connected respectively with a water supply pipe 11 and an overflow pipe 12. The intermediate section desirably has at its bottom a drip outlet spout 13, and the base section desirably has near its upper end a lateral inlet 14 normally closed by a suitable cap.

In operating the illustrated apparatus for water purifying, water is filled into the base

portion 1 and this is set over a suitable burner with the other two portions superposed on it as shown in Fig. 1. Then the upper vessel is filled with cold water, and if running water is available, the hose 11 is connected with the source of the same to maintain a continuous flow of cold water through this upper vessel. As soon as the water in the boiler 1 begins to boil, the resulting steam passes up through the bore of the neck 5 and impinges against the bottom 8, which bottom is kept cool by the cold water above it and therefore condenses the steam into drops which run down the inside of the dome and then drop upon the annular bottom 3 of the intermediate part. Likewise, if some of the condensed water drops off, the dome 8 before running down the sides of the latter, this will be caught by the sloping outer wall of the tapering tube 5, so that the condensed distillate in any case is caught by the intermediate chamber and runs out through the spout 13.

In practice, I desirably make the upper opening or outlet of the tapering tube 3 relatively small in diameter, so that the chances of having any of the condensate drop vertically back through the bore of this tube will be practically negligible. I also desirably provide the dome 8 with deep flutings, thereby increasing the surface of this dome so as to utilize a larger proportion of the cooling water in the upper vessel for cooling the dome and condensing the steam. Both the dome 8 of the apparatus and the bottom of the boiler are desirably made of a metal having a high thermal conductivity, while the remainder of the parts may be of relatively cheaper metals chosen for the ease of preventing their rusting. By spreading the intermediate part to a diameter considerably greater than the upper end of the lower vessel, I readily provide an upper vessel of ample size for containing a considerable volume of the cooling water and am likewise able to employ a dome 8 of relatively large diameter in proportion to that of the surface of the liquid in the boiler. Then, by forming deep flutes in this dome I can increase the surface of the same to an amount greatly exceeding the area of the liquid in the lower vessel, and desirably to approximately four times this area, thereby securing the surface area required for instantly condensing the steam as rapidly as it can be vaporized from the lower or boiler portion of my appliance.

With the apparatus arranged and operated as described, I have found that steam will issue through the spout 13 only for a few seconds after the water begins to boil and that after these initial few seconds the distilled water will drip continuously from the spout 13 without having any more of the steam visible, thus indicating the effective operation of my appliance. Furthermore, by removing the cap from the inlet 14 when a considerable portion of the water has been boiled away, I can readily replenish the supply in the lower vessel, so as to maintain the apparatus in continuous operation as long as desired. Then, when the required distillation has been completed, the parts can readily be lifted off each other as shown in Figs. 3, 4 and 5, to permit a drying and cleaning of the same, in doing which the annular portion 7 affords ready access to the bottom of the upper vessel.

However, while I have illustrated and described my invention in a certain desirable embodiment, I do not wish to be limited to the details of construction and arrangement as here disclosed, it being obvious that the same might be modified in many ways without departing from the spirit of the appended claims.

I claim as my invention:

1. A distilling apparatus comprising a boiler having an upwardly directed spout, an annular drip pan surrounding the lower portion of the spout and resting upon the boiler and projecting laterally beyond the boiler to afford air cooling for a part of the bottom of said pan, and a water cooled receptacle over the said pan and having a concaved bottom housing the upper portion of the said spout.

2. A distilling apparatus as per claim 1, in which the spout for the boiler comprises a tube integral with the boiler and an extension tube integral with the drip pan.

3. A distilling apparatus comprising a boiler having upwardly converging sides and having a vertical tubular outlet offset from the upper ends of the said sides by a relatively narrow annular shoulder; a drip member comprising an annular bottom seated on the said shoulder and projecting laterally therebeyond, and a vertical spout extending upward from the inner edge of the said annular bottom; and a condensing vessel seated on the said rim and having a concaved bottom housing the upper portion of the said spout.

4. A distilling apparatus comprising as three manually separable and snugly interfitting parts a boiler having an upwardly projecting vapor outlet, an annular drip pan carried by the boiler and surrounding the said outlet and having a vertical rim of less height than the said outlet, and a cold water compartment supported by the rim of the drip pan and having its bottom arched over the top of the said outlet.

Signed at Chicago, June 21st, 1919.

WILLIAM A. RUSHWORTH.