April 10, 1945. A. B. BOUWER ET AL 2,373,452

CONCENTRATOR

Filed Aug. 14, 1943

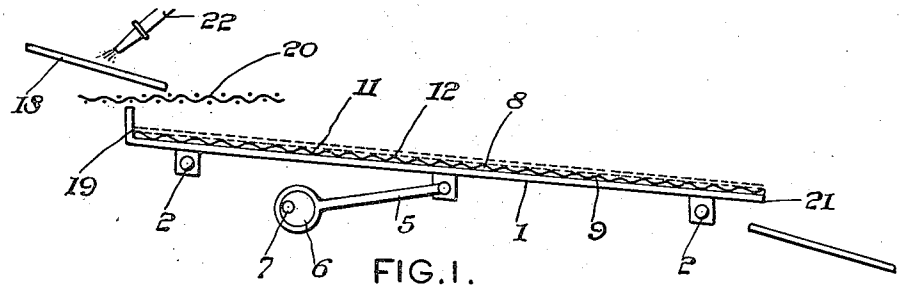


FIG. I.

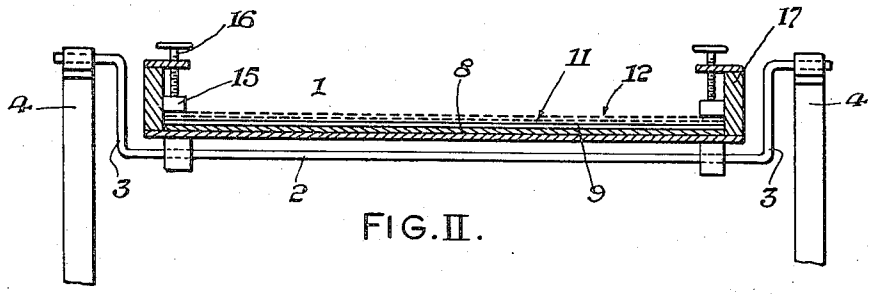


FIG. II.

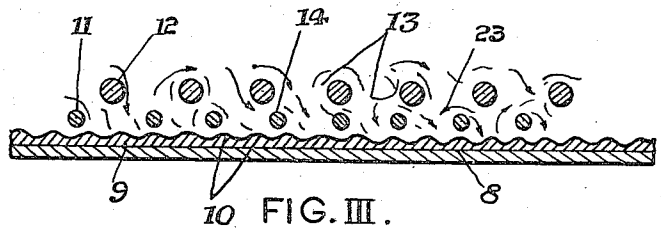


FIG. III.

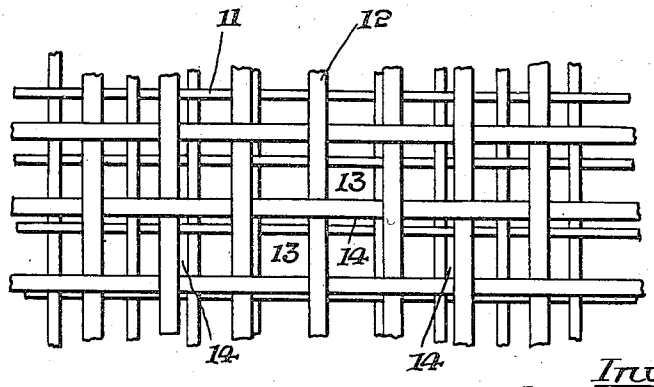


FIG. IV.

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CONCENTRATOR

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3 Claims. (Cl. 209—437)

This invention relates to concentrators, more particularly to apparatus for concentrating mineral values from sands and the like.

The object of the invention is, in a concentrator having the form of a sloping table down the length of which the material to be concentrated is washed, to provide means whereby the flowing stream is rendered turbulent not only by shaking, rocking or swinging the table, but particularly by providing cells or pockets having open tops and broken, or slotted wall areas, and a floor of fibrous material such as corduroy, blanket, mats or the like over which the stream to be treated flows. The construction is designed to facilitate the removal and replacement of the blankets or the like for the recovery of the concentrates caught therein. In other words the object of the invention is to provide a table which shall have the capacity of a sluice box, the ease of manipulation of a corduroy table, and the efficiency of a shaking table. The invention combines in one apparatus the use of the movement of a shaking table, the surface of corduroy which can easily be cleaned, and the capacity of a riffled strake or sluice box.

The invention is illustrated diagrammatically, and in its preferred form, in the accompanying drawing in which

Fig. I is a side elevation,

Fig. II an enlarged sectional view;

Fig. III a sectional elevation, and

Fig. IV a plan, showing on a larger scale and diagrammatically details of construction.

The invention will be described by its application to the treatment of a classified material such as a sand residue dump from a gold mine.

