(No Model.) 2 Sheets—Sheet 1.

M. M. MONSANTO.

SALT GRAINER.

No. 455,572. Patented July 7, 1891.

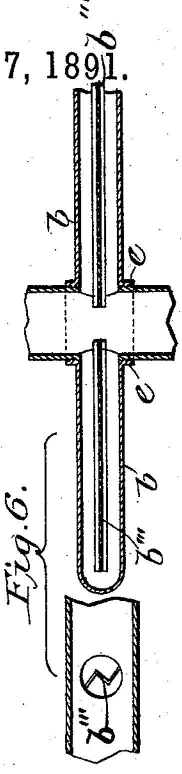

Fig. 6.

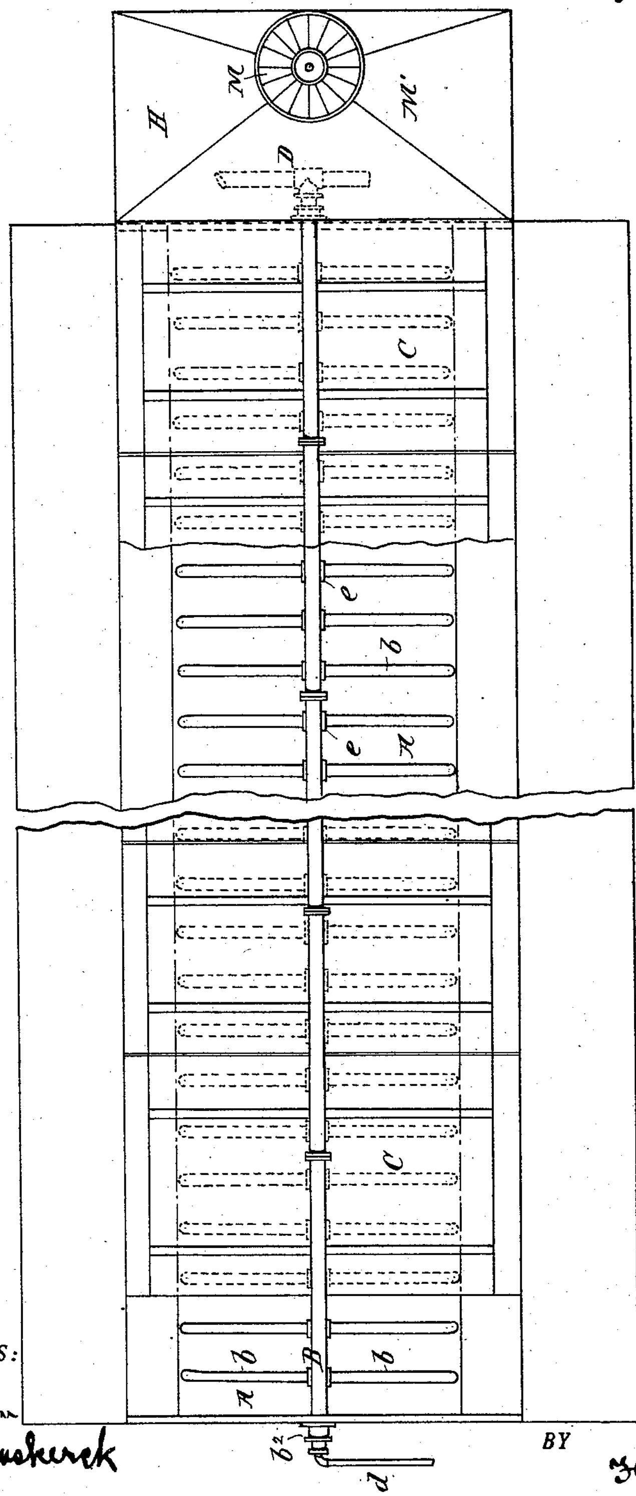

Fig. 1.

