





# UNITED STATES PATENT OFFICE.

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## DISTILLING APPARATUS.

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*To all whom it may concern:*

Be it known that I, HENRY A. STEBER, a citizen of the United States, residing at Utica, in the county of Oneida and State of New York, 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.

This invention relates to improvements in distilling apparatus.

The object of the invention is to provide a still, a peculiar condenser therefor, and means assembled with said still and condenser for the utilization of a portion of the discharged cooling liquids from said condenser in the still for forming vapors which are to be passed into the condensing-chamber of the condenser.

Another object of the invention is the construction of a condenser with the inner cooling-casing of such construction and arrangement that when placed in an assembled position with the other compartments of the condenser it will form a condensing-chamber which has a decreasing area toward the lower discharge end thereof.

A still further object is to provide efficient means which are simple in construction for the purpose of assembling the different parts of the apparatus and which will materially assist in the production of a practical and efficient condenser and its cooperating parts.

With these and other objects in view the invention consists in the novel constructions, combinations, and arrangements of parts, as will be hereinafter fully described, illustrated in the accompanying drawings, and more particularly pointed out in the claims hereto appended.

In the drawings, Figure 1 is a view of the complete apparatus, showing the condenser in transverse section and the discharge-receptacle and the still in side elevation. Fig. 2 is a fragmentary view of the sectional outer casing, showing the locking means for retaining the sections in an assembled position.

Referring to the drawings by reference-numerals, 1 designates a still which is preferably formed cylindrical in shape and which is

provided with an integral annular flange 2. A removable annular top 3 is secured in an assembled position with the body of the still by means of a plurality of removable thumb-screws or similar devices 4. In order to form a tight joint between the flanges 2 and 3, a suitable packing 5 is interposed between the meeting edges of the flange portions of said members. Assembled with said still 1 and preferably secured to the top portion thereof is a horizontal communicating casing 6, which is adapted to conduct the vaporized liquids to the condensing-chamber 7 of the condenser. The conducting means 6 may be of any preferred type and can be formed integrally with the top of the still or removably secured thereto.

In the construction of a completed apparatus I preferably employ a suitable burner 8 for the purpose of vaporizing the liquids contained within the still when the apparatus is in operation.

In the construction of the improved condenser I employ a cylindrical sectional outer casing 9, which comprises in its construction a lower section 10 and an upper section 11. The lower section 10 of the casing 9 is provided with an annular integral extension 12, which is formed upon the inner wall of the casing 10. A suitable cap 13 is removably mounted upon the lower section 10 of the casing 9 and retains in place a ring 14, which normally engages a flexible packing 15. Upon the upper edge of the section 10 of the casing 9, there is formed an integral extension 16, which projects at right angles to said body portion of the casing 10, and integrally secured to said extension 16 of the casing 10 is an annular extension 17 of less diameter than the body portion of the section 10. The extension 17 is provided with an integral annular ledge 18. A removable annular locking member 19 is mounted upon the inner face of the extension 17, and is adapted to engage a flexible packing 20 for the purpose of compressing the same and causing the packing to impinge against the removable casing 21, employed in the construction of the outer wall of the condensing-chamber 7. The casing 21 may be formed of any suitable material, but



