(No Model.)

T. CRANEY.

SALT GRAINER.

No. 305,151. Patented Sept. 16, 1884.

Fig. 1

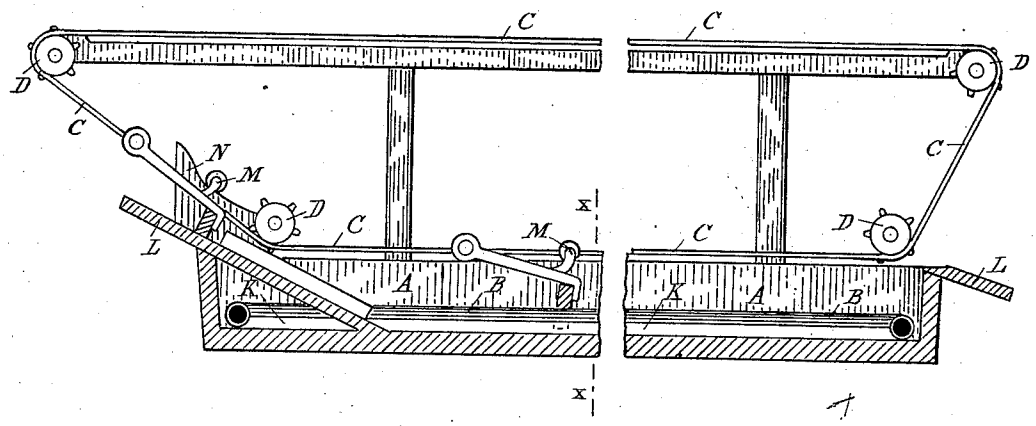


Fig. 2

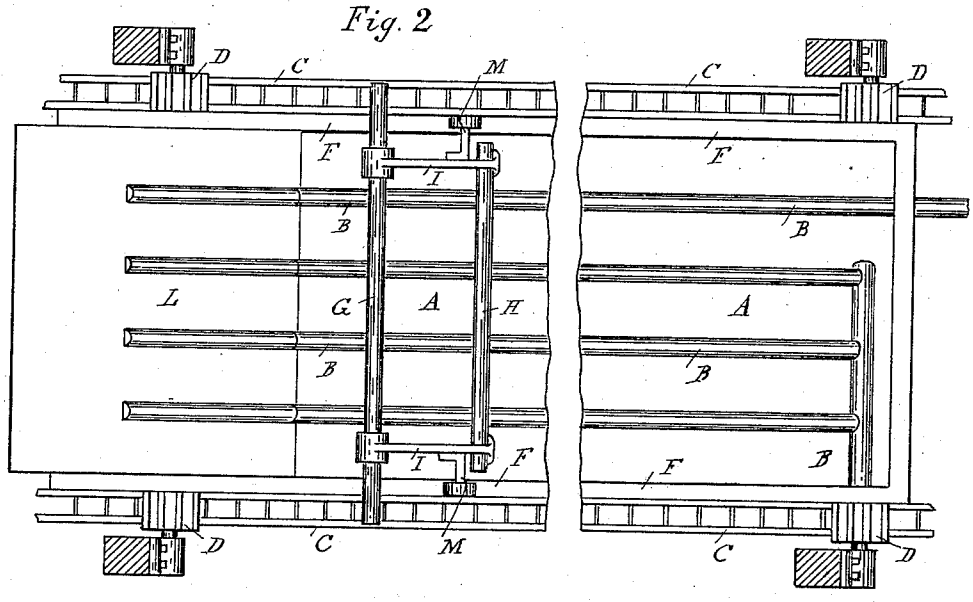
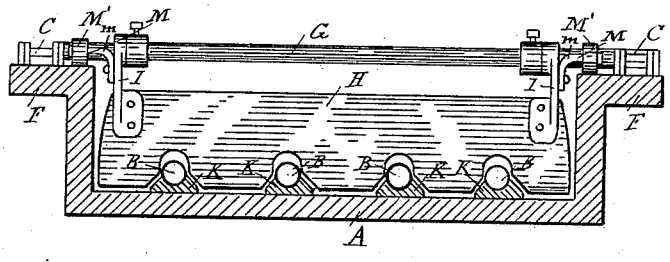


Fig. 3



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UNITED STATES PATENT OFFICE.

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SALT-GRAINER.

SPECIFICATION forming part of Letters Patent No. 305,151, dated September 16, 1884.

Application filed March 19, 1884. (No model.)

To all whom it may concern:

Be it known that I, THOMAS CRANEY, of Bay City, in the county of Bay and State of Michigan, have invented new and useful Improvements in Salt-Grainers; and I do hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawings, which form a part of this specification.

This invention relates to an improvement in salt-collectors; and the invention consists, first, in the arrangement and construction of the mechanical devices for collecting the salt in the grainer and removing it therefrom; second, in the arrangement and construction of the grainer in connection with the collecting devices.

At the present state of the art, in the manufacture of salt from brine, evaporating-pans, or so-called "grainers," are in common use in which the water of the brine is evaporated by means of heat. Steam-pipes placed in the grainer in contact with the brine supply the heat, and a gentle agitation of the brine is kept up during evaporation to precipitate the salt-crystals. In order to get a fine and uniform grade, the precipitated salt-crystals have to be removed at regular intervals, which is done either by hand or by mechanical devices. Nearly all of these mechanical devices involve the use of scrapers so arranged that by a reciprocating motion given to them by suitable mechanical devices they push or scrape the salt, which collects at the bottom of the grainer, step by step toward one end of the grainer, and then up an incline until it is out of the brine.

