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I. A. CAMMETT & F. E. SHEPARD.

ORE CONCENTRATOR.

(Application filed Oct. 12, 1898.)

(No Model.)

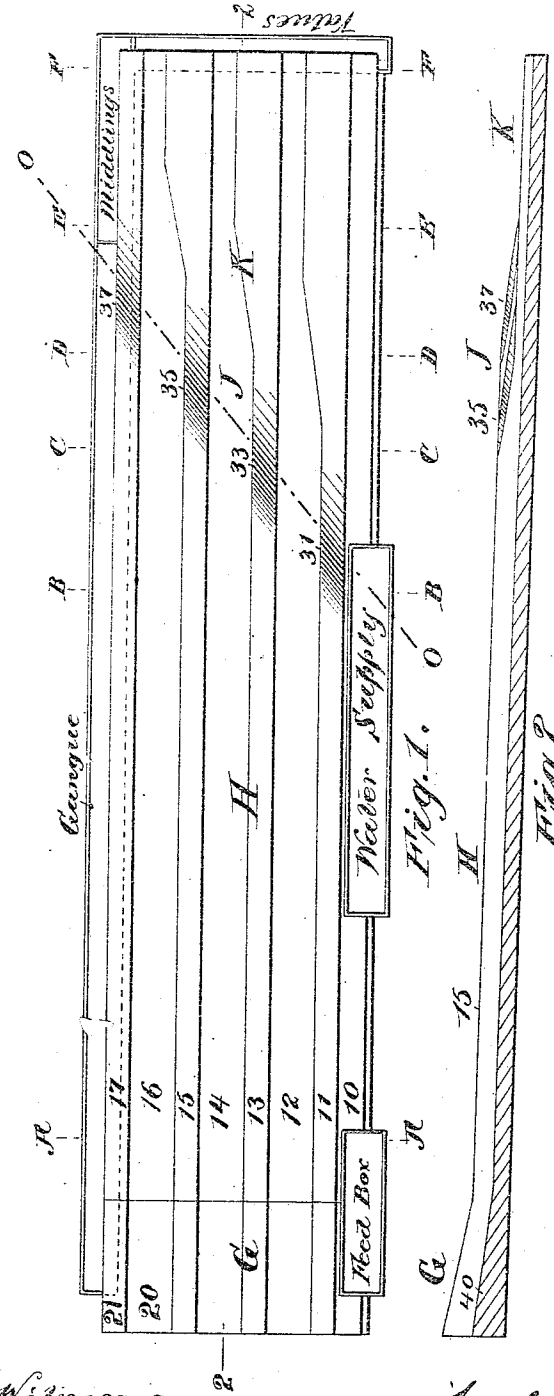


Fig. 1.

Fig. 2.

Fig. 3.

Witnesses,
C. W. Benjamin
Geo. A. Somerborn.

Inventors,
Ira A. Cammett and Frank E. Shepard
By Wadd & Fitzgerald
Attys

UNITED STATES PATENT OFFICE.

IRA A. CAMMETT AND FRANK E. SHEPARD, OF DENVER, COLORADO.

ORE-CONCENTRATOR.

SPECIFICATION forming part of Letters Patent No. 632,892, dated September 12, 1899.

Application filed October 12, 1898. Serial No. 693,334. (No model.)

To all whom it may concern:

Be it known that we, IRA A. CAMMETT and FRANK E. SHEPARD, of Denver, in the State of Colorado, have invented certain new and useful Improvements in Ore-Concentrators, of which the following is a description, referring to the accompanying drawings, which form a part of this specification.

The object of our invention is to improve the riffled surface of the tables of ore-concentrators, particularly that class of ore-concentrators in which the table is given an end-shake movement which agitates and assists in the separation of the values from the sand and tailings and which at the same time produces a progressive movement of the values along the surface of the table in the line of the movement. It is customary in some forms of such tables to provide riffles extending either in the line of the movement or at a slight angle thereto and to so incline the surface of the table that the water flows across from riffle to riffle transversely, carrying with it the sand and dust of the pulp and leaving in the channels between the riffles the values. The latter by the progressive effect of the end-shake movement are carried along between the riffles and finally fall from the foot of the table into a suitable receptacle. Tables have been constructed by which such riffles terminated on a line oblique to the table, leaving an approximately triangular area toward the foot of the table, having a smooth plane or unriffled surface. When the values pass from the ends of the riffles onto such smooth unriffled area, there is nothing except their weight to prevent their being carried sidewise with the wash-water toward the tailings side of the concentrator. In an application filed by us March 29, 1898, Serial No. 675,637, we have set forth the advantages of tapered raised riffles which taper down along an oblique line and terminate at a specially roughened surface, the roughening forming minute recesses which assist in retaining the values. While such a roughening tends to prevent to a large extent the loss of values along with the tailings, such roughened surface does not in any sense guide the values toward the foot end of the table, and we have discovered that the advantages of an unriffled portion toward the foot of the table may be retained and the disadvantages be gotten rid of by continuing the riffles at a diminished height across such area to the foot of the table. The reduced portion of such riffles should be so low as not to interfere with the transverse flow of the wash-water toward the tailings side of the table, yet their presence is sufficient to exert a very decided guiding tendency to the heavier particles which constitute the values. These latter are prevented by the low riffles from being carried transversely, and they therefore travel in line with the riffles to the foot of the table.

