N. CHAPIN.

Evaporating Pan.

No. 34,669. Patented Mar. 18, 1862.

Fig. 1.

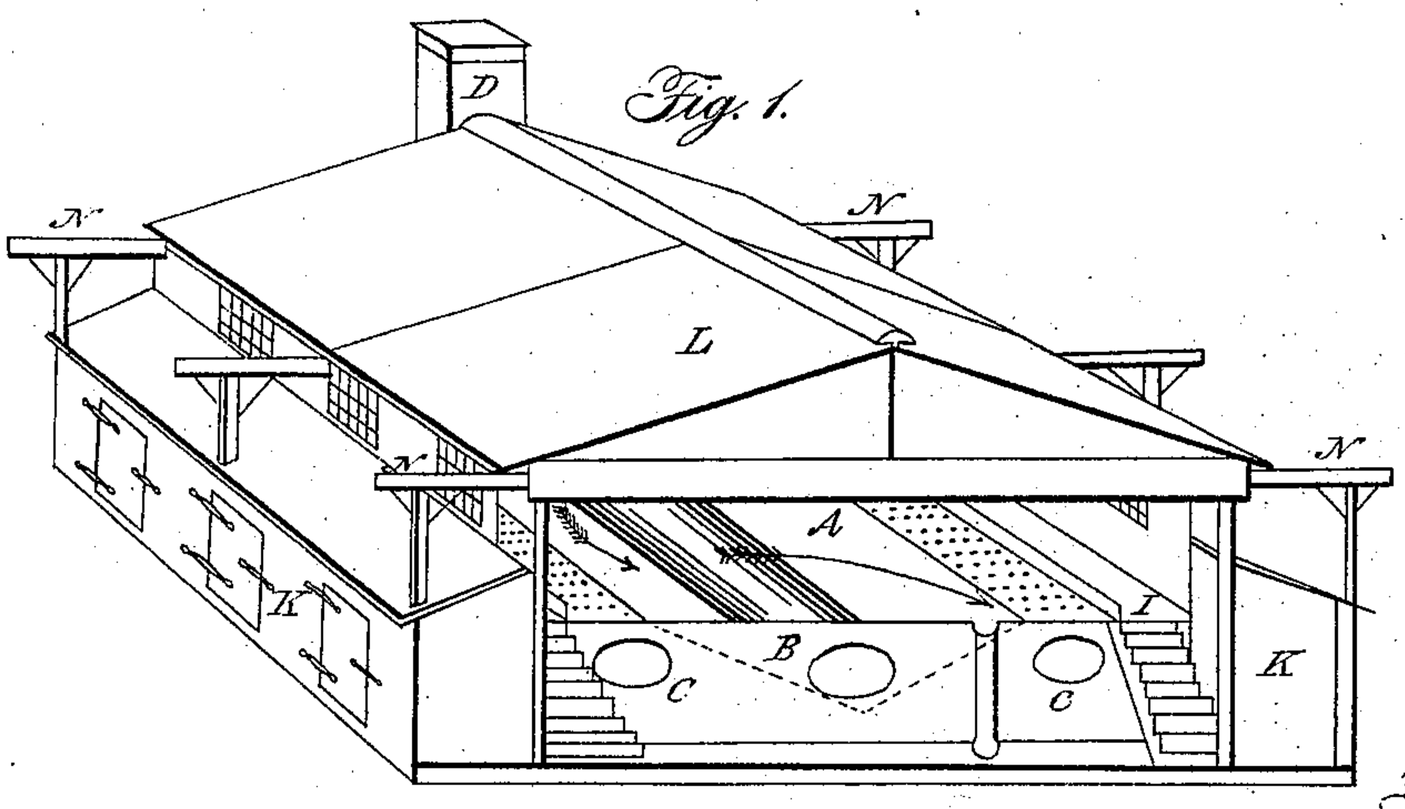


Fig. 2.

