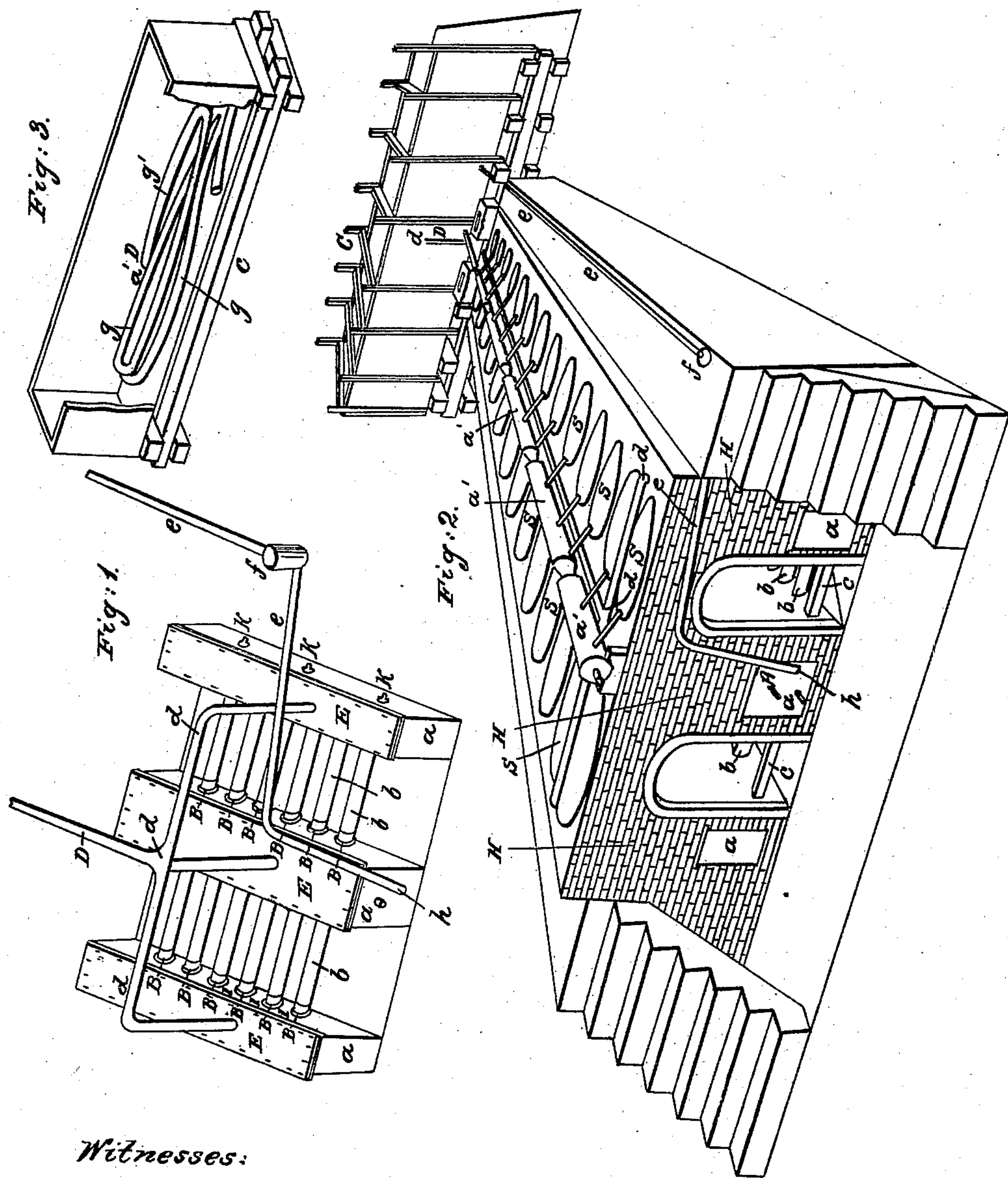


H. SMITH.  
Manufacturing Salt.

No. 3,173.

Patented July 12, 1843.



Witnesses:

Elias Little  
Levy H. Goodsell.

Inventor:

Henry Smith.



# UNITED STATES PATENT OFFICE.

HERVEY SMITH, OF SALINA, NEW YORK.

## IMPROVEMENT IN THE MANUFACTURE OF SALT, &c.

Specification forming part of Letters Patent No. 3,173, dated July 12, 1843.

*To all whom it may concern:*

Be it known that I, HERVEY SMITH, of Salina, in the county of Onondaga, in the State of New York, have invented a new and useful improvement in the manner of constructing the apparatus for manufacturing salt, and which improvement may be applied to the manufacturing of potash and of other articles; and I do hereby declare that the following is a full and exact description thereof.

