No. 808,997. PATENTED JAN. 2, 1906.

J. U. LLOYD.

CONCENTRATOR FOR SOLUTIONS.

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Fig. 1.

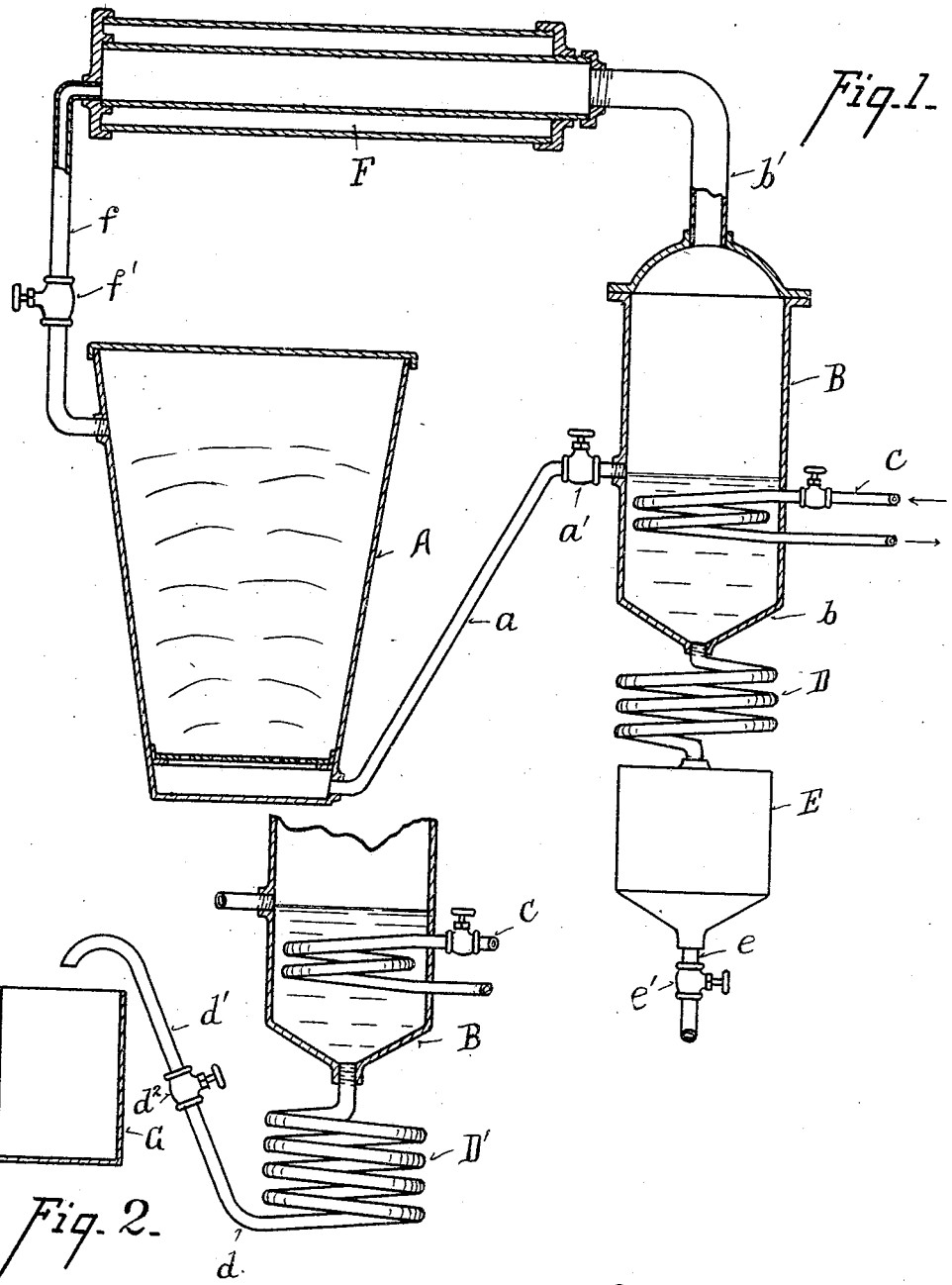


Fig. 2.

