

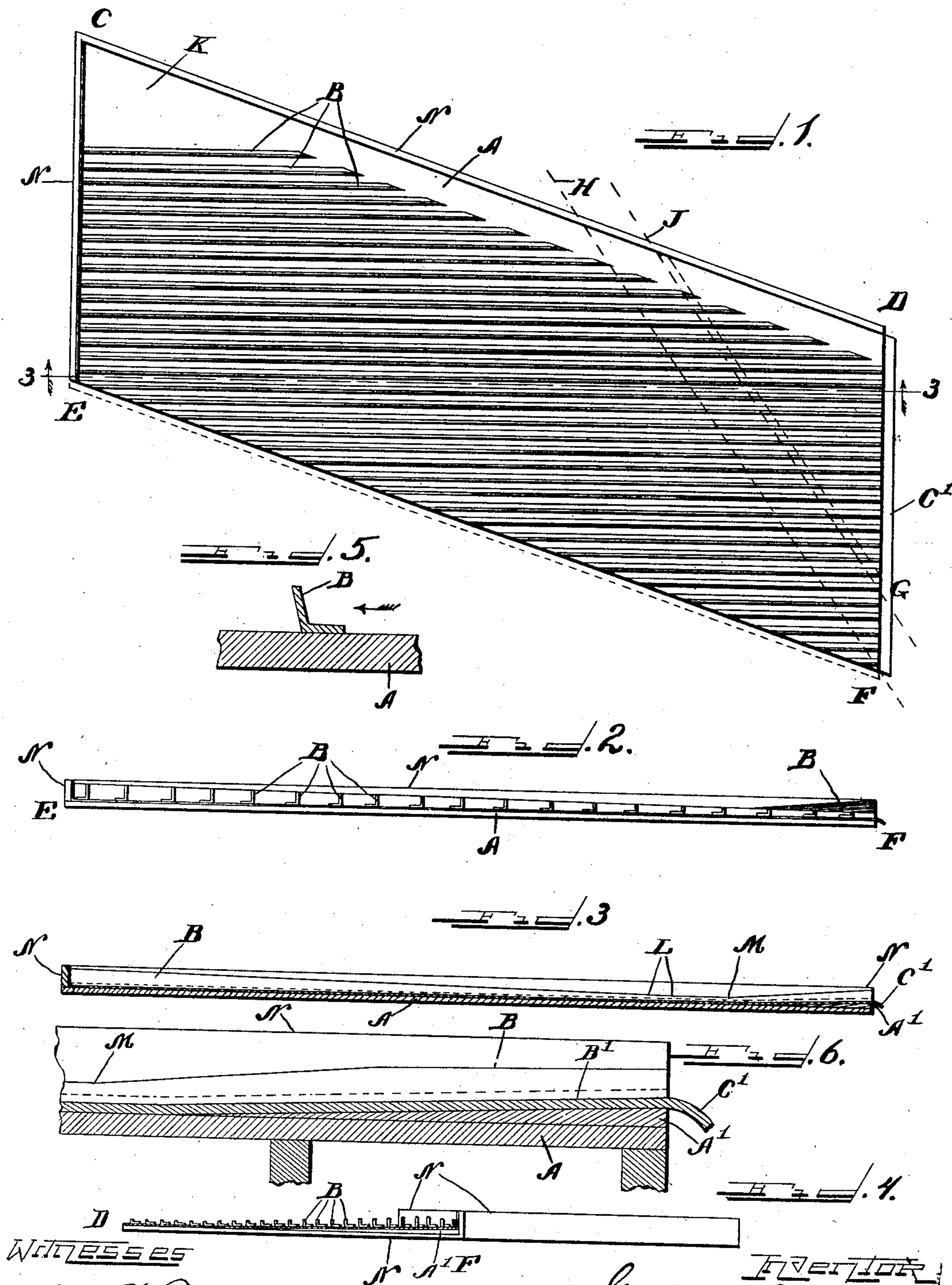
No. 763,784.

PATENTED JUNE 28, 1904.

G. A. OVERSTROM.
CONCENTRATING TABLE.
APPLICATION FILED JULY 19, 1901.

NO MODEL.

