No. 722,783. PATENTED MAR. 17, 1903.

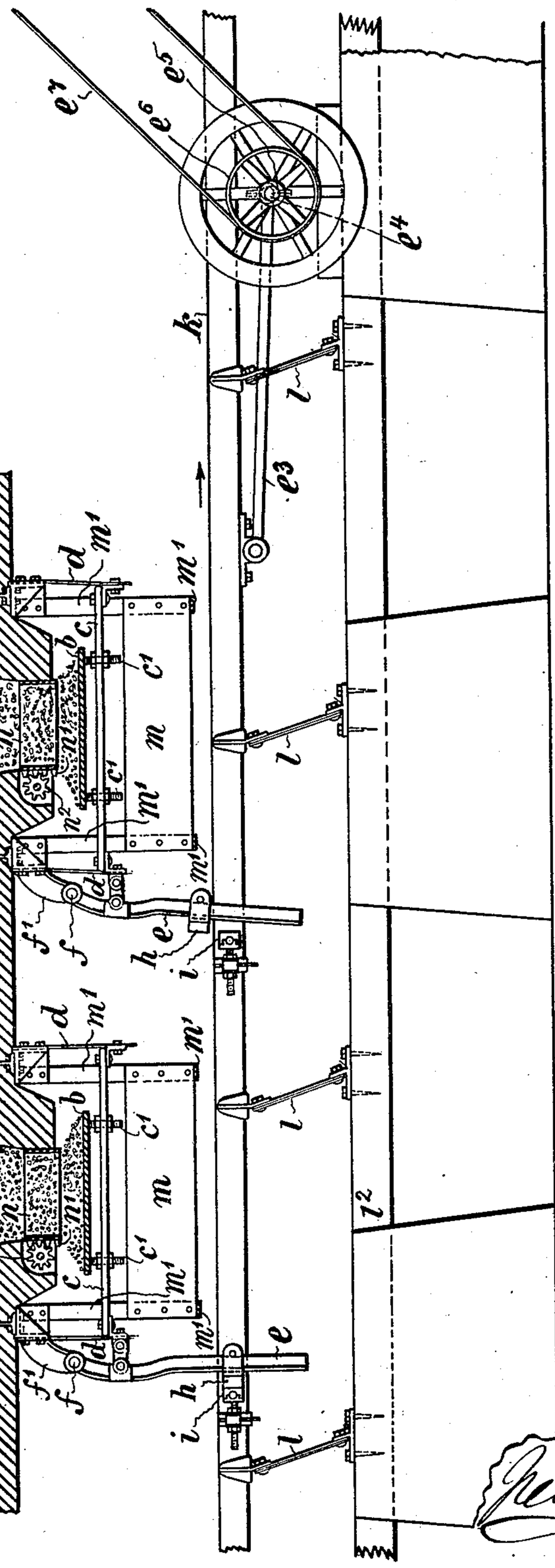
A. WEISS & L. GIROUD.

APPARATUS FOR DISCHARGING PULVERULENT, GRANULAR, OR LIKE SUBSTANCES.

APPLICATION FILED AUG. 9, 1899.

NO MODEL. 3 SHEETS—SHEET 1.

Fig. 1.



