No. 892,593. PATENTED JULY 7, 1908.

A. P. KELLER.

DEVICE FOR EMPTYING SUPERPHOSPHATE CHAMBERS.

APPLICATION FILED FEB. 4, 1907.

2 SHEETS—SHEET 1.

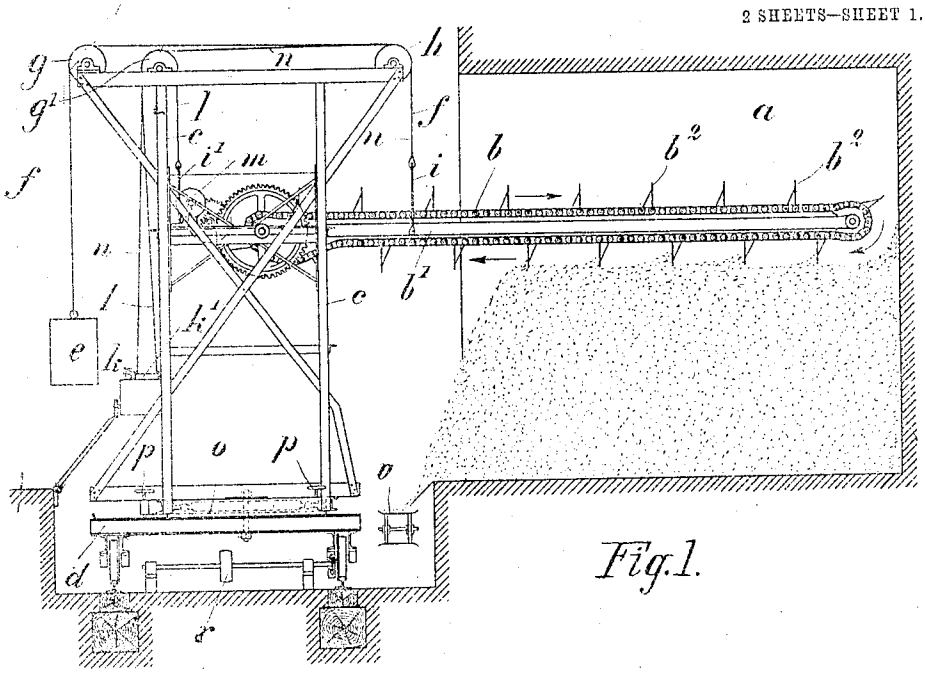
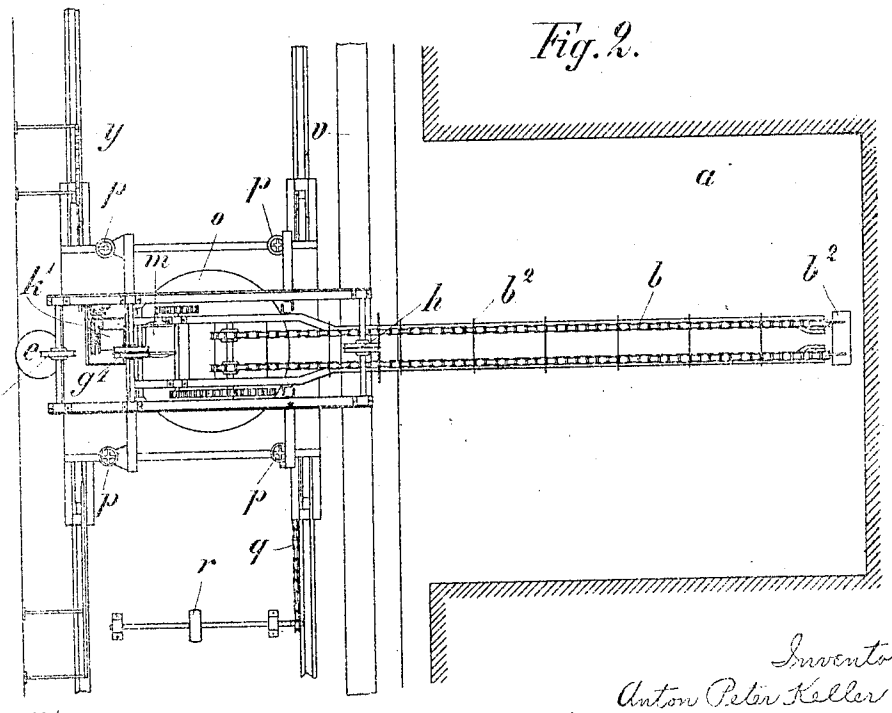


Fig. 1.

Fig. 2.



Witnesses
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2 SHEETS—SHEET 2.

Fig. 3.