2 SHEETS—SHEET 1.



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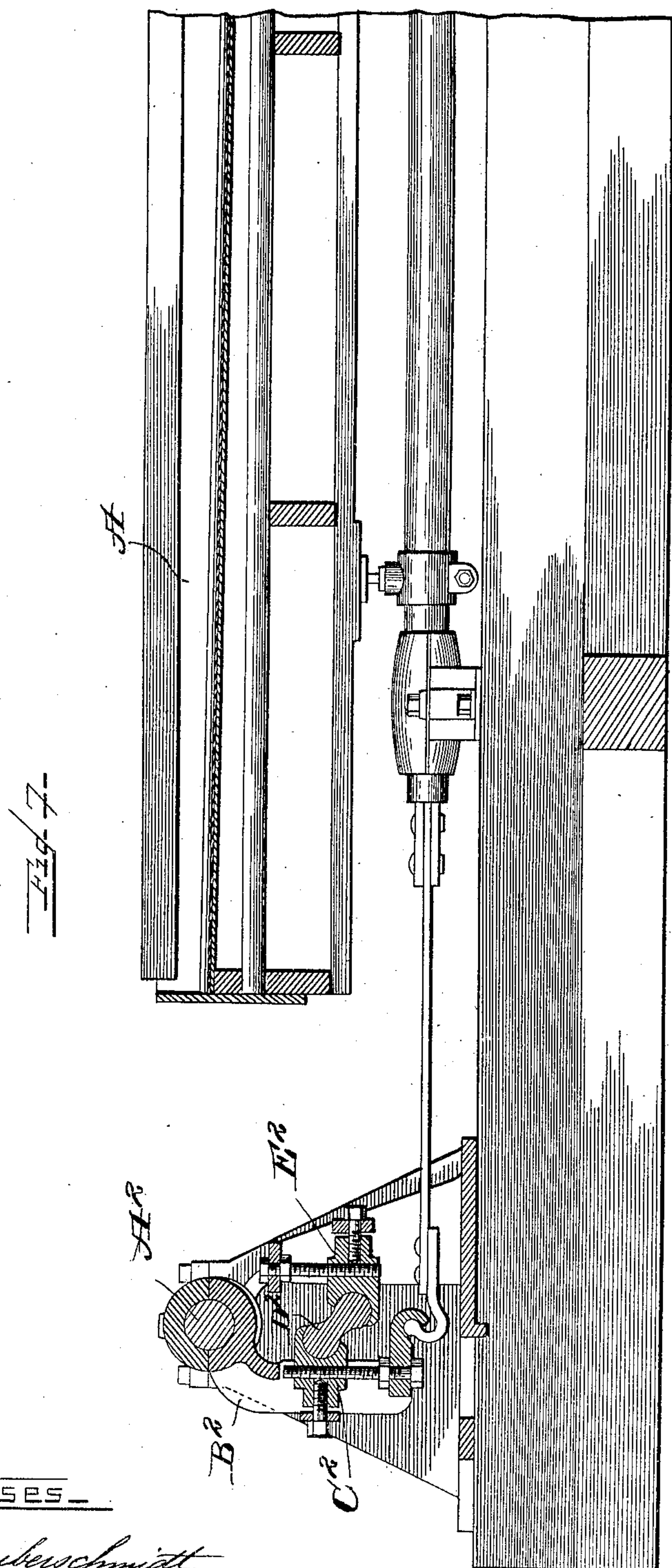
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UNITED STATES PATENT OFFICE.

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CONCENTRATING-TABLE.

SPECIFICATION forming part of Letters Patent No. 763,784, dated June 28, 1904.

Application filed July 19, 1901. Serial No. 68,958. (No model.)

To all whom it may concern:

Be it known that I, GUSTAVE A. OVERSTROM, a citizen of the United States, residing at Anaconda, in the county of Deerlodge and State of Montana, have invented a new and useful Concentrating-Table, of which the following is a specification.

This invention relates to ore-concentrating tables.

10 The object of the invention is to improve the construction of concentrating-tables whereby a more efficient separation of mineral from the silica, rock, dirt, and the like is effected.

15 The invention consists, substantially, in the construction, combination, location, and arrangement of parts, all as will be more fully hereinafter set forth, as shown in the accompanying drawings, and finally pointed out in the appended claims.

20 Referring to the accompanying drawings and to the various views and reference-signs appearing thereon, Figure 1 is a plan view of a concentrating-table embodying the principles of my invention. Fig. 2 is an edge view, 25 taken from the tailings-discharge edge or side of the table, looking from the bottom of Fig. 1, the edge flange or riffle being omitted. Fig. 3 is a longitudinal section on the line 3 3, Fig. 1, looking in the direction of the arrows. 30 Fig. 4 is an end view looking from the right-hand end of Fig. 1. Fig. 5 is an enlarged detail view in cross-section, showing the arrangement of riffle on the upper surface of the table. Fig. 6 is a broken view similar to 35 Fig. 3, but on a larger scale. Fig. 7 is a view in section, taken longitudinally of an ore-concentrating table embodying the principles of my invention and showing the form of reciprocating mechanism therefor.

