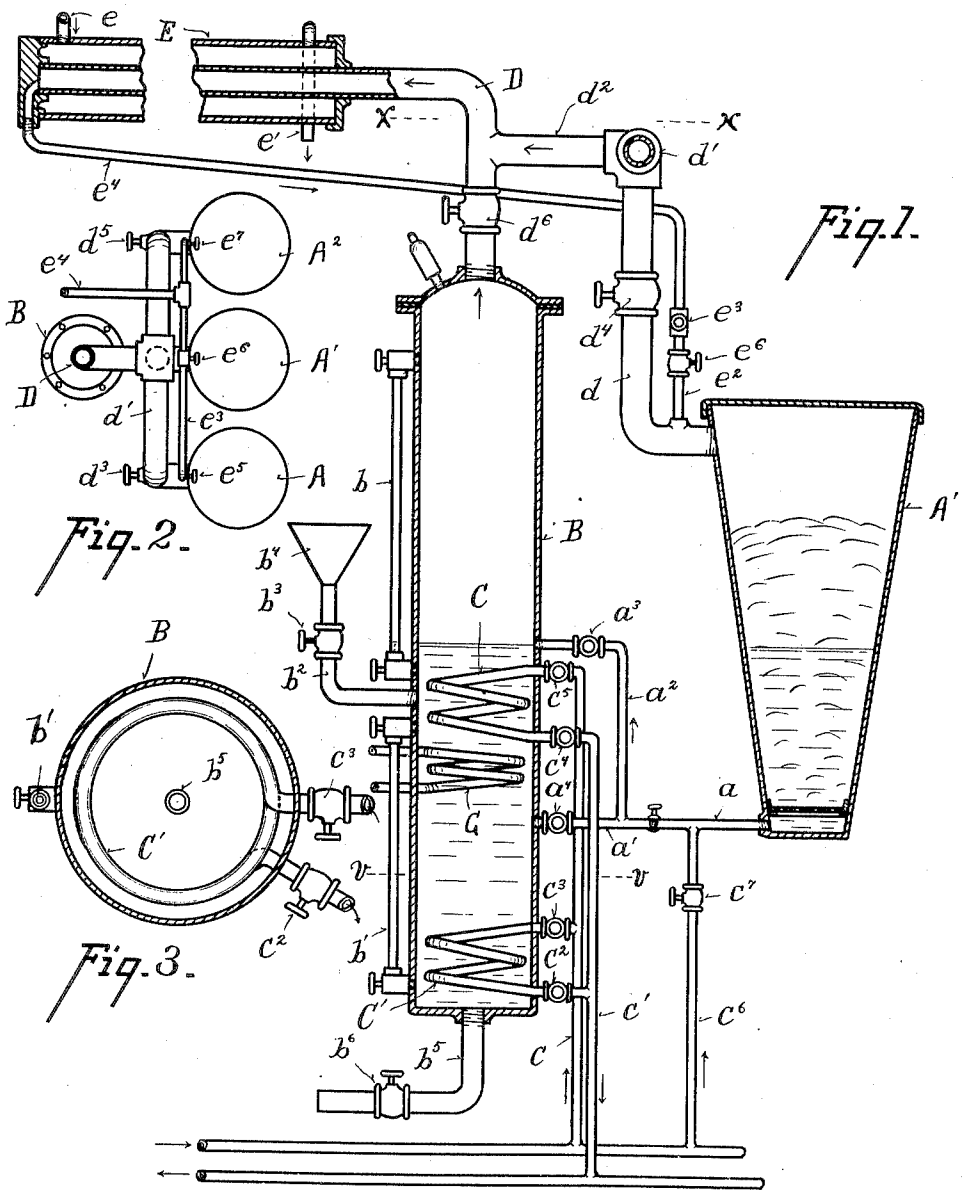
No. 777,115. PATENTED DEC. 13, 1904.

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CONCENTRATOR FOR SOLUTIONS.

APPLICATION FILED JAN. 7, 1904.