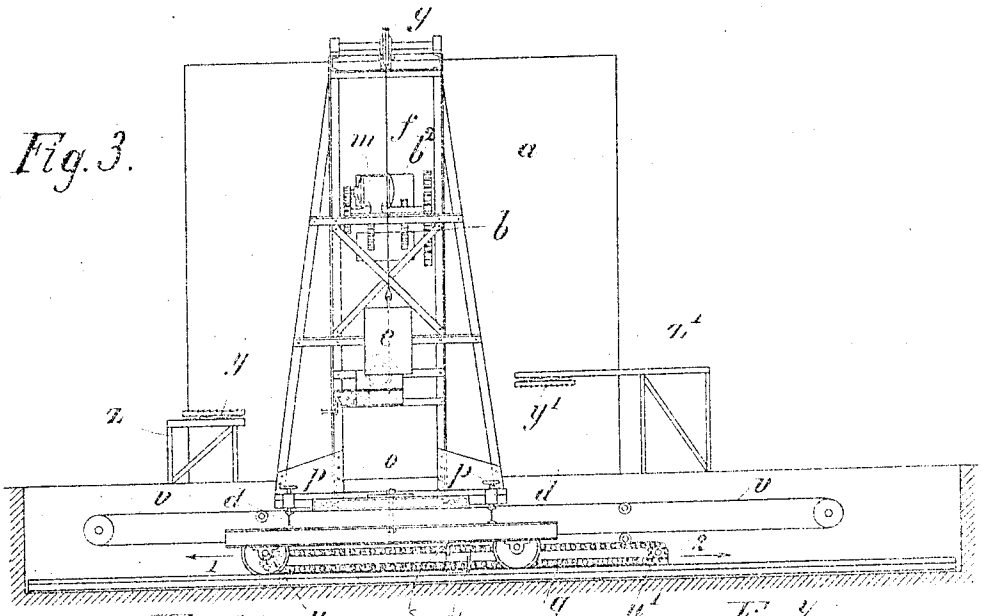


Fig. 6.

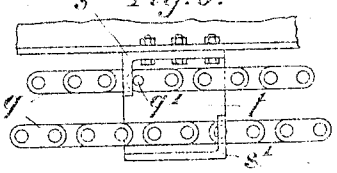


Fig. 4.

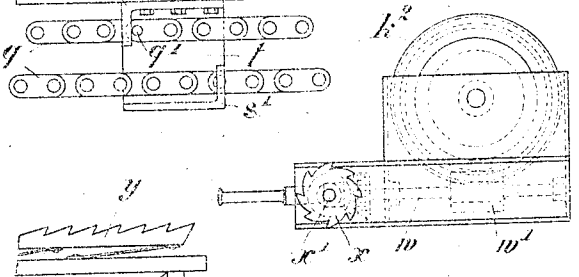
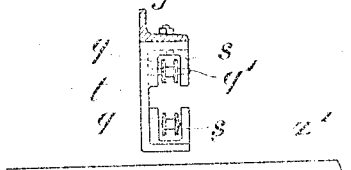


Fig. 7.



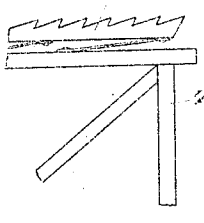
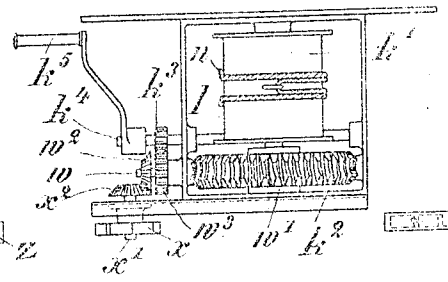
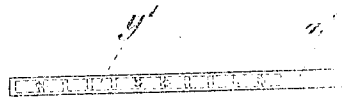


Fig. 5.





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UNITED STATES PATENT OFFICE.

ANTON PETER KELLER, OF BERGEDORF, NEAR HAMBURG, GERMANY, ASSIGNOR TO THE FIRM OF ANGLO-CONTINENTALE (VORMALS OHLENDORFF'SCHE) GUANO-WERKE, OF HAMBURG, GERMANY.

DEVICE FOR EMPTYING SUPERPHOSPHATE-CHAMBERS.

No. 892,593. Specification of Letters Patent. Patented July 7, 1908.

Application filed February 4, 1907. Serial No. 355,716.

To all whom it may concern:

Be it known that I, ANTON PETER KELLER, a subject of the German Emperor, and resident of Bergedorf, near Hamburg, in the German Empire, have invented certain new and useful Improvements in Devices for Emptying Superphosphate-Chambers, of which the following is a specification.

The present invention relates to improvements in devices for emptying superphosphate chambers.

The operation of emptying superphosphate pits or chambers is onerous, and can only be undertaken by healthy workmen, specially selected. There are, indeed devices for lightening this labor, but there are no devices for the purpose which eliminate entirely the manual labor.

