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J. F. C. ABELSPIES.
ORE CONCENTRATING APPARATUS.
APPLICATION FILED AUG. 15, 1904.

Fig. 1.

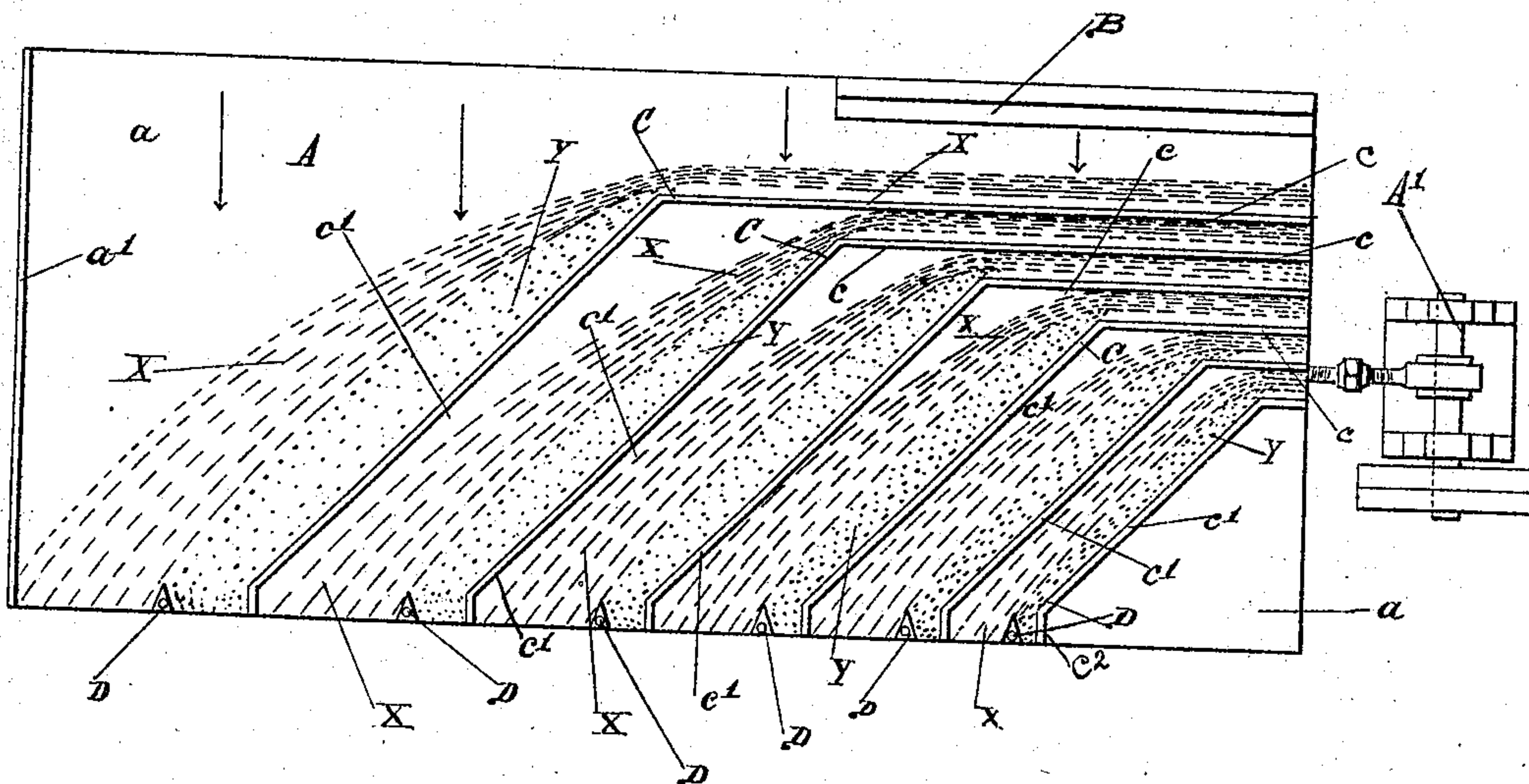
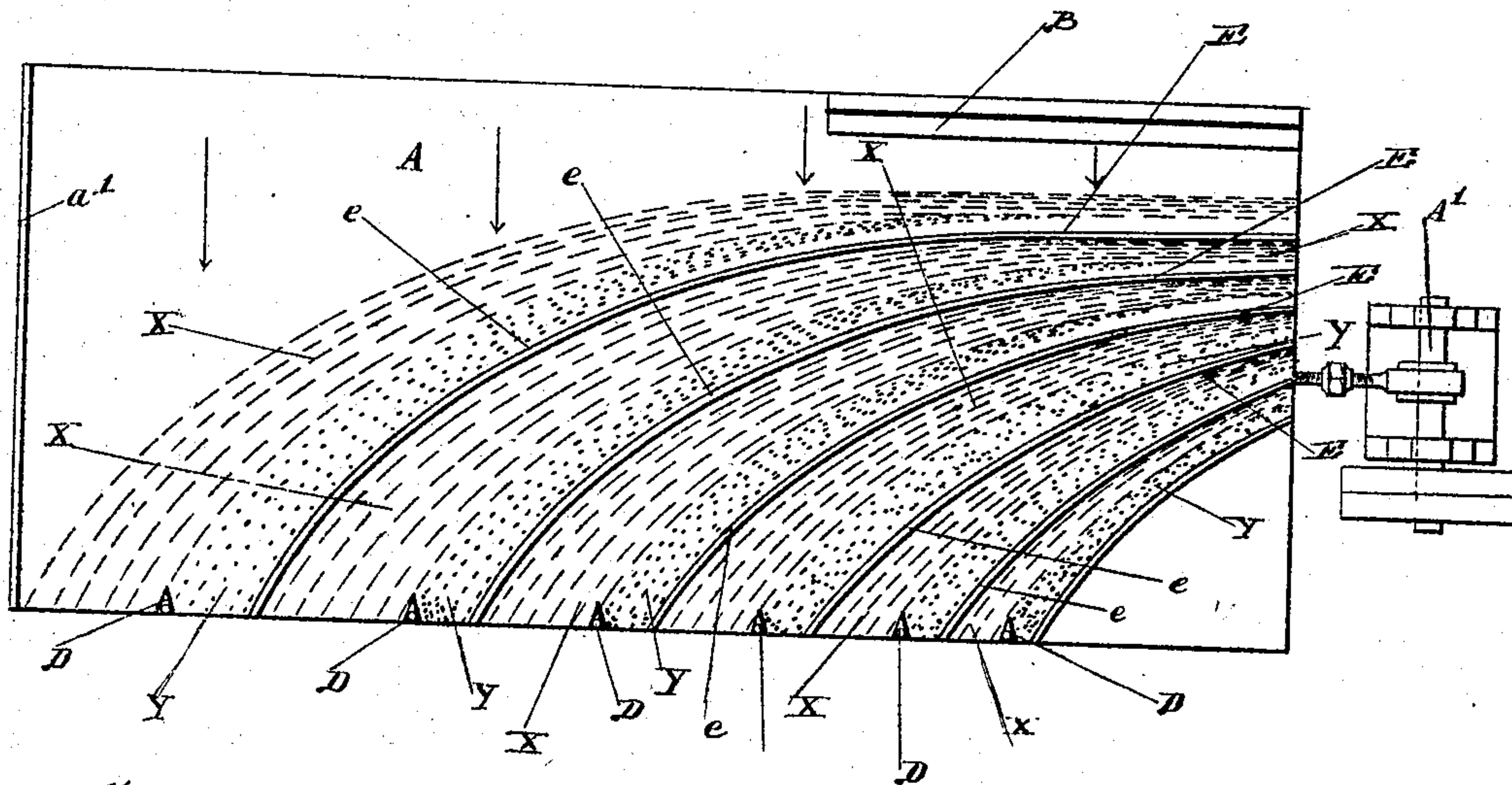