40 The same part is designated by the same reference-sign wherever it occurs throughout the several views.

45 In the operation of ore-concentrating plants the crushed ore is delivered upon a table to which a reciprocatory movement is imparted and upon which is delivered wash-water, the longitudinal reciprocations imparted to said table serving to effect the advancement of the

particles of silica, rock, and mineral along said table, and the mineral portion being heaviest 50 gravitates to the bottom of the mass, is deposited upon the table, and progressed along said table, while the rock portions, the silicate, dirt, and the like are gradually washed away from the mineral portion and are discharged 55 over one edge of the table (which edge I will hereinafter designate the "tailings-discharge" edge) along with the wash-water, while the mineral portion is advanced or progressed over the end of the table. In order to prevent the 60 mineral from being washed off with the wash-water, it is usual to provide riffles upon the upper surface of the table, the purpose and function of which is to form stops to catch and hold the mineral portions, while at the 65 same time permitting the lighter silica, rock, dirt, and the like to wash over the upper or top edges of the riffles. These riffles have been arranged in various ways, and riffles of various shapes in cross-section have been em- 70 ployed for this purpose.

My present invention relates particularly to a construction and arrangement of riffles; and the special object in view is to insure as complete a separation of the silica, rock, dirt, and 75 the like as possible from the mineral without the danger of losing any of the mineral by the same being washed off or away with the wash-water which carries the silica, rock, &c., and while I have shown and will now describe a 80 particular construction and arrangement of table I desire it to be understood that my invention is not limited in this application to a table of the specific construction shown, but is equally well adapted for use with other types 85 and constructions of tables.

Referring to the accompanying drawings, reference-sign A designates the table, which is of quadrangular shape—that is, the sides or edges thereof are parallel with each other and 90 the ends thereof are parallel with each other; but the sides, as shown, are inclined with respect to the ends.

B designates generally the riffles. These riffles are arranged in the particular form 95 shown, and preferably to extend parallel

each other and substantially at right angles to the ends and diagonally to the sides or edges of the table. In practice reciprocatory movements are imparted to the table substantially in the direction of length of the riffles—that is, in a diagonal direction with respect to the table. I have shown an illustrative form of means for imparting such reciprocatory movements to the table. In the form of apparatus for imparting reciprocatory movements to the table shown reference-sign A^2 designates a shaft to which is eccentrically connected an arm B^2 , carrying a bearing-block C^2 . A block D^2 is journaled in said bearing-block and a co-operating stationary bearing-block E^2 , so that when shaft A^2 is rotated the end of said arm B^2 describes an orbital movement. The free end of said arm B^2 is connected in suitable manner to the table A . The construction and arrangement of this reciprocating mechanism is more fully described and claimed in my pending application, Serial No. 38,435, filed December 3, 1900. It is obvious that any suitable form of reciprocating mechanism may be employed. Such mechanism in the specific details of construction thereof forms no part of my present invention.

The crushed ore is in practice deposited upon the table at the point K . Wash-water is supplied along the edge CD and by reason of the component of forces due to the reciprocatory movements imparted to the table about in the diagonal line from E to D and the flow of wash-water transversely across the table from the edge CD the ore is progressed toward the end DF , while at the same time the mineral portion settles to the bottom or upon the surface of the table and the lighter silica, rock, dirt, or the like is washed over the top edges of the riffles B by the wash-water and is discharged along the edge EF , the mineral portion being discharged along the edge DF . In practice each succeeding riffle after the one terminating at the corner E and on each side thereof is slightly less in height above the surface of the table than the one immediately preceding it; but a diagonal line parallel with the line HF will cut the riffles at points of uniform height. The object of this is to insure an even and uniform spreading out of the ore over the entire surface of the table, thereby enabling every portion of the table to perform its proper part of the concentrating-work. Thus, as viewed in Fig. 2, (which is an edge view looking from the bottom of Fig. 1 toward the edge EF), the ends of the riffles shown in end view at the left-hand side of Fig. 2 are of greater height than the riffles shown in end view at the right-hand end of said figure, each succeeding riffle being slightly lower than the immediately-preceding riffle. This is also shown in Fig. 4, which is a view looking from the right of Fig. 1 along the end DF , the riffle shown at the right of said figure being of greater height

