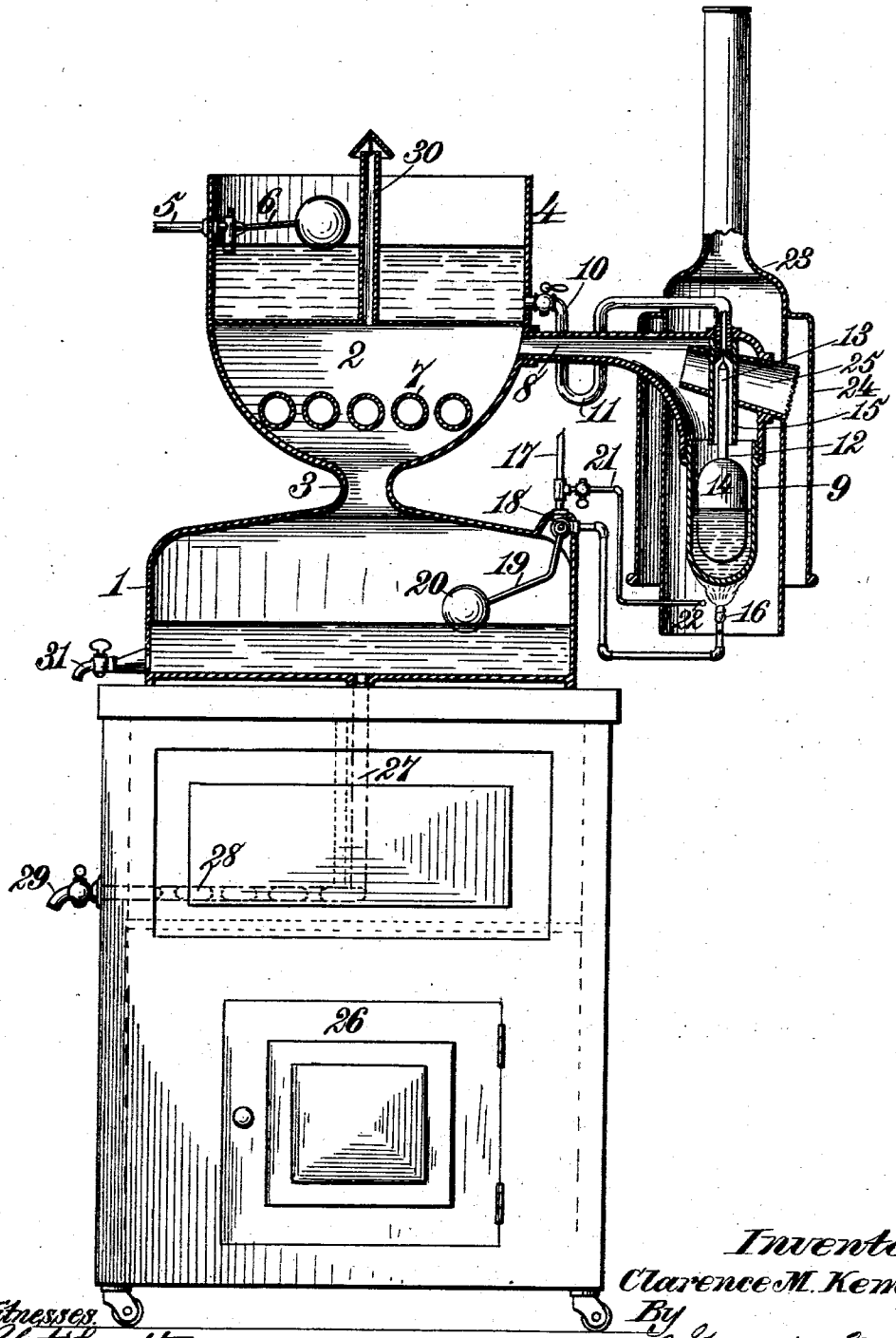
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APPARATUS FOR DISTILLING AND AERATING WATER.

(Application filed Feb. 13, 1899.)

(No Model.)



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APPARATUS FOR DISTILLING AND AERATING WATER.

SPECIFICATION forming part of Letters Patent No. 633,851, dated September 26, 1899.

Application filed February 13, 1899. Serial No. 705,406. (No model.)

To all whom it may concern:

Be it known that I, CLARENCE M. KEMP, a citizen of the United States, residing at Baltimore, in the State of Maryland, have invented certain new and useful Improvements in Apparatus for Distilling and Aerating Water; 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.