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CONCENTRATOR FOR SOLUTIONS.

No. 808,997. Specification of Letters Patent. Patented Jan. 2, 1906.

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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, county of Hamilton, 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 a concentrator in which the evaporation of the solvent is made to take place at the surface while the body thereof is kept cool, which is provided with an efficient and economical means for attaining this latter result.

In the accompanying drawings, Figure 1 is a vertical sectional view through a concentrator embodying my invention. Fig. 2 is a detail view, partially in section and partially in side elevation, of a modified form of concentrating-tank and coil attachment.

The herbs or other material from which an extract or abstract is to be made is placed in a steeping-tank A and steeped in the solvent—as, for instance, alcohol—for the desired period. The solvent is placed in the steeping-tank A by removing its cover, and is kept therein at a higher level than the coil C in concentrating-tank B. From the bottom of the steeping-tank a pipe *a* leads into concentrating-tank B at a distance above its bottom. Within pipe *a* a valve *a'* for regulating the communication between the steeping-tank and the concentrator is placed. Within concentrating-tank B a heating-coil C is located near the bottom *b* of the concentrating-tank, which in the form illustrated is made conical and communicates with an external coil D, which at its lower end communicates with the top of the reservoir E, in whose bottom is located a discharge-pipe *e*, containing a valve *e'*. From the top of concentrating-tank B an enlarged pipe *b'* leads into a condenser F, from which a pipe *f* leads back into the top of the steeping-tank A, pipe *f* having a valve *f'*.

In the modification shown in Fig. 2 in place of having a reservoir E pipe D' has its lower end *d* curved upward into an arm *d'*, which is carried up to the level of the top of the heating-coil C and discharges into a receptacle G. Within pipe D is located a regulating-valve d^2. Vessel G has a discharge-cock *g*.

In operation after the steeping process has gone on for the desired time the valve *a'* is opened and the solution passes into the concentrating-tank B, covering the heating-coil *c*, which may be heated by means of steam or other heating medium. The evaporation of the solvent, such as alcohol, takes place at the surface of the fluid in the concentrating-tank B, passes thence up into the pipe *b'* and condenser F, and, when condensed, passes through pipe *f* into the steeping-tank A to be used again for steeping. The external coil D, being located just below the heating-coil and being kept cool by reason of its large exposure of surface to the atmosphere, keeps the liquid below the heating-coil cool, so that the substances held in solution are not deleteriously affected by the heat, while at the same time it affords a sufficient communication between the main body of the fluid in the reservoir E and the portion of the fluid near the surface to maintain the uniformity of the solution throughout. After the fluid has been concentrated to the extent desired it may be drawn off through the discharge-pipe *e* by opening valve *e'*, which is kept closed during the process of concentrating the liquid in order to keep the fluid above the level of the heating-coil. In the modification after the process has been started the valve d^2 may be opened, and the height of the pipe *d'* then maintains the level of the fluid in the tank B above heating-coil C. The valve *e'* in the preferred form and the pipe *d'* in the modified form are the means illustrated by me for keeping the level of the liquid around the heating-coils. In this modification the external coil D' likewise keeps the body of the solution cool to the desired degree.

What I claim is—

1. The combination of a concentrating-tank, a heating-coil located within the tank near its bottom, an external coil communicating with the tank below the heating-coil, and a means for keeping the level of the liquid in the concentrating-tank around the heating-coil.

2. The combination of a concentrating-tank, a heating-coil located therein near its bottom, an external coil communicating at one end with the concentrating-tank below the heating-coil, and a reservoir at the other end of the external coil.

3. The combination of a concentrating-tank, a heating-coil within the concentrating-tank near its bottom, a reservoir located

below the concentrating-tank, and an external coil connecting the top of the reservoir and the bottom of the concentrating-tank.

4. The combination of a concentrating-tank, a heating-coil within the concentrating-tank near the bottom thereof, an external coil communicating with the concentrating-tank below the level of the heating-coil, a means of holding the fluid in the concentrating-tank at the level of the heating-coil, a steeping-tank, a means of communication between the steeping-tank and the concentrating-tank, a condenser and means for connecting the condenser with the top of the concentrating-tank and with the steeping-tank.

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