E. A. WALL.

ORE CONCENTRATING TABLE.

APPLICATION FILED DEC. 29, 1910.

988,748.

Patented Apr. 4, 1911.

2 SHEETS—SHEET 1.

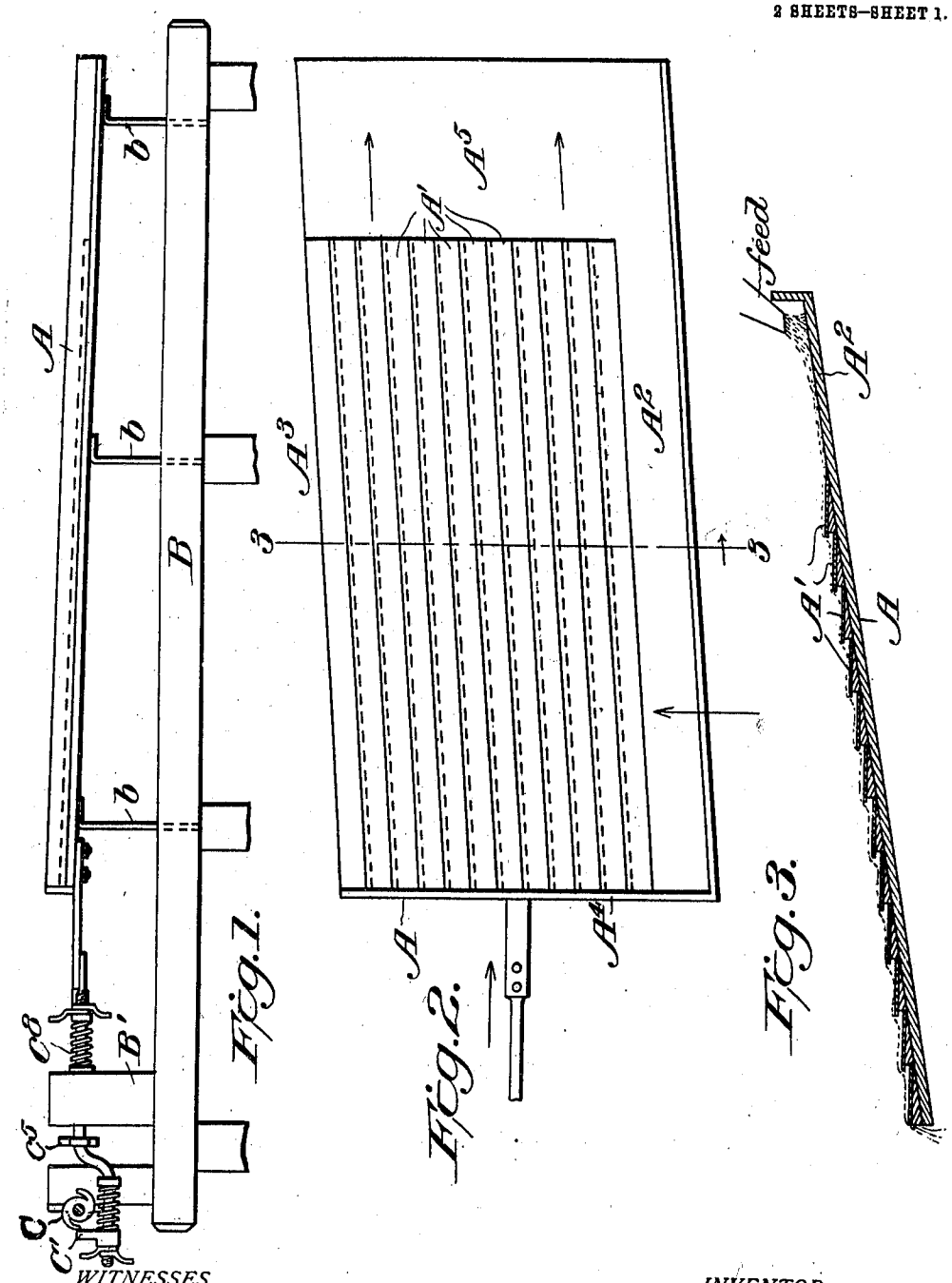

Fig. 1.

Fig. 2.

Fig. 3.

