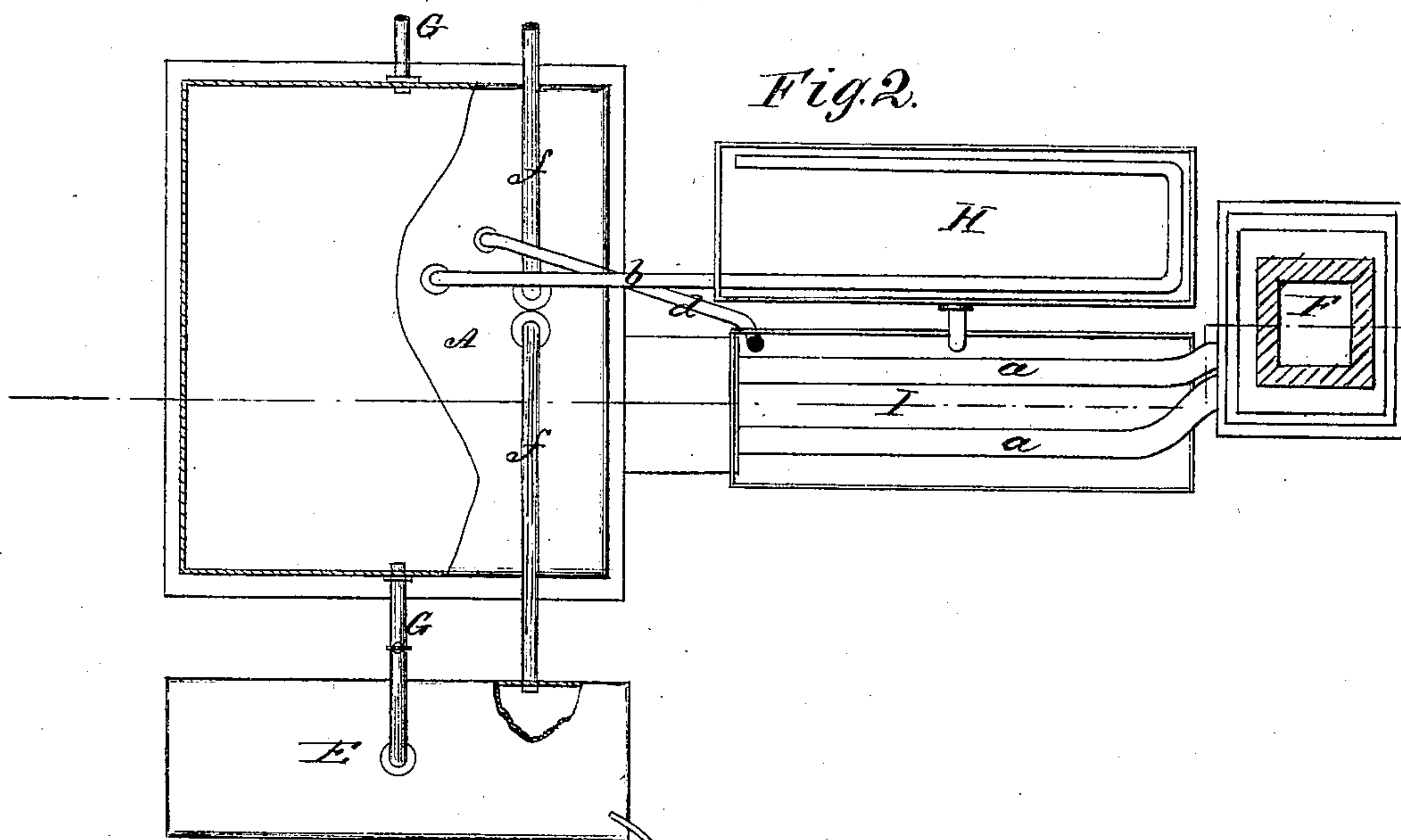
