No. 720,143. PATENTED FEB. 10, 1903.

H. L. HILDRETH.

SALT GRAINER.

APPLICATION-FILED SEPT. 18, 1902.

NO MODEL. 2 SHEETS—SHEET 1.

FIG. 1

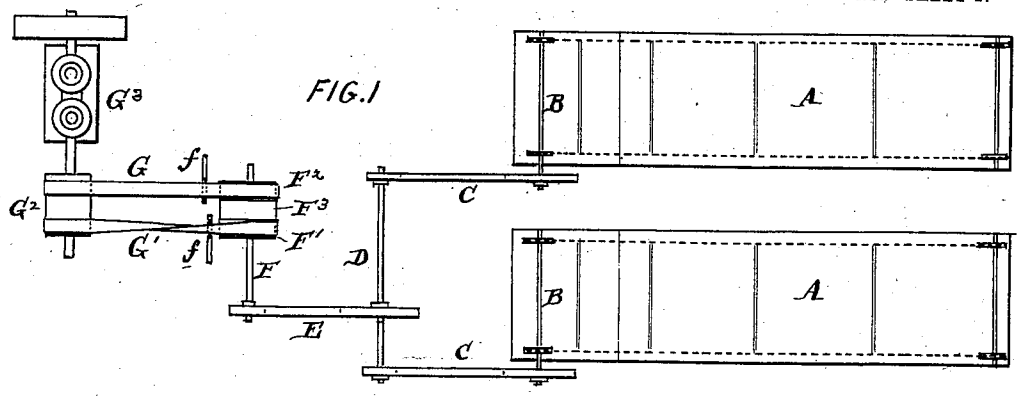


FIG. 2

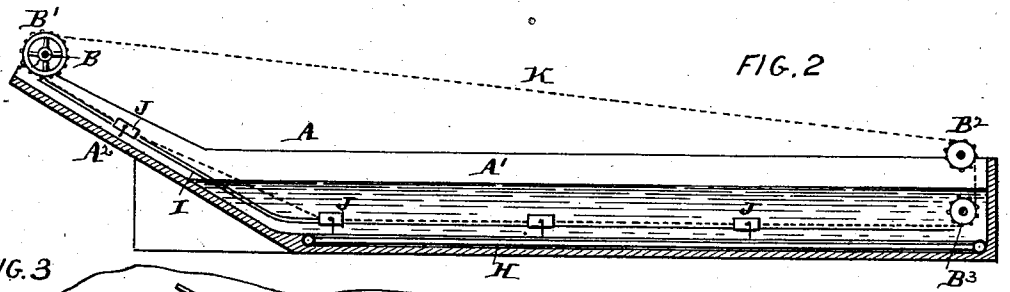


FIG. 3

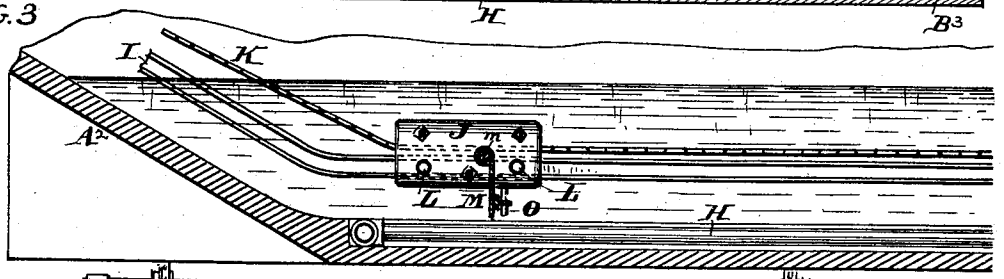


FIG. 4

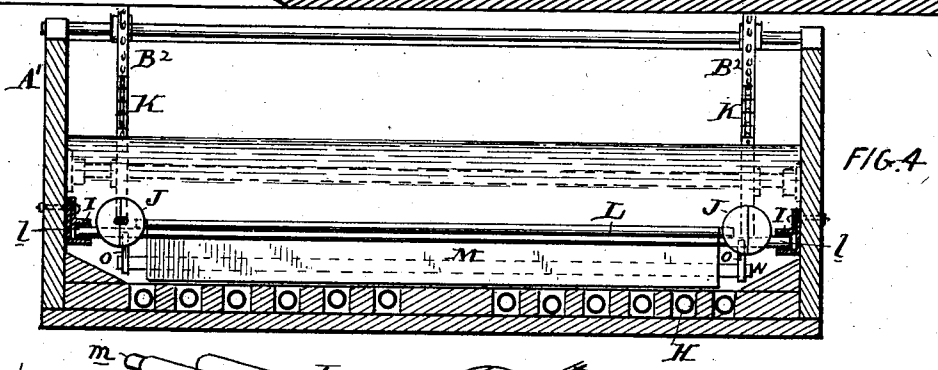
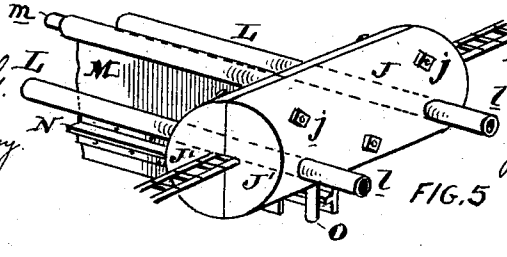


FIG. 5



Attest

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SALT GRAINER.

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NO MODEL. 2 SHEETS—SHEET 2.

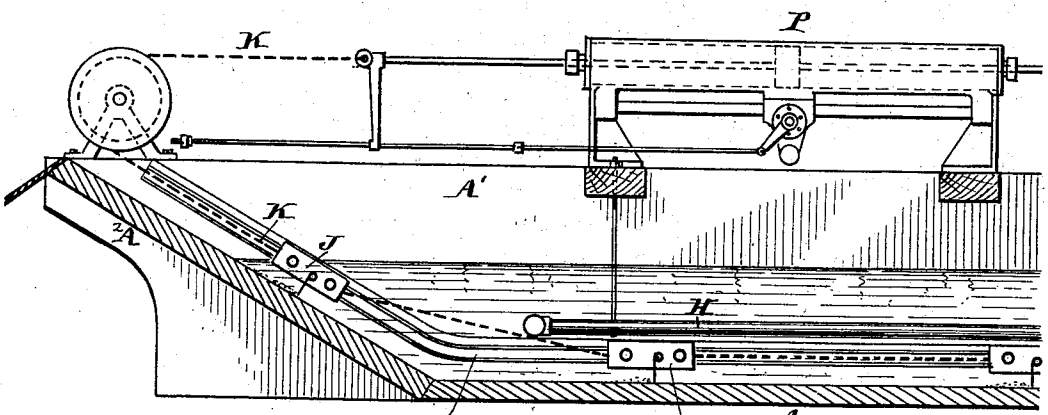


FIG. 6

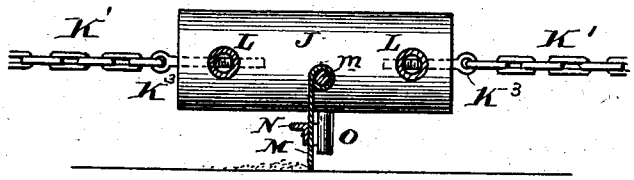


FIG. 7

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UNITED STATES PATENT OFFICE.

HENRY L. HILDRETH, OF SAGINAW, MICHIGAN.

SALT-GRAINER.

SPECIFICATION forming part of Letters Patent No. 720,143, dated February 10, 1903.

Application filed September 18, 1902. Serial No. 123,834. (No model.)

To all whom it may concern:

Be it known that I, HENRY L. HILDRETH, of Saginaw, county of Saginaw, State of Michigan, have invented an Improvement in Salt-Grainers, of which the following is a specification.

My invention has reference to salt-grainers; and it consists of certain improvements set forth in the following specification and shown in the accompanying drawings, which form a part thereof.

The object of my invention is to provide a construction of salt-grainer which shall embody simplicity, cheapness of construction, and durability.

In carrying out my invention I employ a long grainer-tank having an incline at the discharge end and combine therewith side guides on the sides and scraper devices comprising reciprocating chains or cables, saddles or blocks clamped to the chains or cables at intervals in their length within the grainer-tank, cross-bars connecting the saddles and having ends beyond the saddles guided in the guides, and hinged scrapers pivoted or hinged to the saddles.

My invention also comprehends the said improvements further distinguished by the fact that the saddles are split and adjustably clamped upon the chains or cables to permit of proper relative adjustment of the several scrapers.

