No. 757,008. PATENTED APR. 12, 1904.

G. E. WOODBURY.

ORE CONCENTRATOR.

APPLICATION FILED DEC. 4, 1899.

NO MODEL. 2 SHEETS—SHEET 1.

Fig. 1.

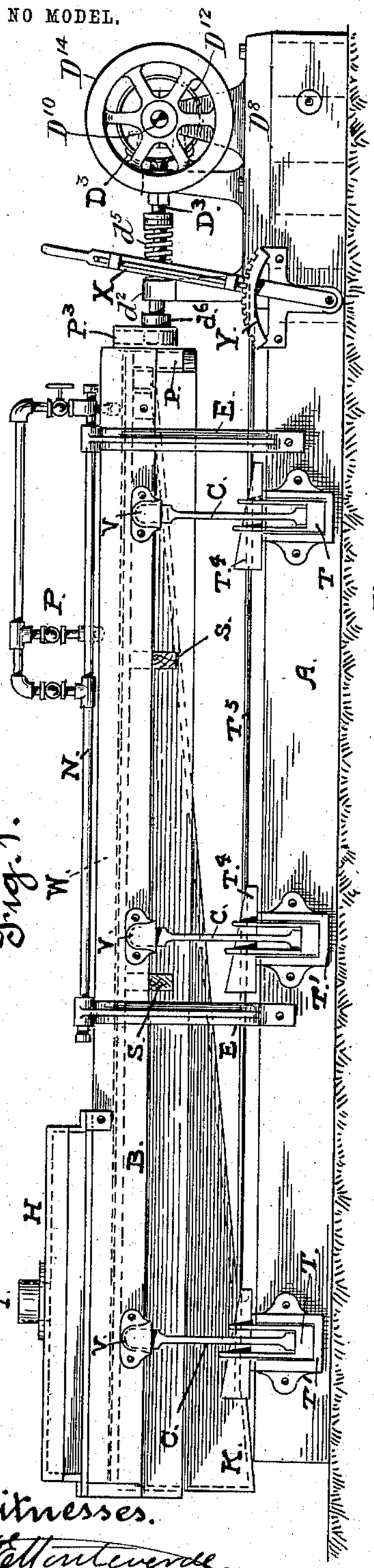
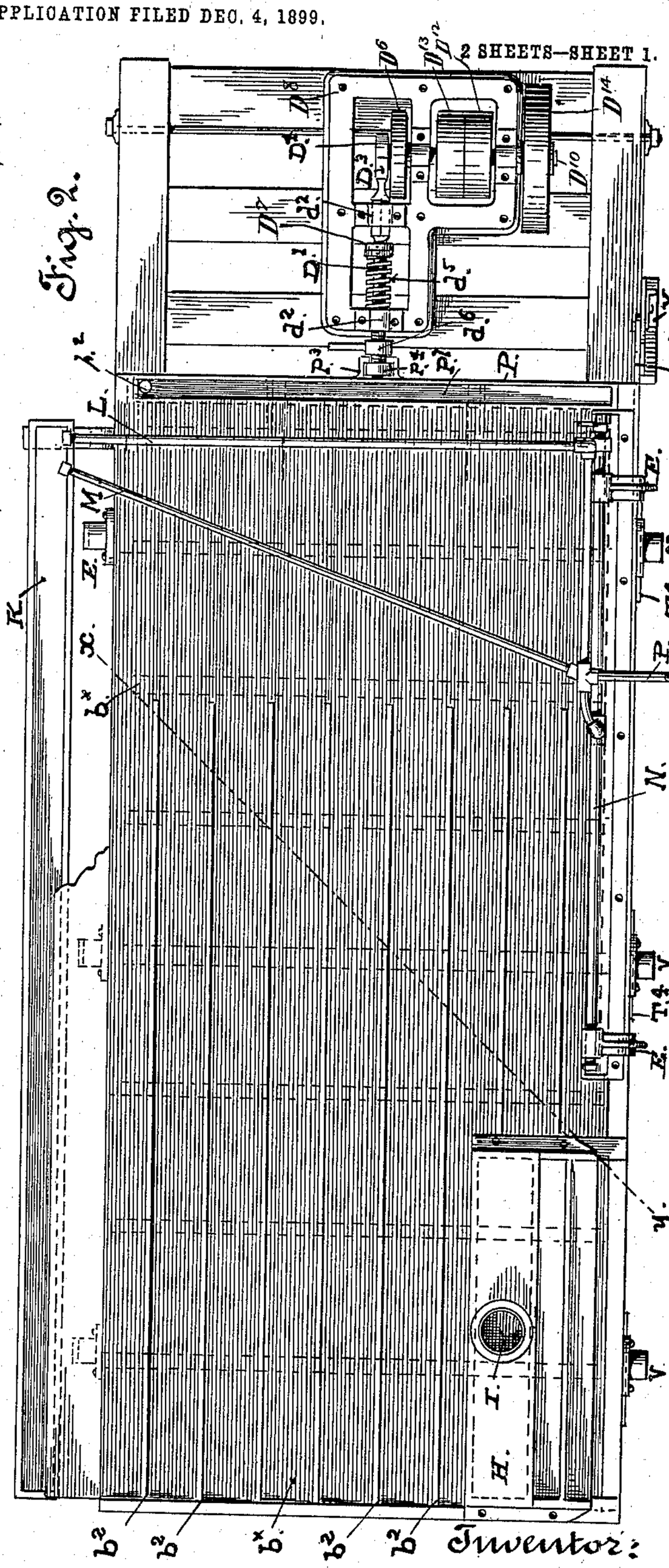


