

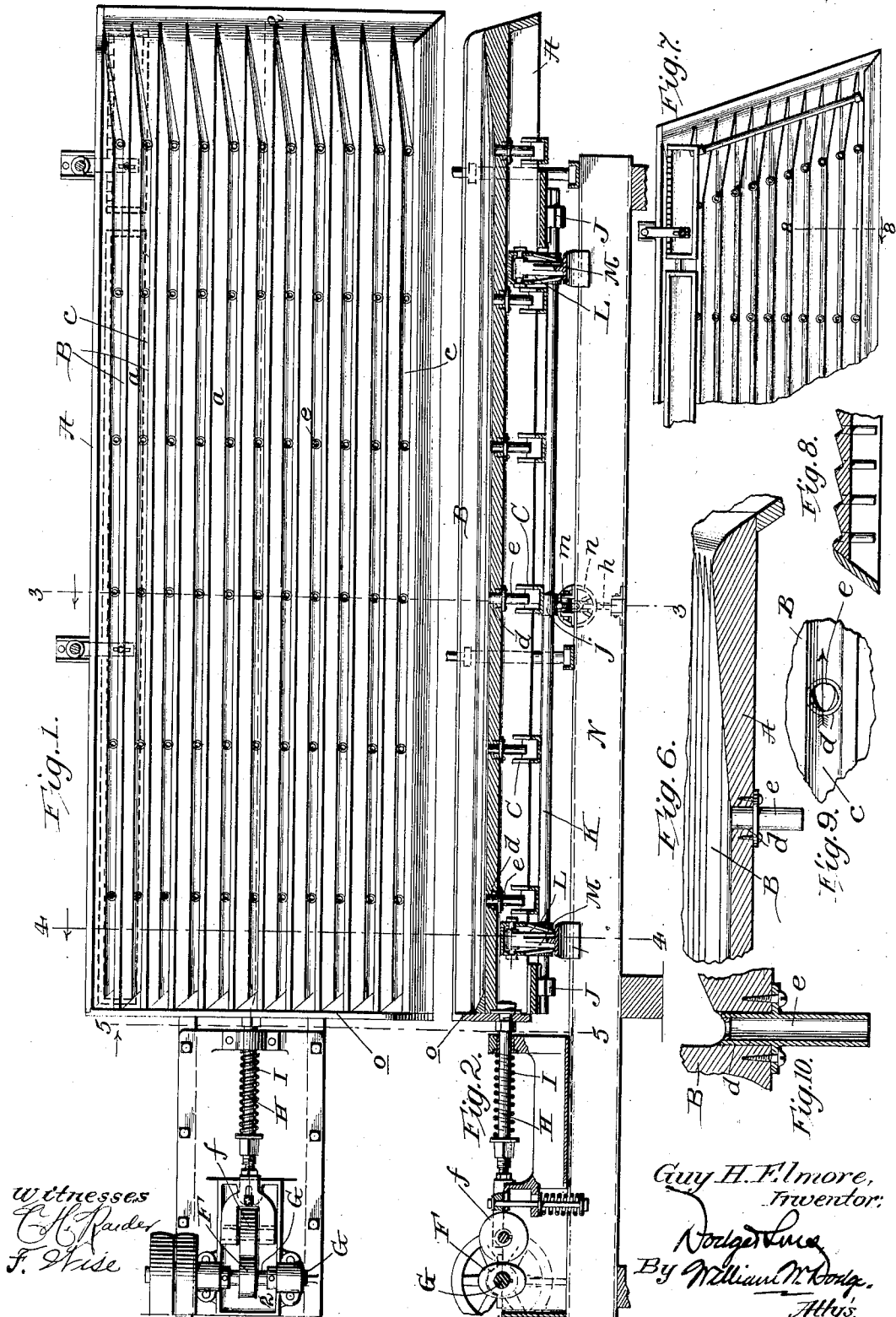
G. H. ELMORE.
CONCENTRATING TABLE.

APPLICATION FILED OCT. 29, 1910.

1,056,519.

Patented Mar. 18, 1913.

