

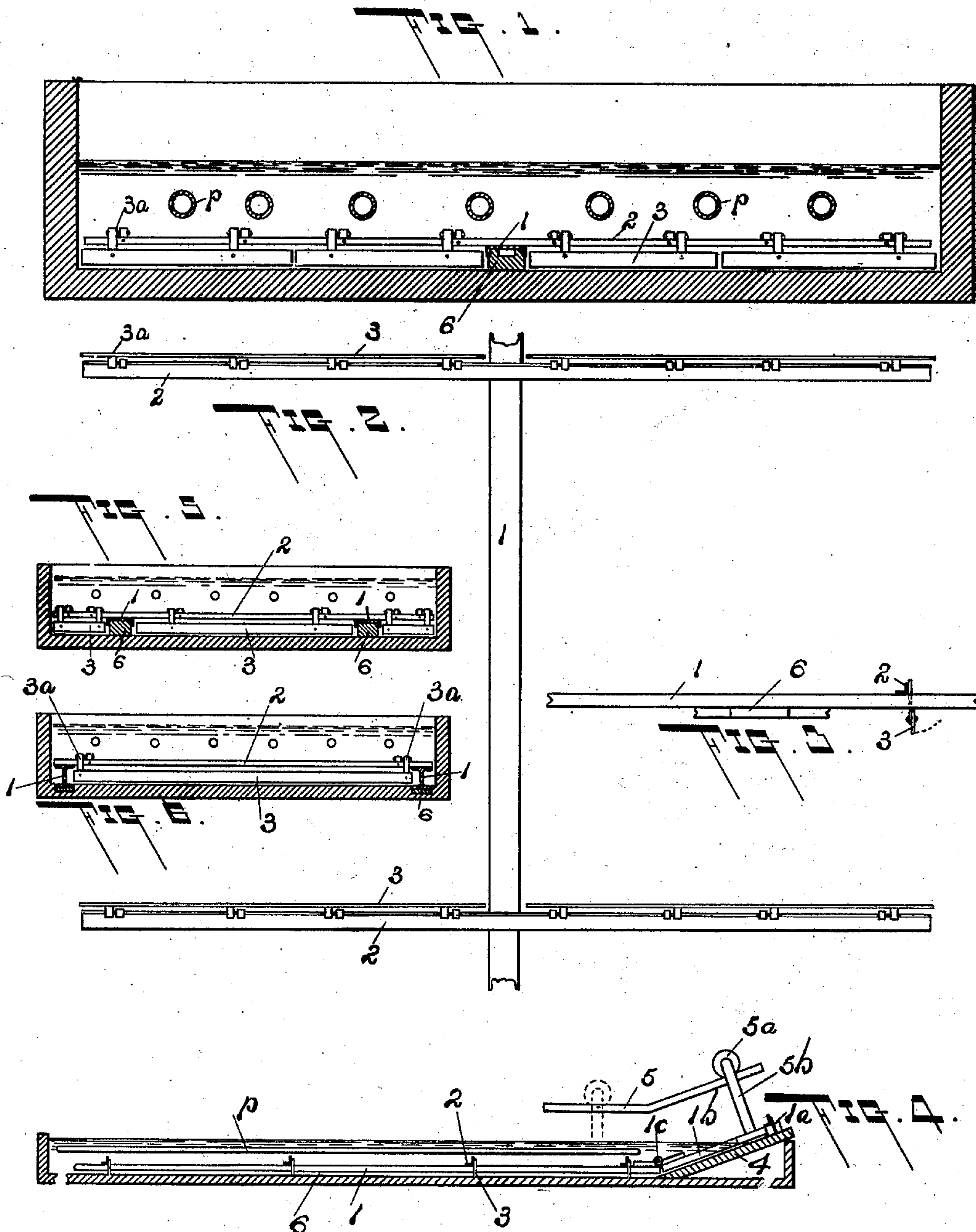
No. 762,907.

PATENTED JUNE 21, 1904.

A. JOHNSON.  
SALT RAKER.

APPLICATION FILED FEB. 24, 1903.

NO MODEL.