My invention also comprehends details of construction which, together with the above features, will be better understood by reference to the drawings, in which—

Figure 1 is a plan view of two grainers and the driving mechanism therefor embodying my invention. Fig. 2 is a sectional elevation of one of my improved grainers. Fig. 3 is a sectional elevation of a portion of same on a larger scale. Fig. 4 is a cross-section of same on line 4 4 of Fig. 2, and Fig. 5 is a perspective view of one of the saddles and the connecting parts. Fig. 6 is a sectional elevation of the front portion of a salt-grainer, showing a modification of my invention; and Fig. 7 is a side elevation of the saddles into the cross-rods and scraper in section, showing a modified form of this part of my invention.

A A are grainers, which are of the construction to be described in detail later on. These grainers have driving-shafts B for reciprocating the scrapers. These shafts B are each driven by sprocket wheel and chain gearing C from a counter-shaft D, and this counter-shaft in turn is driven first in one direction and then in another by a power-shaft F through sprocket wheel and chain gearing E. This power-shaft is secured to a driving-pulley F^3 and has also upon it two loose pulleys F′ F^2. Belts G and G′ are adapted to rotate the pulley F^3 in opposite directions and are driven by a drum G^2, rotated by the engine G^3. The belts G and G′ are shifted by belt-shifters *f* and *f*′, so that either belt may be alternately thrown upon the pulley F^3 and in that manner alternately rotate the power-shaft F in opposite directions. As the transmitting-gearing E and C produce a reduced speed, it is evident that the grainer-driving shafts are rotated at slow speeds. Any number of grainers may be operated by the same counter-shaft D, if so desired.

Referring now to the grainers, as more fully shown in Figs. 2 to 5, inclusive, the tanks A′ are provided with incline discharge ends A, up which the salt is scraped and discharged by the scrapers. The bottom of the tank is provided with steam-pipes H for evaporating the brine contained in the tanks to secure concentration and precipitation of the salt. I represents guides secured upon the sides of the tank near the bottom and incline and preferably consist of two angle-irons bolted to the side frames of the tank. L L are cross-bars or tubes having their ends *l* guided in the guides I, as shown in Fig. 4. Secured to these cross-bars adjacent to the respective guides are the saddles. These saddles are split vertically and by bolts *j* are clamped upon the endless chains or cables K, which are guided about the wheels B^2 B^3 at the rear of the grainer-tank and driven by wheels B′ at the front of the tank secured upon the driving-shaft B. The opposite rotation of this shaft reciprocates the saddles and their cross-bars in the guides I. Pivoted in the saddles by rods *m* are the grainer-scrapers M, which may be of metal and stiffened by T-iron N, secured to the same and extending transversely across the tank. Stops O, extending down from the saddles J, act to limit the back-

ward movement of the scrapers M, but allow them to swing in their backward movement so as to pass freely over the salt. In the forward movement the scrapers M are vertical, as shown in Fig. 3, and push the salt forward. The distance apart of the saddles and their scrapers is proportional to the distance it is desired they shall travel in their reciprocation, so that the space traversed by one scraper shall be overlapped by the space traversed by the adjacent scrapers. In this manner the salt is conveyed forward in stages, one scraper after the other moving it forward toward and up the incline.

The two halves J′ J′ of the saddles J are held in position by the rods L and permit any desirable relative adjustment in the length of the chains. The construction is simple and inexpensive. The several saddles being connected by the chains are caused to move simultaneously in the same direction and at the same speed. The special gearing employed enables the movement to be comparatively slow. It is immaterial whether the reciprocations are caused to take place automatically or by hand manipulation of the shifters *f f′* at proper intervals, as such details are immaterial to my invention.

While the saddles J may be split and adjustably clamped upon the chains or cables, (the latter being continuous,) as shown in Figs. 2 and 5, the saddles may be solid, if desired, and the chains or cables made in sections and suitably attached at their ends to the saddles. This is shown in Fig. 7, in which the chain ends K′ are secured to screw-eyes K^3, screwed into the ends of the saddle J and through the transverse tubular bars L for strength and also to hold the saddle in proper position upon the bars. Any other manner of connecting the chains or cables with the saddles may be used.

In Fig. 1 I have shown one manner of reciprocating the chains K; but instead of using a steam-engine and reversing-belt-driving mechanism I may employ a reciprocating engine, preferably hydraulic, as indicated at P in Fig. 6. To the ends of the piston-rod the chains K are connected. Any other suitable manner of imparting a reciprocating motion to the chains may be employed.

