Oct. 4, 1927. 1,644,113

E. DEISTER

CONCENTRATING TABLE

Filed Feb. 15, 1926 2 Sheets-Sheet 1

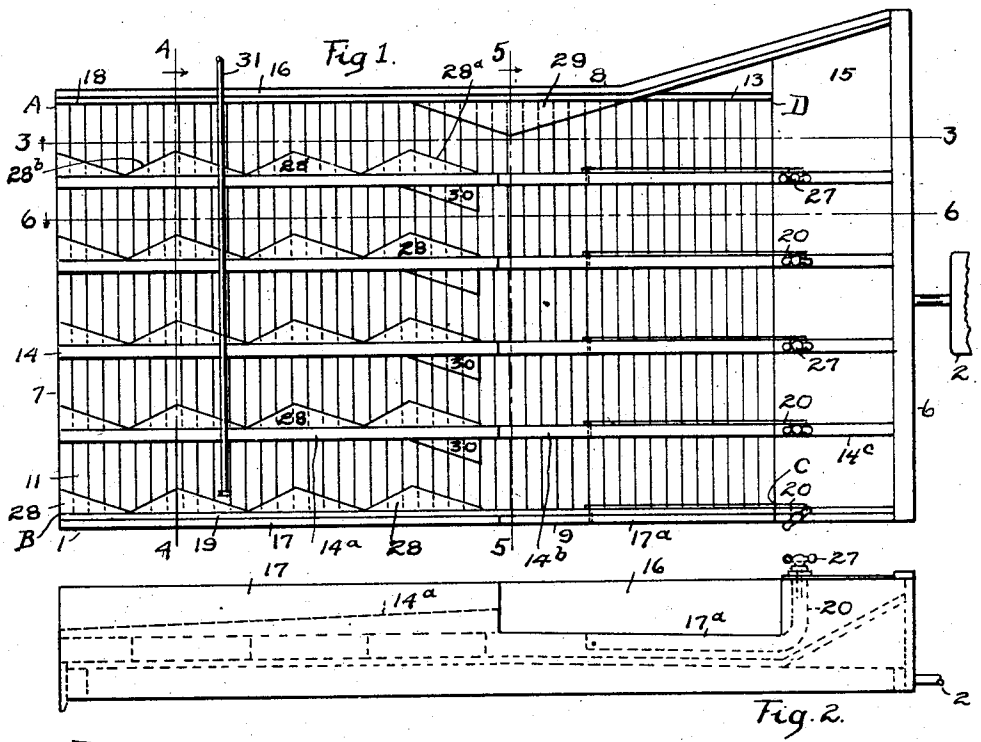

Fig. 2.

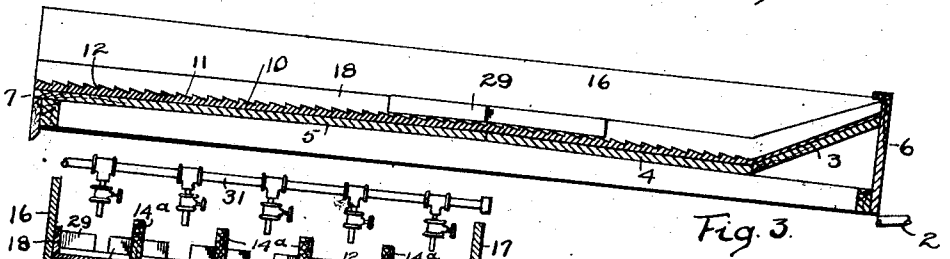

Fig. 3.