WITNESSES:

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# UNITED STATES PATENT OFFICE.

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## SALT-RAKER.

SPECIFICATION forming part of Letters Patent No. 762,907, dated June 21, 1904.

Application filed February 24, 1903. Serial No. 144,844. (No model.)

*To all whom it may concern:*

Be it known that I, ANDREW JOHNSON, a citizen of the United States, residing at Saginaw, in the county of Saginaw and State of Michigan, have invented certain new and useful Improvements in Salt-Rakers; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

This is a salt-raker for automatically removing salt from the bottom of a steam-grainer as fast as the salt is formed, and pertains more particularly to that class of rakers comprising a framework having a forward-and-back reciprocating motion and carrying scraper-blades that operate along the grainer-bottom to push the salt to the end of the grainer on the forward stroke and feather on the back stroke, so that the salt is intermittently moved along the bottom of the grainer and delivered up the incline at its front end with a step-by-step movement. A raker of this general mode of operation is shown in my Patent No. 689,675, issued December 24, 1901.

The objects of this invention are to so construct a salt-raker of the reciprocating type just described that the cross-bars by which the scraping-blades are carried shall move back and forth beneath the grain-pipes, the working parts of the raker being submerged in brine, so that the rapid corrosion of metal alternately dipped in hot brine and exposed to the air is avoided. By keeping all the working parts beneath the grainer-pipes the space above the pipes is left unobstructed, so that workmen can easily rap the scale and accumulated gypsum from the pipes without interference from the raker mechanism.

A further object is to actuate the scrapers by means of one or more inflexible longitudinal members submerged in brine and operating both to move the rakers forward on one stroke and to move them back on the next stroke, said member being so constructed as to resist the pull of one stroke and the push

or compression of the next stroke, whereby the entire stress of both the forward and back strokes is carried by the said longitudinal members. This device is well suited to wide grainers.

It is to be understood that my invention is susceptible of various structural modifications, although I have illustrated only one preferred form of mechanism for accomplishing the required results.

In the accompanying drawings, Figure 1 is a vertical cross-section of a grainer embodying my invention. Fig. 2 is a plan view of two sets of scrapers. Fig. 3 is a side elevation of the scraper-blades and part of the longitudinal member. Fig. 4 is a vertical longitudinal section of a grainer embodying my invention. Figs. 5 and 6 show modified forms employing more than one longitudinal member.

The longitudinal inflexible member or backbone 1, of iron, steel, or other suitable material, extends lengthwise the grainer near the bottom and is moved back and forth lengthwise by any suitable means. In Fig. 1 I have shown a single backbone, which in practice works satisfactorily; but more than one may be used, if desired, as is indicated in Figs. 5 and 6. The backbone 1 is of any suitable cross-sectional form that is capable of resisting the alternate tensile and compressive stress brought upon it in moving the scrapers back and forth. It is preferably supported near the grainer-bottom by any suitable means, as by guides 6, by rollers, or otherwise.

At intervals along the backbone 1 and beneath the grainer-pipes *p* are transverse bars 2, carrying scraping-blades 3. The scraping-blades are pivoted to the cross-bars by hinges 3<sup>a</sup> or are pivotally suspended from them in any other manner. These blades are arranged to feather on the back stroke and to push the salt toward the end of the grainer on the forward stroke. In Fig. 1 I have shown several blades carried by the bar 2; but any desired number may be used. In cases where



two backbones are used, one at each side of the grainer, as indicated in Fig. 6, a single blade extending from side to side of the grainer, carried by the cross-bar 2, is employed.

To operate the raker, the backbone 1 is moved by any suitable means slowly back and forth lengthwise the grainer, carrying the cross-bars 2 and their scraping-blades 3 with it, moving the salt forward by a step-by-step movement. The salt having been brought to the end of the grainer by this intermittent movement of the scraping-blades, it is pushed up the incline 4 and discharged over its end by the scrapers 1<sup>a</sup>, carried by the forwardly-extending section 1<sup>b</sup> of the longitudinal member 1. This section is secured to the member 1 in any suitable manner, as by the hinge 1<sup>c</sup>.

