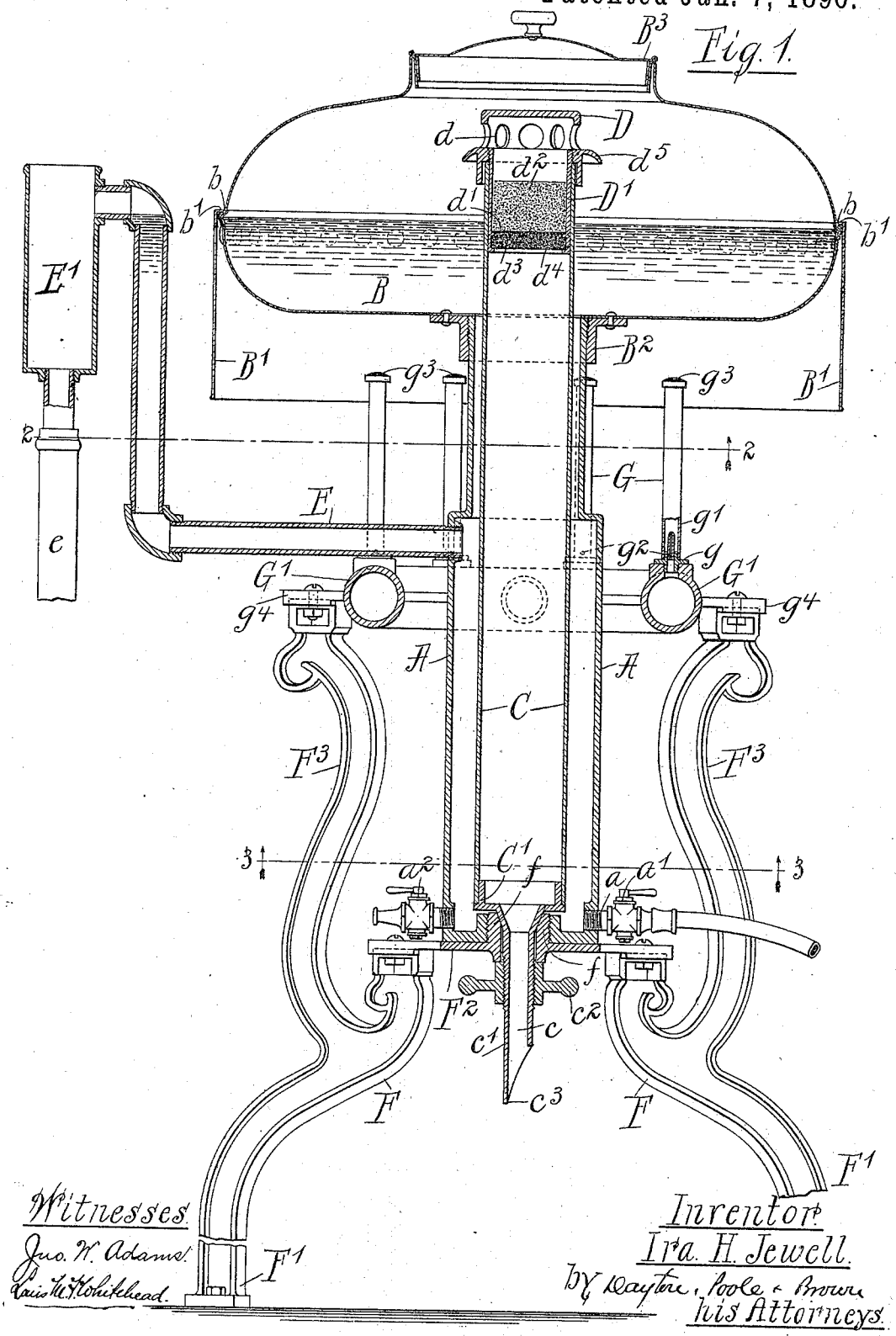
(No Model.) 2 Sheets—Sheet 1.

I. H. JEWELL.

DISTILLING APPARATUS.

No. 552,688. Patented Jan. 7, 1896.

Fig. 1.



Witnesses
Jno. W. Adams.
Louis M. Whitehead.

Inventor
Ira H. Jewell.
by Dayton, Poole & Brown
his Attorneys.

ANDREW B. GRAHAM, PHOTO-LITHO. WASHINGTON, D.C.

(No Model.) 2 Sheets—Sheet 2.

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Fig. 2.

