No. 649,035. Patented May 8, 1900.

F. A. ANDERSON.

APPARATUS FOR MAKING EXTRACTS.

(Application filed Dec. 4, 1899.)

(No Model.)

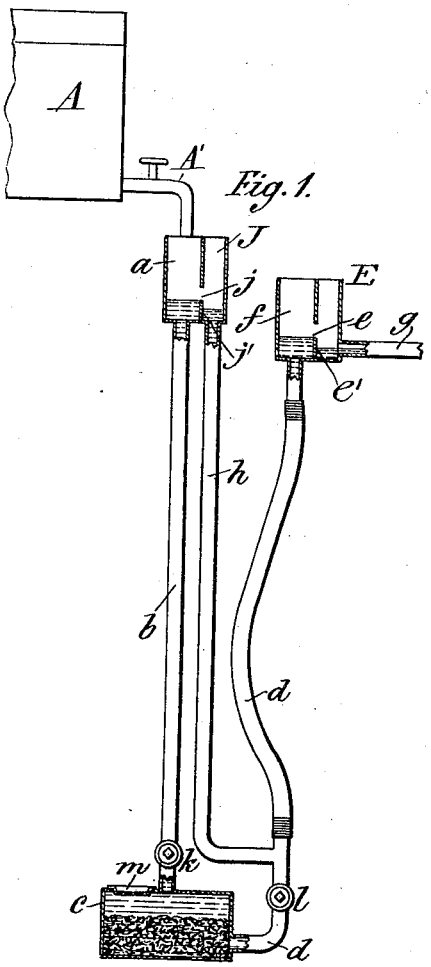


Fig. 1.

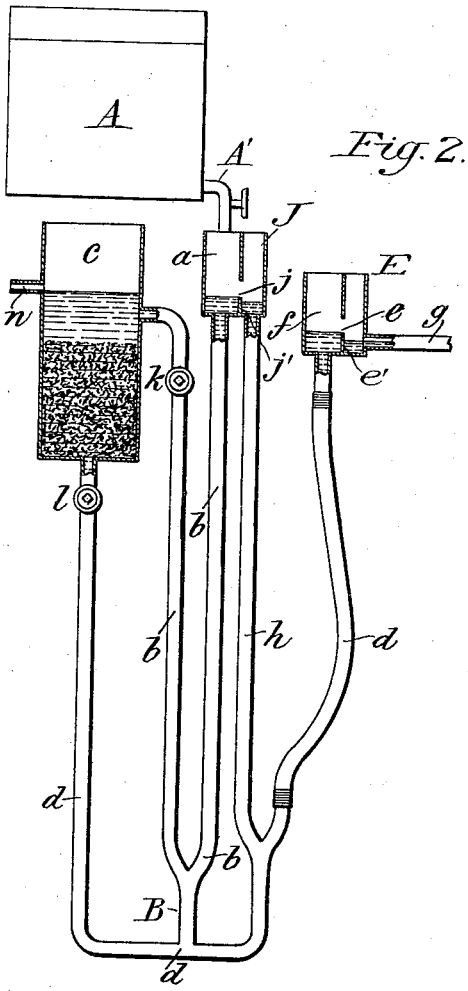


Fig. 2.

Witnesses
Ed. Bullock
Walter P. Dubby.

Inventor.
Frederic A. Anderson
By his Attorneys,
Baldwin Davidson & Wright

# UNITED STATES PATENT OFFICE.

FREDERIC ALFRED ANDERSON, OF LONDON, ENGLAND.

## APPARATUS FOR MAKING EXTRACTS.

SPECIFICATION forming part of Letters Patent No. 649,035, dated May 8, 1900.

Application filed December 4, 1899. Serial No. 739,184. (No model.

*To all whom it may concern:*

Be it known that I, FREDERIC ALFRED ANDERSON, analytical chemist, a subject of the Queen of Great Britain, residing at 65 Palace Gardens Terrace, London, in the county of Middlesex, England, have invented certain new and useful Apparatus for Making Solutions, of which the following is a specification.

The object of this invention is to automatically and continuously make solutions of definite strength. For this purpose the solid to be dissolved is placed in a tank to which two pipes are connected, one leading from the tank to which the solvent is supplied and the other being a delivery-pipe leading to an overflow at a suitable height above the bottom of the tank. A third pipe is also provided connecting the lower end of the delivery-pipe to the supply-pipe, opening into the latter above its bottom. The strength of the solution obtained depends upon the difference of level between the overflow from the delivery-pipe and the overflow from the supply-tank to this third pipe. This difference of level may preferably be made adjustable to regulate or alter the strength of the solution by altering the height of the overflow from the supply-tank or of that from the delivery-pipe, or both of them.

In the accompanying drawings, Figures 1 and 2 are side elevations, partly in section, of two forms of apparatus made according to this invention. The scale may be assumed to be about one-twelfth full size; but the dimensions may be greatly varied. The longer the pipes the greater is the delicacy of the appliance.

Referring first to Fig. 1, *a* is the supply-tank, into which solvent is gradually and continuously run. The solvent may be supplied from a tank A, connected with the tank *a* by a pipe A′, provided with a cock. *b* is the pipe connecting the tank *a* to the tank *c*, which latter contains the solid to be dissolved. In this figure of the drawings the tank *c* is at the bottom of the apparatus and therefore must be closed, as shown. *d* is a pipe connecting the tank *c* to a tank *f*, which connects by means of an opening *e* over a weir *e′* with a chamber E, to which is connected an outlet-pipe *g*. Part of the pipe *d* is preferably made flexible, as shown, so that the weir *e′* or the opening *e* can be raised or lowered relatively to the tank *a*. *h* is a pipe connected to the bottom of a chamber J at the side of the tank *a*. The chamber J connects by means of an opening *j* over a weir *j′* with the tank *a*. The opening *j* is arranged a short distance above the bottom of the tank *a*. The pipe *h* is also connected to the pipe *d* at a point a short distance above its lowest part. *k* and *l* are cocks on the pipes *b* and *d*, preferably near the tank *c*. *m* is a manhole opening into the tank *c*.