Fig. 2.



Witnesses.

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Inventor:

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by

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NO MODEL. 2 SHEETS—SHEET 2.

Fig. 9

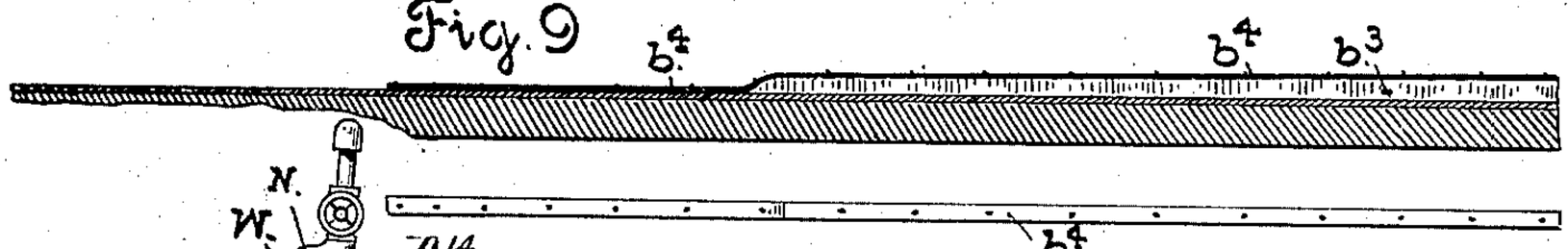


Fig. 10.