than those at the left-hand end of said figure. The riffles, as above specified, extend diagonally with respect to the table, and those which terminate along the end DF extend all the way to the end of the table, and those which would otherwise intersect the edge CD terminate a short distance from said edge, as clearly shown in Fig. 1. Each riffle, in accordance with the principles of my invention, is of decreasing height from the left-hand end thereof toward the right-hand end to a point indicated at L , Fig. 3, and from thence to a point indicated at M , Fig. 3, the height of the riffle remains substantially uniform and slightly above the top surface of the table, and from the point M to the extreme right-hand end the riffle increases in height to the point N , Fig. 3. The point L of each riffle is somewhat nearer the edge DF than the corresponding point of the preceding riffle. Consequently the dotted lines HF and JG , Fig. 1, indicate the line of the straight parallel surfaces of the riffles between the points LM , and which portions of the riffle extend only a very slight distance above the top surface of the table. The special purpose of this arrangement is to provide means for insuring a complete and efficient concentration of the mineral and the elimination of the dirt, rock, silica, and the like therefrom. Thus when the mineral reaches the point L , for instance, in the length of a riffle there is still provided a ledge for retaining mineral; but the height of such ledge is not sufficient to prevent any silicate or rock to be washed over, but is of sufficient extent to prevent the mineral from being carried over the top edge thereof, and even if some particles of mineral are carried over the depressed portion LM of one riffle they will be caught by the projecting edge of the next succeeding riffle and progressed somewhat farther toward the end DF of the table before it reaches the depression LM of the next succeeding riffle, and after the depression LM of any riffle is passed by any mineral it is desirable to provide against any further wash over the top edge of the riffle, for at that period a complete separation of the silica, rock, &c., from the mineral has been effected. In other words, whatever portions of the rock, silica, and the like which have not been separated and washed away from the mineral will be separated and washed away at the lowest portions LM of the riffles, and after passing the point M of any riffle the riffle increases in height, so as to insure against any particle of the mineral being washed over. It will be understood that when the crushed ore is first supplied upon the surface of the table at the point K it partially lodges against the first riffle, a portion of the crushed material washing over the top edge of the first riffle and being caught by the next succeeding riffle, and so on, at the same time being progressed lengthwise of the first riffle and finally falling

over the extreme end of the first riffle and being caught by the extended length of the next succeeding riffle, and so on. In order to still further insure the separation of the silica, rock, and the like from the mineral and also to prevent too much of the water from flowing over the edge D F of the table along with the mineral, I prefer to slightly raise the surface of the table adjacent to said edge. This result may be accomplished in many ways. A simple way is shown most clearly in Fig. 6, wherein a tapering or wedge-shaped piece A' is inserted underneath the linoleum lining B' of the table-surface, the thickened portion of the wedge being presented toward the edge D F of the table. The piece A' tapers not only in a direction away from and normal to the edge D F, but also in a direction parallel with said edge in order to diminish the height of the raised portion or surface of the table toward the extreme lower corner of the table. This raised portion begins immediately beyond the seats or depressions in the riffles, the bounds of which are indicated by the lines J G and H F and continues to the extreme end of the table, and in order that the riffles may not be raised a too great height above the surface of the table said riffles toward the ends thereof may be slightly reduced in height to compensate for the wedge-blocks, as clearly shown in Fig. 6. The purpose of this construction is to prevent the possibility of any silica, rock, or the like or too much water being carried over the end of the table. The silica, rock, water, and the like being lighter than the mineral will not travel up the inclined surface of the table near the end thereof, while the momentum of the mineral under the impetus of the reciprocations of the table will cause the mineral to travel up the incline. Therefore the silica, rock, water, or the like is retarded and caused to be washed away toward the tailings-delivery edge of the table, while the mineral is fed or progressed on over the edge D F of the table and over the extending apron C' of the linoleum. This I regard as a valuable feature of my invention.

The riffles, as above stated, may be of any suitable or convenient shape in cross-section. In Fig. 5 I have shown the construction of riffle which I have found suitable, comprising an angle-strip somewhat inclined in the direction of flow of the wash-water delivered upon the table along the edge C D—that is, the riffles incline somewhat toward the tailings-delivery edge E F—the direction of transverse flow of the wash-water being indicated by the arrow in Fig. 5. I do not desire, however, to be limited to this specific shape in cross-section of the riffle, as other specific shapes in cross-section of riffles may equally well answer the purpose. In practice I prefer to employ a flange or riffle (indicated at N) along the upper edge from D to C of

the table, along the end from C to E, and along the tailings-discharge edge from E to F, as indicated in dotted lines in Fig. 1. The flange or riffle extending from E to F is omitted in the view shown in Fig. 2, and in practice this edge or flange should be of decreasing height from the corner E toward the corner F and corresponding in height to the height of the riffles—that is, corresponding to the decrease in height of the riffles, as viewed in Fig. 2.