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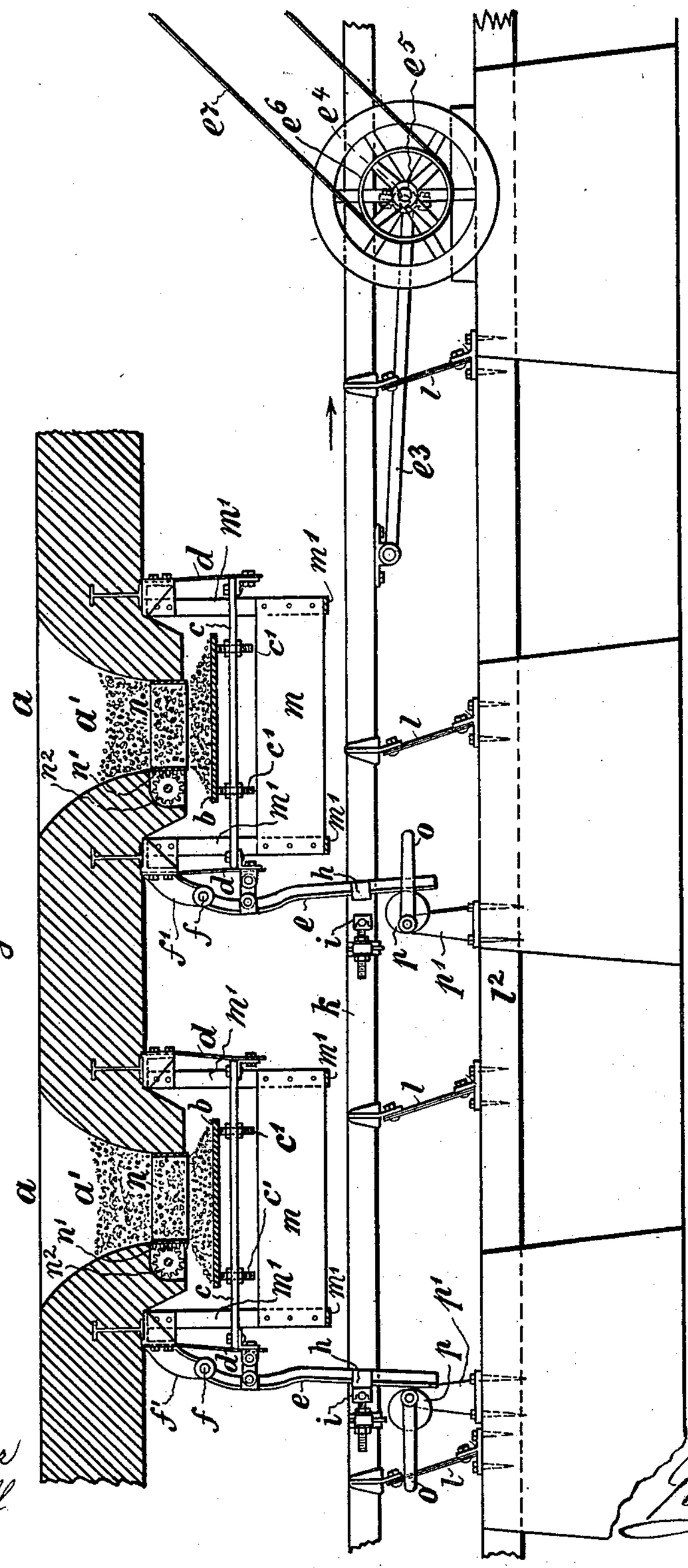
NO MODEL. 3 SHEETS—SHEET 2.

Fig. 2.



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NO MODEL. 3 SHEETS—SHEET 3.