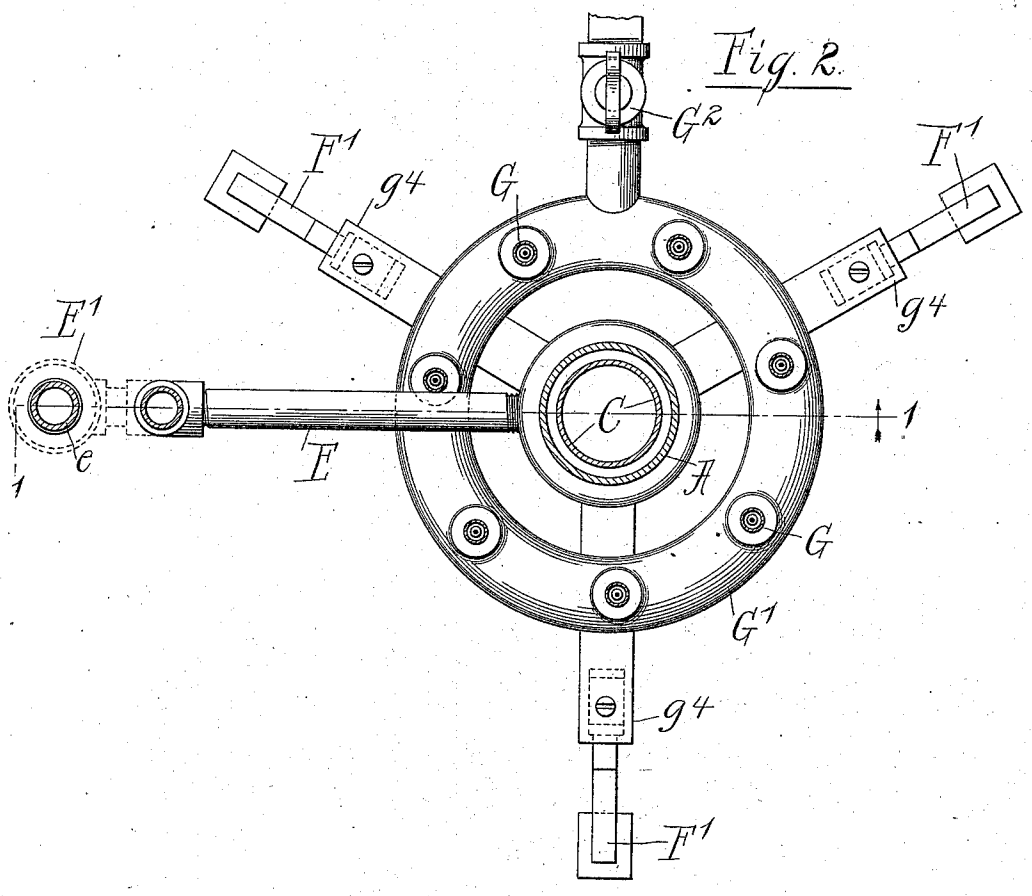
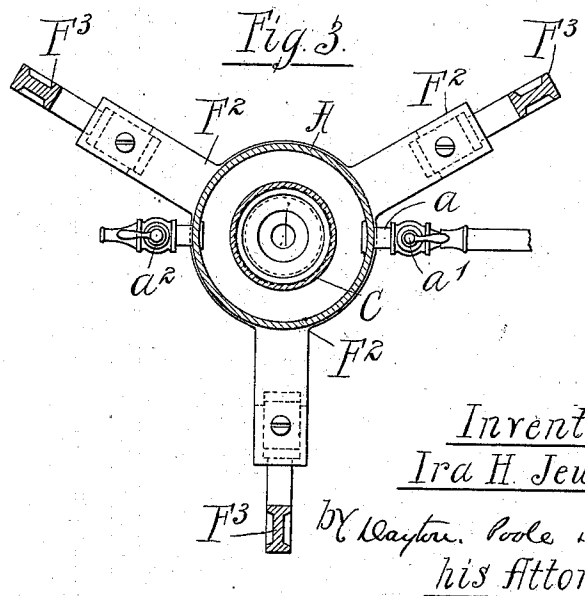


Fig. 3.



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UNITED STATES PATENT OFFICE.

IRA H. JEWELL, OF CHICAGO, ILLINOIS.

DISTILLING APPARATUS.

SPECIFICATION forming part of Letters Patent No. 552,688, dated January 7, 1896.