This invention relates to apparatus for distilling and aerating water; and it has for its object to provide an apparatus of the class referred to which shall be automatic throughout, shall be simple, durable, and inexpensive in construction, and safe, certain, and efficient in operation.

To these ends my invention consists in the features and in the construction, combination, and arrangement of parts hereinafter described, reference being had to the accompanying drawing, forming a part of this specification, wherein is illustrated a vertical sectional view of my improved apparatus.

Referring to the drawing, the numeral 1 indicates a storage vessel for holding the distilled and aerated water, and 2 the condensing vessel. The vessels 1 and 2 are preferably made integral, the condenser surmounting and supported on the storage vessel, with which it communicates by a central contracted neck 3. Seated on top of the condenser 2 is a reservoir 4 for containing the feed-water, which is supplied to the reservoir by a service-pipe 5, leading from any suitable source of supply, and the water is maintained at a constant level in the reservoir by a ball-cock 6 of ordinary construction. The reservoir 4 forms the top of the condenser 2, and passing transversely through the latter are tubes 7, which at their opposite ends communicate with the atmosphere, thus affording a large cooling-surface to condense the vapor, as will more fully hereinafter appear. Arranged by the side of the condenser and at a suitable distance away therefrom to prevent the heat from affecting the said condenser is the vaporizing and aerating apparatus, constructed as follows:

The numeral 8 indicates an elbow-pipe connected at one end to the condenser. The opposite end of the elbow-pipe projects downward and is interiorly threaded, as shown, and within said threaded end is screwed a retort-shaped tube or boiler 9, closed at its lower end, as shown. Leading from the reservoir 4 is a feed-pipe 10, which is tapped into the pipe-elbow 8 at a point directly above the boiler 9, and between its ends it is preferably trapped, as at 11, passing up into the water-reservoir. The end of the feed-pipe 10 that is tapped into the pipe-elbow is reamed to form a tapered valve-seat, in which is adapted to seat a needle-valve consisting of a rod 12, having a pointed end 13, that seats in the tapered valve-seat referred to, and having attached to its lower end a float 14, that is adapted to float in the water contained in the boiler 9. A tube 15 surrounds the valve rod or stem 12 and depends from the end of the feed-pipe 10. The tube 15 acts as a guide for the rod 12 to guide the valve to its seat and also operates to lead the water down into the boiler in such manner that it will not be sprayed or brought into intimate contact with the rising vapor or steam, and thus tend to condense the latter before it passes to the condenser.

A burner 16 is arranged beneath the boiler 9 and is connected with a supply-pipe 17, leading from a suitable source of gas or oil supply. A cut-off valve 18 is arranged in the supply-pipe 17 and is controlled by a lever 19, carrying at its end a float 20, that rests on the surface of the distilled water contained in the storage vessel 1. A branch pipe 21 leads from the supply-pipe 17 to the burner 16 and is provided with a small jet-burner 22, that is constantly lighted and operates to ignite the main burner 16 whenever the latter is supplied with inflammable material.

Surrounding the boiler 9 and the end or angle of the pipe-elbow 8 is a chimney-casing 23, and fixed to the exterior of the latter is a hood 24, that is open at its lower end for the admission of the atmospheric air. An injector-tube 25 is tapped through the bend of the elbow-pipe, as shown, and leads from the space inclosed by the hood 24 to the interior of the elbow-pipe.

The storage vessel 1 rests upon and is supported by a refrigerator or cooling vessel 26, which may conveniently form a base or sup-

port for the apparatus, and from the bottom of the storage vessel 1 leads a pipe 27, which is bent to form a coil 28, terminating at its end in a draw-off cock 29. A block of ice or other cooling medium may be disposed upon or around the coil 28.

The operation of my improved apparatus is as follows: Let it be assumed that the water is at the level in the reservoir 4 indicated in the drawing. Then the water will flow through the pipe 10 into the boiler 9 until a predetermined level is reached in the boiler, upon which the float 14 rises and forces the valve 13 to its seat, thus closing the pipe 10 and shutting off the supply of water to the boiler. The chimney-casing 23 will confine the heat from the burner 16 about the boiler, (and leads away from the apparatus the spent heat,) and the water in the latter will be converted into steam or vapor, which will pass by means of the pipe-elbow 8 into the condenser 2. The heated air in the hood 24 forces its way through the injector 25 into the pipe 8 and is materially aided by the current of vapor arising from within the boiler. The injector draws its supply of air from the atmosphere through the hood 24, where it is heated by the radiated heat from the burner and is thereby sterilized. The steam or vapor and the sterilized air intimately mix before their entrance into the condenser, and in the latter the steam or vapor is condensed and drops down in the form of aerated globules of water into the storage vessel 1, from whence it passes by means of the pipe 27 into the coil 28, where it is cooled. From the latter it may be drawn off by a faucet 29 or at the faucet 31. When the distilled water in the storage vessel 1 rises to a predetermined height, the ball-cock 18 will cut off the supply of gas or oil to the burner 16, whereupon the vaporization of the water in the boiler will cease. When the consumption of the water reduces the level in the storage-chamber, the ball-cock will again open and supply the burner 16, which will immediately be ignited by the auxiliary burner 22, whereupon the distilling and aerating operation will be repeated. The distilling and aerating apparatus will thus be thrown into and out of operation by the variations in the amount of purified water held in storage.