The present invention relates to an improved device for mechanically emptying such chambers and consists of a rotatable endless chain or band having projections or blades which act as scrapers. The scraping device is adapted to be introduced into the chamber in such a manner that it extends from front to back horizontally over the top of the heap of superphosphate. Furthermore the scraping device is arranged to be traveled in a horizontal plane from right to left and vice versa, while the said projections or blades are traveling from back to front of the chamber. The apparatus is also so constructed that at the end of each lateral travel or movement it sinks automatically or is lowered manually to a somewhat lower horizontal plane.

In front of the chamber there may be arranged at a lower level than the floor of the chamber, a conveyer to receive the superphosphate. And with this end in view my invention consists in certain novel features of construction and combinations of parts, as will be hereinafter fully described, and pointed out in the claims, reference being taken to the accompanying sheets of drawings, wherein—

Figure 1 is a transverse vertical section, Fig. 2 a plan and Fig. 3 an end view of the improved emptying device; Fig. 4 is a detailed elevation and Fig. 5 a detailed plan, both drawn on a larger scale, of the means for raising and lowering the scraping apparatus proper; Figs. 6 and 7 are detailed views drawn likewise on a larger scale and illustrating the means for moving to and fro the carriage carrying the scraping device.

Similar letters of reference refer to corresponding parts throughout the several figures.

Into the chamber *a* containing the superphosphate extends a scraping device which consists of an endless chain *b* having blades b^2 and being rotatably mounted between longitudinal girders b^1 stiffened by suitable braces or traverses, so as to form a suitable supporting frame which is movably mounted in a tower-like structure *c* arranged on a suitable carriage *d* running in front of the chamber. The scraping device proper is driven, for example, by an electric motor *m* mounted on the said supporting frame. The greatest part of the weight of the supporting frame with the scraping device and its motor, which is arranged to be capable of being moved up and down in suitable vertical guides of the frame *c*, is counteracted by a weight *e* suspended from a rope *f* passed over grooved pulleys *g* and *h* and attached to a hoop *i* fastened to the longitudinal girders b^1 of the supporting frame.

The raising and lowering of the scraper in the towerlike structure *c* is effected by means of a winch *k* attached to the structure *c* and two hoisting ropes *k* and *n*; one hoisting rope *l* passing from the drum k^1 of the winch over a grooved pulley g^1 to a hoop i^1 fastened to the girders of the scraper supporting frame, the other hoisting rope *n* passing over the grooved pulleys g^1 and *h* to the hoop *i*. By the coöperation of this winch or hoisting device and the counter weight *e* the scraping device or scraper proper may be raised or lowered, as desired, without wedging.

In order to allow the scraper to be put into or moved out of the chamber *a*, the tower *c* is mounted on a turn-table *o* which may be held stationary during the working operation of the scraper by means of set screws *p*. When the scraper is to be removed from the chamber the procedure is as follows. The carriage *d* is driven to a lateral end position, so that the scraper is nearly in contact with one of the side walls of the chamber *a*, whereupon the turn table is turned and the scraper swung horizontally through the chamber until its free end nearly touches the opposite side wall of the chamber. Thus by alternately driving forward the carriage and

swinging round the scraper, the whole device may be brought step by step into such a position, that the scraper can be entirely swung out of the chamber. The swinging of the scraper into the chamber is to be effected in the reverse order.

The lowering of the scraper and the horizontal to and fro movement of the carriage, that is to say, the movement of the scraper in a vertical and a horizontal plane may be effected by hand, but it will be more practical to have these movements done automatically. For this purpose there is arranged an endless chain q driven in one direction for example by a belt passing round a pulley r. The chain q is provided with a suitable tappet q^1 which when traveling with the chain in the direction of the arrow 1 shown in Fig. 3, engages a hook s fixed to a plate or support t attached to the carriage frame d, thereby driving the carriage to the left hand side. This movement continues until the tappet q^1 has reached the left hand chain wheel u, whereupon the tappet by its passing around the latter disengages the hook, so that the carriage comes to a standstill in the left hand end position. The carriage remains stationary in this position, until the tappet q^1 in its movement in the opposite direction engages a second hook s^1 carried by the plate t carried in the lower plane of travel of the tappet. The carriage is then driven by the chain q in the opposite direction, indicated by the arrow 2 (Fig. 3), until it reaches its right hand end position, where the tappet q^1 changes from the hook s^1 to the hook s, during which time the carriage again remains stationary. As soon as the tappet q^1 has passed around the chain wheel u^1 and engaged the hook s the carriage begins a new left hand travel, and so on; the carriage is thus driven to and fro and the scraper caused to reciprocate horizontally over the top of the superphosphate heap in the chamber.