Application filed January 20, 1894. Renewed October 5, 1895. Serial No. 564,813. (No model.) Patented in Belgium January 13, 1894, No. 82,273.

To all whom it may concern:

Be it known that I, IRA H. JEWELL, of Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Distilling Apparatus, (for which I obtained Letters Patent No. 82,273 in Belgium on the 13th day of January, 1894;) and I do hereby declare that the following is full, clear, and exact description thereof, reference being had to the accompanying drawings, and to the letters of reference marked thereon, which form a part of this specification.

This invention relates to improvements in distilling apparatus, and more particularly to a form of such apparatus suitable for producing distilled water.

The object of the invention is to provide a device of the character referred to which shall be so inexpensive in construction and simple and efficient in operation as to render it suitable for household use.

To this end the invention consists in the matters hereinafter set forth and particularly pointed out in the appended claims.

In the accompanying drawings, Figure 1 is a vertical section on line 1 1 of Fig. 2. Figs. 2 and 3 are horizontal sections on lines 2 2 and 3 3, respectively, of Fig. 1.

A designates an elongated upright tank, reservoir or jacket opening at the upper end into a closed vessel or boiler B, which, in the form of the device illustrated, is circular and is placed centrally over the tank or jacket and supported thereby. Within the jacket A and extending axially thereof is an upright condenser C, the external diameter of which is less than the internal diameter of the tank or reservoir to provide an annular water-space between them, so that the said tank or reservoir constitutes in effect a water-jacket surrounding said tube. The upper end of the condenser C extends through the open upper end of the jacket A into the boiler B and is itself left open at its upper end to permit the entrance thereto of the steam or vapor formed in the boiler. An inlet-opening *a* at the bottom of the jacket A admits water from any suitable source of supply, and an outer passage *c*, leading through the bottom of the jacket from the tube C, serves to discharge the distilled water which has been condensed within said tube. A cap D provided with lateral perforations *d* is employed to prevent drops thrown upward by violent ebullition of the water from entering the top of the tube, and a flange d^5, located on said cap below the perforations *d*, serves to prevent any water from splashing into the said apertures.

Any suitable valve *a'* in the inlet *a* serves to regulate the water-supply to the jacket A. To prevent an undue quantity of water from collecting in the boiler B, an overflow-opening is provided, consisting, in this instance, of a pipe E leading outwardly and upwardly from the jacket A and discharging laterally into the upper portion of an open cup E' at the desired maximum level of the water within the boiler B. From the bottom of the cup E' a suitable pipe *e* leads off to a sewer or convenient receptacle. The excess of water-supply over that used in the boiler will escape through the overflow thus provided, and the extent of the waste occasioned thereby may be at any time readily determined by noticing the amount of water flowing through the cup.

As herein shown, the jacket A is mounted upon a supporting stand or frame F comprising three legs F' connected at their upper ends by a horizontal plate F^2 suitably secured thereto. Said plate F^2, as herein shown, is provided centrally with an upwardly-projecting screw-threaded hub *f* which enters a screw-threaded aperture in the lower end of the jacket A for rigidly fastening the jacket to the frame.

Devices for heating the boiler B, as herein shown, comprise a plurality, in this instance seven, of gas-burners G arranged in a circle beneath the boiler upon an annular pipe G'. Said burners are of the well-known Bunsen type, comprising a short inner nozzle *g* leading from the pipe G' and an outer tube *g'* provided at its base with apertures g^2 for admitting air to mix with the gas discharged from the nozzle so as to produce a flame having great heating capacity. A cap g^3 of wire-gauze covering the outer end of the tube *g'* prevents the flame from entering the same. The annular pipe G' is in this instance cast

with outwardly-projecting lugs g^4 which are secured to the upper ends of arms F^3 on the supporting-frame. An inlet-nozzle and valve G^2 on the pipe G′ admit gas thereto from any suitable source of supply through a flexible hose or other convenient piping.

