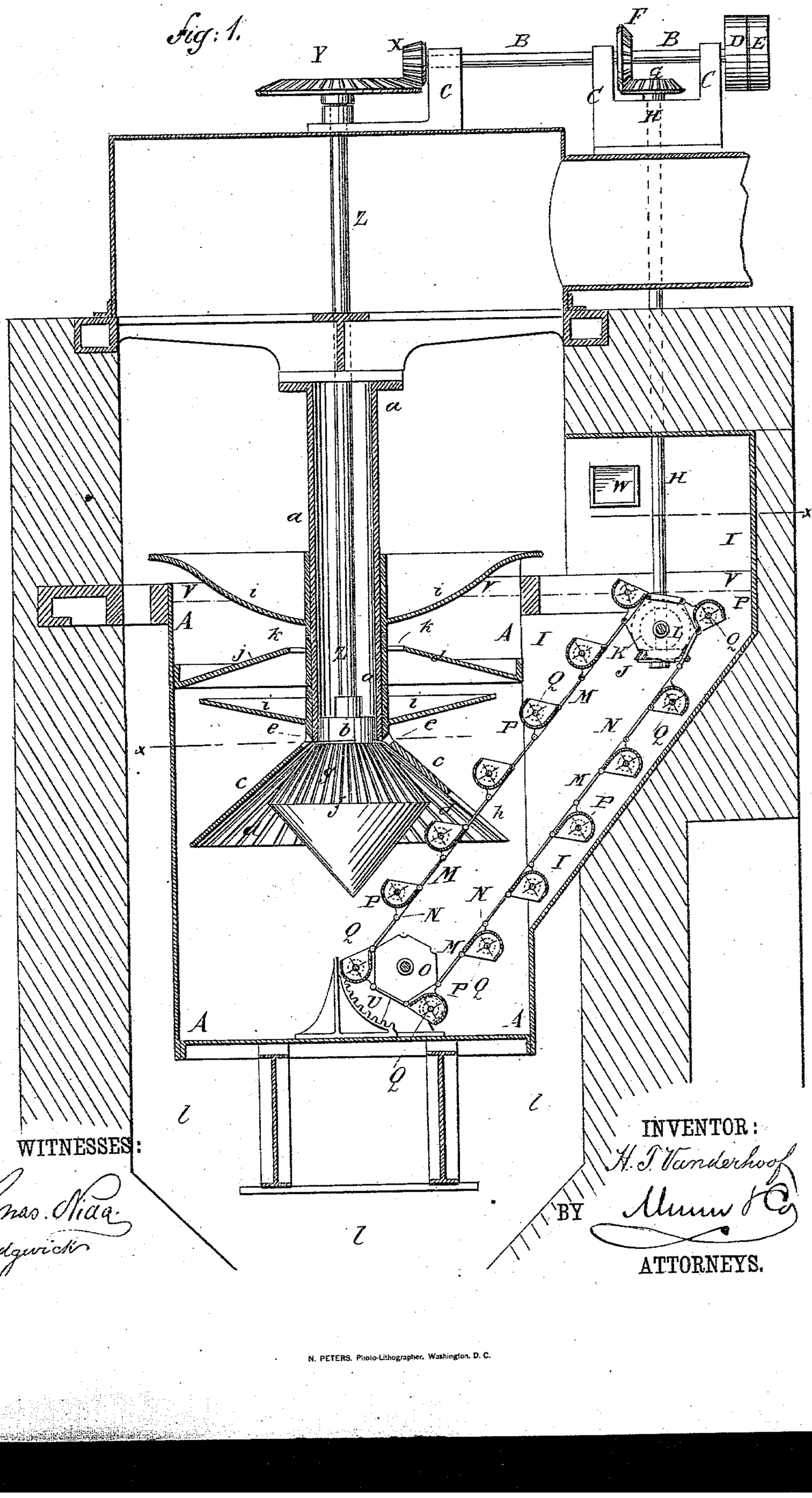
(No Model.) 2 Sheets—Sheet 1.

H. T. VANDERHOOF.

AMALGAMATOR.

No. 283,540. Patented Aug. 21, 1883.

Fig: 1.



WITNESSES:

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(No Model.) 2 Sheets—Sheet 2.

H. T. VANDERHOOF.

AMALGAMATOR.

No. 283,540. Patented Aug. 21, 1883.

Fig: 2.