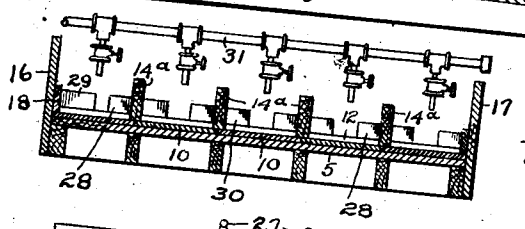

Fig. 4

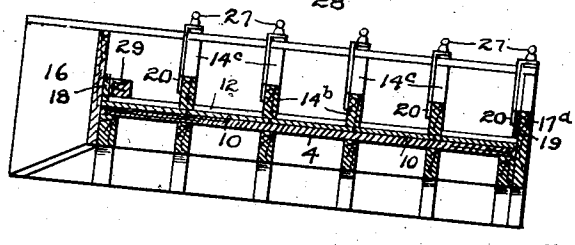

Fig. 5

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CONCENTRATING TABLE

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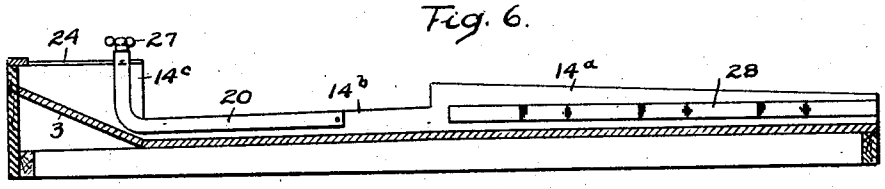
Fig. 6.



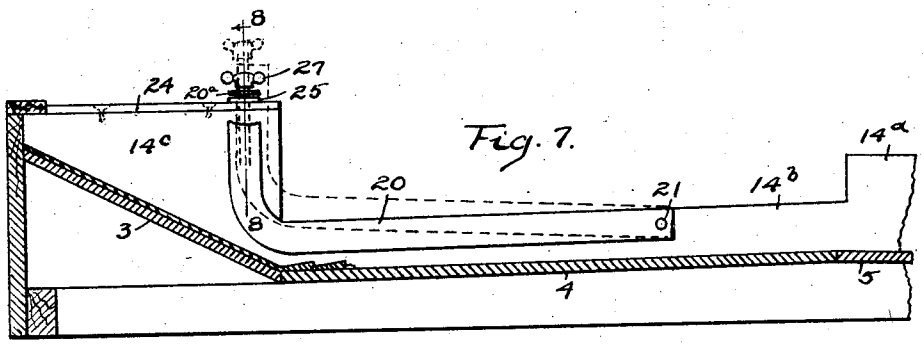


Fig. 7.

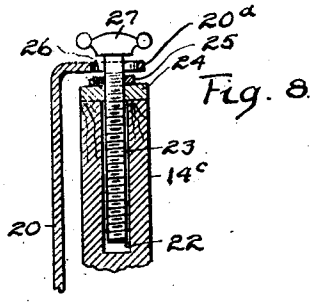


Fig. 8.

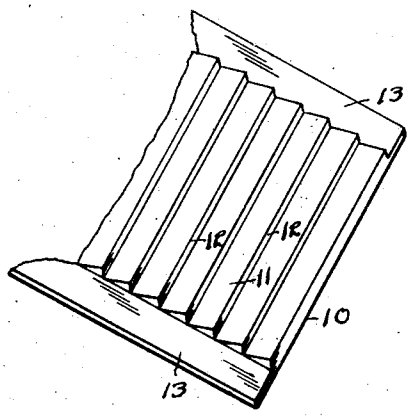


Fig. 9.

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UNITED STATES PATENT OFFICE.

EMIL DEISTER, OF FORT WAYNE, INDIANA.

CONCENTRATING TABLE.

Application filed February 15, 1926. Serial No. 88,240.

The invention relates to concentrating tables and particularly to such tables adapted for the cleaning of coal.

In the cleaning of coal and other materials it is desirable to effect a rapid stratification of the material and a rapid separation and recovery of the valuable portion thereof from the refuse, and to be efficient the table should have a large tonnage.

The object of my invention is to provide a table, the deck of which is constructed to accomplish the above mentioned requirements effectively and economically.

The invention consists of a transversely and longitudinally inclined differentially reciprocating table, the deck of which is composed of a series of substantially parallel launders in substantially the same plane, across the lower portion of which launders the lighter particles of the feed, such as coal, travel under the influence of gravity to the discharge side of the deck and in which launders the refuse or heavier particles of the feed are extracted and conveyed therein to the discharge end of the deck.

An embodiment of the invention is illustrated in the accompanying drawings in which

Figure 1 is a plan of the deck of a table, embodying the invention; Fig. 2 a side elevational view of the deck; Fig. 3 a cross-sectional view on line 3—3 of Fig. 1; Fig. 4 a cross-sectional view on line 4—4 of Fig. 1; Fig. 5 a cross-sectional view on line 5—5 of Fig. 1; Fig. 6 a cross-sectional view on line 6—6 of Fig. 1; Fig. 7 an enlarged cross-sectional view on line 6—6 of Fig. 1 illustrating the controlling overflow gate; Fig. 8 a cross-sectional view on line 8—8 of Fig. 7 and Fig. 9 a perspective view of a fraction of one of the covering strips on the deck.