WITNESSES

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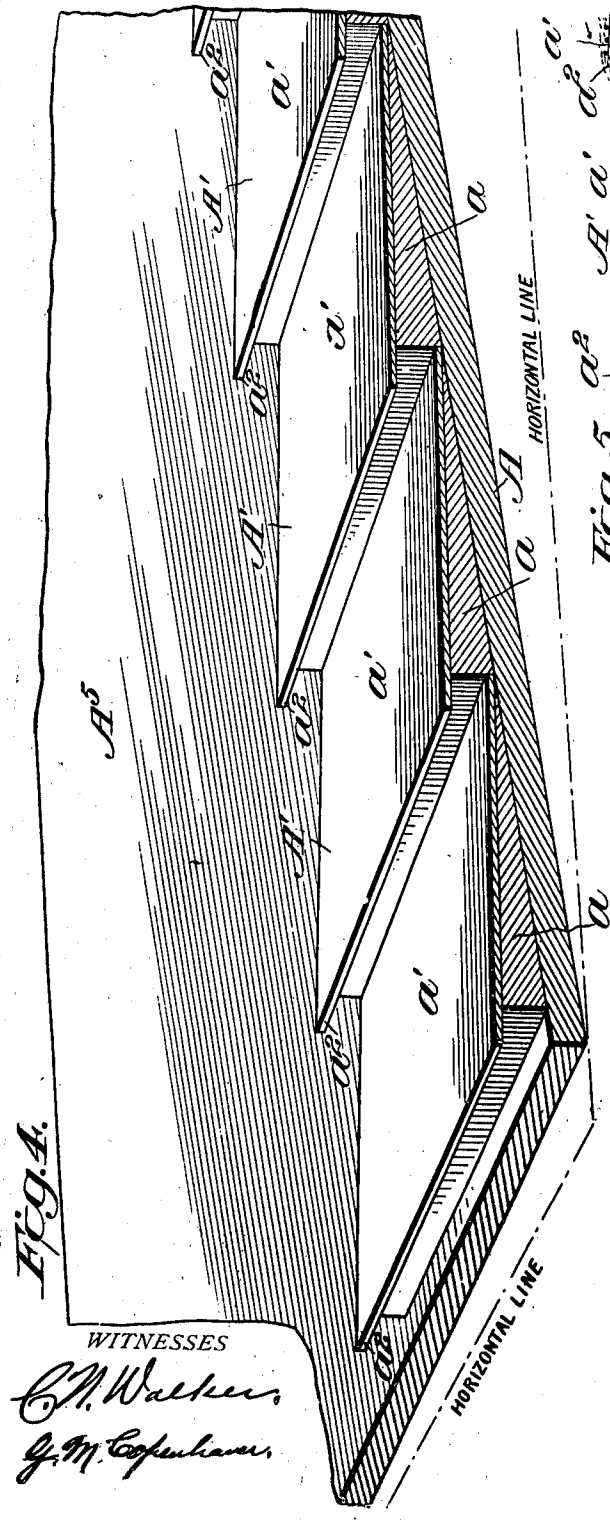

Fig. 4.

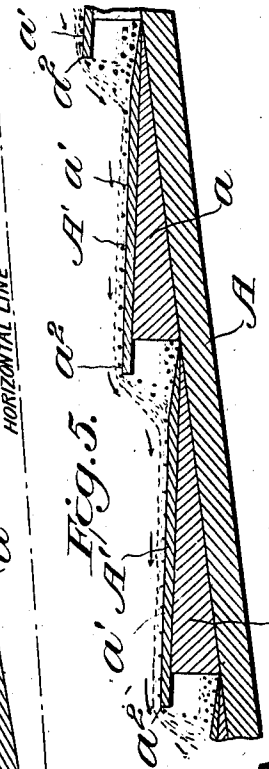

Fig. 5.

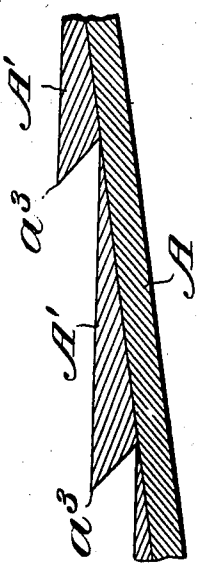

Fig. 6.

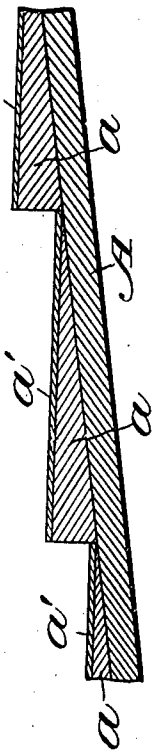

Fig. 7.