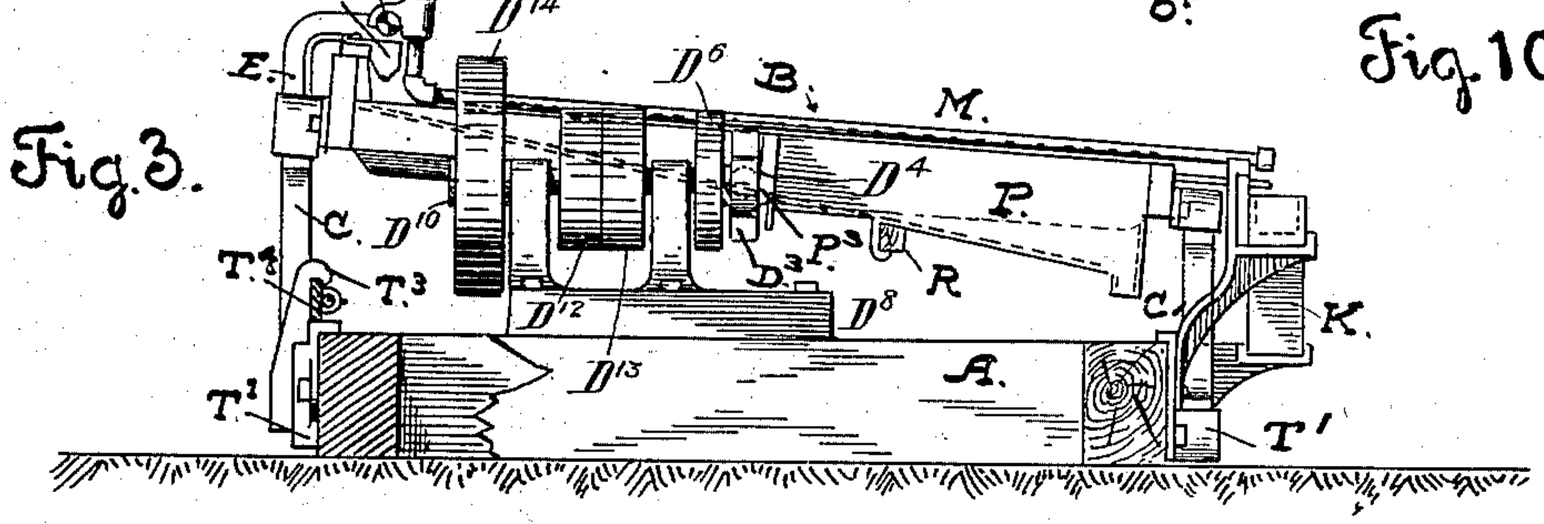


Fig. 3.

Fig. 4.

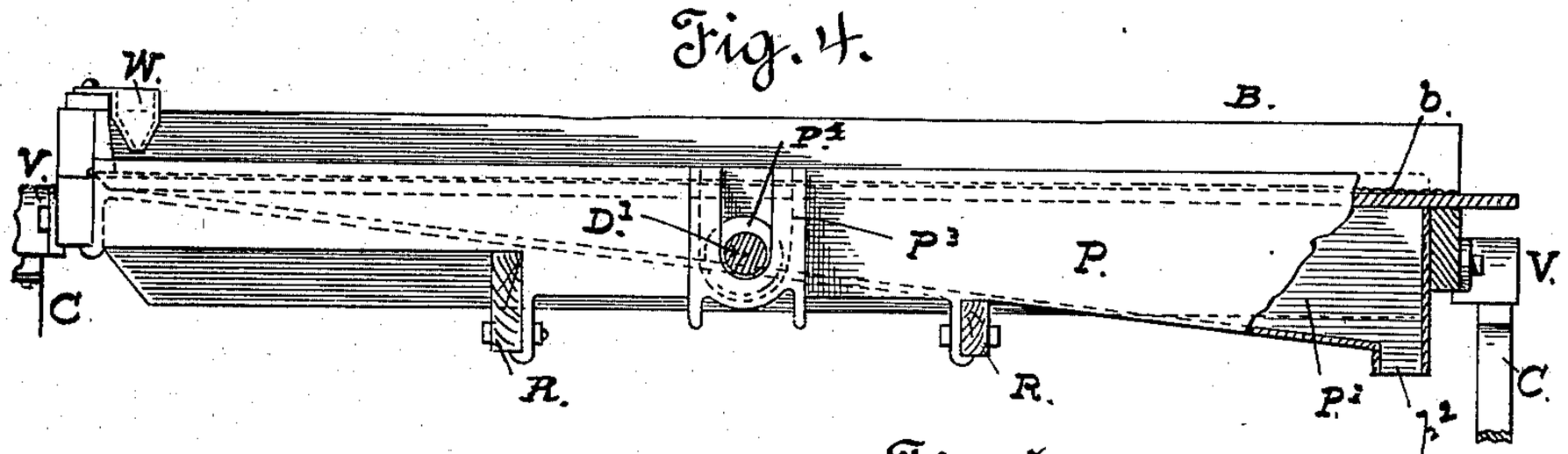


Fig. 5.