Fig. 3

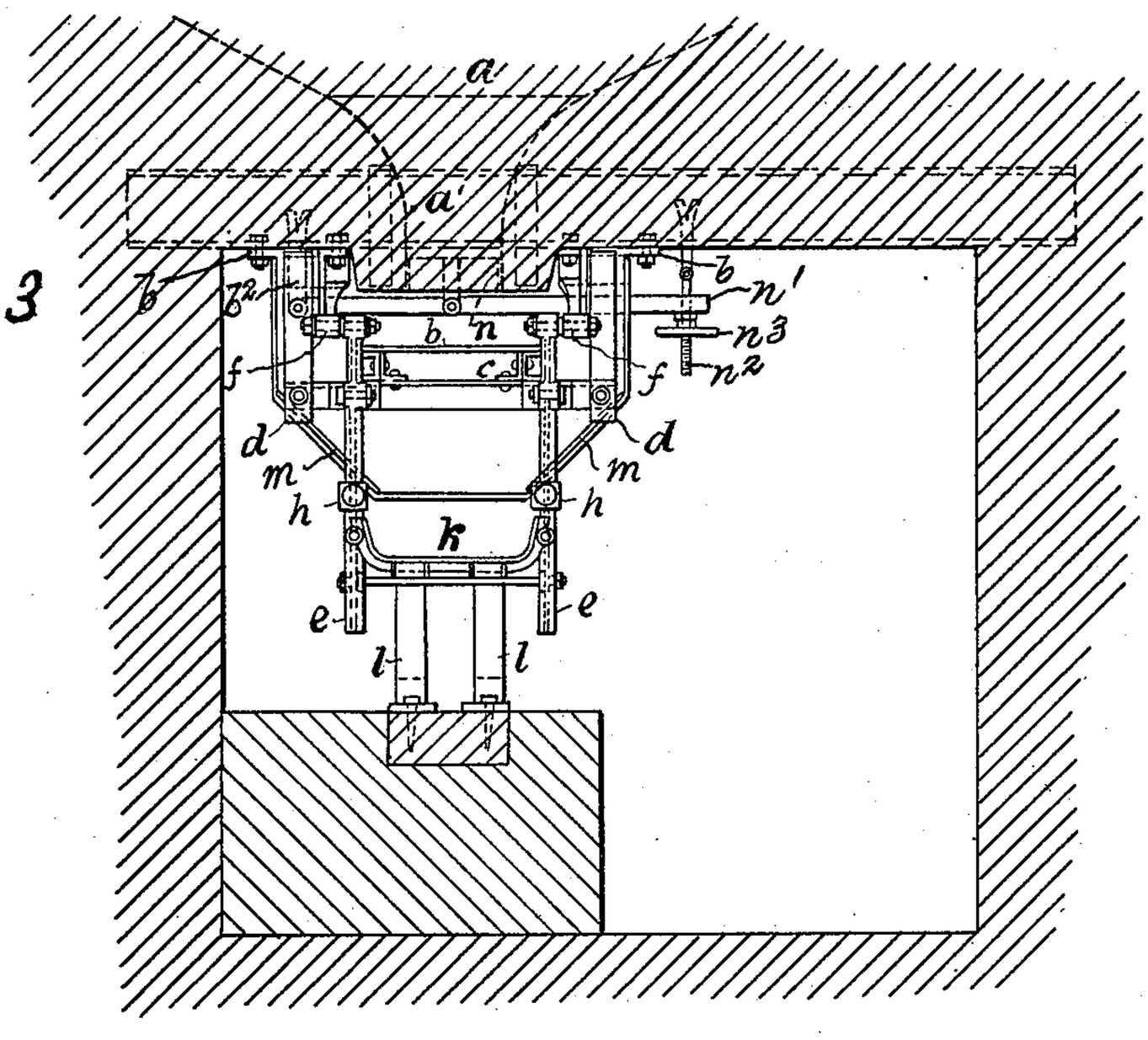
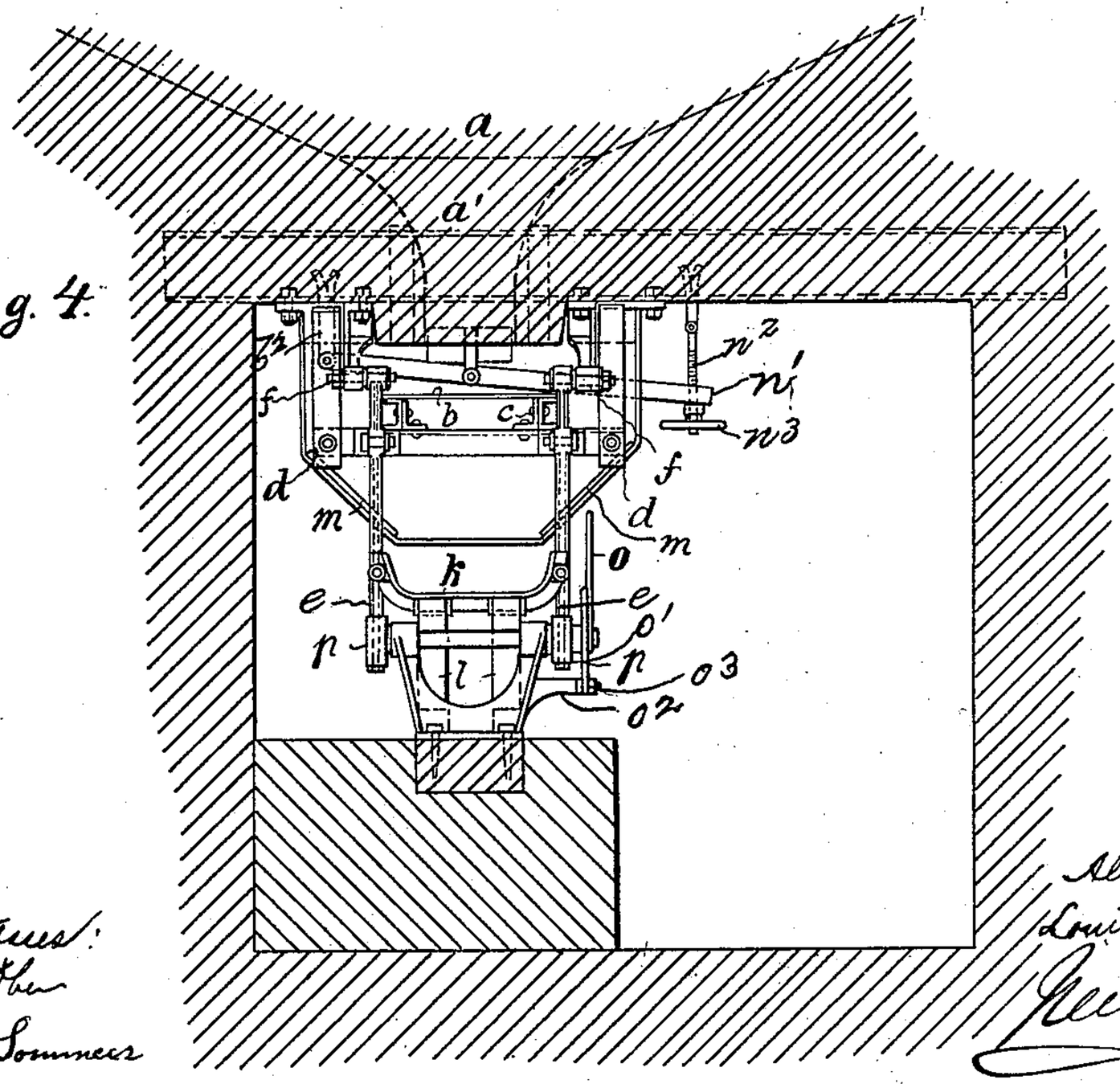