NO MODEL.



Witnesses
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No. 777,115. Patented December 13, 1904.

UNITED STATES PATENT OFFICE.

JOHN URI LLOYD, OF NORWOOD, OHIO.

CONCENTRATOR FOR SOLUTIONS.

SPECIFICATION forming part of Letters Patent No. 777,115, dated December 13, 1904.

Application filed January 7, 1904. Serial No. 188,000. (No model.)

To all whom it may concern:

Be it known that I, JOHN URI LLOYD, a citizen of the United States of America, and a resident of Norwood, in the county of Hamilton and State of Ohio, have invented certain new and useful Improvements in Concentrators for Solutions, of which the following is a specification.

The object of my invention is an apparatus for making solutions, such as extracts and abstracts, whereby the substance held in solution is not changed by heat, by which the strength of the solution may be changed readily to suit the case, in which the alcohol or other menstruum used to assist in getting the solution may be finally separated therefrom and be used over and over again, and in which the menstruum remaining in the waste may be recovered readily for use again.

In the accompanying drawings, in which like parts are indicated by similar reference-letters wherever they occur throughout the various views, is illustrated an apparatus embodying my invention.

Figure 1 is a vertical sectional view of an apparatus embodying my invention, the connecting-pipes being shown in elevation. Fig. 2 is a plan view of the same upon a slightly-reduced scale, taken upon line $x\ x$ of Fig. 1. Fig. 3 is a sectional view taken upon line $v\ v$ of Fig. 1 upon a somewhat enlarged scale.

Referring to the parts, the steeping-tanks A, A′, and A^2 are to receive the alcoholic or other appropriate liquid and the herbs or whatever material of which it may be desired to make an extract or abstract. Each of the tanks A, A′, and A^2 is connected by a branch pipe a with a pipe a', which leads into a concentrating-tank B. Pipe a' has a branch pipe a^2, which leads into the tank B at a point higher than the pipe a'. Both pipes a' and branch a^2 have stop-cocks a^3 a^4 located in them.

The concentrating-tank B has within it an upper and a lower heating-coil C C′, both of which are connected to steam-pipes c c', the communication between the pipes and the coils being controlled by stop-cocks c^2, c^3, c^4, and c^5. Below the heating-coils are water-coils G, through which cold water circulates to keep the liquid beneath cool. Upon the sides of the concentrating-tank B are two gages b b'. From the upper end of tank B an enlarged pipe D leads into a condenser E, which is supplied with a cooling fluid through a pipe e, the exit for the fluid being through a pipe e'.

Each of the steeping-tanks A, A′, and A^2 has an enlarged pipe d leading out of its top and communicating with a pipe d', which itself communicates with the pipe D by means of a branch pipe d^2. The tops of the steeping-tanks likewise have small pipes e^2 communicating with a pipe e^3, which itself connects with the condensor E by means of a pipe e^4. In the pipe e^2 are located stop-cocks e^6, e^6, and e^7. In the pipes d are located stop-cocks d^3, d^4, and d^5. Communication between the tank B and the condenser is regulated by a stop-cock d^6.

Upon the side of the tank B is a pipe b^2, having located in it a stop-cock b^3 and at its upper end a funnel b^4.

In operation it is supposed that herbs or drugs have been placed in the tank A′ and that an alcoholic solution has been placed upon the same and the steeping process has been carried on the length of time desired. The cock a^3 is opened and the fluid flows from the steeping-tank to the same level. Then cocks c^4 and c^5 are opened and steam passes into the heating-coil C, the cocks c^2 and c^3 being closed, and the heat of the coil C drives off the alcohol contained in the surface of the liquid in the tank and the vapors rise to the top thereof and pass thence into the pipe D and into the condenser, where they are liquefied and pass into the pipe e^4, whence they flow into the pipe e^3 and may be either returned to tank A or by opening cocks e^5 or e^7 be admitted to tanks A′ or A^2, in the latter of which a steeping process may be going on. By thus heating the contents of the concentrator B at its surface the body thereof is not affected by the heat, and therefore the substance, such as delicate herbs, &c., is not deteriorated thereby. To obtain as strong a product as may be desired, as the contents in the concentrator lower fresh supplies of the solution are brought into it from the steeping-tank. The placing of water-coils immediately below the heating-coils enhances the effect of keeping