WITNESSES

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UNITED STATES PATENT OFFICE.

ENOS A. WALL, OF SALT LAKE CITY, UTAH.

ORE-CONCENTRATING TABLE.

988,748. Specification of Letters Patent. Patented Apr. 4, 1911.

Application filed December 29, 1910. Serial No. 599,986.

To all whom it may concern:

Be it known that I, ENOS A. WALL, a citizen of the United States, residing at Salt Lake City, in the county of Salt Lake and State of Utah, have invented certain new and useful Improvements in Ore-Concentrating Tables, of which the following is a specification.

My invention relates to that class of ore washing machines which, by reason of their exterior form are called tables. Such tables are usually constructed in rectangular form, with a plain or riffled surface. These tables are provided with devices whereby their surfaces may be adjusted to varying degrees of inclination either longitudinally or transversely, and are connected with actuating mechanism which imparts to the table an oscillating reciprocal movement, terminating with a sudden jerk, or bump, the effect of which is to cause particles of mineral, or other heavy substances, resting on the surface of the table, to slide or progress in the direction of movement of the actuating mechanism. In operation the table is inclined transversely to a degree sufficient to cause the material being treated to move or drift freely by power of a slowly moving current of water. The material consists of a mixture of finely crushed or divided rock or sands and water and is fed upon the surface of the higher side of the table, and is carried thence by the flowing water across the line of motion of the table to the downward or opposite side thereof, and as a result the heavier, or mineral particles, on coming in contact with the surface of the table, respond to the bumping or jerking action of the actuating mechanism, and are thus caused to move in the direction of the bumping or jerking motion of the table, across the path of the flowing water, and drifting sands, and are discharged into a receptacle at the tail end of the table. In the early stages of progress in the development of tables of this character, the surface of the table used was uniformly plain or unriffled, and while the recovery of the valuable mineral in this form of surface was much more complete, than now results from modified forms, the capacity came to be considered too low for successful application to treatment of the lower grade ores which are being utilized by later practice. It was therefore discovered that by the intervention of a series of dams formed by placing thin strips of wood or other material across the flow of water and drifting ore and sands, that the volume of ores susceptible of treatment could be greatly increased. At the same time however, the fact developed that a large portion of the finer particles of valuable mineral persistently passed over the riffles and was discharged with the waste sands.

In practical operation of tables of this class I discovered that whereas, the upper vertical walls of the riffles are effective in damming or holding back the coarser and heavier portions of mineral which readily settle to the surface of the table, the finer and lighter portions were kept in partial suspension with the sands in the water, due to the succession of miniature boiling cataracts which are produced by impact of the water on the riffles and its rise and fall in passing over the riffles, and that practically all of the finer portions of mineral that are recovered are those which find accidental lodgment in the narrow eddy formed against the face of the lower vertical wall of the riffle. In order to recover the finely divided portions of mineral in its treatment upon tables of this class, it is essential that the mass of material containing a mixture of the finer grains be caused to drift upon a plain smooth surface, sufficient distance to allow the fine as well as the coarser grains to settle through the sands and come in contact with the surface of the tables. If then the mass be caused to pass over a series of my improved step-falls, the fine and coarse mineral will be found by reason of relative specific gravity to lodge in the angles or recesses formed against the face of the lower wall of the successive steps as shown in the drawing and hereinafter described.

The object of my invention is therefore to provide a table formed of a series of longitudinally extending horizontally disposed parallel surfaces so that the flow of water and material will be down the successive steps and across the line of motion of the table, whereby the heavier material in passing over one step will fall down and be arrested at the angle of the next step below and be forced along the vertical wall at the junction of the two steps and to the tail of the table. This object I accomplish by the mechanism shown in the accompanying drawings in which—

Figure 1 is a side elevation of an ore concentrating table with my improvements ap-

plied. Fig. 2 is a plan of the table. Fig. 3 is a section on line 3—3 of Fig. 2. Fig. 4. is a transverse section in perspective looking toward the tail end of the table. Fig. 5 is a detail section showing the flow of water and material across the table. Fig. 6 is a similar section showing a modified form of step. Fig. 7 is a like view of a further form.

A, designates the table supported in any suitable manner upon a bed or frame B, as for instance by the plate springs *b*. The table A, has its upper surface in the form of a series of longitudinally extending steps A′, the upper or working faces of which lie in horizontally disposed parallel planes; the highest step being at the feed side A^2, and the lowest step being at the gangue-discharge side A^3. The steps A′ extend from the head end A^4 toward the tail end A^5 of the table and this end is a plane surface as shown.