In the operation of the apparatus water is supplied to the jacket A through the inlet a at its base, the supply being regulated by the valve a' to properly supply the boiler and to furnish a flow through the jacket and outlet-pipe E sufficiently rapid to keep the condenser-tube at a temperature low enough to secure condensation of all the steam entering the same. The burners C being lighted, steam will be formed within the boiler, and in the absence of any other outlet will be forced by its own pressure through the apertures d in the cap D downwardly into the condenser-tube C. Coming in contact with the wall of said tube, which is maintained at a low temperature by the surrounding body of water in the jacket A, the steam will be rapidly condensed. Since the natural tendency of steam is to rise, it will only move down into the condenser-tube as it is forced down by the pressure in the boiler. Condensation will thus take place to a great extent in the upper part of the tube, and when the parts are properly proportioned there will be no liability of the steam being driven out uncondensed through the outlet c. Moreover, the drops of condensed water formed in the upper part of the tube will trickle down over the cold walls of the same until they emerge at the outlet c, and, owing to the upward flow maintained in the jacket A and the consequent constant accession of cold water at its base, the distilled water discharged from the apparatus will commonly be as cold, or nearly so, as the water supplied to said jacket.

As a further improvement the condenser C is in this instance provided at its upper end with absorbent material for eliminating any noxious gases or vapors which may pass off with the steam. For this purpose the cap D has secured within its lower part beneath the perforations d a short tube or cup D′, adapted to loosely fit the mouth of the said condenser-tube. Within the cup D′ is a fine screen d', above which is provided a layer d^2 of bone-charcoal or equivalent material adapted to absorb noxious gases. To prevent any charcoal which may ooze through the screen d' from passing down into the condenser, a shallow layer d^3 of coarse sand or quartz is provided between said screen d' and a lower screen d^4 at the bottom of the cup D′. Obviously with this construction all the vapor arising from the heating of the water within the boiler must pass through the layer of charcoal in entering the condenser-tube. The noxious vapors will thereby be absorbed and only the purified steam will be condensed.

Referring more particularly to the details of construction shown in the accompanying drawings, the upper part of the jacket A is made smaller in diameter than its base portion in order to expose a greater portion of the bottom of the boiler to the action of the burners without greatly reducing the capacity of the jacket. The boiler B is preferably made of copper or other suitable sheet metal and is herein shown as composed of upper and lower sections joined at their edges by a seam which forms an outwardly-projecting annular bead b around the boiler. To confine the heated products of combustion rising from the burner-flames beneath the boiler, and to protect the flames from drafts of air, a sheet-metal hood B′ closely encircles the boiler and is in this instance supported by an inwardly-turned flange b' at its upper edge which rests upon the bead b. The connection between the jacket and boiler is provided by means of an interiorly-screw-threaded collar B^3, rivoted to the margins of an aperture in the bottom of the boiler and engaged with exterior screw-threads on the upper end of the jacket. A tight-fitting removable cover B^3 in the top of the boiler gives access to its interior. The sheet-metal wall of the boiler is shown as bent to form a depending flange within which the flange of the cover B^3 closely fits.

As a further improvement the condenser-tube C is made readily removable so that the parts may be easily cleansed from any adherent coating of calcareous or other matter which may become deposited thereon. To this end the bottom C′ of the tube (shown as a separate piece or casting secured thereto) is provided on its under side with a central depending tubular projection c', which forms the outlet-passage c and extends through a suitable aperture in the central hub f of the plate F^2, being secured therein by a hand-nut c^2, which engages an exterior screw-thread on the lower part of said projection and abuts against the lower face of the said plate. To prevent leakage the tubular projection is made conical at its upper part, and the upper portion of the aperture in the hub f is similarly shaped, so that as the nut c^2 is screwed against the hub a water-tight joint is formed between the conical surfaces of the parts.

The lower end of the tubular projection c' is beveled off to a point c^3 in order to accurately direct the drops of water falling therefrom into a suitable receptacle placed beneath the discharge-outlet. Being thus removably secured the condenser may be lifted out of the jacket at any time by merely unscrewing the hand-nut c^2, and by removing the cap D the interior of the tube may be readily reached.

The jacket A may, if necessary, be removed from the stand by unscrewing it from the hub f, but will ordinarily be cleaned without removal after the tube C and boiler B are detached. A drain-cock a^2 in the base of the jacket permits the apparatus to be emptied when desired.

The apparatus thus described, while particularly adapted for household use in producing distilled water, may obviously be oth-

erwise employed in distilling water or for distilling other liquids.