the body of the solution cool while causing evaporation from the surface. The cold extract in concentrating-tank B is thus concentrated. Should it be desired to secure a more concentrated extract, the cocks c^2 c^3 may be opened to allow the steam to pass into the heating-coil C', whereby the liquid in the concentrating-tank may be quickly diminished, the vapors passing, as before, into the condenser and thence into the steeping-tanks. By opening cock a^4 all of the fluid in the tank A' may be conveyed into the concentrating-tank B. After the extract in the tank B has been brought to the strength desired it may be drawn off from the tank through pipe b^5 by opening cock b^6. When the material in the tank—for instance, A'—has been thoroughly worked, by closing off cocks a^3 a^4 and opening cock c^7 steam may be passed through the waste material in the tank, taking up the alcohol that remains therein, and the vapors pass up through pipe d, cock d^4 being open, and into the pipe d', thence through pipes d^2 and D, into the condenser, where the liquid is condensed and conveyed back into pipe e^3 to be used in one of the tanks A or A^2, in which a steeping process may be going on.

The pipe b^2 and funnel b^4 are used for placing fluid in the concentrating-tank for diluting the extract to bring it to the exact strength desired.

I have shown two heating-coils located in the concentrating-tank; but it is obvious that more might be placed therein and be coupled independently to the steam-pipes, if desired.

What I claim is—

1. A concentrator for solutions consisting of a tank, a heating-coil therein, a cooling-coil beneath the heating-coil and means for admitting a heating medium to the heating-coil and a cooling medium to the cooling-coil simultaneously.

2. The combination of a series of steeping-tanks, concentrating-tank, pipes connecting the series with the concentrating-tank and cocks for controlling the connections, a condenser, a vapor-pipe leading from the concentrating-tank into the condenser, return-pipes leading from the condenser into the steeping-tanks and cocks located in the return-pipes, substantially as shown and described.

3. The combination of a steeping-tank, a concentrating-tank, a series of coils, one above the other, in the concentrating-tank, steam-pipes, independent connections between each coil and the steam-pipes and means for regulating the communication between each coil and the steam-pipes, substantially as shown and described.

4. A steeping-tank, a concentrating-tank, pipes leading from the bottom of the steeping-tank and into the concentrating-tank at various heights, a series of heating-coils one above the other in the concentrating-tank, steam-pipes, independent means for connecting each of the series of the heating-coils with the steam-pipes and means for regulating the communication between the steam-pipes and the coils, substantially as shown and described.

5. The combination of a series of steeping-tanks, a concentrating-tank, pipes connecting the series with the concentrating-tank, and cocks for controlling the connections, heating-coils in the concentrating-tank, a condenser, a vapor-pipe connecting the concentrating-tank and the condenser, pipes leading from the condenser into the steeping-tanks and cocks located in said pipes to control the communication between the condenser and the steeping-tanks.

6. The combination of a series of steeping-tanks, a concentrating-tank, pipes connecting the concentrating-tank with the steeping-tanks, a condenser, vapor-pipes connecting the steeping-tanks with the condenser and fluid-pipes leading from the condenser back to the steeping-tanks and steam-pipes leading into each of the steeping-tanks, substantially as shown and described.

7. The combination of a series of steeping-tanks, a concentrating-tank, a condenser, heating-coils located in the concentrating-tank, pipes connecting the steeping-tanks and the concentrating-tank, vapor-pipes connecting the concentrating-tank with the condenser and the steeping-tanks with the condenser, return-pipes from the condenser into the steeping-tanks, cocks located in the return-pipes and steam-pipes for the coils and for the steeping-tanks substantially as shown and described.

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