Referring to the illustrative embodiment of the invention the deck 1 has any suitable shape, the rectangular shape shown being preferred. The deck is suitably supported so that it may be differentially reciprocated longitudinally by suitable mechanism indicated at 2. The floor of the deck is formed in three sections 3, 4 and 5. Section 3 slopes downwardly from the head or motion end 6 of the deck to the section 4. Section 4 slopes upwardly from section 3 toward section 5 and the latter section slopes upwardly from the section 4 toward the discharge end 7 of the deck, the degree of slope of the section 5 being less than that of the section 4. In operating position the deck is longitudinally and transversely inclined so that the feed side 8 is highest and the discharge side 9 is lowest.

A transversely ribbed covering is placed on the floor sections and forms the concentrating surface of the deck. I preferably form this covering in strips 10 (Fig. 9) and may form them of rubber, wood, metal or any suitable material. The transverse ribs 11 on each strip present substantially upright walls 12 which face toward the discharge end 7 of the deck and smooth areas or sections are provided at the opposite sides of the strips and extend adjacent to the ends of the ribs. The strips are laid on the deck with their side edges abutting as shown in Figs. 4 and 5 and relatively high walls 14 are placed on the adjacent smooth sections 13 respectively, each wall covering the joint between two of the strips and extending from the discharge end 7 toward the head end 6 of the deck. The walls thus form relatively deep launders on the deck, the bottom of each of which is transversely ribbed. Each wall 14 is reduced in height on the section 4, and on the section 3 the wall is higher than any other portion of it. For convenience in manufacture, each wall is formed in three sections, 14^a being the forward portion, 14^b being the lowest section and section 14^c being the rear high section.

The deck is preferably widened adjacent the head end 6 and along the feed side 8 to form a surface 15 upon which to feed the materials. A high board 16 extends along the feed side 8 and along the head end 6 and another high board 17 extends along the discharge side 9. The side board 17 is reduced in height at 17^a to correspond to the reduced portions 14^b of the walls 14. A bar 18 is secured to the floor or side board 16 to fasten down the edge of the strip 10 beneath it and a similar bar 19 is secured adjacent the high board 17 for a similar purpose. Gates 20 are pivoted to the sides of the walls 14 and the side of the board 17 respectively and adjacent the reduced portion of each, said sides of the walls and of the board 17, in the operating position of the deck, being the upper sides thereof. Each gate extends part way along the low portion of the wall and side board and is pivoted at 21 at its forward end thereto. The opposite end of each gate is extended

upwardly along the side of the highest portion of the wall and the side board and its upper end is bent laterally to pass over the top of the said wall and of the side board. An opening 22 is formed in each wall and in the side board 17 into which a bolt 23 loosely depends. The bolt is threaded through a plate 24 secured to the top of the wall and a washer 25 is pinned to the bolt between the plate and the overlying portion 20^a of the gate, the said portion 20^a being spaced from the washer and having a slot 26 therein through which the bolt is loosely extended. A suitable operating handle 27 is secured to the upper end of the bolt and it is spaced from the portion 20^a of the gate. By rotating the bolt the gate may be rocked on its pivot to regulate the height of the rear portion of the low or discharge portion of the wall or side board 17.

On the section 5 of the deck and adjacent to the upper sides of each wall 14 and of the high board 17, I secure a series of angular baffles 28, each of which tends to restrict the forward movement of the material and cause it to take a zigzag course in the launder. I also attach an angular baffle block 29 adjacent to the high board along the feed side 8, this baffle being disposed upon the covering on both sections 4 and 5, and I prefer to attach an angular baffle block 30 adjacent to the lower side of each wall 14^a near the lower end thereof. The top of each baffle is flat. The baffle block 29 and each baffle block 30 prevents the mass of materials in the launders from advancing too rapidly therein under the influence of the reciprocating movement of the deck. Since the launders are declined transversely the refuse collects in a bed along the lower side of each launder and the coal or lighter particles of the material are higher up on the transverse slope. The latter particles abut the baffle block 30 and are held back thereby so that the refuse and such lighter particles as may be mixed therewith pass onto the section 5 and are caused by the baffle blocks 28 to follow a zigzag course.