Having thus briefly outlined the main points of the present invention, we will now describe the invention in connection with the accompanying drawings and point out several other features which can be best understood in connection with the drawings.

Figure 1 is a diagrammatic plan view of the table. Fig. 2 is a longitudinal section on the section plane 2 2 of Fig. 1; and Fig. 3 is a series of transverse sections on the respective planes A, B, C, D, E, and F of Fig. 1.

Throughout the drawings like reference letters and numerals indicate like parts.

Certain features, as will be clearly apparent to any one skilled in the art, are exaggerated for the purpose of clear illustration in the drawings, and the table shows only four riffles, although it will be understood that in practice a greater number are employed. By reducing the number for the purpose of illustration we have sought to bring out the details more clearly.

The head end of the table-surface is provided with a gently-upward incline 40, which takes the place of a vertical confining-wall at that point. This incline confines the pulp and water while it is being agitated without producing a wave along the surface, such as would be produced at each movement of the table if the liquid were confined by a vertical wall. Preferably also the riffles 11, 13, 15, and 17 are inclined upward at the same point, as shown in the drawings, so that the head portion G rises bodily on an incline above the surface of the pulp upon the table. Along the portion H of the table the riffles form very decided channels 12, 14, and 16 between them, as will be apparent from Fig. 3. In the neighborhood of the oblique line

O O, however, the riffles taper down nearly to the surface of the table, not merging therein, but continuing at a greatly-reduced height through the portion K of the table-surface. In this manner there are formed a number of channels 12, 14, and 16 between the riffles, which channels have a continuous and uninterrupted bottom from end to end and have walls formed by the riffles at first of a considerable height and then of a diminished height. The more elevated portion of the riffles should not be reduced abruptly, but preferably tapers for a considerable extent, which we have sought to indicate by shading in Fig. 1 and which clearly appears in Fig. 2 at 35 and 37. The riffles should also widen along the portion K to restrict and reduce the width of the channels between them. This widening of the riffles is clearly shown in the drawings. The reason for it is that when the pulp reaches the portion K of the table and when the water begins to wash away the sand lying above the values the decrease in the cross-section or capacity of the channels necessarily contracts and deepens the layer of material in each, thereby throwing up the sand, to be caught and washed off by the current of water. Furthermore, as the concentration proceeds and the sand is eliminated the remaining concentrates occupy less space. Therefore the capacity of each channel should be diminished proportionally, that the riffles may extend upward only just through the layer of concentrates.

The pulp delivered from the feed-box onto the portion H of the table is subjected to the agitating action. As the water flows over from riffle to riffle, seeking the lower level at the tailings side of the table, it carries with it much of the sand and like materials. The values travel along the channels between the riffles with much of the tailings until they reach the reduced portion of the riffles. At this point they are preferably met by the wash-water which flows obliquely across the portion K of the table, carrying with it nearly all the material, except the values, which are retained by the low riffles, and leaving the values almost free from sand and dust. It is clear that after the pulp has been stratified on the portion H of the table its condition does not have to be disturbed by passing around the end of abruptly-terminating riffles, and for this reason we prefer to make the low riffles on the portion K of the table a continuation of and in line with the riffles on the portion H. In the broader claims, however, which follow this specification we do no mean to restrict ourselves to such a feature of alinement.

In order to give precise instructions in regard to the height at which it is desirable to make the riffles for the surface K, it is necessary to know the richness of the ore to be treated; but, in general, the richer the ore the deeper will be the layer of values or concentrates which is passing over the portion K of the table, and the height of the riffles on this portion should be such as to extend approximately up to the top of such layer, and thus allow the valueless portions of the pulp to be washed away with the water with the least possible disturbance of the values. We have, however, in the foregoing given such instructions as will enable the skilled operator to carry out the invention.

Without attempting to enumerate the several variations and modifications that may be made in the details of our invention and without departing from its principles we shall point out in the following claims the novel and characteristic features of our invention.

We claim—

1. An ore-concentrating table having riffles extending from end to end of the active surface of the tables, the said riffles being reduced in height toward the foot end, and the reduction in height occurring along an oblique line or area from the feed side to the tailings side of the table, substantially as set forth.

2. An ore-concentrating table having riffles extending from end to end of the active surface of the tables, the said riffles being reduced in height toward the foot end, and the reduction in height occurring gradually and along an area oblique to the table, substantially as set forth.

3. An ore-concentrator table, having a series of substantially parallel riffles extending from the head end of the table, reduced in height along an oblique line or area and increased in width toward the foot of the table, substantially as set forth.

4. An ore-concentrator table, having a series of substantially parallel riffles extending from the head end of the table, reduced in height before their termination and continuing at a reduced and substantially constant height for a portion of their foot ends, substantially as set forth.

5. An ore-concentrator table provided with a series of riffles which are each of a constant height for a portion of their length and of a constant but lower height for a portion of their foot ends, substantially as set forth.

6. An ore-concentrator table, provided with a riffled portion toward its head and a low riffled portion toward its foot end, the latter portion succeeding the former along an oblique line or area, substantially as set forth.

Signed this 30th day of September, 1898, at Denver, Colorado.

IRA A. CAMMETT.
FRANK E. SHEPARD.

Witnesses:
W. D. MILLER,
W. C. WEBB.