2 SHEETS—SHEET 1.



Witnesses
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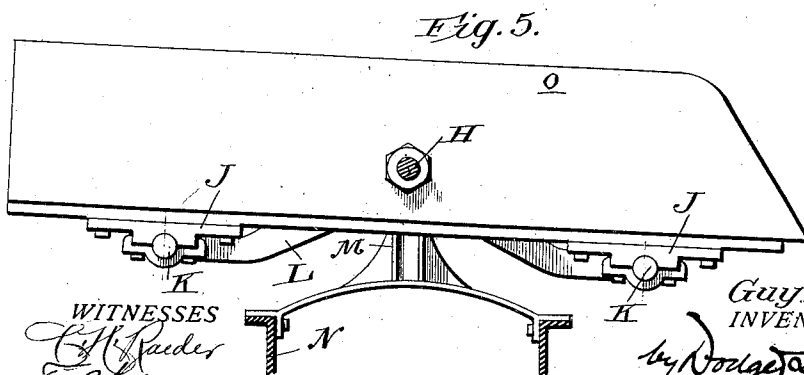
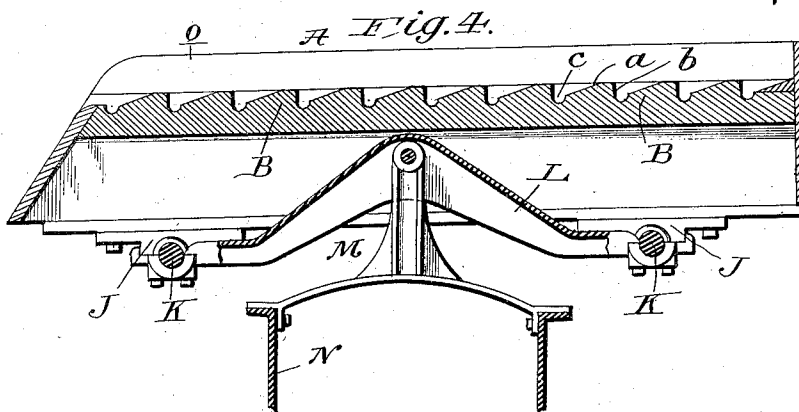
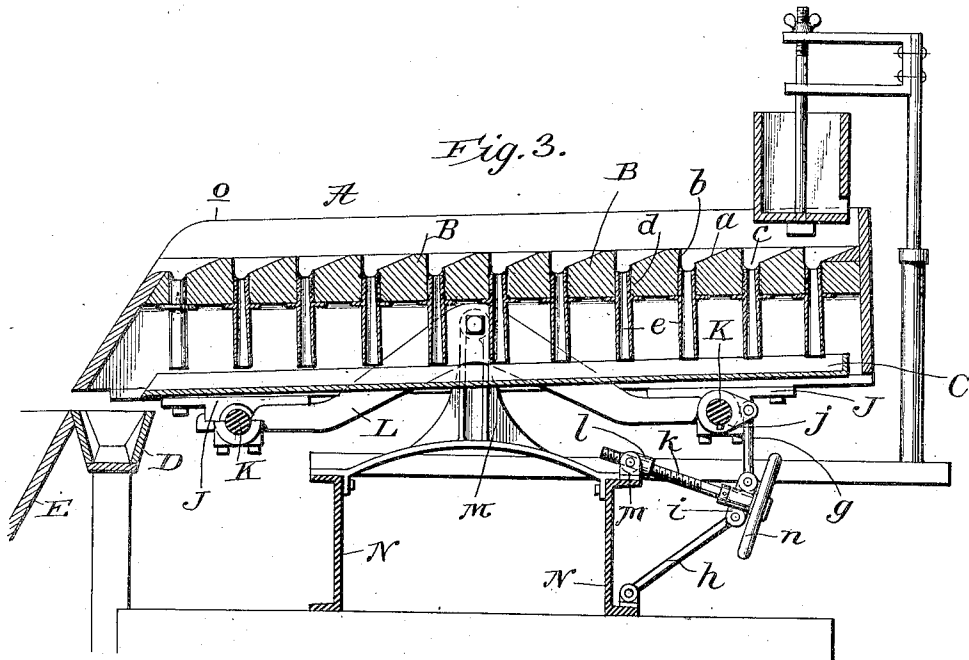
Noted
By William M. Dodge,
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WITNESSES
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UNITED STATES PATENT OFFICE.

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CONCENTRATING-TABLE.

1,056,519.

Specification of Letters Patent.

Patented Mar. 18, 1913.

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To all whom it may concern:

Be it known that I, GUY H. ELMORE, a citizen of the United States, residing at Swarthmore, in the county of Delaware and State of Pennsylvania, have invented certain new and useful Improvements in Concentrating-Tables, of which the following is a specification.

This invention pertains to concentrating tables, which in the more general features, mounting, drive, etc., may be of usual or approved construction, the object of the apparatus about to be described being to increase very greatly the capacity of the table, though at the expense of the completeness or closeness of separation. In other words, the purpose is to produce what might properly be called a "roughing" concentrating table, designed to effect a preliminary concentration or separation, leaving the final and closer separation to be effected on a second or ordinary table. Under this plan of construction and operation, the capacity of the "roughing" concentrating table will be, approximately, from six to ten times that of the ordinary table, and the concentration or separation will be such that the concentrates of several of the "roughing" tables may be handled on a single ordinary table.