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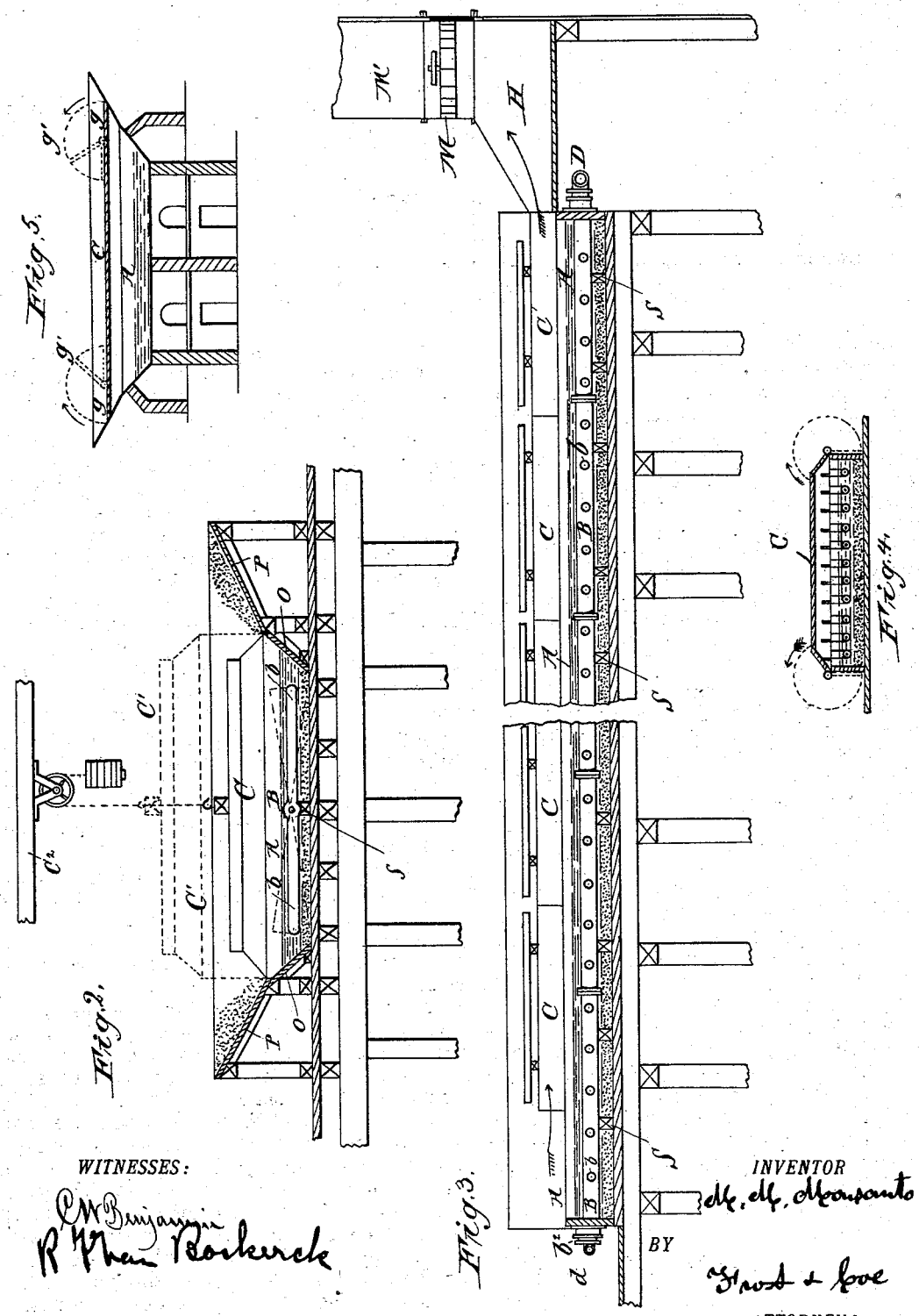
(No Model.) 2 Sheets—Sheet 2.

M. M. MONSANTO.

SALT GRAINER.

No. 455,572. Patented July 7, 1891.



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UNITED STATES PATENT OFFICE.

MAURICIO M. MONSANTO, OF NEW YORK, N. Y., ASSIGNOR TO THE NATIONAL SALT AND CHEMICAL COMPANY.

SALT-GRAINER.

SPECIFICATION forming part of Letters Patent No. 455,572, dated July 7, 1891.

Application filed June 14, 1889. Serial No. 314,284. (No model.)

To all whom it may concern:

Be it known that I, MAURICIO M. MONSANTO, a citizen of the United States of Colombia, residing in the city, county, and State of New York, have invented certain new and useful Improvements in Salt-Grainers, of which the following, taken in connection with the accompanying drawings, is a full, clear, and accurate description.

The first part of my invention has for its principal object a more effective and convenient arrangement of the heating-surface, and consists in the use of a central longitudinal steam-pipe located near the bottom of the pan and journaled in its ends branch pipes having internal diaphragms and suitable supports having concave upper surfaces for the purpose of facilitating the lifting of the salt and cleaning of the pan when desired.

The second part of my invention relates to and consists of sectional covers open at one end, fitting the sides of the pan substantially air-tight and arranged in close proximity to the level of the liquid, thus leaving an intervening space which, in combination with a suction device placed at the other end of the pan, produces a current of air above the boiling liquid, thereby accelerating the evaporation of the brine and preventing the acceleration of deleterious vapors in the building and the discoloration of the salt.

In the drawings, Figure 1 represents a horizontal plan view of my improved grainer. Fig. 2 is a vertical cross-section of the same. Fig. 3 is a vertical longitudinal section of the same. Fig. 4 represents an adaptation of the hood and fan to the construction of grainers now in use, and Fig. 5 an adaptation of the same to salt-pans operated by direct fire. Fig. 6 is a horizontal and cross section of the main and branch pipes, showing the position of the diaphragms *b'''* in the branch pipes.

In the various figures similar letters represent corresponding parts.