I have found by experience that there are several objections against the use of scrapers as at present constructed. One objection is that they agitate the brine too much, and another is that either do their work imperfectly or necessitate an arrangement of the steam-pipes within the grainer, which does not place them in the best position for evaporating. By means of the devices hereinafter described, and which form the subject of my invention, I have succeeded in overcoming these objections.

In the drawings which accompany this specification, Figure 1 is a longitudinal vertical section of a grainer provided with my improved salt-collector. Fig. 2 is a plan view thereof, and Fig. 3 is a cross-section on line *x x*.

A is an evaporating-pan or so-called "grainer," of known construction.

B is a horizontal coil of steam-pipes placed at or near the bottom of the grainer, and provided with steam inlet and outlet, as shown.

C are endless chains passing over a system of sprocket-wheels, D, which are supported in any convenient manner, so that the chains are free to travel in a vertical plane on each side of the grainer. The lower stretches of the chains are supported and travel upon horizontal stringers F of the grainer. The upper stretches of the chains may be supported in a like manner.

G is a cross-bar secured upon its ends to the chains C, and H is a scraper, provided with the arms I, which are pivotally secured to the cross-bar G. The scraper H is preferably made of non-corrosive material, and is of proper size and shape to loosely fit the cross-section of the grainer, and it is sufficiently cut away at the lower edge to pass freely over the steam-pipes. The steam-pipes are preferably placed as near to the bottom as convenient, and upon their sides they are provided with deflectors K, by means of which the salt, when precipitated to the bottom of the grainer, is collected between the pipes. One or both ends of the grainer are provided with or form inclined planes L, and a suitable platform is connected with one of the inclined planes, upon which the salt is deposited by the scraper, and from which it may be gradually pushed by the action of the scraper itself into a trough or conveyer after it has had sufficient time to drain off.

To prevent the scraper producing impurities in the salt, owing to abrasion by wearing on the bottom of the grainer, I fix a little shoe, M, on either end of the scraper, which may be made to travel upon the sides of the grainer and lift the scraper slightly off from the bottom. This shoe M consists of an upwardly and outwardly curved rod, *m*, provided with an anti-friction roller, M', on its outer end.

In practice a slow and continuous motion is communicated to the chains by any suitable means, (not shown,) which slowly drags the

scraper through the brine, producing the required agitation, and at the same time collects all the salt. In striking the incline at the rear end of the grainer the salt is carried out of the brine and deposited upon the draining-platform, where the scraper leaves it, owing to a change of direction in the run of the chains, or to an upward rise, N, placed in the track of the shoes M, which lift the scraper vertically. This rise N in the track may be so arranged as to let the scraper drop again into the salt which has been previously scraped out (and which has been pushed farther along by the succeeding scraping of salt) and carry it into the trough or conveyer. After the scraper has passed the length of the grainer, it is carried back by the chains toward the other end of the grainer, where it is made to enter the same again.

Although I have described but one scraper attached to the chains, two or more may be operated with the same grainer if its length should demand it.

I do not desire to confine myself to the precise construction of the scrapers hereinbefore described, as I may want to connect them directly to the chain, either fixedly or pivotally, without the intervening arms I.

Instead of constructing the scraper in one piece to reach clear across the whole grainer, a number of individual scrapers may be used, each occupying simply the distance formed between two steam-pipes or between a steam-pipe and the side of the grainer.

I lay particular stress upon the utility of the deflectors K, as they present additional advantages in connection with the construction of the grainer. Heretofore it was always found necessary to keep the steam-pipes above the bottom of the grainer, so as to allow of the removal of the salt; besides, the pipes were few in number, so as to get them sufficiently far apart to get access to the bottom. By the use of the deflectors K, I can now place the pipes at or near the bottom of the grainer and use more and smaller steam-pipes. This does not only effect a saving of steam for evaporating, but I can use shallower pans—that is, I can give more evaporating-surface to a given quantity of brine, and the precipitation of the salt will be more rapid and require less agitation than with deep pans. The deflectors K may simply consist of strips of wood secured to the bottom of the grainer on each side of the steam-pipes; or a plank may be shaped with deflecting-faces at the top, with a trough between for the steam-pipe to rest on.

What I claim as my invention is—

1. The grainer A, incline L, and a scraper, H, in combination with the shoe M and track N, constructed to raise the scraper H clear of the incline L during a portion of its travel over the same, and then drop the said scraper onto the incline during the remainder of its passage over the said incline, substantially as and for the purpose specified.

2. In combination with the grainer A, provided with an incline, L, and the scraper H, a conveyer, as C, arranged to run over a series of supports, D, two of the series arranged in a plane substantially parallel with the bottom of the grainer, and another of the series arranged in advance of and at a higher plane than the supports referred to, whereby the scraper is carried over the grainer and up the incline, substantially as described.

3. In combination with the steam-pipes of a grainer, the deflectors K, for collecting the salt between the pipes.

4. In combination with deflectors K, which collect the salt between the pipes, traveling scrapers which collect the salt lengthwise of the pipes, substantially as set forth.

THOS. CRANEY.

Witnesses:
H. S. SPRAGUE,
E. J. SCULLY.