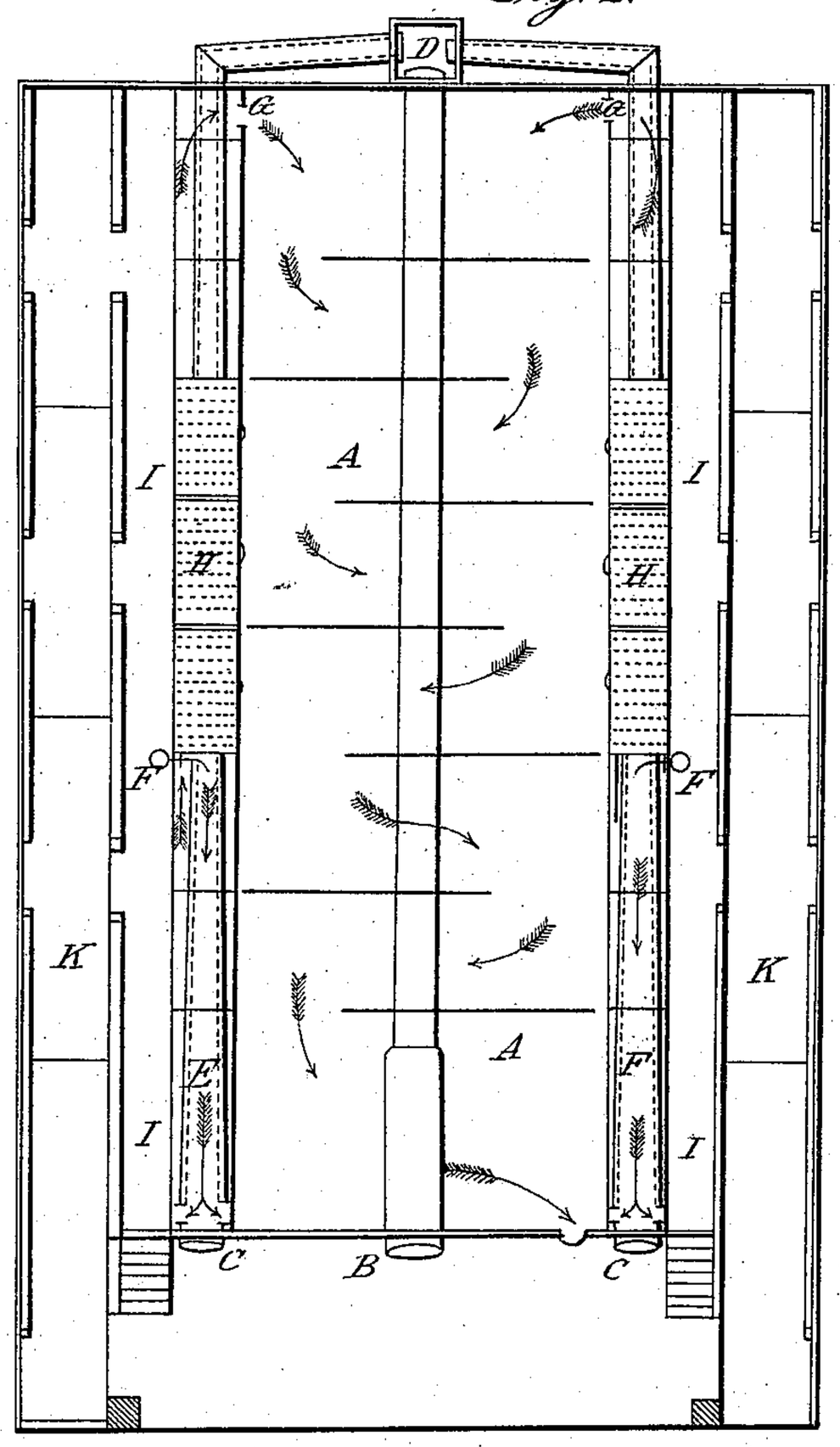
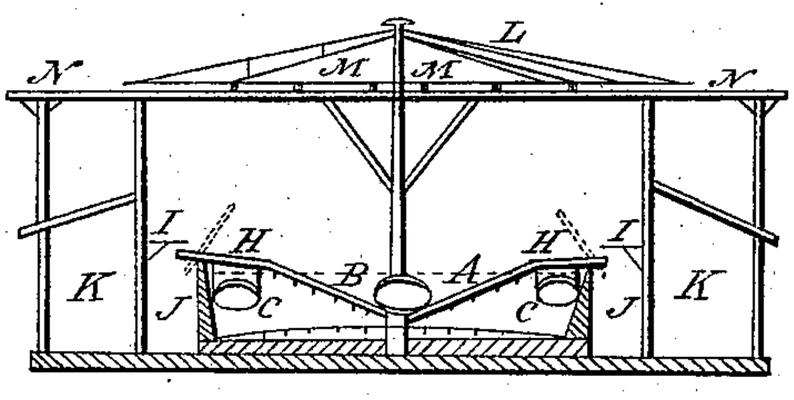


Fig. 3.



Inventor:

Nathan Chapin

UNITED STATES PATENT OFFICE.

NATHAN CHAPIN, OF EAST SAGINAW, MICHIGAN.

IMPROVED APPARATUS FOR THE MANUFACTURE OF SALT.

Specification forming part of Letters Patent No. 34,669, dated March 18, 1862.

To all whom it may concern:

Be it known that I, NATHAN CHAPIN, of East Saginaw, in the county of Saginaw and State of Michigan, have invented a new and useful Improvement in Apparatus for the Manufacture of Common Salt; and I do hereby declare that the following is a full, clear, and exact description of the construction and operation of the same, reference being had to the annexed drawings, making a part of this specification.

The nature and character of my invention consists in an apparatus and building constructed with special devices for the economy of fuel, labor, and expense of erection; also for producing an article of salt clear from any substance foreign to saline matter, by the use of fuel and the natural elements combined.