The present invention is designed primarily with reference to the handling of coal in a finely crushed or pulverized condition; and for removing the refuse and fine sulfur therefrom, and for use with low grade ores having a large proportion of tailings to concentrates. In the case of coal the purpose is to make a clean product, with a concentrate of refuse carrying some coal, and in the case of ore, to produce a clean tailings product and a concentrate carrying some tailings, relying, as above explained, upon the subsequent treatment upon an ordinary table to complete the concentration and separation.

The accompanying drawings illustrate my invention in a preferred form.

Figure 1 is a top plan view of the table; Fig. 2, a longitudinal vertical section on the line 2—2 of Fig. 1; Fig. 3, a transverse section on the line 3—3 of Figs. 1 and 2, looking to the left; Fig. 4, a section on the line 4—4 of Figs. 1 and 2, looking to the left; Fig. 5, a section on the line 5—5 of Figs. 1 and 2, looking to the right; Fig. 6, a view showing the riffles decreasing in

depth at one end; Fig. 7, a view showing the riffles of unequal length; Fig. 8, a top plan view of a portion of one of the riffles, and showing the form or outline of the discharge opening; Fig. 9, a top plan view of one of the outlet tubes or pipes; and Fig. 10, a vertical sectional view of the same.

Referring to said drawings, A indicates the bed or table proper, which is ordinarily made of wood, but may be of any suitable material, provided with longitudinal riffles B, preferably of the form indicated in Figs. 3 and 4. On referring to said figures it will be noted that from the receiving or high side of the table each riffle B has a beveled or slanting upper side *a*, an upright wall *b* on the lower or discharge side, and a shallow smaller trough or channel *c* between the vertical and the oblique or inclined walls, said channel being provided with holes or outlets, as hereinafter described. In the preferred form these riffles B run the entire length of the table, and are of uniform depth throughout the length of the feed box or slightly more, this being the point at which the last row of holes transverse of the length of the table is located. From this point they grow progressively shallower to the end of the table, as in Fig. 6. They may also grow progressively longer as in Fig. 7, and as is now sometimes done in other tables. The final row of holes or outlets should be parallel with the end of the table, or approximately so.

At suitable intervals in the length of the table are formed holes or outlets *d*, as above indicated, opening from the lowest point of the riffle, groove or depression *c* through to the under side of the table, and in order to maintain these outlets of proper form and dimensions, and also better to direct the discharge to a launder C beneath them, each outlet *d* is provided with a discharge nozzle or pipe *e*, inserted into the hole or opening, as shown in Figs. 2 and 3, and held in place by screws passing through a radial flange on the pipe and into the bottom of the table. This is best shown in Fig. 10.

To guard against the clogging of the outlet nozzles *e*, the hole or passage through them is made of materially increasing dimensions in cross section from the upper toward the lower end, as indicated in Figs. 3 and 10, and further to insure clearance, the openings increase in width in the direction of flow of the water along the channels

5 c , being narrowest at the upper or receiving side and widest toward the delivery side, as indicated in Fig. 9, where the arrow shows the direction of flow of the water across the upper end or mouth of one of the nozzles. The several launders C , which are arranged as above stated between the respective transverse lines of pipes or nozzles e , are arranged to deliver into a common launder D
 10 lying within the skirt or lower edge of the table at its discharge side, and far enough inward to prevent the tailings from the table falling into it. A chute or directing board E carries the tailings to a proper receptacle.

15 The manner of mounting and actuating the table A is variable at will. In the drawings I have represented an elliptical cam F , mounted upon a shaft G and acting against a roller f carried or journaled in the forked end of a rod H , guided in ways and attached to one end of the table, a return spring I being employed to maintain the roller in contact with the cam. The table is
 20 provided with metallic bearing blocks J , which slide upon guide rods K carried in rocking beams or hangers L , pivotally mounted upon supporting standards M carried by a base frame N of any suitable construction.

30 In order to tip the table to any desired degree to determine the rapidity of flow of water and coal, pulp or stock across its face, there is provided a toggle support composed of two links g and h , connected at their inner ends to an intermediate sleeve block i , and at their outer ends, respectively, to a lug on the base frame N and to a collar j on one of the rods K . A screw k is swiveled in the sleeve block i , and passes through a nut
 40 l pivoted in lugs or ears m on the base frame N , the opposite end of the screw being provided with a hand-wheel n by which it may be readily turned to straighten or to bow the toggle, as desired. The mounting devices and actuating mechanism of the table constitute no part of the present invention, and are described merely for the purpose of setting forth a complete machine.