Fig. 2.



Witnesses

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UNITED STATES PATENT OFFICE.

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ORE-CONCENTRATING APPARATUS.

No. 814,896.

Specification of Letters Patent.

Patented March 13, 1906.

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To all whom it may concern:

Be it known that I, JOHN FREDERICK CHARLES ABELSPIES, a subject of the German Emperor, and a resident of Polmear Mine, Charlestown, in the county of Cornwall, England, have invented certain new and useful Improvements in Ore-Concentrating Apparatus, of which the following is a specification.

This invention relates to improvements in ore-concentrating apparatus; and it consists of a special arrangement of the kind in which the action of water flowing over a transversely-inclined reciprocating table is employed.

In most concentrators having riffled surfaces the discharge of the concentrates takes place at the lower end of the table diagonally opposite to the feed-intake, and the riffles acting as checks against the downflow of material each receives a certain portion of ore, the mineral particles of which are supposed to travel within the riffles toward the discharge end. The riffles run either straight in the direction of the motion or more or less diagonally upward toward the higher side. The action of the table frequently causes overloading and leaves a large part of the table-surface unavailable for actual concentration work. I propose to employ riffles extending from the feed-intake on the higher side of the inclined table and slanting downward in a suitable form toward the lower side, so that the wash-water on striking the riffles forms a swirl or small return-current at the edges, which prevents the concentrates or mineral particles gathering close to the riffles and at the same time assists the gangue particles to separate. Each riffle brings about the formation of definite streaks or streams of mineral and gangue or waste, which are collected at the lower edge of the table, and the concentrates from each riffle may be collected separately.