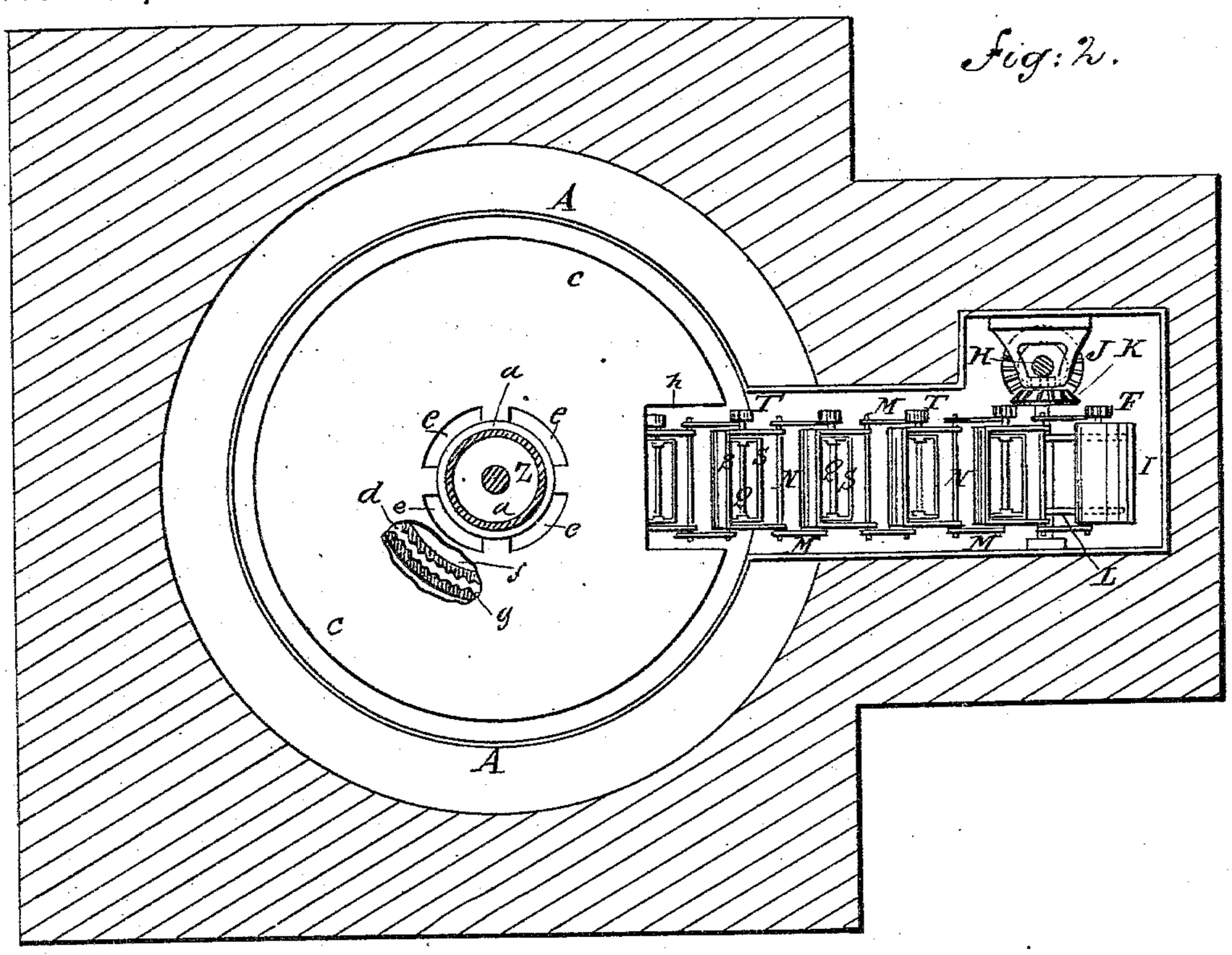


Fig: 3.