Figure 1 is a perspective of the building and apparatus. Fig. 2 is the ground plan of the same. Fig. 3 is a transverse section of the same.

The following is a description of the construction and operation.

The same letters when found in any of the figures refer to the same parts.

A represents the floor of the crystallizing-vat, which is one hundred feet long and forty feet wide, built in a doubly-inclining position (see dotted lines in front) from the two edges downward under the submerged furnace B, the flue of which extends the entire length of the said vat to a smoke-chimney in the rear of the block, and operates as the principal heater of the brine in said vat.

C C represent another vat of brine, which is called the "settling-vat," the same length and height and three feet wider upon each side and directly under the former, the contents of which rest in contact with the under side of the floor of the former, and when heated by the submerged furnaces at C C for precipitating sulphates and other impurities, the two vats unite their heat that would otherwise escape—one from its bottom and the other from its top surface—thus preventing the escape of a large amount of heat from both and economizing room to a great extent, while the work of cleansing and crystallizing is going on in each of the respective vats.

The dotted line in Fig. 3 over the three furnaces shows the level of the brine in the two vats.

D is the smoke-chimney, which gives draft to the three said furnaces and flues.

E E are troughs formed upon the furnaces C C by perpendicular flanges fixed upon the sides to prevent the new brine from mixing with that about the furnace till it has flown from the pump-log F, where it is received directly over the fire in the furnace nearly to its mouth, where it flows off from both sides. This gives the brine a thorough boiling on its introduction to the settling-vat, and the weaker the brine may be the longer should be the trough upon the furnaces and their flues, and the farther back should the pump-log be placed. After leaving said troughs the brine proceeds back in the large embodiment of the vat, settling its impurities by continued heat, with no place for escape except through the two notches G G in the rear corners of the crystallizing-vat, where it flows in at an increased density which makes the salt visible upon the surface and is called the "point of saturation." Thus commences the formation of salt, which takes place upon the surface of the brine in square hopper-shaped crystals from one-eighth of an inch to one inch square, when they sink to the floor, and by the intensity of heat from the flue in the brine and the great distance of its flow, being intercepted by a succession of partitions for the brine to flow around, crossing and recrossing said flue till, when it reaches the outlet in front of the vat the salt-formation is completed and settled and does not reach the destination of the remaining foreign chlorides, which infest all brines taken from springs, and by this means are separated from the salt or chloride of sodium and pass the outlet. The said partitions also assist in equalizing heat from the flue to the margin of the brine. The arrows show the current of the brine from the pump-log to the outlet in front of the crystallizing-vat.

H H are perforated covers over the most heated portion of the settling-vat extending the entire length of the vat for receiving the salt when raked from the crystallizing-vat, so that the steam from the boiling brine may be forced up through the salt and moisten the chlorides that still adhere to it to a draining

consistency, that they may be well drained off before placing the salt in storage, which is done by raising one edge of said covers and discharging them under the sidewalks I I I I into the deposits J J adjoining the storage-rooms K K, where it is packed for market; and for the purpose of adding to this process the benefit of solar heat, the covers of the building L L are made separate upon the ridge and in sections to be moved off in fair weather upon the rollers M, which rest upon the track N N N, subjecting the entire manufacturing interior to the rays of the sun, thus bringing into practical utility all the cleansing and evaporating agencies of the natural elements combined with artificial heat.

I do not claim the construction of a salt-block, nor the application of artificial heat to cleansing and manufacturing salt, nor the application of solar heat to the cleansing of brine and evaporation of water from it; neither do I claim sliding covers upon rollers for sheltering rain and admitting the sun; neither do I claim as my invention the continuous flow of brine through pans or kettles, nor the concave bottom of a pan or kettle, nor partitions crossing the flow of brine to cause a serpentine current while evaporating, nor submerging furnaces in brine for heating; but

What I do claim as my invention, and desire to secure by Letters Patent, is—

1. Submerging a doubly-inclining floor in a vat of brine with its two margins elevated to the surface, separating the brine in two bodies, upper and lower, while the heat therein is connected through the floor, and combining with said floor metallic partitions for transmitting heat direct through said partitions and brine from the more heated to the less heated sections of the vat for rapid equalization of temperature, while the brine is thereby detained to a moderate flow in passing from one end of the vat to the other.

2. Adding to said combination submerged furnaces in both bodies of brine parallel with each other for cleansing in the lower while granulating in the upper body, as described.

3. Adding still to this combination perforated covers over a steam-chamber connecting said incline-plane floor with the salt-bins for draining chlorides from the salt after raking, and before dumping into the bins.

4. Combining with the entire apparatus opening covers over the building inclosing it for solar assistance in artificial evaporation, as described.

5. Placing partitions upon the sides of my submerged furnaces, as described, for preventing the boiling brine thereon from mixing with the main body and interfering with its quiet precipitation of impurities.

NATHAN CHAPIN.

Witnesses:
JOHN B. DILLINGHAM,
P. GLYNN.