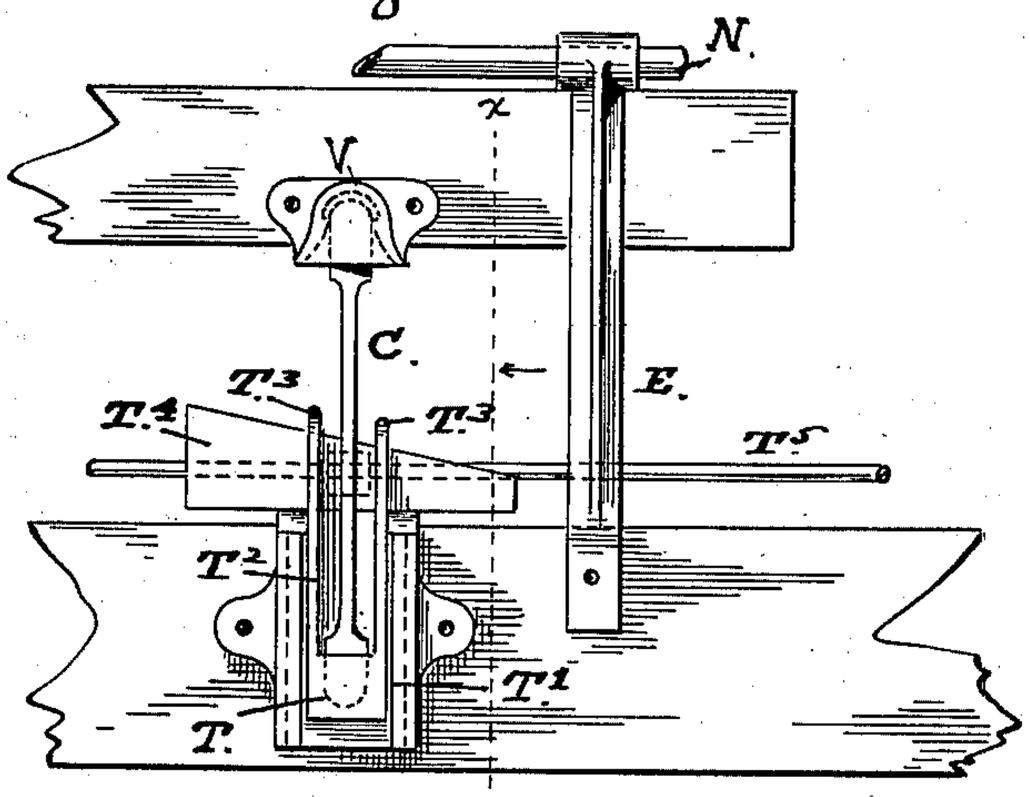


Fig. 6.

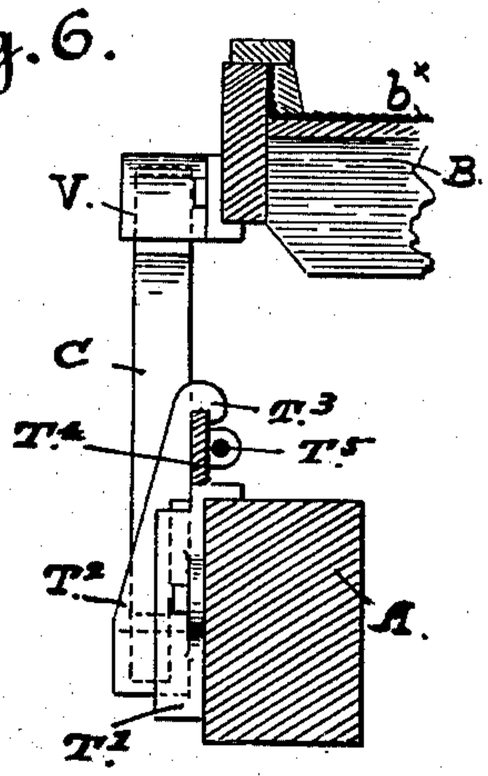


Fig. 8.