As before stated, the table in operating position is inclined transversely and longitudinally so that the corner A is the highest point on the deck, the corner B the next highest point, the point C in the discharge edge at the junction of the two sections 3 and 4 is the lowest point of the deck, and the point D in the feed side is higher than point C. The side walls 14 of the launders are preferably substantially parallel to each other and to the line of reciprocation of the deck and the transverse ribs on the concentrating surface of the launders extend preferably at right angles to the said walls. Hence, the launders are substantially parallel to each other and are in the same plane.

The material to be treated is fed with a suitable amount of water onto the smooth area 15 from which it travels, under the influence of gravity, into the first launder. The reciprocating movement of the deck, together with the water that is fed from the water pipe 31 into the upper portion of each launder and which flows down the longitudinally inclined launders, cause the material to stratify therein, the lighter particles—that is, the coal, when such material is being treated—passing into the upper strata. This stratification is greatly facilitated by the section 3 which causes a wave like action in the bed of materials, the waves travelling longitudinally in the launder.

Eventually, as the launder fills up, or the bed of materials increases in depth, the upper strata of particles pass over the reduced portion 14^b of the wall 14 into the next launder below. When the remaining strata of the material in the launder reach the baffles 28 it first engages the tapered side 28^a of the first baffle block 28 by which it is diverted laterally in the launder. The baffles set up a panning action of the dressing water and materials in the angular pockets between the baffles which vigorously agitates the material and dressing water and lifts the lighter particles onto the flat tops of the baffle blocks 28, the tapered side 28^b of each baffle shearing off the lighter particles which are caused to flow backwardly on the top of the baffle under the influence of the dressing water. The heavier materials continue their zigzag movement up the slope of the launder, more and more of the lighter particles being brought into the upper strata and washed rearwardly. The wall section 14^a is higher than the baffles, hence none of the material escapes over that section. Therefore, the heavier particles or refuse continue their movement to the discharge end of the launder and the lighter particles that are washed rearwardly escape only over the low section 14^b of the wall into the next launder below, where similar actions take place. Similar actions occur in each launder until the coal is discharged at the side 17^a, and the refuse is discharged at the upper discharge end of the deck. The greater quantity of coal passes across the discharge section 4 and the particles of coal that remain in the beds and pass with the refuse onto the section 5 are eventually brought into the upper strata, sheared off by the baffles and washed back onto the discharge section 4.

The overflow gates are used in accordance with the degree of fineness of the material being treated. The finer the material the higher will the gates be raised.

In Fig. 8 the gate 20, for the sake of clearness, is shown considerably spaced from the wall 14^c. In practice, however, the gate 20 is close to the wall 14^c.

What I claim is:

1. In a reciprocating concentrating table a transversely inclined deck, a series of upwardly inclined launders on the deck substantially parallel to each other and substantially in the same plane and having relatively high sides with their lower ends reduced in height across which reduced portions the lighter particles of the feed under the influence of gravity are caused to travel and discharge at the discharge side of the deck, means to reciprocate the deck to cause the heavier particles of the feed to travel up the inclined launders to the discharge end of the deck, and means to feed dressing water to each launder.

2. In a reciprocating concentrating table a transversely inclined deck, a series of upwardly inclined launders on the deck substantially parallel to each other and substantially in the same plane and having relatively high sides having their lower ends reduced in height across which reduced portions the lighter particles of the feed under the influence of gravity are caused to travel and discharge at the discharge side of the deck, means to reciprocate the deck to cause the heavier particles of the feed to travel up the inclined launders to the discharge end of the deck, means to feed dressing water to each launder and baffles in each launder to retard the materials as they travel upwardly therein.

3. In a reciprocating concentrating table a deck having thereon a series of longitudinally and transversely inclined launders substantially parallel to each other and in substantially the same plane, each launder having in its lower portion a transverse discharge section across which the lighter particles of the feed, under the influence of gravity, are caused to travel into the discharge sections of the adjacent launders in succession and finally discharge at the discharge side of the deck, means to reciprocate the deck to cause the heavier particles of the feed to travel up the inclined launders to the discharge ends thereof, and means to discharge dressing water into each launder to wash the lighter particles down the launders into the discharge section.

4. In a reciprocating concentrating table, a longitudinally and transversely inclined deck, a series of relatively high walls on the deck forming on the top surface thereof a series of launders substantially parallel to each other and in substantially the same plane and extending upwardly toward the discharge end of the deck, the said walls in their lower portions being reduced in height at corresponding points to form a transverse discharge section on the deck for the lighter particles of the feed, means to reciprocate the deck to cause the materials to move up the inclined launders, means to discharge dressing water into each launder, and baffles in each launder forwardly of the discharge section to agitate the feed while under the influence of the reciprocating movement of the deck and of the dressing water.

