I. NOYES.

Manufacture of Salt.

No. 3,230. Patented Aug. 26, 1843.

Fig. 1

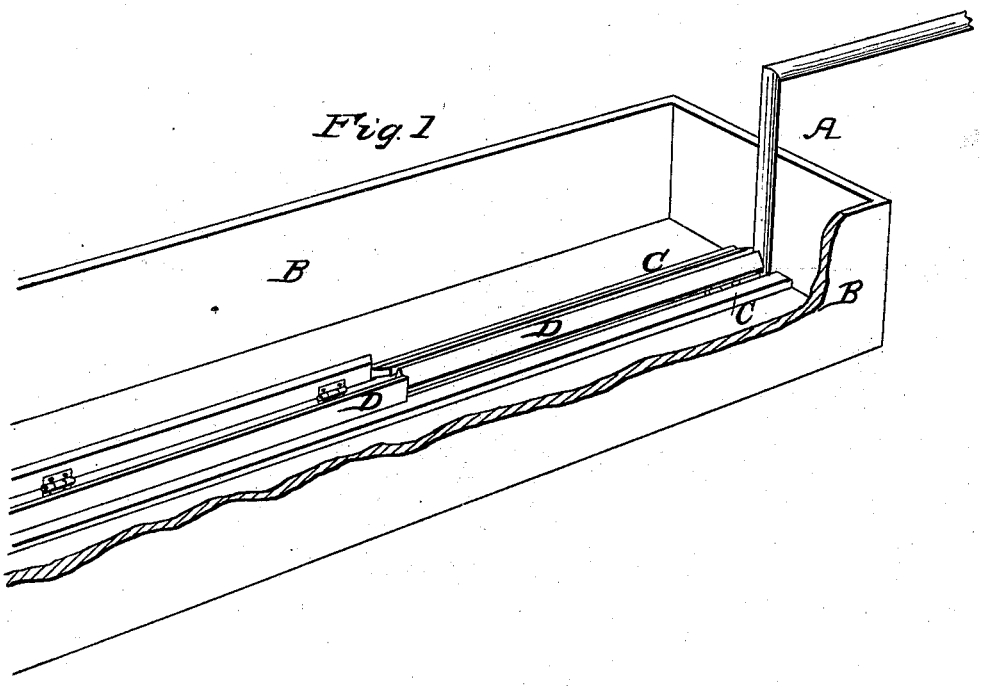


Fig. 3

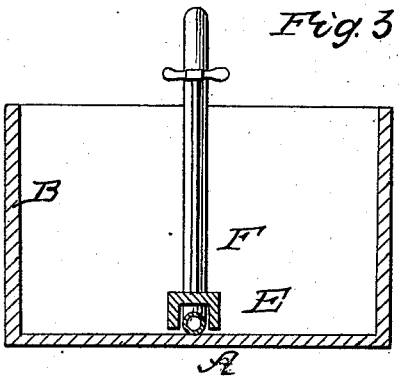
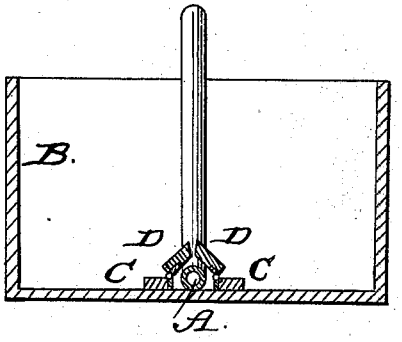


Fig. 2



UNITED STATES PATENT OFFICE.

ISAAC NOYES, OF KANAWHA SALINES, VIRGINIA.

IMPROVEMENT IN MAKING SALT.

Specification forming part of Letters Patent No. **3,230**, dated August 26, 1843.

To all whom it may concern:

Be it known that I, ISAAC NOYES, of Kanawha Salines, in the county of Kanawha and State of Virginia, have invented a new, useful, and Improved Method of Making Coarse or Alum Salt with Steam, of which the following is a specification.

In order to understand the improvement made by me, it may be useful to describe the method now in use on the Kanawha river under the patents of Calvin Guiteau, of New York, of which I am part owner by purchase, specifications, models, and drawings of which may be had in the Patent Office at Washington, to which reference is here made.