By arranging the heating and aerating apparatus outside of the condenser the action of the latter is not retarded by the heater. Furthermore, by means of the valved arrangement shown and described the water from the reservoir is fed to the boiler automatically to maintain a fixed quantity of water therein. The body of water, being small, is more readily heated, and the flame need only be small to secure this result, making the presence of the apparatus in no wise objectionable on account of its heat.

By the means and arrangement shown the apparatus automatically operates to keep the boiler supplied with water and regulates the application of heat to the latter to maintain a constant supply of purified and aerated water in the storage vessel without necessitating the care or attention of an attendant.

A relief-pipe 30 is connected to the condenser to convey away the surplus of air not absorbed by the vapor.

By making the boiler detachable in the manner shown it may be detached when desired and the sediment, scale, and insoluble matter removed.

As shown and described, the storage and condensing vessels are connected by a contracted neck 3. This arrangement is adapted for a twofold purpose: First, it gives to the condensing vessel an increased surface that is in contact with the atmospheric air, increasing its condensing-surface, and, second, it acts to check or retard the commingled air and vapor and hold it in the condenser until it is thoroughly condensed before being discharged into the storage vessel.

Having described my invention, what I claim is—

1. In a combined distilling and water-aerating apparatus, a boiler, a condenser communicating therewith, an air-chamber surrounding the boiler, a heater for said boiler and air-chamber, and means for conducting heated air from said chamber and commingling it with the steam or vapor before the latter is introduced into the condenser, substantially as described.

2. In a combined distilling and water-aerating apparatus, the combination with a boiler, of a condenser connected therewith, a feed-water device for supplying water to the boiler, a heater for the boiler, an air-chamber surrounding the boiler, and means for conducting heated air from said air-chamber and mixing it with the steam or vapor in its passage to the condenser, substantially as described.

3. In a combined distilling and water-aerating apparatus, the combination with a boiler, of a condenser, a pipe connecting the boiler with the condenser, a feed-water device for supplying water to the boiler, a heater for the boiler, an air-chamber surrounding the boiler, and an injector for injecting heated air from the air-chamber into the pipe connecting the boiler and condenser, substantially as described.

4. In a combined distilling and water-aerating apparatus, the combination with a boiler, of a condenser, a pipe leading from the boiler to the condenser, a heater arranged beneath the boiler, a chimney-casing surrounding the heater and boiler, a hood closed at its top and open at its bottom and surrounding the chimney-casing, and an injector connected at its inlet end with the hood and at its outlet end with the pipe leading from the boiler to the condenser, substantially as described.

5. In a combined distilling and water-aerating apparatus, a boiler, a condenser communicating therewith, an air-chamber surrounding the boiler, a heater for the boiler and air-

chamber, and means for conducting heated air from said chamber and commingling it with the steam or vapor before the latter is introduced into the condenser, substantially as described.

6. The combination with a condenser, of a pipe-elbow connected at one end with the condenser, a boiler detachably connected to the opposite depending end of the pipe-elbow, and a hot-air injector projecting into the pipe-elbow above the boiler, substantially as described.

7. The combination with a condenser, of a pipe-elbow secured at one end to the condenser, and having its opposite free end screw-threaded, a boiler supported by said elbow, and comprising a tube having its lower end closed and its upper end screw-threaded, the screw-threaded ends of said elbow and said boiler providing means whereby the latter may be attached to, and detached from the former, and heating means for said boiler, substantially as described.

8. The combination with a condenser, of a combined vapor-generator and air-heating device arranged wholly without the condenser-casing, means for feeding water to the vapor-generator, means for conveying the vapor and heated air to the condenser, and a protective hood surrounding the vapor-generator and air-heating device, substantially as and for the purpose set forth.

In testimony whereof I affix my signature in presence of two witnesses.

CLARENCE M. KEMP.

Witnesses:
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