Variations and changes in the specific details of construction and arrangement would readily occur to persons skilled in the art and still fall within the spirit and scope of my invention. I do not desire, therefore, to be limited or restricted to the exact details of construction shown and described; but,

Having now set forth the object and nature of my invention and a construction embodying the principles thereof, what I claim as new and useful and of my own invention, and desire to secure by Letters Patent, is—

1. An ore-concentrating table having an open discharge end, riffles arranged upon the surface of said table and extending toward said open discharge end, each of said riffles having a depressed portion and elevated or raised portions on each side of the depressed portion, the depressed portion being formed therein between the ends of the riffles, and means for reciprocating said table in the direction of the length of said riffles, as and for the purpose set forth.

2. An ore-concentrating table having an open discharge end provided with riffles, arranged upon the surface of said table and extending toward said open discharge end, each of said riffles being of decreasing height for a portion of the length thereof and increasing in height at the extreme end thereof, and means for reciprocating said table in the direction of the length of said riffle, as and for the purpose set forth.

3. An ore-concentrating table, an open discharge end provided with riffles arranged upon the surface of said table and extending toward said open discharge end, each riffle having a portion of its length of uniform height, and increasing in height from said portion of uniform height toward the respective ends thereof, and means for reciprocating said table in the direction of the length of said riffles, as and for the purpose set forth.

4. The combination with a concentrating-table, of riffles mounted on the upper surface of said table and extending diagonally of said table, said riffles being of decreasing height for a portion, and in the direction of, the length thereof, and of increasing height for another portion of the length thereof, and means for reciprocating said table in the direction of the length of said riffles, as and for the purpose set forth.

5. The combination with a concentrating-

table, of riffles mounted on the upper surface thereof and extending parallel with respect to each other, each of said riffles provided with a portion of uniform height and increasing in height toward the respective ends thereof from said portion of uniform height, thereby forming a seat or depression, the seat or depression formed in one riffle being somewhat in advance of or nearer the end of the table than the seat or depression formed in the preceding riffle, means for reciprocating said table in the direction of the length of the riffles, as and for the purpose set forth.

6. The combination with a concentrating-table having parallel sides and parallel ends, the sides being inclined with respect to the ends, of riffles mounted on the top surface of said table and arranged in substantially parallel relation with respect to each other and substantially at right angles of said table, said riffles decreasing in height for a portion of the length thereof and increasing in height for a portion of the remaining length thereof, and means for reciprocating said table in the direction of the length of said riffles, as and for the purpose set forth.

7. A concentrating-table having riffles upon the upper surface thereof, a covering or lining interposed between the riffles and table, and a wedge-block interposed between said table and covering to form an upwardly-inclined surface at the mineral-delivery end of the table, and means for reciprocating the table in the direction of the length of said riffles, as and for the purpose set forth.

8. A concentrating-table having a covering or lining for the upper surface thereof, and a block interposed between said cover and table

adjacent to the mineral-delivery end of the latter, in combination with riffles arranged on said table-covering, said block being tapered lengthwise with respect to said riffles to form an upwardly-inclined surface at the mineral-delivery edge of the table, and means for reciprocating the table in the direction of the length of said riffles, as and for the purpose set forth.

9. A concentrating-table having riffles arranged to extend in the direction of the length of the table, in combination with a block arranged adjacent to the mineral-delivery end of said table, said block being tapered both lengthwise and transversely with respect to the length of said riffles to form an upwardly-inclined surface at the mineral-delivery end of the table, and means for reciprocating said table in the direction of the length of said riffles, as and for the purpose set forth.

10. The combination with a concentrating-table having parallel sides and parallel ends, said ends being inclined with respect to said sides, of riffles mounted on the upper surface of said table, said riffles being parallel with respect to each other and inclined to the sides and substantially at right angles to the ends of the table, and means for reciprocating said table in the direction of the length of said riffles, as and for the purpose set forth.

In witness whereof I have hereunto set my hand, this 2d day of July, 1901, in the presence of the subscribing witnesses.

GUSTAVE A. OVERSTROM.

Witnesses:

CHAS. H. SEEM,
S. E. DARBY.