I have found the water produced by distillation in the apparatus described to have superior qualities in respect to its taste and acceptability as a beverage without other aeration than that produced in the operation of the apparatus. These qualities I believe to be due to the fact that carbonic-acid gas produced from carbonaceous matters in the water, as well as other gases, such as oxygen driven off from the water in the act of boiling, are retained in the descending condensing pipe or tube and there remain admixed and in contact with the steam or vapor and water of condensation, so that they are largely absorbed or taken up by the water, with the result of giving it a sparkling and pleasant as distinguished from a flat or insipid taste. This desirable result, to whatever extent it is due to the presence of gases coming from the water, is increased and augmented by the inflow of atmospheric air through the outlet-passage and the dripping of the water from said outlet-passage to the vessel placed thereunder to receive it.

I claim as my invention—

1. A distilling apparatus comprising an upright tubular tank or water jacket having a supply inlet at its bottom, a boiler the bottom wall of which is attached to the open upper end of said jacket, an upright tubular condenser located within the said jacket and extending at its upper end into the boiler and terminating above the water line therein, said condenser being provided with a discharge outlet at its bottom, substantially as described.

2. A distilling apparatus comprising an upright tubular tank or water jacket provided with a supply inlet at its bottom, a boiler provided with an aperture in its bottom around which the upper open end of the jacket is secured, an upright tubular condenser located within the jacket with its upper end extending into the boiler and terminating above the water line thereof, said condenser being provided with a discharge outlet at its lower end, and means for limiting the maximum depth of water in the boiler comprising a passage connected with the jacket and leading upwardly therefrom and an overflow orifice in the said passage located above the level of the boiler bottom and below the level of the top of the said condenser, substantially as described.

3 A distilling apparatus comprising an upright tubular tank or water jacket provided with a supply inlet at its bottom, a circular boiler having a central aperture in its bottom around which the upper end of the jacket is secured, a condenser tube located within the jacket and extending at its upper end into the boiler to a point above the water line thereof, said condenser being provided with a discharge outlet at its lower end, and an annular burner extending around the jacket beneath the boiler, substantially as described.

4. A distilling apparatus comprising an upright tubular tank or water jacket provided with a supply inlet at its bottom, a circular boiler having a central aperture in its bottom around which the upper end of the jacket is secured, a condenser tube located within the jacket and extending at its upper end into the boiler to a point above the water level therein, said condenser having a discharge outlet, and an annular fuel pipe surrounding the jacket beneath the boiler provided with a plurality of jets or burners, substantially as described.

5. A distilling apparatus comprising an upright tubular tank or water jacket having a supply inlet at its lower end, a boiler provided in its bottom with an aperture with which the open upper end of the jacket is connected, and a straight, upright condenser tube located within the jacket and extending upwardly within the boiler to a point above the water line thereof, said condenser tube being detachably secured at its lower end to the jacket and having a discharge outlet passing through the bottom wall of the jacket, substantially as described.

6. A distilling apparatus comprising an upright tank or water jacket having a supply inlet at its base, a boiler provided in its bottom with an aperture with which the open upper end of the jacket is connected, and a straight condenser tube located within the said jacket with its upper end opening into the boiler above the top of the jacket and provided with a depending projection on its lower wall apertured to form a discharge outlet, said projection being inserted through an aperture in the bottom wall of the jacket and having a conical surface which fits a corresponding surface on the said bottom wall of the jacket, and a nut or equivalent means for holding said conical surfaces in contact with each other, substantially as described.

7. A distilling apparatus comprising an upright tank or water jacket having a supply inlet, a boiler into which said jacket opens at its upper end and an upright condenser tube located within the jacket and opening at its upper end into the boiler above the jacket and provided at its lower end with a discharge outlet, and at its upper end with a laterally apertured cap, substantially as described.

8. A distilling apparatus comprising an upright tank or water jacket having a supply inlet, a boiler into which said jacket opens at its upper end, and an upright condenser tube located within the jacket, opening at its upper end into the boiler above the jacket and provided at its lower end with a discharge outlet, said tube having at its upper end a laterally apertured cap provided with a protecting flange below the apertures therein, substantially as described.

9. A distilling apparatus comprising an upright tubular tank or water jacket having a supply inlet at its lower end, a boiler having an opening in its bottom to which the upper open end of the jacket is attached, a condenser within the jacket extending at its upper end into the boiler to a point above the water level therein and provided at its bottom with a discharge outlet, and a mass or body of absorbent material placed in the upper end of said condenser through which steam or vapor passes in entering the condenser, substantially as described.

In testimony that I claim the foregoing as my invention I affix my signature in presence of two witnesses.

IRA H. JEWELL.

Witnesses:
C. CLARENCE POOLE,
ALBERT H. GRAVES.