50 It is customary with concentrating tables generally to incline the table both longitudinally and transversely, and that may be done in the present instance if deemed desirable, but I consider it sufficient ordinarily
 55 to incline the table transversely, as indicated in Figs. 2, 3, 4 and 5, provided the table be given a quick return movement toward the feed end, so that there shall be a regular progression or advance of the heavy concentrates which lodge in the longitudinal riffles or channels. Where, as is frequently the case, the movement is alike in both directions, the table is, of course, made slightly lower at its discharge end than at
 65 the feed end. It is also usual to deliver the

water and coal, pulp or other mineral substance, to the table at one end or corner only, the longitudinal inclination tending to distribute the material over the entire length of the table. Under the present plan, however, the supply launder is extended nearly the full length of the table and delivers thereto substantially from end to end, the flow across the table being perpendicular to its length and hence the same at all points. The longitudinal reciprocation of the table tends to move the material slightly toward one end of the table, and this end (the right as represented in Figs. 1 and 2), is left entirely free of obstruction, so that the material may work off at that end, while the opposite end has the riffles closed by an end plate or bar o , as shown in the several figures. The riffles are gradually lessened in depth from the last series of holes, which row or series of holes advisably is parallel with the end of the table, or in other words, they are progressively shallower from the last hole in each, to the end of the riffle. This construction tends to lessen the quantity of tailings working out to the end of the riffle, and to bring the ore to the surface of the table, so that they will be washed over the lower edge of the table. This slow and gradual movement is sufficient to cause the fine and heavy material, which settles in the depressions c of the riffles, to work longitudinally along said depressions until the outlets d are reached, and in this way the constant discharge of such fine and heavy material through the pipes or nozzles e is insured.

The travel of the water and coal, pulp or ore, as the case may be, transversely of the table is so rapid, relatively, that no considerable longitudinal travel thereof is caused, and the material moves across the table practically at right angles thereto.

As stated above, this table is designed more especially for handling finely pulverized coal or low grade ores. Much of the coal is found to contain sulfur, which lies in thin films or layers between layers of coal, and it is only by finely pulverizing the coal and separating the layers so as to expose the sulfur, that it can be removed and washed off. By making the riffles of the peculiar form here shown and described, the sulfur, which is heavy, finds its way into the depressions c , and thence through the outlet pipes or nozzles e into the launders by which it is carried off to a suitable receptacle for more perfect separation and recovery.

Any form of riffle which produces a relatively narrow channel for the heavy materials or concentrates, at its lowest point, will serve the purpose.

By reason of the outlets d , e , at intervals, in practice usually about five feet, the table is in effect divided up into a series of rela-

tively short decks, and the concentrates or heavier particles, instead of being required to travel the entire length of the table, or to be washed over its lower edge in order to escape, have only to traverse a riffle until the nearest outlet *d* is reached whereupon it is permitted to escape. This greatly facilitates the separation of the concentrates, and is the main underlying feature of the invention whereby the greatly increased capacity is attained. The length of the table is hence unrestricted except by capacity to support and actuate it, and this covers very wide limits.

Having thus described my invention, what I claim is:

1. In combination with a transversely inclined concentrating table having longitudinal riffles provided at intervals with discharge openings through their bottoms for escape of fine and heavy concentrates; means for reciprocating said table longitudinally and effecting a progressive travel of concentrates within the riffles from the feeding end toward the tail or discharge end of the table; and a feeding launder extending along the upper side of the table throughout substantially the whole length thereof.

2. In combination with a transversely inclined concentrating table, having a series of longitudinal riffles decreasing from full depth at a point near the tail end of the table to zero at said end, and provided with discharge openings at intervals through their bottoms; a feeding launder extending along the upper side of the table throughout substantially the whole length thereof; and means for effecting longitudinal reciprocation of the table, and effecting a progressive movement of concentrates in the riffles toward the discharge end of the table.

3. In combination with a concentrating

table provided with longitudinal riffles having outlets through their bottoms spaced apart suitable distances, the transverse rows of outlets dividing the table into a series of decks or sections each having its outlets for concentrates; means for effecting a longitudinal reciprocation of the table, and effecting a progressive movement of concentrates lodging in the riffles, from the power or driving end of the table toward the delivery end thereof; and a feeding launder extending throughout substantially the whole length of the table, and adapted to deliver material thereto throughout substantially its full length, said table being transversely inclined to cause a flow of the mass of material fed, crosswise of the table.

4. In combination with a concentrating table provided with longitudinal riffles, and divided into sections or decks by transverse rows or series of outlets opening through the bottoms of the riffles for the escape of concentrates; means for longitudinally reciprocating the table, and thereby effecting a progression of concentrates deposited in the riffles toward the delivery ends of said riffles; and a feeding launder extending substantially the full length of the table, and delivering material thereto throughout practically the whole length of the table, said table being inclined downward transversely from the feeding launder toward the discharge side of the table.

In witness whereof, I have signed my name to this specification in the presence of two subscribing witnesses.

GUY H. ELMORE.

Witnesses:

GUSTAVUS C. S. WELZEL,
JULIA M. O'BRIEN.