The heating steam-pipes H are shown in Figs. 2 to 4 as below the scrapers, while in Fig. 6 I have shown them above, this latter location being perhaps the most satisfactory and economical from the practical standpoint. It is, however, immaterial to my invention what location is given to these steam-pipes.

While I have shown a chain as the connecting means between the saddles for driving them, it is evident that any other suitable means, preferably flexible, may be used instead. For instance, the chain may be substituted by a cable as a well-known mechanical equivalent.

While I prefer the construction shown, I do not limit myself to the details thereof, as they may be modified without departing from the spirit of the invention.

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

1. In a salt-grainer, the combination of a tank, guides within the tank upon its sides near the bottom, cross-bars of a length less than the width of the interior of the tank and having their ends guided in the guides, saddles secured to and carried by the cross-bars, a pivoted scraper hinged between the saddles of each cross-bar, and means for reciprocating the saddles.

2. In a salt-grainer, the combination of the tank, guides upon its sides, cross-bars guided in the sides, saddles carried by the cross-bars near each of the guides, a pivoted sheet-metal scraper hinged upon the saddles and having a transverse strengthening-bar, stops carried by the saddles to limit the backward movement of the scrapers on the saddles, and means for reciprocating the saddles.

3. In a salt-grainer, the combination of the tank, guides upon its sides, cross-bars guided in the guides, saddles carried by the cross-bars near each of the guides and consisting of two parts adjustably clamped together, a pivoted scraper hinged upon the saddles, and means for reciprocating the saddles.

4. In a salt-grainer, the combination of the tank, guides upon its sides, cross-bars guided in the guides, saddles carried by the cross-bars near each of the guides, a pivoted scraper hinged upon the saddles, means for reciprocating the saddles consisting of endless and flexible devices secured to the saddles and guided over wheels on the grainer-tank, and power devices for rotating the wheels first in one direction and then in the other.

5. In a salt-grainer, the tank having a guide upon its side, in combination with a hinged scraper, means for supporting and reciprocating the scraper in the tank consisting of a chain, a saddle J formed of parts J′ J′ clamped together and upon the chain, and cross-bars L L having their ends projecting through the saddle a short distance to form ends *l l* which are guided in the guide in the tank.

6. In a salt-grainer, the tank having a guide upon its side consisting of a grooved structure having guiding-flanges above and below, in combination with a hinged scraper, means for supporting and reciprocating the scraper in the tank consisting of a chain, a saddle J formed of parts J′ J′ clamped together and upon the chain, a stop O projecting down from the saddle to limit the backward motion of the scraper, and cross-bars L L having their ends projecting through the saddle a short distance to form ends *l l* which are guided in the guide in the tank.

7. In a salt-grainer, the combination of the tank A′ having inclined front A^2, side guides arranged on the tank a short distance above

the bottom and incline, a series of pairs of cross-bars extending across the tank and guided in the guides, saddles secured to the pairs of cross-bars near each side guide to form a series of carriages adapted to slide in the guides, scrapers hinged to the saddles and extending across the tank, guide-wheels at the upper end of the inclined front and at the rear of the tank, and flexible connecting means connecting the saddles at each side and guided over the guide-wheels.

8. In a salt-grainer, the combination of the tank A′ having inclined front A^2, side guides arranged on the tank a short distance above the bottom and incline, a series of pairs of cross-bars extending across the tank and guided in the guides, saddles secured to the pairs of cross-bars near each side guide to form a series of carriages adapted to slide in the guides, scrapers hinged to the saddles and extending across the tank, guide-wheels at the upper end of the inclined front and at the rear of the tank, flexible connecting means connecting the saddles at each side and guided over the guide-wheels, and means for moving the flexible connecting means longitudinally first in one direction and then in the other.

9. In a salt-grainer, the combination of a tank, guides on its sides inside the tank near the bottom so as to be below the liquid-level, cross-bars adapted to said guides and arranged below the liquid-level, pivoted scrapers supported by the cross-bars, and means acting upon the cross-bars to reciprocate them in their guides.

10. In a salt-grainer, the combination of a tank, guides on its sides inside the tank near the bottom so as to be below the liquid-level, cross-bars adapted to said guides and arranged below the liquid-level, pivoted scrapers supported by the cross-bars, steam-pipes arranged within the tank above the cross-bars and scrapers, and means acting upon the cross-bars to reciprocate them in their guides.

In testimony of which invention I have hereunto set my hand.

H. L. HILDRETH.

Witnesses:
WINIFRED DU LONG,
BENJAMIN GEER.