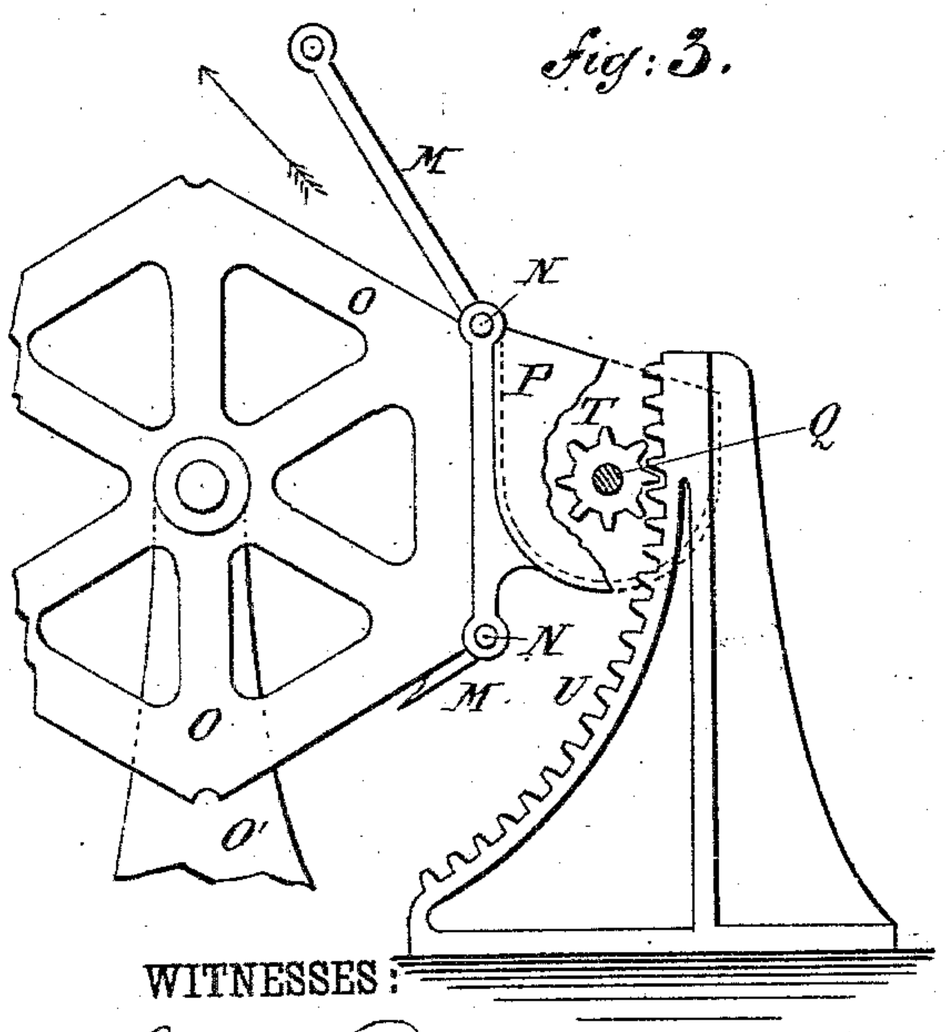
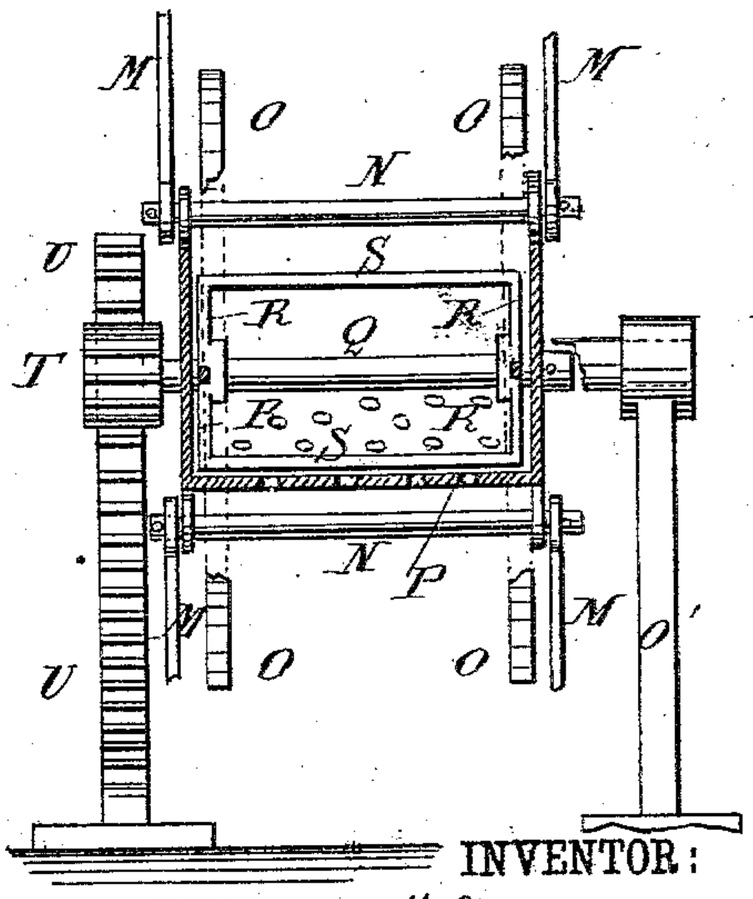


Fig: 4.



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UNITED STATES PATENT OFFICE.