I prefer to guide the front scraper which goes up the incline by a trolley-track 5 over the incline, the trolley-wheel 5<sup>a</sup> being connected to the front end of the scraper by the trolley-arm 5<sup>b</sup>.

It is seen that the scraping-blades arranged one behind the other and the longitudinal member or members connecting them and actuating them back and forth together form a structure or framework that is submerged in brine and operates entirely beneath the grainer-pipes *p*.

The practical advantages derived from my construction, in which the cross-bars, to which are pivoted the feathering scraping-blades, are submerged in brine and are given a back-and-forth movement beneath the pipes instead of projecting above them, are of the utmost importance in salt-making. From Figs. 1 and 4 it is seen that the area above the pipes is as free and unobstructed as if there were no raking device in the grainer. The salt-maker therefore has ready access to the pipes for removing the scale and gypsum from them and for inspecting and repairing them.

Corrosion of the metal framework is reduced to the minimum, for the reason that the parts are not exposed alternately to the action of the hot brine and the corrosive effect of the air.

I have not illustrated the mechanism for actuating the raking device, for the reason that any suitable means may be employed to produce the required back-and-forth movement of the raker, and such actuating means may be applied to the raker in any convenient manner.

The reciprocating or back-and-forth movement of the raker has been found by experience to be especially well adapted for removing salt from grainers, and the objection heretofore found in reciprocating scrapers of this class has been that a framework extending over the top of the grainer and moving back and forth on wheels at the sides of the grainer

has been necessary to support the scraping-blades beneath the pipes. This construction has been found in practice to be difficult to maintain in repair. My present invention does away with mechanism above the pipes and embodies all the advantages of the reciprocating type of raker as heretofore used without any of the disadvantages above mentioned.

While I have described this submerged raker as applied to salt-grainers, it may also be used for similar purposes in handling other material under like conditions.

What I claim as my invention, and desire to secure by Letters Patent, is as follows:

1. In a raker for grainers an inflexible member located within the grainer and extending lengthwise and in proximity to the grainer-bottom and adapted to back-and-forth reciprocating movement; and scraping devices carried by said inflexible member.

2. In a raker for grainers an inflexible member located within the grainer and extending lengthwise and in proximity to the grainer-bottom and adapted to back-and-forth reciprocating movement; scraping devices secured to and carried by said inflexible member and guides to slidably support said inflexible member.

3. In a raker for grainers an inflexible member located within the grainer and extending lengthwise and in proximity to the grainer-bottom and adapted to back-and-forth reciprocating movement; transverse feathering scraping-blades carried by said inflexible member, and guides secured in the grainer in proximity to its bottom and adapted to slidably support said member.

4. In a raker for grainers an inflexible member located within the grainer and extending lengthwise in proximity to the grainer-bottom and adapted to back-and-forth reciprocating movement; transverse cross-bars secured to and carried by said inflexible member; and feathering scraping-blades mounted on said cross-bars and operating substantially in the horizontal plane of said inflexible member.

5. In a raker for grainers an inflexible member located within the grainer and extending lengthwise and in proximity to the grainer-bottom and adapted to back-and-forth reciprocating movement; said member being made of a plurality of inflexible backbones; scraping devices carried by said inflexible backbones and guides secured in the grainer to slidably support during back-and-forth movement the backbones comprising said member.

6. In a raker for grainers an inflexible member located within the grainer and extending lengthwise and in proximity to the grainer-bottom and adapted to back-and-forth reciprocating movement; said member being made

up of a plurality of inflexible backbones;  
transverse cross-bars secured to and carried  
by the backbones comprising said inflexible  
member; and feathering scraping - blades  
5 mounted on said cross-bars and operating sub-  
stantially in the horizontal plane of said in-  
flexible backbones; and guides secured in the  
grainer to slidably support during back-and-

forth movement the backbones comprising  
said member; substantially as described. 10

In testimony whereof I affix my signature in  
presence of two witnesses.

ANDREW JOHNSON.

Witnesses:

P. M. HOLDSWORTH,  
FRANK MARTINDALE.