In operating the apparatus shown in Fig. 1 the cocks *k* and *l* are closed and the manhole *m* is opened. The solvent is let into the tank *a*. The liquid displaced by the solid introduced into the tank *c* flows out by the manhole *m*, (which is then reclosed,) and the cocks *k* and *l* are opened. When the apparatus is at work, the solvent introduced into the supply-tank *a* flows down the supply-pipe *b* into the tank *c*, displacing solution, which rises up the delivery-pipe *d* and runs out through the overflow-opening *e* and overflow-pipe *g*. If the solution at any time is too strong, the column of it in the delivery-pipe *d* more than counterbalances the column of solvent in the supply-pipe *b*, and the solvent consequently rises and overflows down the third pipe *h* and mixing with the solution in the delivery-pipe *d* dilutes it until its gravity is diminished. On the other hand, if the solution is too weak there is no overflow of solvent from the supply-tank *a* into the pipe *h*, and consequently no dilution of the solution in the delivery-pipe *d*, until the solution in the latter is so far replaced by a stronger solution from the tank *c* as to cause the level of the solvent to rise to the overflow-opening *j*. Thus the strong solution from the tank *c* and the overflow solvent automatically mix at the bottom of the delivery-pipe *d* in such proportions that the outflowing solution is of definite and invariable strength. Preferably the outlet-tank *f*, chamber E, and weir *e′* are of exactly the same size and form as the inlet-tank *a*, chamber J, and weir *j′*, so that any alteration in the rate of supply of the solvent does not affect the working of the apparatus.

The apparatus shown in Fig. 2 is slightly modified, but the operation is precisely the same. In this case the tank *c* is arranged at a higher elevation—that is, at about the same

height as the tanks *a* and *f*. The tank *c* in Fig. 2 may of course be left open instead of being closed, as in Fig. 1, and this tank is provided with an overflow *n*. The tank *a* in this apparatus is supplied with solvent from the tank A, as in Fig. 1. The tank *a* is of precisely the same construction as that shown in Fig. 1 and is connected with the chamber J by means of an opening *j* over a weir *j'*. The tank *f* is in like manner similar in all respects to the tank *f* in Fig. 1, and it is connected with a chamber E by an opening *e* over a weir *e'*, and the chamber E is provided with an overflow-pipe *g*. A pipe *d* extends downwardly from the bottom of the tank *f* and then extends upwardly to the bottom of the tank *c*, being provided with a cock *l* near the tank *c*. The bottom of the chamber J is connected with a pipe *h*, which is connected at its lower end to the pipe *d*, near the lower portion thereof. The pipe *b* is connected with the bottom of the tank *a* in a similar manner to that in which it is shown connected in Fig. 1. It extends downwardly and then extends upwardly to the upper portion of the tank *c*, a cock *k* being provided near the tank *c*. The lower ends of the two branches of the pipe *b* unite in a branch B, which connects with the pipe *d*, near the lower portion thereof, between the tank *c* and the connection of the pipe *h* with the pipe *d*.

The description of the operation of the apparatus shown in Fig. 1 applies equally to the operation of the apparatus shown in Fig. 2. The solvent cannot flow directly from the tank *a* to the tank *f*, because the bottom of the apparatus is full of dense solution, which is much heavier than the solvent, and the solvent would of course have to sink through this solution in passing directly from the tank *a* to the tank *f*, which is impossible. The reason why the solvent passing down through the pipe *h* can mix with the solvent solution is that it is free to rise up through the pipe *d* to the tank *f*. On the other hand, there is a connection between the pipe *b* and the pipe *d* in order that the column of solvent in the one may balance the column of solution in the other.

I claim as my invention—

1. The combination of a tank to receive the solid to be dissolved, a solvent-supply pipe leading to the tank, a solution-delivery pipe leading from the tank and a pipe leading downward from an overflow in the supply-pipe to the delivery-pipe.

2. The combination of a tank to receive the solid to be dissolved, a solvent-supply tank, a solution-delivery tank similar to the supply-tank, overflow-weirs in the supply and delivery tanks, pipes connecting the solid-containing tank to the supply and delivery tanks, and a pipe leading downward from the weir in the supply-tank to the pipe connecting the solid-containing tank and delivery-tank.

3. The combination of a tank to receive the solid to be dissolved, a solvent-supply pipe leading to the tank, a solution-delivery pipe leading from the tank, a pipe leading downward from an overflow in the supply-pipe to the delivery-pipe and means for adjusting the levels of the overflow from the supply and of the delivery relatively to each other.

4. The combination of a tank to receive the solid to be dissolved, a solvent-supply tank, a solution-delivery tank similar to the supply-tank, overflow-weirs in the supply and delivery tanks, pipes connecting the solid-containing tank to the supply and delivery tanks, a pipe leading downward from the weir in the supply-tank to the pipe connecting the solid and delivery tanks, and means for adjusting the levels of the supply and delivery weirs relatively to each other.

FREDERIC ALFRED ANDERSON.

Witnesses:
W. J. NORWOOD,
WALTER J. SKERTEN.