HENRY T. VANDERHOOF, OF NEW YORK, N. Y., ASSIGNOR, BY MESNE ASSIGNMENTS, TO THE HAMILTON LEAD BATH COMPANY, OF SAME PLACE.

AMALGAMATOR.

SPECIFICATION forming part of Letters Patent No. 283,540, dated August 21, 1883.

Application filed January 13, 1883. (No model.)

To all whom it may concern:

Be it known that I, HENRY T. VANDERHOOF, of the city, county, and State of New York, have invented a new and useful Improvement in Amalgamators, of which the following is a full, clear, and exact description.

Reference is to be had to the accompanying drawings, forming a part of this specification, in which similar letters of reference indicate corresponding parts in all the figures.

Figure 1, Sheet 1, is a sectional side elevation of my improvement. Fig. 2, Sheet 2, is a sectional plan view of the same, taken through the broken line *x x*, Fig. 1. Fig. 3, Sheet 2, is an elevation of the rack and gear-wheel for operating the bucket-clearer, showing the reverse side from that shown in Fig. 1, and part of the bucket being broken away. Fig. 4, Sheet 2, is a rear elevation of the rack and gear-wheel, and showing a bucket in section.

The object of this invention is to facilitate the introduction of ore beneath the surface of molten lead in amalgamating.

The invention consists in an amalgamator constructed with an endless chain of buckets for carrying the ore downward into and discharging it in the lower part of a kettle of molten lead, and in a revolving double cone and inverted conical hopper for distributing the ore through the lead. The buckets are made with apertures in their bottoms, and are provided with skeleton clearers rotated by a gear-wheel, and a stationary curved rack at the lower part of the lead-kettle, so that the said buckets will be emptied in the said lower part of the kettle.

A represents the kettle which contains the lead, and in which the lead is kept molten by heat from a furnace. (Not shown in the drawings.)

B is the driving-shaft, which revolves in bearings in brackets C, attached to the casing or frame of the amalgamator or other suitable support. To one end of the shaft B is attached a fast pulley, D, and a loose pulley, E, to receive the driving-belt. To the shaft B is attached a beveled-gear wheel, F, the teeth of which mesh into the teeth of the beveled-gear wheel G, attached to the upper end of the vertical shaft H. The shaft H revolves in bearings in the frame-work of the amalgamator, and extends down into the inclined offset or chamber I, formed in the side of the kettle A, and called by me the "feed-chamber." To the lower end of the shaft H is attached a beveled-gear wheel, J, the teeth of which mesh into the teeth of the beveled-gear wheel K, attached to a journal of the upper chain-wheels, L. The journals of the chain-wheels L revolve in bearings attached to the frame or walls of the amalgamator, and around the said wheels pass the endless chains M, which are connected and kept in proper relative position by rounds N. The endless chains M pass around chain-wheels O, journaled to standards O', attached to the middle part of the bottom of the kettle A.

To the alternate links of the chains M are attached buckets P, the bottoms, backs, and fronts of which are perforated or have slots or other shaped apertures formed through them for the passage of the molten lead.

To the ends of the buckets P are journaled shafts Q, to which, at the inner sides of the said ends, are attached radial arms R, which are connected in pairs by thin bars S, the arms R being made of such a length that the bars S, as the shafts Q are revolved, will sweep along the inner surfaces of the said buckets P and separate the ore in the said buckets from the walls of the buckets and allow the molten lead to enter through the apertures in the buckets and force out the said ore.

To one of the journals of each shaft Q is attached a small gear-wheel, T, the teeth of which, as the bucket P, with which it is connected, is moving upward around the lower chain-wheels, O, mesh into the teeth of the rack-bar U, attached at its lower end to the bottom of the kettle A. The toothed surface of the rack-bar U is curved upon the arc of a circle having its center in the axis of the chain-wheels O, so that each clearer Q R S will be revolved

automatically as its bucket P moves upward around the chain-wheels O.

The upper end of the carrier should be so arranged that the buckets P, when passing over the tops of the chain-wheels L, will rise above the surface of the molten lead, which stands about at the lead-line V V V.

The ore to be operated upon is fed into the upper part of the feed-chamber I through a chute, W, or by other suitable means.

To the end of the drive-shaft B is attached a small beveled-gear wheel, X, the teeth of which mesh into the teeth of the larger beveled-gear wheel, Y, attached to the upper end of the vertical shaft Z. The shaft Z revolves in bearings attached to the frame of the amalgamator, and its lower part passes through the center of the pipe *a*, attached at its upper end to the frame of the amalgamator. The lower end of the pipe *a* is closed by a collar, *b*, through the center of which the shaft Z passes, and which is secured to the said shaft Z or to the pipe *a*, as may be desired.