In the use of said Guiteau's invention on Kanawha, large boilers are constructed to saturate the salt-water. The hot brines are drawn from the boilers into settling-cisterns; then saturated brines are drawn into a large granulating-cistern twenty feet wide and about two hundred and fifty feet long, constructed with large timbers framed together, the sides and ends whereof are closed with thick plank. The floor is covered with plank, except about sixteen inches in the middle from one end to the other. This space in the middle is filled by the insertion of a square trunk, three sides whereof are made with plank from two to three inches thick, leaving one side open, which is left uppermost in placing the trunk in the space in the middle aforesaid. This trunk is sunk in the space aforesaid until the upper part thereof is even with the floor of the cistern, and is then covered with a metallic plate, (copper or lead or other metal,) which makes a part and parcel of the floor of the granulating-cistern. The brines are then drawn from the settling-cistern as fast as they are prepared by the boiler. The steam generated in saturating the brines is conducted in a wooden trunk or tube to the end of the granulating-cistern, and connected with the trunk covered with the metallic plate aforesaid, and running through the middle of the cistern aforesaid. As wood is a non-conductor of heat, the steam is not condensed in passing only by the metallic plate aforesaid, over which the brines in the granulating-cistern flows or rests. The heat applied to the brines may be increased or diminished by the exposure of more or less of the metallic plate. This may be done by covering portions of the plate with plank. This method I have found liable to serious objections. First, the granulating-cistern to receive and firmly hold the trunk aforesaid, and to sustain the weight of salt and brine which accumulates in a full run, must be framed at much expense out of very heavy timber; second, it is liable to much leakage, no matter how great the precautions, at the seams made by the junctions of the sides of the trunk with the floor of the cistern, also between the metallic covering and the trunk, and also in the plank floor, sides, and ends of the cistern. The benefits of this method of making coarse or alum salt are, first, three sides of the trunk being of wood and not condensing the steam, and the metallic plate which is exposed to the brine in the cistern being small, the steam from the boiler is easily passed through the trunk, though the brine in the cistern may be cold; second, the small exposure of metallic surface to the brines enables the manufacturer to keep the brines at that moderate degree of heat which is most favorable to the coarse granulation and the formation of alum salt. When the heat applied to the brines is so great as to disturb them, coarse granulation cannot be effected. Notwithstanding these advantages in Guiteau's method, the leakages in the cistern are a heavy drawback upon the successful prosecution of the plan. This cistern cannot be formed for this plan, so far as my experience has gone, so as to prevent those leakages. Where metallic pipes are used, clay cisterns, comparatively cheap and impervious to liquids, may be constructed; but where large cisterns are used the pipes must be very large, in order to get the steam through them in any reasonable time, when they are immersed in the cold brines, and when it is through so great is the exposure of metallic surface that the brines become too much heated for the manufacture of coarse or alum salt. In my method by the adoption of a clay cistern all leakage is avoided, and I have adopted the metallic pipe upon a new plan, so as to remove the objections to them before indicated in the manufacture of coarse or alum salt. The clay cistern is formed by excavations in the earth the length, breadth, and depth required for the cistern. The bottom is covered with a coat of white clay or

pipe-clay taken from a marsh. The clay is then covered with plank of a suitable thickness, the length of which is equal to the breadth of the excavation. The sides and ends are lined with thick plank, well braced, so as to prevent their yielding to the inside, and on the outside, between the plank and the earth bank, the clay is rammed in, so as to prevent all leakage at the sides and ends. A cistern so constructed, with good clay well prepared, prevents all leakage.

My improvements consist in the use of metallic pipes A in such a way as to make coarse or alum salt in a large cistern, B, the plan of which cistern is as above described. I do hereby declare that the following is a full and exact description of my improvement and invention.

After constructing the cistern as above described, I run a row of metallic pipes, A, five or six inches in diameter, through the cistern lengthwise. I then make a case or covering for those pipes, either by nailing cleats C on the floor of the cistern along each side of the pipes, and nailing plank standing on their edge to those cleats, having the upper edges of those plank about as high as the top of the pipes, then fastening lids D to the upper edges of those planks with hinges, so that the top of the case or covering can be raised, leaving the cold brine on the outside of the case or covering to communicate freely with the hot brine on the inside of the case, and immediately around the pipes, or shut down upon the edges of the plank, so as to inclose the pipes and leave but very little communication with the hot brines in the case and the cold brines in the cistern on the outside of the case. Openings are also made on the sides of this case by means of sliding doors, which can be opened or shut at pleasure as the temperature of the brines may require; or I form a case or covering for the pipes by nailing the edges of three planks together, so as to form three sides of a case or covering, E. (These can be made of planks of any length to suit the fancy of the parties using it.) These cases are suspended by rods E, cords, or chains immediately over the pipes, with the open side down, and by means of levers or pulleys can be let down to the floor of the cistern over the pipes, having the ends of those cases so constructed that when they are let down they will match together, and the bottom edges of the side plank resting even on the floor of the cistern on each side of the metallic pipes, so that when let down over the pipes they form a continuous case the entire length of the cistern and prevent a too free circulation of the hot brine within the case with the cold brine without the case; or they can be raised from the floor and let the brines within the case communicate freely with the brines on the outside of the case, as the nature of the case may require. The object of the case or covering is to prevent a too free communication between the cold brines in the cistern and the hot brines in the case, and so constructed that such communication, to a greater or less degree, may be had at pleasure. Any case or covering made in any form or of any kind of materials, or of any shape or form therefore, that may accomplish that result may be adopted. This case or covering removes the objections before stated to the use of metallic pipes for the manufacture of coarse or alum salt. The free communication between the brines within and without the case being prevented, the steam may be readily forced through the metallic pipes, as the brines in the case, in starting on Monday morning, when everything is cold, is all that is to be heated, so as to prevent rapid condensation of the steam, and thereby obstructing its passage. When that in the case is heated and the steam is passing freely through the metallic pipes, the sliding doors aforesaid at the sides of the case may be opened, the lids may be raised, or the case may be partially raised by the levers or pulleys, as aforesaid, so as gradually to distribute the heat through the brines in the cistern until it is raised to the temperature proper and most suitable for the manufacture of coarse salt. When the temperature rises too high, it may be readily reduced by closing some of the doors or lids, or lowering the case, at the option of the individual using them.

I claim not the metallic pipes or the clay cistern or the use of steam in the manufacture of salt as my invention. My claim is in the construction and application of a case or covering to the metallic pipes with lids, sliding doors, openings, &c., therein, so as to pass the steam through the metallic pipes easily, and afterward to distribute the heat to the brines in the cistern gradually and preserve a temperature in the brines in the cistern to the degree adapted to the manufacture of coarse salt. It is for the use and application of the case or covering aforesaid in making coarse or alum salt with metallic pipes—a thing which has not been hitherto successfully done. It is preferable to the plan of Guiteau in this, that it avoids the cistern, which by its structure is so liable to leakages.

ISAAC NOYES.

Witnesses:
EDM. MAHER,
GILBERT L. GIBERSON.