A represents the pan proper, which I prefer to make in the form shown in Fig. 2, the sides *o* of which pan are shown in said figure as beveled out like a tray to facilitate the raking out of the salt, and are also provided with slanting side tables P to drain the salt.

B is a central steam-pipe provided with side nozzles *e* to receive and be secured to branch pipes *b*, welded or closed at their outer ends, which branch pipes *b* are preferably provided with vertical diaphragms *b'''*, as shown in Fig. 6, said diaphragms extending from each side of the central pipe, the ends of the diaphragms projecting slightly into the central pipe and extending to within a short distance from the outer closed end of the branch pipes for the purpose of promoting the circulation of the steam.

b' is a trunnion connecting the main steam-pipe B with an inlet-pipe D, running from any suitable source of steam-supply. *b''* is another trunnion at the other end of said main steam-pipe B, connecting with the condensation water-pipe *d*. The main steam-pipe B is supported by supports *s*, (shown in Figs. 2 and 3,) running up from the bottom of the pan A. The supports *s* are preferably of such form and shape as to allow the pipe B, carrying the branch pipes *b*, to partially rotate in connection with trunnions *b'* and *b''*, as shown by the dotted lines in Fig. 2, either way to facilitate the raking out of the pan A when it is desired to take out the salt or clean the pan. The revolution of the main and side pipes can be dispensed with, if desired.

It will be readily seen that the steam entering the main steam-pipe B from the inlet-pipe D passes through the length of such pipe and therefrom into the branch pipes *b*, and when the steam is condensed by the absorption of its heat the water of condensation will pass out through the pipe *d* to a steam-trap or other convenient receptacle. As the branch pipes *b* are directly fed from the main steam-pipe B, all of the heating-pipes or heating-surface is equally and uniformly heated, and the brine in the pan A will therefore boil or evaporate uniformly over the whole of its surface, consequently producing a uniform quality of crystallization of the salt. The structure and arrangement of the main steam-pipe B are such that it can expand and contract independent of the branch or side pipes *b* and of its supports *s* and its end connections, and the branch pipes *b*, being duly secured at their inner ends to the main steam-pipe, can also expand and contract independ-

ently, whereby all risk of leakage or rupture of pipes is prevented.

C represents removable covers or hoods placed over the pan A, (see Fig. 3,) and so arranged end to end as to practically form one continuous cover for the pan, the sides of said covers closing substantially air-tight over the pan and the sectional covers arranged in close proximity to the level of the liquid, leaving thereby only a thin strata or intervening space for the current of air immediately above the boiling liquid. They may be made of any suitable material, and may be suspended from a beam by means of a pulley and weight, as shown in Fig. 2, so as to be raised or lowered, as desired, or they may be provided with swing doors or wings *g*, which when opened will be placed as shown at *g'* in Figs. 4 and 5. At or near the end of the grainer next to the condensation-water outlet *b''* the series of covers C form an opening to the atmosphere, while at the other end the said covers C connect with a suitable conduit H, leading to the uptake or chimney M', which leads the vapors from the pan. In the conduit H is placed a suction-fan M, which draws the air entering into the opening at the other end of the pan over the liquid in the pan and between the covers, thus creating a current, as shown by the arrows in Fig. 3, thus absorbing and eliminating the vapors resulting from the evaporation and exhausting them into the atmosphere. Evaporation will thus be facilitated by the continuous removal of the vapors formed, giving place and opportunity for other particles of vapor, which in their turn rise to surface and are carried off in the same way, and as the current of air is contained within a thin section above the liquid only the necessary quantity of air need be sucked through the passage for its becoming fully saturated with the emanating vapor, whereby greatly economizing in power and utilizing the air to greater advantage.

The pan M may be provided with a speeding counter-shaft, so as to be able to regulate and control the current of air. If it should be desirable to apply heated air, a steam heater or radiator may be attached to the inlet of air to the covers, or the air of the building may be kept heated at the desired temperature.

Having thus described my invention, what I claim, and desire to secure by Letters Patent, is—

1. In a salt-grainer, in combination with a long and narrow pan of central longitudinal steam-pipe located near the bottom of the pan and journaled in its ends, branch pipes having internal diaphragms *b'''*, extending from each side of the central pipe, the ends of the diaphragms projecting slightly into the central pipe, and short supports S, having concave upper faces, upon which the central pipe rests intermediate the journals, whereby the entire heating device may be rocked slightly from side to side to permit the salt to be racked out of the pan, all substantially as set forth.

2. In a salt pan or grainer, the combination, with a long and narrow pan having suitable means for heating it, of a sectional cover open at one end, fitting the sides of the pan substantially air-tight and arranged in close proximity to the level of the liquid and having intervening space, an uptake at the opposite end of the pan opening into the space, and a suction device in the uptake, all substantially as set forth.

In testimony whereof I have hereunto set my hand this 25th day of May, 1889.

MAURICIO M. MONSANTO.

In presence of—
R. T. VAN BOSKERCK,
CHARLES G. COE.