To the lower end of the pipe *a* is attached an inverted funnel or conical hopper, *c*, the inner surface of which may be roughened by grooves or corrugations *d*, which gradually decrease in size toward the smaller upper part of the said inverted hopper *c*. In the upper part of the inverted hopper *c*, at the lower side of the collar *b*, are formed transverse slots or openings *e*, as shown in Figs. 1 and 2.

To the lower end of the shaft Z, in the upper part of the inverted hopper *c*, is attached a head, *f*, made in the form of a double cone. The double cone *f* may have the surface of its upper part, or of both parts, roughened by grooves or corrugations *g*, which become smaller as they extend upward. The inclination of the upper part of the double cone *f* is made steeper than the inclination of the inverted hopper *c*, so that the annular space between the said upper part of the double cone *f* and the said hopper *c* will gradually become narrower, as shown in Fig. 1. The lower part of the double cone *f* projects below the lower edge of the inverted hopper *c*, as shown in Fig. 1. The lower part of the inverted hopper *c* has a recess or slot, *h*, formed in it for the passage of the endless chain of buckets, as shown in Fig. 1, so that the lower end of the endless-chain ore carrier can be placed in such a position that the ore will be discharged directly beneath the double cone *f*.

To the pipe *a*, above the inverted hopper *c*, are attached a series of alternating plates, *i j*. The plates *i* incline upward from the pipe *a* toward the walls of the kettle A, and the plate *j* inclines upward from the walls of the kettle A, to which its outer edges are attached, toward the pipe *a*, and has slots *k*, formed in it near the said pipe *a*. The upper plate, *i*, projects over the edge of the kettle A, and is so formed that the refuse from the ore will pass over the said edge and fall into the refuse-pit *l*, whence it can be readily removed.

In using the machine the buckets P, as they pass over the chain-wheels L, become filled with the powdered ore floating upon the surface of the molten lead in the feed-chamber I, and carry the said ore down into the lower part of the kettle A. As the filled buckets P pass up around the chain-wheels O the clearers Q R S are operated by the rack and gear-wheel U T to loosen the ore from the inner surface of the said buckets, so that the ore will be forced out of the said buckets by the upward pressure of the lead through the apertures in the buckets, and will rise through the lead. As the ore from the buckets P rise in clumps it is guided by the lower parts of the double cone *f* and of the inverted hopper *c* into the space between the upper parts of the said double cone and inverted hopper, where it is crushed and distributed by the revolution of the said double cone, escapes through the apertures *e*, and rises through the lead along the lower sides of the plates *i j*, so that the lead will come in contact with every particle of the ore, and will abstract all the gold and silver there may be in the said ore.

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

1. An amalgamator constructed, substantially as herein shown and described, with an endless chain of buckets for carrying the ore downward into and discharging it in the lower part of an amalgamating-kettle, and of a revolving double cone and an inverted hopper for distributing the ore through the amalgamating material, as set forth.

2. In an amalgamator, the combination, with the ore-carrying buckets P, having apertures in their bottoms, of rotary clearers and the gear-wheels T and toothed rack U, substantially as herein shown and described, whereby the said buckets will be emptied automatically while in the lower part of the lead-kettle.

3. In an amalgamator, the combination, with the kettle A, the curved rack U, and the apertured ore-carrying buckets P, of the shafts Q, journaled in said buckets, the clearers R S, and the gear-wheels T on the ends of the said shafts, substantially as herein shown and described.

4. In an amalgamator, the combination, with the endless-chain buckets P, provided with rotary clearers, of the inverted conical hopper *c*, having slot *h* for the passage of the endless chain of buckets, the double cone *f*, and means for operating the same, substantially as herein shown and described.

5. In an amalgamator, the combination, with the vertical rotary shaft Z, of the double cone *f* and the inverted conical hopper *c*, substantially as herein shown and described, whereby the clumps of ore are broken up and distributed through the lead, as set forth.

6. In an amalgamator, the combination, with the endless chain of buckets P, provided with

rotary clearers, of the inverted conical hopper *c*, provided with the corrugations *d*, the aperture *e*, and the slot *h*, and the double cone *f*, provided with corrugations *g*, substantially as herein shown and described.

7. In an amalgamator, the combination, with the kettle A and the rotary double cone *f*, of the tube *a*, the inverted conical hopper *c*, provided with the aperture *e*, and the plates *i j*, substantially as herein shown and described.

HENRY T. VANDERHOOF.

Witnesses:
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C. SEDGWICK.