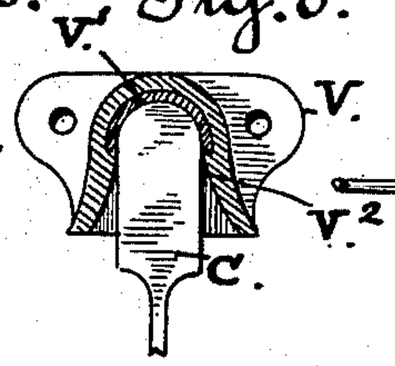
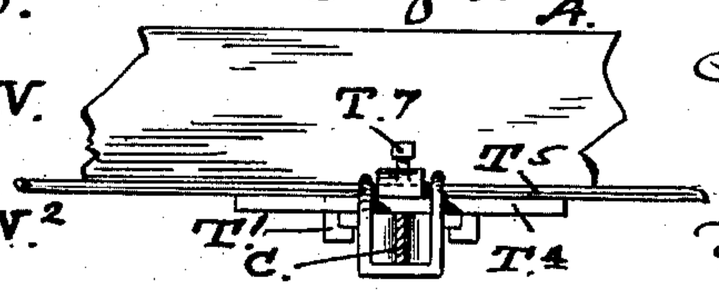


Fig. 7.



Witnesses.

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M. Regnes

Inventor.

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No. 757,008. Patented April 12, 1904.

UNITED STATES PATENT OFFICE.

GEORGE E. WOODBURY, OF SAN FRANCISCO, CALIFORNIA.

ORE-CONCENTRATOR.

SPECIFICATION forming part of Letters Patent No. 757,008, dated April 12, 1904.

Application filed December 4, 1899. Serial No. 739,096 (No model.)

To all whom it may concern:

Be it known that I, GEORGE E. WOODBURY, a citizen of the United States of America, and a resident of the city and county of San Francisco and State of California, have invented new and useful Improvements in Ore-Concentrators, of which the following is a specification.

This invention relates to improvements in ore-concentrators of that class or description in which the concentrating-surface is a flat table inclined transversely and having a vibratory motion imparted to it in the direction of its length by mechanical means applied usually at one end.

The present improvements have for their object to provide a simple and efficient means of raising or lowering one side of the table to adjust the slant or degree of inclination of the concentrating-surface from time to time while the machine is in operation; also, to produce a table-concentrator having novel and useful features of construction that contribute to simplicity in construction and durability under use and in which large quantities of material can be worked rapidly and effectively.

To these ends and objects my said improvements consist in certain novel parts and combination of parts, as hereinafter described, and pointed out in the claims at the end of the specification, reference being had therein to the accompanying drawings, forming part thereof.

Figure 1 of the drawings is an elevation of a table-concentrator, taken from the higher side of the machine. Fig. 2 is a plan or top view of Fig. 1. Fig. 3 is an end elevation taken from the right-hand side of Figs. 1 and 2 or the concentrates-discharging end of the machine. Fig. 4 is a front elevation of the metal head trough or receptacle at the end of the table to receive the concentrates as they are discharged. Fig. 5 is an elevation in detail, on an enlarged scale, of one of the table-supporting spring-legs and its sockets and parts of the adjusting mechanism. Fig. 6 is a vertical cross-section at $x\ x$, Fig. 5. Fig. 7 is a top view of the bottom leg-socket and the parts of the adjusting mechanism connected therewith. Fig. 8 is a sectional view, on an enlarged scale, of the top leg-socket. Fig. 9 is a longitudinal section taken through the table-surface on a line with one of the standing strips. Fig. 10 is a top view of the metal facing of the standing strip.

A indicates the stationary bed of the machine; B, the table, on the upper surface of which the pulp and water are distributed and the concentrating is effected.

C C are spring-legs on which the table is set, and D is the vibrating mechanism connected to one end of the table.

E E are fixed standards secured to the bed-frame and supporting above the table the water-distributing pipes.

H is the pulp-distributing box mounted on the higher side of the table, and I is a pulp-feeding pipe leading into the top of the box.