In order that this invention may be more readily understood, reference is had to the accompanying sheet of drawings, in which—

Figure 1 is a plan of a table having riffles formed according to my invention, and Fig. 2 is a similar view of a slightly-modified construction.

The table A is mounted and reciprocated longitudinally in the manner common to such tables, reciprocating means A' being shown diagrammatically in the drawings, and slopes downward at an angle from top to bottom, so

that the wash-water which is led from the upper side flows in the direction of the arrows in the form of a thin sheet of water over the table. The feed-intake for the ground ore or slimes is indicated at B at the upper right-hand corner of the table, while the wash-water is supplied in the well-known manner along the remainder of the upper edge.

In the apparatus shown in Fig. 1 the riffles C are formed in the two main parts *c* and *c'*, the parts *c* being situated immediately below the feed-intake and sloping downward from right to left at a small angle, having a fall of about half an inch to one foot. The parts *c'* of the riffles extend downwardly from the end of *c* and form an angle of about forty-five degrees with the edge of the table, so that each riffle has a bend which may be sharp, as shown in the drawings. The parts *c* and *c'* of each riffle are arranged, as shown in the drawings, parallel to one another, so that each forms a succession of parallel ribs separated by suitable intervals. I prefer to decrease the intervals between the parts *c'* in successive riffles extending from left to right, as the lower riffles successively treat smaller portions of ore and require less space. The slimes flowing in from the feed-intake B down the inclined table strike against the part *c* of the top riffle, overflowing this riffle and the successive riffles as each one becomes fully charged. The slight slope of the parts *c* directs the ore downward and to the left, the reciprocating action of the table of course assisting, and the wash-water carries the material downward with it, forming, as already mentioned, a swirl as it strikes the riffle and more especially the part *c'*, which has a steeper slope. It is found that the effect of this swirl is to cause a clean separation of the concentrates and the waste, as shown by the dotted parts X and Y, X indicating the stream of concentrates which are directed away from the inner stream of gangue, the latter collecting a short distance from the riffle and following the lines of the water-swirl produced close to the edge. The swirl or return current imitates the action of the hand-vanning shovel and causes the mineral to wash in front of the gangue. It is found that, as shown in the drawings, each riffle formed in this manner causes separate streams of concentrates and gangue, which are separately collected at the lower edge *a* of the table, a vertical bar or rib *a'* being placed, if necessary, at the end of the table to direct

the upper or left-hand stream toward the outlet at the lower edge. The movable guides or pointers D shown at the lower edge of the table separate the streaks of concentrates and waste, which are directed into separate channels. The finer concentrates and gangue are washed over the upper riffles and collected and separated by the lower ones. Where several minerals are included in the ore, they are separated into different streaks by the action of the riffles, according to their specific gravity and fracture, and each streak is separately taken off. At the lower end of each riffle I have shown a small vertical portion c^2 , which assists to some extent in directing the streak of gangue; but this vertical part is not essential.

In the modification shown in Fig. 2 the form of the riffles is somewhat different, each riffle E having a continuous curve from the upper right-hand end to the lower, the steeper part e of the curve, however, having a slope of about the same amount as c' in the first figure. The action of these riffles is similar to that of the first form and requires no further description.

What I claim as my invention, and desire to secure by Letters Patent, is—

1. In a concentrator, a transversely-inclined reciprocating table, feeding means extending along a portion of the upper longitudinal edge of the table, longitudinal riffles extending transversely of the line of feed for a portion of the table length, partitions extending from the ends of the said riffles diagonally to the lower side of the table, and means

at the lower end of each of the concentrating-sections formed by said partitions for separately collecting the grades separated by said sections.

2. In a concentrator, a transversely-inclined reciprocating table, feeding means extending along a portion of the upper longitudinal edge of the table, riffles extending transversely of the line of feed for a portion of the table length and sloping downwardly at a small angle, partitions extending from the ends of the said riffles diagonally to the lower side of the table, and means at the lower ends of each of the concentrating-sections formed by said partitions for separately collecting the grades separated by the sections.

3. In a concentrator, a transversely-inclined reciprocating table, feeding means extending along a portion of the upper longitudinal edge of the table, parallel longitudinal riffles extending transversely of the line of feed for a portion of the table length, partitions parallel to each other extending from the ends of the said riffles diagonally to the lower side of the table, and means at the lower end of each of the concentrating-sections formed by said partitions for separately collecting the grades separated by the sections.

In witness whereof I have hereunto set my hand in the presence of two witnesses.

JOHN FREDERICK CHARLES ABELSPIES.

Witnesses:

FRANK WILLIAM PATTISON,
WILLIAM JAMES COX.