5. In a reciprocating concentrating table, a longitudinally and transversely inclined deck, a series of relatively high walls on the deck forming on the top surface thereof a series of launders substantially parallel to each other and in substantially the same plane and extending upwardly toward the discharge end of the deck, the said walls in corresponding lower portions being reduced in height to form a transverse discharge section on the deck for the lighter particles of the feed, a member pivoted to each wall adjacent to the reduced portion thereof to vary the height thereof, means to reciprocate the deck to stratify the feed and to cause the heavier particles thereof to travel up the inclined launders to the discharge ends thereof and means to discharge dressing water into the upper portion of each launder.

6. In a reciprocating concentrating table, a deck having upon its surface a series of relatively deep upwardly inclined and transversely declined launders substantially parallel to each other and in substantially the same plane, means to reciprocate the deck, means to feed dressing water to the upper portion of each launder, each launder in its lower portion having a discharge section across which the lighter particles of the feed are caused to travel into the corresponding section of the next launder below and finally discharge at a common point at the discharge side of the deck, and angular baffles in each launder adapted to cause the heavier particles of the feed, under the influence of the reciprocating movement of the deck, to follow a zigzag course up said launders to the discharge ends thereof and also adapted to cause the dressing water to agitate the said particles and cause the lighter particles thereof to rise into the upper strata thereof and to wash them rearwardly in the launder into the discharge section thereof.

7. In a reciprocating concentrating table, a deck having upon its surface a series of relatively deep upwardly inclined and transversely declined launders substantially parallel to each other and in substantially the same plane, means to feed dressing water to the upper portion of each launder, each launder in its lower portion having a discharge section across which the lighter particles of the feed are caused to travel into the corresponding section of the next launder below and finally discharge at the discharge side of the deck, means at the lower end of each launder to cause the materials

in the bed, under the influence of the reciprocating movement of the deck, to move longitudinally in the launders in waves for effecting a stratification thereof, and angular baffles in each launder adapted to cause the heavier particles of the feed, under the influence of the reciprocating movement of the deck, to follow a zigzag course up said launders to the discharge end thereof and also adapted to cause the dressing water to agitate the said particles whereby the lighter particles thereof are caused to rise into the upper strata of the mass and are washed rearwardly in the launder and along the tops of the baffles to the said discharge section.

8. In a reciprocating concentrating table, a deck, a plurality of relatively deep longitudinally inclined and transversely declined launders on the deck substantially parallel to each other and in substantially the same plane, the bottom of each launder being transversely ribbed to present upstanding transverse walls facing the upper or discharge end of the launder for conveying the heavier particles of the feed toward said end of the deck under the influence of the reciprocating movement of the deck, and a discharge section on the deck extending across the lower portion of the launders and at right angles thereto for the gravital discharge of the lighter particles of the feed thereover.

9. In a reciprocating concentrating table, a deck, a plurality of relatively deep longitudinally inclined and transversely declined launders on the deck substantially parallel to each other and in substantially the same plane, the bottom of each launder being transversely ribbed to present upstanding walls facing the upper or discharge end of the launder for conveying the heavier particles of the feed toward said end of the deck under the influence of the reciprocating movement of the deck, means in each launder to cause the said heavier particles to follow a zigzag course therein, means to discharge dressing water into each launder to agitate the particles in their zigzag movement and stratify them and cause the lighter particles to move downwardly in the launders and a discharge section on the deck extending across the launders for the gravital discharge of the lighter particles of the feed thereover.

10. In a reciprocating concentrating table, a longitudinally inclined and transversely declined deck, mechanism at the rear end of the deck to reciprocate the deck, a series of laterally spaced parallel high walls on the deck forming a series of launders extending from end to end of the deck, each wall adjacent the rear end of the deck being reduced in height to form a discharge section extending across the launders at right angles to their longitudinal axis and terminating at the discharge side of the deck, means to discharge dressing water into the upper portion of each launder, and triangular shaped baffles in each launder forwardly of the discharge section and being less in height than the adjacent wall whereby to form angular pockets in each launder.

In witness whereof I have hereunto set my hand this 12th day of February, 1926.

EMIL DEISTER.