K is the tailings-trough on the bed beneath the lower edge of the table.

L M N are perforated water-distributing pipes, and P is a supply-pipe provided with stop-cocks for regulating the flow of water.

The working surface of the table is covered with finely-grooved rubber fabric $b^{\times}$, laid smoothly over the entire surface, with the grooves running lengthwise and from end to end of the table. This surface is divided by a number of raised strips b^{2}, placed lengthwise of the table-surface and parallel with the grooves at regular distances apart, so as to divide the grooved surface into a number of channels. The standing strips terminate at a line extending transversely across the grooved surface at a distance from the concentrates-discharge end of the table, and between that line and the concentrates-trough at the end the table-surface is without strips, but is grooved for the entire width of the table. From this transverse line backward or toward the feeding-in end the strips are reduced in height for a greater or less distance, according to the location of the individual strip, and such reduction in the height of the whole set or number of strips begins on a line $x\ y$, extending from about midway of the length of the table-surface at the higher side diagonally across the table to the lower side, so that the strips are of uniform height from the feeding-on end up to this diagonal line; but for the

remainder of the length they are of less height. Thus the reduced portions of the standing strips vary in length one over the other from the higher to the lower side of the table. Usually the line *x y*, on which the strips vary in height, is carried from about the end of the pulp-distributing trough down to the end of the lowermost standing strip, and from the feeding-on end, where the standing strips begin, the top edge of each strip is carried on a slant toward the line *x y*, so as to gradually reduce this portion of the strip in height. The construction of these standing strips, which is illustrated in Figs. 9 and 10, is designed to secure strength and great durability under wear and the action of the water, to which the strips are necessarily exposed. The higher portion of the standing strip, extending from the feeding-on end of the table to the line *x y*, is formed of a strip of wood b^3, on the top edge of which is laid and secured a strip of thin sheet-brass b^4, and from the line of reduction this strip of metal is carried down to the surface of the table and is secured thereto, so as to form the remainder of the standing strip, the metal strip used for this purpose being of proper thickness to give the required height for that portion of the standing strip. This construction furnishes a standing strip that will not warp, swell, or be otherwise affected or thrown out of line or be loosened by the action of the water and gives it sufficient strength to withstand wear and the rough usage to which machines of this character are exposed through the ignorance or carelessness of unskilled persons. This surface is best made of rubber cloth or fabric finely grooved on the upper face and smooth on the back. Other material can be substituted for rubber, or the grooves can be made directly in the material of which the table-surface is formed, in which case the surface, if it be of wood, should be coated or covered with varnish or other material to protect the wood from the action of the water.

The means that gives motion to the table is connected or attached thereto at one end in such manner that the power is applied in a right line in the same plane with the table-surface and so as to produce a reciprocating movement, with short strokes or vibrations uniform in extent for every part of the surface and without a perpendicular or vertical lifting movement on any part of such surface, which movement is found in machines of this class to interfere with and prevent to a greater or less degree the effective separation and precipitation of the mineral particles on those portions of the working surface affected by that movement.

The vibrating mechanism consists of a reciprocating bar D′, connected at one end directly to the end of the table and supported in guides d^2 to reciprocate in a horizontal plane on a level with the surface of the table, while the opposite end of the bar is provided with a head D^3, having a concave face or bearing-surface held up to a wrist-pin or roller-stud on the face of a rotatable disk D^4. A stiff helical spring d^5 around the bar D′ holds the concave head constantly against the roller-stud, and by the rotation given to the shaft the disk is turned and the bar is operated with short vibratory movement in a right line. The vibrations having a short and quick quality of motion, it is found necessary to connect the reciprocating bar directly to the end of the table and to stiffen the table or frame in such manner that the vibrations shall be distributed equally and uniformly throughout the length and breadth of the table and shall be also of the same general character at the end farthest from the power as they are at the end where the power is applied. These features are secured in the present machine by attaching the reciprocating mechanism to the center of a metal header-bar P, fixed across the end of the table, to which longitudinal sills R, extending from the header-bar to the opposite end of the table, are stiffly joined, the cross-timbers S of the table-frame being secured to or let into the sills and those parts being carried by depending flanges on the bottom of the bar. The header-bar is also utilized for a concentrates-trough by forming a channel P′ in the top of proper dimensions to receive and carry the concentrates to the settling box or receptacle, in which the mineral particles are collected, the bottom of the trough being formed with a regular inclination to an outlet p^2 at the lower end.