While the table extends downwardly at an incline from its feed side A^2 toward its waste side A^3 the series of working faces formed by the upper sides or "treads" of the steps all lie in substantially horizontal planes and so while the surface of the table is in parallel planes it is substantially horizontal.

The discharge edge of each step is made to overhang the inner edge of the next step below as in Figs. 2, 3, 4, 5 and 6 though this overhang may be omitted if desired as shown in Fig. 7. In Fig. 4, which shows the preferred form, the steps A′, are formed of wedge shaped strips *a*. extending in the direction of the length of the table with their thicker sides next to the discharge side A^3 of the table and upon the upper side of the strips *a*, are secured plates *a′*, of linoleum or sheet metal; the plates *a′* in Figs. 4 and 5 being wider than the strips *a*, so as to produce an overhang a^2 at the discharge edges of the strips. This overhang may be produced in other ways as for instance by an undercut or bevel a^3 as in Fig. 6. In any event the thicker side of the strip *a* will form a wall or "riser" at the opposite edge of the step from the flow of the feed water so that the heavier material will fall down from the discharge edges of the steps and lodge next to said vertically disposed wall while the water and lighter material will fall beyond the heavier material and flow on down the succeeding steps depositing as it flows the valuable material at each "riser" or vertical wall. The valuable material thus deposited along each vertical wall will by the bumping or jerking action of the table be moved therealong and finally reach the plane A^5 at the tail end from which it will be discharged into any suitable receptacle.

By referring to Fig. 5 the action of the water on the material will be the more readily understood. It will be seen first that the flow of water from the feed side of the table toward its discharge side will not be impeded by any raised surfaces, ribs, or riffles since there are none.

In the old forms of tables employing riffles or dams, the flow of water is interrupted by the water striking against the front vertical wall of the riffle which causes a sudden upward movement which carries much valuable material over the dam or riffle and causes a great waste of the lighter and valuable particles. In my table there are no dams for the water to impact or strike and impede its flow as the surface, though divided, is horizontally disposed and the water will fall from one step to another as shown in Fig. 5. The valuable heavier particles will drop down at the discharge edge of every step and the water will strike the next succeeding step beyond the point where the valuable particles lie and will not therefore carry them beyond the last step. Successive step-like strata of valuable material will underlie the water and waste material and, as deposited at the vertically disposed walls or risers, will be moved longitudinally therealong toward the tail of the table owing to the bumping or jerking action thereof.

The steps or surfaces A′, are shown in Fig. 2 as slightly oblique to the line of motion of the table but this is not necessary as they may be arranged in the same direction as the line of movement.

The inclination of the table from feed side toward overflow may be varied and so with the inclination from head to tail as is usual in this class of machines.

Any form of actuating mechanism may be employed, which will cause the particles of mineral adhering to or resting upon the surface of the table to progress toward the tail or discharge end of the table in response to the movement of such mechanism but I prefer the mechanism shown and described in my Patent No. 947,874, dated Feb. 1, 1910, which acts to slowly retract the table by the cam C acting on tappet C′ and then release it when it will be projected quickly forward by the spring c^8 and suddenly stopped by contact of the buffer c^5 with the bumping post B′ thus producing a jerk or bump, and causing the mineral to progress toward the discharge end of the table with each successive jerk or bump.

Having thus described my invention what I desire to claim is:—

1. A transversely inclined concentrating table, reciprocating means adapted to progress the concentrates toward the discharge end, said discharge end being unobstructed and said table being provided with a working surface divided into a series of parallel transversely horizontal planes extending unobstructed in the direction of the length, and line of motion, of the table and forming a

series of steps descending from the high or feed side of the table toward the opposite or gangue-discharge side; the risers at the discharge edges of the steps forming walls against which the heavier particles will settle as the wash-water and lighter material flow on down the steps.

2. A transversely inclined concentrating table, reciprocating means adapted to progress the concentrates toward the discharge end, said discharge end being unobstructed and said table being provided with a working surface divided into a series of parallel transversely horizontal planes extending unobstructed in the direction of the length and line of motion of the table and forming a series of steps descending from the high or feed side of the table toward the opposite or gangue-discharge side, and the discharge edge of one step overhanging the inner edge of the next step below and thereby forming recesses into which the heavier particles will settle as the wash water and lighter material flow on down the steps.

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

ENOS A. WALL.

Witnesses:
C. L. STURTEVANT,
E. G. MASON.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."