Fig. 4.



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UNITED STATES PATENT OFFICE.

ALBERT WEISS, OF ZURICH, AND LOUIS GIROUD, OF OLTEN, SWITZERLAND.

APPARATUS FOR DISCHARGING PULVERULENT, GRANULAR, OR LIKE SUBSTANCES.

SPECIFICATION forming part of Letters Patent No. 722,783, dated March 17, 1903.

Application filed August 9, 1899. Serial No. 726,672. (No model.)

To all whom it may concern:

Be it known that we, ALBERT WEISS, engineer, residing at Limmastrasse, Zurich, and LOUIS GIROUD, engineer, residing at Olten, Switzerland, citizens of the Republic of Switzerland, have invented certain new and useful Improvements in Apparatus for Discharging Pulverulent, Granular, or Like Substances; and we 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 invention has relation to the art of transferring pulverulent, granular, or lumpy materials from a bin or other storage-receptacle to a point distant therefrom, and is more particularly designed for the transfer of coal from storage chambers or bins to the retorts in gas-works.

The invention has for its object the provision of means whereby the discharge of such materials from a constantly-open discharge-port in the storage-receptacle may be stopped and resumed at will and the quantity of material discharged regulated.

The invention has for its further object the provision of means for moving the material from the point of discharge to a point distant therefrom.

That our invention may be fully understood we will describe the same in detail, reference being had to the accompanying drawings, in which—

Figure 1 shows in side elevation appliances embodying our invention for receiving coal, for instance, from a constantly-open discharge port or ports of a bin or bins or other storage-receptacle, which latter is shown in part only and in section, and for transferring such coal to a point distant from such port or ports. Fig. 2 is a view similar to Fig. 1, illustrating a slight modification in the means for varying the amplitude of the reciprocations of the forwarding or transferring table. Figs. 3 and 4 are end elevations of the appliances shown in Figs. 1 and 2, respectively, for delivering coal, for instance, to a conveyer, part of a bin or other masonry being shown in section.

In the drawings, a' indicates a discharge-passage in the bottom of a storage-receptacle a, of which there may be any required number, or the storage-bin may have any required number of discharge-passages a', two such passages being shown. Below each of these passages is arranged a receiving and delivery table b, supported by screws c' from a frame c, bolted to spring-hangers d, secured to the under side of the bin a. The table b is of greater superficial area than the cross-sectional area of the discharge-passage a' in the bin above the same, and said table is so located relatively to the outlet of said passage a' that the base of the column of material between said table and outlet will spread nearly to the edges of such table and be held by its own weight from further spread or displacement.

To the under side of the bin a on opposite sides of the discharge-passage a' are also secured the side bars or hangers m' of a hopper m, that discharges into a reciprocating conveyer-trough k, mounted on resilient supports l and receiving to-and-fro motion from any well-known mechanism, as from an eccentric or crank-shaft e^4, whose crank e^5 is connected by a connecting-rod e^3 with the table k, said shaft carrying a belt-pulley e^6, driven by a belt e^7 from any suitable prime motor.

In the throat of the discharge-passage a' of the bin a is arranged a sleeve n, adjustable toward and from the receiving and delivery table b by any suitable means, as by rack and pinion n' n^2, or said sleeve may be linked to a lever adjustable along a screw-threaded rod r^2 by means of a nut n^2, Figs. 3 and 4, the last-named figure showing the sleeve n adjusted closer to the table b.