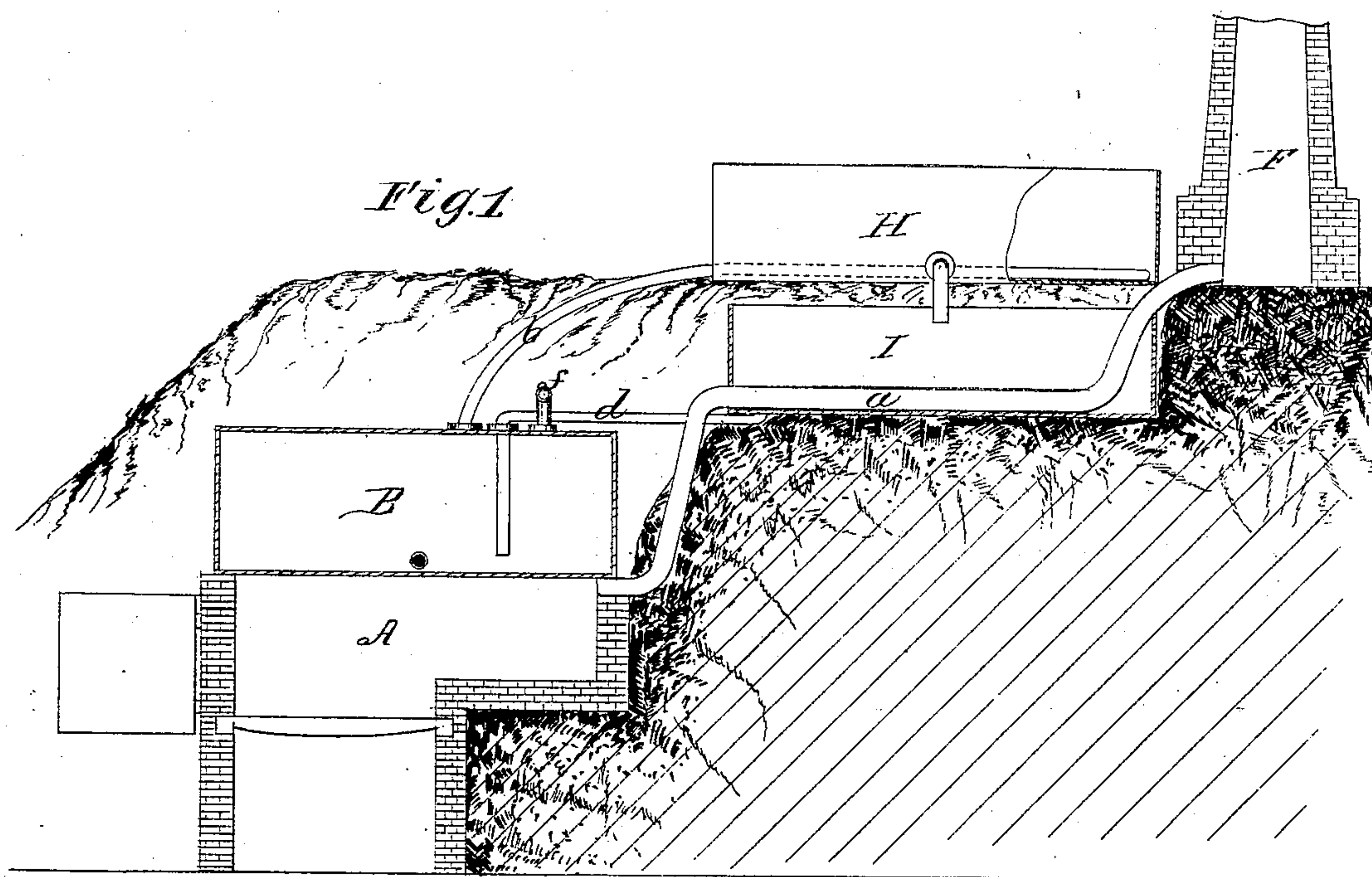