In constructing my apparatus for the manufacturing of salt from brine or of other articles of a similar nature, I form the jambs of the arches in which the kettles are to be set of large metallic cases or boilers, either of wrought or of cast iron. When a single arch is used, two such metallic cases will be required; but where there are two arches, which will generally be the case where salt is manufactured, three such cases will be required. These cases take the places of the side and intermediate walls of masonry generally employed. They are to be connected together by tubes which reach across from one to the other of them, and constitute the grate-bars upon which the fuel is to be placed. These tubes are to be at such distance apart as to allow of the falling of live coals and brands between them, which are to burn on the bottom of the ash-pit, by which the heat will be economized, as the lower part of the tubes and of the metallic cases will be thereby more effectually heated.

In using this apparatus the metallic cases are to be filled with fresh water, the use of them being to generate steam, which is to be conducted from them through suitable pipes into a cistern or vat containing the water from which salt is to be manufactured. The pipes through which the steam is passed are to be coiled back and forth in the cistern or vat, so as to effect the heating of the salt-water and the condensation of the steam. The water resulting from such condensation is to be returned into the metallic cases, by which means they will be kept nearly supplied, and what is lost by evaporation or otherwise may be added from any suitable source.

In the accompanying drawings, Figure 1 is a representation of three metallic cases or boilers with their connecting-tubes, &c. Fig. 2 is a view of the whole structure, consisting of the

two arches, the cistern or vat for containing the brine, the salt-kettles, &c. Fig. 3 shows the vat or cistern with a part of one of its sides removed to exhibit the interior.

E E E are the metallic cases or boilers, which are to be supplied with fresh water. These cases I prefer to make rectangular; but they may be varied in form, if desired. They may also be varied in size; but I intend usually to make them from six to nine feet in length and from twenty inches to two feet in height. The outside cases may be one foot wide, the inner eighteen or twenty inches.

B b are the tubes which constitute the grate-bars, which are firmly attached at their ends B B to the cases or boilers. There are openings through the cases at I I I, from which may project short tubes or thimbles to receive the tubes b b, which may be firmly united by cement or otherwise.

a a a are the outer ends of the metallic cases E E, which cases form the foundation for the arches of masonry H H. The cases and tubes are to be made perfectly water-tight, and when connected, as above described, they constitute one combined boiler. To prevent their being displaced by expansion and contraction, rods of iron are passed through the three metallic cases, passing also through the tubes b, and being secured by screw-nuts, as seen at k k k. The masonry-work H H is to be built up to the desired height to receive the evaporating-kettles S S, and to allow of the introduction of fuel between them and the tubes B b. In some cases these tubes may stand higher up in the arch, and the fire be made on the hearth of the ash-pit, and the result will, as I believe, be equally beneficial in the economy of heat. The steam generated in the cases or boilers is to ascend and pass through the iron or other pipes, D d, and is to be carried into the cistern C, which contains the brine. Within the cistern the pipe may be of copper or other suitable metal, and is to be coiled round, as shown at g g, Fig. 3. This coil must be of sufficient length and capacity to exhaust the heat as nearly as may be, and to condense the steam. e e f are tubes entering one of the boilers at h for conducting the hot water produced by the condensation back into the boiler.

The cistern C, in which the brine is to be



heated, is made of plank and braced by strong girths. It may contain from ten to twenty-five thousand gallons, according to the capacity of the boiler and the contents of the kettles S S. Into these the heated brine is drawn by conducting-pipes *a' a'*, of wood, passing from the cistern between the two lines of kettles, each kettle having its appropriate supply tube and faucet.

Although there is not any direct connection between the boilers and the kettles in this apparatus, they are both heated by the same fire—an arrangement which is productive of great economy. The heat from the steam serves also to purify the brine, and obviates the necessity of using limes or other extraneous matter for that purpose. Not only is the quantity of fuel lessened by this apparatus, but the quality of the salt produced is much improved.

Having thus fully described the nature of my

improvement in the construction of the apparatus for manufacturing salt, what I claim therein as new, and desire to secure by Letters Patent, is—

The manner in which I have arranged the metallic boilers or cases in the jambs of the arch, and the tubular grate-bars by which they are connected, in combination with the evaporating-kettles situated above and between the said boilers for the purpose of manufacturing salt, as set forth, and this I claim whether the apparatus be made precisely in the form and manner herein made known or in any other which is substantially the same, producing a like effect by equivalent means.

HERVEY SMITH.

Witnesses:

ELIAS TUTTLE,  
EVERT WYNKOOP.