is preferably constructed of glass or any suitable non-corrodible substance. By means of the locking members 13 and 19 cooperating with the flexible packing 15 and 20 the casing 21 is positively retained in a fixed assembled position with the other parts of the condenser, for the reason that when the locking members are adjusted upon the section 10 of the casing 9 the flexible packings will be caused to impinge against the outer surface of the casing 21. The lower portion of the casing 21 is funnel-shaped and is provided with a suitable conducting-pipe 22 for the purpose of conducting the condensed vapors to any suitable receiver. Casing 10 and casing 21, secured in an assembled position, as shown in Fig. 1, form an air-tight compartment which is adapted to receive cooling liquids introduced by means of the inlet-pipe 23, which is provided with a suitable valve 24. In constructing the apparatus I provide a discharge-receptacle 25, which is provided with an inclined partition 26, which is shown in dotted lines in the drawings. The discharge-receptacle is provided, by means of the inclined partition 26, with a plurality of compartments 27 and 28. The compartment 27 is connected by a pipe 29 with the still 1. A suitable discharge-pipe 30 is secured to the said discharge-receptacle 25 and communicates with the compartment 28. A discharge-pipe 31 provides communication between the outer cooling-compartment 32, which is formed between the outer casing 9 and the casing 21, and the compartment 28 of the partitioned discharge-receptacle 25. It is obvious that the discharge-pipe 30 is approximately twice the size of pipe 31 and that the pipe 29 is several times larger than pipe 46. The overflow from the compartment 27 will be discharged through a comparatively large pipe 30, as well as the liquids which are discharged from the pipe 31. The section 11 of the outer casing 9 is provided with a shoulder 33, which is adapted to engage a suitable packing mounted upon the integral extension 16 when the section 11 is in an assembled position with the lower section 10. In the drawings the communicating member 6 is shown integrally secured to the section 11 and top 3. An extension 34 is formed integral with the section 11 of the casing 9 upon its inner face and is adapted to receive a suitable packing 35. Above the packing 35 and within the section 11 is removably secured an annular rigid member 36, which is provided with parallel flanges and a body to which said flanges are integrally secured. Above the annular member 36 is mounted a suitable annular packing 37, and above said packing 37 there is interposed between the removable cap 38 a suitable washer or rigid packing 39, which engages the upper face of the packing 37. When the cap 38 is screwed upon the section 11, its inner upper face will engage the rigid

member 39; said member 39 will press upon the packing 37, causing the same to be expanded, and the members 36 will likewise cause the packing 35 to be expanded, thereby engaging the inner cooling-casing 41 when the parts are in an assembled position. The inner cooling-compartment 40 is formed by assembling with the other parts a casing 41, formed of glass or suitable non-corrodible material, said casing being provided with a removable cap 42. The casing 41 has a plurality of integral bulbs 43, which produce a roughened-surface wall. An inlet-pipe 44 is removably mounted upon said cap 42 and is provided with a pipe 45, which projects toward the bottom of the casing 41, and is arranged within said casing for the purpose of introducing the cooling liquids near the bottom of the cooling-casing. The liquids which are supplied to the casing 41 are adapted to be discharged therefrom through the discharge-pipe 46 and thence into the compartment 27 of the partitioned receiving-receptacle 25.

Referring to Fig. 2, the projection 33, of the casing 9, is provided with integral extensions 47 for the purpose of providing means for carrying a thumb-screw 48. Said thumb-screw is adapted to engage a suitable screw-threaded aperture formed within integral extensions 49, projecting at right angles from the lower section 10 of the outer casing 9.

In operation the cooling liquid is introduced into the outer cooling-compartment 32 by means of the inlet supply-pipe 23, and from the said compartment 32 the cooling liquid is discharged through the pipe 31 into the compartment 28 of the partitioned discharge-receptacle 25 and thence into the discharge-pipe 30. It will be apparent that any grade of water may be used in this cooling-casing; but in the construction employed in this apparatus for distilling purposes it will also be apparent that water or other liquid may be employed for introduction into the inner cooling-receptacle 40, and the liquids which are discharged therein are discharged subsequently into the compartment 27 of the partitioned receptacle 25, and thence into the still for the purpose of vaporization, and thence, by means of the member 6, into the condensing-chamber 7, and thence to a suitable reservoir arranged for the reception of the condensed vapors. Owing to the inner cooling-casing being provided with the bulging portions, which increase in diameter toward the lower end thereof, the space within the condensing-chamber is decreased toward the lowest end thereof. The vapors when first entering the condensing-chamber come in contact with the inner wall of the outer cooling-casing and the outer roughened surface of the inner cooling-casing, and as they are forced toward the discharge end of the condensing-casing, they are compelled to pass be-



tween the two cooling-surfaces, toward the bottom of the compartment. The space between the inner and outer walls of the condensing-chamber materially decreases in size toward the lower end thereof, and such vapors as have not been condensed, pass beneath the central cooling-casing. The said vapors are thus compelled to come in contact with the lower bulging portion forming the bottom of the inner cooling-casing.

A valve 50 is mounted upon the inlet-pipe 44 for the purpose of controlling the amount of liquid which is discharged into the inner cooling-receptacle, and, subsequently, into the compartment 27 of the receptacle 25. It will be obvious that by this means the amount of liquids supplied to the still can be easily controlled, and if by any means the supply would be greater than the demand the liquids may overflow and be discharged into the compartment 28 and thence into the waste-pipe 30.