H. LERNER & E. C. HARPOLD.
 Improvement in Apparatus for the Manufacture of Bromine.
 No. 132,296. Patented Oct. 15, 1872.



Witnesses:
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 PER *[Signature]*
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UNITED STATES PATENT OFFICE.

HERMAN LERNER, OF MASON CITY, AND ELIJAH C. HARPOLD, OF HARTFORD CITY, WEST VIRGINIA.

IMPROVEMENT IN APPARATUS FOR THE MANUFACTURE OF BROMINE.

Specification forming part of Letters Patent No. **132,296**, dated October 15, 1872.

To all whom it may concern:

Be it known that we, HERMAN LERNER, of Mason City, in the county of Mason and State of West Virginia, and ELIJAH C. HARPOLD, of Hartford City, in the county of Mason and State of West Virginia, have invented an Improved Apparatus for the Manufacture of Bromine, of which the following is a specification:

The invention consists in making the bitter-water pan with a close cover so as to form a boiler, and in connecting its steam-space with the stills, whereby the vaporized bitter-water may be utilized for the agitation of the liquid therein. It also consists in connecting this boiler with a primary reservoir, which is thereby kept at a proper temperature, and a large proportion of the salt precipitated. It also consists in connecting the furnace with a secondary reservoir, whereby the latter may be always maintained at the desired temperature, and thereby precipitate nearly all the residue of salt.

In the drawing, Figure 1 is a vertical section through line *x x* of Fig. 2; and Fig. 2 is a plan view.

A, in the drawing, represents the furnace; B, the boiler-pan; E E, the stills; F, the smoke-stack; and G G, the pipes which conduct the product of the bitter-water from the boiler-pan B to the stills E E. H is the primary reservoir, which directly receives the refuse water left after the manufacture of salt. This is some twenty times as large as the boiler-pan B, and is placed at a considerably higher elevation. Here the salt-water remains for some twenty-four hours, or until a new supply is to be drawn from the salt-works. This reservoir is heated by steam brought through a pipe, *b*, connected with the top of boiler-pan B. I is a secondary reservoir of the same size as H, and placed below it, but still in a position higher than the boiler-pan. This reservoir is heated by flues *a a* which pass through it, and communicate at their opposite extremities with the combustion-chamber of furnace and smoke-stack F. The liquid

is gradually let into the boiler, as wanted, through pipe *d*.

By this construction, the refuse water first passes from salt-works into primary reservoir H, where it is maintained at a certain temperature until a large percentage of the salt is deposited. The connection between this and the adjoining secondary reservoir I is now opened and the liquid allowed to descend by gravity into this new receptacle, where nearly all the remaining portion of the salt is eliminated. The connection being opened between reservoir I and boiler-pan B, the product of the salt-water falls, by gravity, into this latter receptacle, where it is boiled, and its strength raised to about 38° of the hydrometer. It then becomes ready for distillation, and passes into the stills E E, (only one being shown,) where the bromine is distilled in the usual manner, the liquid being agitated during the process of distillation by steam which is introduced into the stills through pipes *f f* leading from the boiler B.

It will thus be perceived that by generating steam from the bitter or salt water, and using it for the purpose of agitating and heating the liquid to which the chemicals are applied, and from which the bromine is obtained, we introduce something closely analogous in its nature and substance to the liquid itself. Practical experiment has proved to us that this results in eliminating a much larger product of bromine from a given quantity of bitter or salt water, and at comparatively less expense.

Having thus described our invention, what we claim as new, and desire to secure by Letters Patent, is—

1. The combination of heated primary and secondary reservoirs H I with the close boiler B, for preparing refuse salt-water for the distillation of its bromine.

2. The means of heating the primary reservoir H, consisting of a pipe leading from the top of boiler-pan B, as described.

3. The means of heating the secondary reservoir I, consisting of pipes passing there-through from the furnace, and carrying the

products of combustion to the smoke-stack, as described.

4. The pan B, made with a close cover and converted into a steam-generator, as and for the purpose described.

5. The method of agitating and heating the liquid, while being distilled, by steam generated from the salt or bitter water, as described.

6. The combination, in an apparatus for the manufacture of bromine, of the reservoirs I H, boiler-pan B, and stills E with the same furnace A, as and for the purpose set forth.

HERMAN LERNER.

ELIJAH C. HARPOLD.

Witnesses to both signatures:

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