At one end of the frame c, on opposite sides thereof, there is a lever e, linked to a spring-hanger d, said levers being fulcrumed to a bracket or brackets f' on the under side of bin a, the free ends of which levers project down either side of the conveyer-trough k and serve to impart a reciprocating motion to the frame c and its table b. This reciprocating motion may be imparted to the levers by any desired mechanism—as, for instance, through the trough k itself—in which case each lever e carries a shoe h, having bearing on an abutment-block i, pivoted to one end of a screw-bolt i', adjustable in a screw-threaded bearing secured to the sides of the trough k, so that as the trough k reciprocates the levers e will vi-

brate therewith, the spring-hangers *d* holding the shoes *h* constantly in contact with their blocks *i*, and in order that perfect contact may take place at all times and in view of the fact that the trough *k* not only reciprocates horizontally, but also has a rising-and-falling motion, we pivot the blocks *i* to their respective screw-bolts.

In order that the feed of the material to and its discharge from the table *b* may be interrupted at will, any suitable mechanism may be provided. As shown in Fig. 1, the shoe *h*, for instance, may be made adjustable along its lever *e* and, as shown on the right of said Fig. 1, moved out of reach of the block *i*, or, as shown in Fig. 2, an eccentric *p* mounted on either side of trough *k* on a suitable revoluble shaft mounted in standards *p'* and adapted when rotated by lever *o* to bring the eccentrics into the position shown on the right to move and hold the levers *e* out of reach of the blocks *i* or to bring them within such reach, as shown on the left, or to vary in a measure the amplitude of vibration of table *b* by moving the eccentrics to any position between the aforesaid extreme positions, in which case the blocks *i* act as percussion-blocks to impart short reciprocations and shocks to said table.

We have hereinbefore stated that the distance between the feed-table *b* and the discharge end of the passage *a'* in bin *a* may be varied by means of an adjustable sleeve *n* in order to adapt the apparatus to the transfer of various granular materials. This may also be accomplished by vertical adjustment of table *a* by means of its supporting-screws *c'*, as will be readily understood.

From the above description the operation of the appliances will be readily understood, as it is obvious that as long as the table *b* remains stationary the column of material thereon will remain immovable, as is the case in self-feeding heaters, for instance; but the moment the table *b* is reciprocated this column of material will be disturbed and caused to spread in all directions, such material dropping into the conveyer-trough *k*, which conveys the same in a well-known manner to the desired point. It is furthermore obvious that the smaller the material to be delivered to the bins the closer must be the table to the discharge *a'* in order that the column of material between *a'* and *b* may be self-sustaining and prevented from spreading when said table is stationary.

It will be observed that the table *b* is substantially horizontal, has an unobstructed upper surface, is unconfined, and consequently free to discharge from all of its four sides, and it will readily be understood that unless the lower edges of the walls of the discharge-hopper *a'* of the bin *a* are parallel to the table a uniform feed of material to and delivery from said table would be impossible, because the natural slope of the column of material or talus between the table and said outlet would be longer on one side than on another and feed more material off that edge of the table that lies farther from said outlet. On the other hand, if the upper face of the table *b* were inclined to any great extent relatively to the vertical axis of the discharge-passage a talus could not readily be maintained thereon, if at all, especially if the material is granular, as cereals, for instance.

Having thus described our invention, what we claim as new therein, and desire to secure by Letters Patent, is—

1. The combination with a storage-bin having a discharge-hopper; of an unconfined substantially horizontal table with unobstructed upper face of greater superficial area than the cross-sectional area of said hopper below and parallel to the lower edges of the side walls of the hopper and distanced therefrom in proportion to the talus formed by a given material supported on said table, and means for shaking the same, for the purposes set forth.

2. The combination with a storage-bin provided with an extensible hopper; of a horizontal table of greater superficial area than the cross-sectional area of said hopper below the same and parallel to the lower edges of the side walls of said hopper and means for shaking the table, for the purpose set forth.

3. The combination with a storage-bin having a hopper; of an unconfined table with an unobstructed upper face of greater superficial area than the cross-sectional area of said hopper, arranged below the same and parallel to the lower edges of the side walls of said hopper, and means for varying the distance between the table and hopper in accordance with the talus formed by a given material supported on said table, and means for shaking the same, for the purpose set forth.

4. The combination with a storage-bin having a discharge-hopper, and a table of greater superficial area than the lower end of said hopper, arranged below the same and parallel to the lower edges of the side walls of said hopper and distanced therefrom in proportion to the talus formed by the material supported on said table, a support for said table adapted to vibrate, springs acting on opposite ends of said support, and a lever linked thereto and projecting below the table and carrying a vertically-adjustable shoe; of a conveyer below and into which the table is adapted to discharge, an abutment on said conveyer normally in the path of the aforesaid shoe, and means for imparting a longitudinal reciprocating motion to the conveyer, substantially as and for the purposes set forth.

In testimony whereof we affix our signatures in presence of two witnesses.

ALBERT WEISS.
LOUIS GIROUD.

Witnesses:
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