It will be apparent from the foregoing description that in constructing a completed apparatus certain modifications, alterations, and changes could be resorted to without materially changing the spirit of the invention, and I therefore reserve the right to make such alterations, modifications, and changes as shall fairly fall within the scope of the invention.

Having thus fully described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. In a device of the character described, the combination with a still, a condenser assembled therewith, a communicating casing secured to said condenser and still, a partitioned discharge-receptacle having a plurality of compartments assembled with said still and condenser, a tubing secured to said still and partitioned receptacle and communicating with one of the compartments formed in said receptacle, tubings connected to said discharge-receptacle and condenser forming communication with each of the compartments of said condenser, and inlet valved means for supplying liquids independently to each of said compartments.

2. In a device of the character described, the combination with a still, a partitioned discharge-receptacle assembled therewith, a pipe connecting one of the compartments of said receptacle with said still, a condenser comprising a plurality of casings forming compartments assembled with said still and receptacle, a communicating casing secured to said still and condenser, a plurality of pipes connected to said condenser and receptacle and communicating with the compartments formed in said condenser and receptacle, and inlet valved means assembled with each of said casings of the condenser and communicating with the compartments formed therein.

3. In a device of the character described, the combination with a still, of a condenser provided with a plurality of compartments as-

sembled therewith, a casing connected to said still and communicating with one of the compartments formed in said condenser, a partitioned discharge-receptacle assembled with said still, a tubing secured to said still and communicating with one of the compartments formed in said discharge-receptacle, separate tubings connected to said condenser and discharge-receptacle and communicating with separate compartments formed in said condenser and receptacle for permitting of the liquids to be discharged from one of the compartments in the condenser into said still, and inlet valved means connected with each of the compartments of said condenser.

4. In a device of the character described, the combination of a still, a partitioned discharge-receptacle assembled therewith, a condenser assembled with said still, said condenser comprising a plurality of casings secured one within the other, one of said casings provided with a plurality of bulging portions increasing in diameter toward the lower end thereof, tubing connecting said condenser with said discharge-receptacle, tubing connecting said discharge-receptacle with said still, said tubing providing means whereby one of the cooling liquids may be discharged from one of the compartments of the condenser into the still, and the liquid discharged from the other compartment of said condenser may be allowed to waste.

5. In a device of the character described, the combination with a still, of a condenser assembled with said still comprising a plurality of hollow casings one secured within the other forming compartments, a partitioned discharge-receptacle assembled with said still, a pipe connected to said still and communicating with one of the compartments in said discharge-receptacle, piping connected to said condenser and communicating with each of the compartments of said discharge-receptacle providing means whereby some of the liquids which are adapted to be discharged from said condenser may be passed through said discharge-receptacle into the still, and inlet means communicating with the compartments formed in said condenser.

6. The combination with a still and a discharge-receptacle, of a condenser comprising an outer, an inner, and an intermediate casing, said inner casing closed at one end and provided with a removable cap upon its opposite end, said inner casing provided with a succession of enlarged or bulged portions of progressively-greater diameter toward its closed end, said outer casing provided with an integral extension formed upon its inner wall near its upper end, a removable cap mounted upon the upper end of said outer casing, an annular member interposed between said extension of the outer casing and the cap, flexible means interposed between said extension and annular member and cap, an integral extension pro-



jecting upon the inner wall of said outer casing and from approximately the central portion thereof, a removable locking member positioned within said casing contiguous to said  
5 extension, flexible means interposed between said central extension and the locking member, a removable cap carried by the lower end of said outer casing, an integral extension formed upon the inner wall of said casing near  
10 the lower end thereof, a packing interposed within said extension and the cap positioned upon the lower end of the outer casing, said intermediate casing provided with a reduced end and having its opposite end of the same  
15 dimension as its central portion, said intermediate casing secured within the outer casing

and engaged by the flexible means carried upon the lower end and approximately the central portion of the outer casing, a removable tube secured to the cap of the inner casing and extending approximately the entire length of and within said inner casing, an inlet-tube secured to the outer casing, and tubing connecting the condenser with the still and discharge-receptacle. 20 25

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

HENRY A. STEBER.

Witnesses:

FRANK BOUDOIN,  
JOHN WELCH.