During the horizontal reciprocation of the endless scraping device b being moved in the direction of the arrows shown in Fig. 1, the blades b^3 scrape the superphosphate from the top of the heap in the chamber. The superphosphate scraped out falls in front of the chamber on to a conveyer band v for which may be substituted tip-wagons, a worm conveyer or the like. The action of the scraper blades b^3 tends to subdivide finely and thereby to aerate the superphosphate, thus improving it essentially.

For lowering automatically the scraping device b b^3 during the change of direction of its horizontal movement, the following means are provided. On the shaft w (Figs. 4 and 5) carrying the worm w^1 engaging the toothed wheel k^2 keyed on the shaft of the drum k^1 is fixed a bevel-wheel w^2 gearing with another bevel-wheel x^2 carried by a gudgeon x^1 journaled in the frame of the winch. On the free end of the gudgeon x^1 is mounted a ratchet wheel x, which coöperates with two rack-bars y and y^1 arranged on either side of the chamber a on suitable supports z and z^1 in such a manner that the said rack-bars are in the same plane as the ratchet wheel and adapted to engage the latter from below and from above, when the said ratchet wheel shortly before the carriage reaches its left hand or right hand end position, runs upon the rack bar y or y^1. By this running up the ratchet wheel x is each time rotated to a certain extent, in order to slowly rotate the drum k^1 of the winch and ease off the hoisting ropes l and n correspondingly, whereby the scraping device b b^1 b^2 is lowered, so as to work during the time its horizontal travel is discontinued, a groove of a certain depth into the heap of superphosphate, so that when the scraping device begins its next horizontal travel, it moves in a horizontal plane somewhat lower than the existing top plane of the heap of superphosphate. Instead of working in the manner above described, the scraping device may also be operated to work vertically, that is to say, to remove the superphosphate by scraping off vertical layers, as will be evident without any further description.

For operating the winch by hand the shaft w is provided with a toothed wheel w^3 gearing together with a toothed wheel k^3 on a driving shaft k^4 provided with a crank handle k^5.

As many changes and modifications might be made in the construction and relative arrangement of the different parts without involving a departure from the spirit of my invention, I would have it understood that I do not limit myself to the exact construction shown and described, but consider myself at liberty to make such changes and alterations as fall within the scope of my invention.

I claim:

1. In an apparatus of the character described, the combination with a support, of a scraping mechanism carried thereby, means for raising and lowering said mechanism in substantially parallel planes and means for bodily moving the support transversely to the movements of the scraping mechanism.

2. In an apparatus of the character described, the combination with a support, of a scraping mechanism carried thereby, and means to automatically lower the scraping mechanism.

3. In an apparatus of the character described, a traveling support, scraping mechanism carried thereby, means operated by the movement of the carriage to lower the scraping mechanism and means to automatically reverse the direction of travel of the support.

4. In an apparatus of the character described, a scraping mechanism, a support therefor, a carriage for the latter, an endless

traveling member, and means connected with the carriage adapted to be engaged by the traveling member.

5. In an apparatus of the character described, a scraping mechanism, a support therefor, a carriage for the latter, an endless traveling member moving in opposite directions and means connected with the carriage adapted to be engaged by the traveling member and alternately moved in opposite directions.

6. In an apparatus of the character described, a support, an endless carrier mounted therein, a plurality of scrapers mounted on the carrier, means on the support for lowering the carrier, a carriage for the support, means for intermittently moving the carriage in opposite directions, and means operated by the movement of the carriage in each direction to operate the lowering means.

7. In an apparatus of the character described, a support, an endless carrier mounted therein, a plurality of scrapers mounted on the carrier, a drum on the support connected with the carrier, a carriage for the support adapted to move transversely to the movement of the scrapers, means to intermittently move the carriage in opposite directions, and means at each side of the support adapted to rotate the drum.

8. In an apparatus of the character described, the combination of a carriage, an endless chain moving in different planes contiguous to the carriage, a tappet on the chain, and hooks on the carriage in both planes of the chain.

9. In an apparatus of the character described, the combination with a movable support and a scraping mechanism adjustably mounted therein, of a drum on the support connected with the scraping mechanism, a ratchet wheel connected with the drum, and racks mounted at each side of the support adapted to alternately engage the ratchet.

10. The combination with a chamber, of a carriage mounted in front of the chamber, a support on the carriage, an endless traveling carrier mounted on the support extending into the chamber, scrapers carried by the carrier, means for counterbalancing the endless carrier, a drum on the support, a cable connected with the drum and carrier, a ratchet wheel, gearing connecting the latter with the drum, an endless chain movable in different planes contiguous the carriage, hooks on the latter adapted to alternately engage the chain, and racks mounted near each side of the chamber to engage the ratchet wheel.

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Witnesses:
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