The means for attaching the end of the reciprocating bar to the end of the table consists of a slotted box P^3, cast on the back of the header-bar of the table-frame, and a stationary head P^4 on the end of the bar, with a jam-nut d^6 on the screw-threaded portion of the bar behind the head, the box being clamped tightly between the nut and the head after the bar is set into the slot. Provision is thus made for varying the points of attachment of the reciprocating bar to the table under different adjustments of the table on its spring-legs and at the same time to maintain a direct and rigid connection between the bar and the header P.

The inclination of the table-surface is changed during the operation of the table without throwing off the power by raising or lowering the spring-legs supporting one side of the table, and the means for doing this is constructed to raise and lower simultaneously the whole number of legs on the higher side of the table and to lock or hold them in any position of adjustment when the table is loaded and at work. The foot of the leg is carried by a block T, fitted to slide in a grooved box T′, bolted to the sill of the bed-frame and having side pieces T^2, with hook-shaped ends T^3 engaging the top edge of a movable wedge

T^4. The wedges of all the legs on that side of the table are connected by a rod T^5 with a setting-lever X, by means of which all the wedges are moved at once to the same extent in one direction or the other. The straight bottom edge of each wedge has for a bearing-surface the top flange of the box, and the rod T^5 runs through a socket on the back of the wedge and is fastened in it by a set-screw T^7. The setting-lever X is fulcrumed at the lower end to the bed-timber and is locked by a locking-segment Y and pawl of well-known construction. The top ends of all the legs fit in socket-irons V, bolted on the sides of the table. The ends of the legs are curved, and the sockets in the iron are of corresponding shape to receive them. This recess V^2 is faced with leather V′ to furnish a smooth bearing and take the wear from the end of the leg as well as to produce a noiseless bearing and one that does not require lubricating.

The water is distributed upon the concentrating-surface at different points in the usual way by the perforated pipes L M N, connected with a service-pipe P and provided with proper cocks for controlling and regulating the supply. Across the concentrates-discharging end of the table the jets are directed or allowed to fall directly on the surface from the pipes L M; but along the higher side the pressure under which the water is supplied is taken off by interposing a trough W with a perforated bottom between the distributing-pipe N and the table-surface, so that the water is applied on that portion of the table by gravity alone. The trough W, secured to the table along the top side directly beneath the water-pipe, is constructed with a contracted bottom having converging side walls, and apertures for discharging the water in divided streams are formed along the bottom. This distributing device extends for about three-quarters of the length of the table and from the pulp-distributing box H to the concentrates-discharging end of the table.

I do not in this application claim the mechanism for imparting rectilinear reciprocatory motions to the table illustrated in this case, as such mechanism forms the subject of another application for Letters Patent filed by me on the 17th day of March, 1904, Serial No. 198,522.

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

1. In an ore-concentrator, a reciprocating table, wooden strips thereon disposed in parallel rows, and extending from one end of the table-surface for a portion of the length thereof, and a relatively thin metal strip of the same width as the wooden strip and fastened on the top of the wooden strip, said metal strip extending beyond the wooden strip and being fastened directly on the surface of the table beyond the terminal end of the strip, the extension forming a continuation of the riffle.

2. In a concentrator, a base, grooved boxes thereon, the top of each of which rests on top of the base, a block slidingly mounted in each box, and provided with hook-ended side pieces, a wedge between said side pieces and the top of each box, a rod connected to the wedges in the desired position, a leg projecting up from each block, a table mounted above the base on one side and supported by the legs on the other side, and means for reciprocating the table.

In testimony that I claim the foregoing I have hereunto set my hand and seal.

GEORGE E. WOODBURY. [L. S.]

Witnesses:
EDWARD E. OSBORN,
M. REGNER.