In the illustration 1 is a shallow sluice box or table having a length about seven times its width and usually sloping at an angle of about 5° with the horizontal.

The table 1 is hung in stirrups 2 which are free to swing on crank arms 3 supported in suitable fixed bearings on uprights 4 fixed on either side of the table 1. The table is shaken, swung or vibrated for example by means of a pitman 5, with one end connected to the bottom of the table 1 and the other journalled to an eccentric 6 on a cross shaft 7 adapted to be driven at some hundreds of revolutions per minute. The floor 8 of the table 1, is flat and is covered, see Fig. III, preferably with corduroy 9 with the riffles 10 running across the length of the table. This fibrous covering is protected by a metal sieve. For instance perforated or expanded metal sheets may be used or preferably wire mesh screens, as shown, are fastened over the corduroy 9 and lie close down on it. 11 is a layer of wire screen having a coarse mesh for instance a half inch. Over this first wire screen 11 is placed a second 12 of similar mesh but usually made of a heavier gauge wire. These wire screens 11, 12, placed one above the other on the corduroy 9 provide the desired concentrating cells 13, which, it will be understood, form pockets or pans all over the surface of the table and each has irregular sides 14 (Figs. III and IV) the amount of irregularity depending on how closely the meshes of the two wire screens 11, 12 superimpose on one another. All the sides are broken by slotted openings between the wires as shown in Figs. III and IV.

There are therefore preferably three layers 9, 11, 12, on the surface 8 of the table 1, namely the corduroy 9, a screen of wire 11, and a further screen 12 of the same size mesh but preferably of heavier gauge wire. There may be one or more further layers of slotted wearing plates down which large stones or the like may slide, or further screens, but usually two are sufficient. These layers are held in place by longitudinally placed strips or battens 15 clamped by screws 16 at the edges 17 of the table 1 and conveniently in the corners made by the upstanding edges 17 of the table.

The table 1 has a shute or feeding platform 18 from which the material is washed onto the head 19 of the table generally through a screen 20, the latter conveniently placed for removing lumps, stones, sticks or other objectionable and oversize material. At the foot 21 of the table provision is made to remove the treated sand after separating the water. The dirty water may be run to settling tanks and clarified, by the use of a flocculating medium such as lime or otherwise. The clarified water is returned to the head of the table for re-use.

The action of the concentrator, according to this invention, and when working for instance on the sands of an old mine dump, is as follows. The sand is washed by the use of water from nozzle 22 onto the head 19 of the table 1, using an ample supply of water. The stream flows by gravity down the sloping table 1, sinking through the screens 11, 12 when the heavier particles fall onto the corduroy 9. The fine particles of value in the sand, some of which have been freed from the sand by weathering or otherwise, are caught in the corduroy 9 in the well known manner. Whilst in some cases heavy and larger particles are caught in the pockets 13. The stream 23 (Fig. III) however

is not allowed to flow smoothly, it must make its way in and out of each cellular compartment 13 on the floor 8 of the table 1 and is kept in a turmoil by having to flow between the strands of the wire mesh 11, 12, that is through the slotted walls 14 of the cells 13. At the same time the table 1 swings rapidly through a small amplitude and generally longitudinally. This means that each small section of the stream is buffetted by the moving wire meshes, 11, 12 as it passes from one cell 13 to the next. It is well known that fine gold is best caught in rough water and that clean concentrate is best procured in narrow deep riffles.

This invention provides therefore what is considered the best means for concentrating values cleanly and efficiently from material containing the values in small sizes.

The length of the table 1 allows the concentration to be carried on for a reasonably long period without the necessity for removing and changing the charged corduroy 9. The time between cleaning will depend on the richness of the material. Due to the cellular surface 8 of the table and its constant agitation a large quantity of material may be treated rapidly and efficiently.

It will be obvious that the invention is suitable for use in concentrating heavy fractions from numerous materials in which the values can be washed out and which are small enough to be caught in the cells.

What we claim as new and desire to secure by Letters Patent is:

1. In a concentrator, the combination of an elongated table sloping longitudinally, a liquid supply for causing a flow down the length of the table, means for oscillating the table in longitudinal direction, a removable fibrous sheet covering on the floor of the table, two layers of wire mesh screen disposed above said covering, both screens of the same size mesh opening but differing in diameter of wire, and clamping means for removably holding the fibrous covering and the screens in close contact with one another and in place on the table.

2. In a concentractor, the combination of an elongated table sloping longitudinally, a liquid supply for causing a flow down the length of the table, means for oscillating the table in longitudinal direction, a removable fibrous sheet covering on the floor of the table, two layers of wire mesh screen superimposed on said covering, both screens of the same size mesh opening but differing in diameter of wire and running parallel with the length of the table and at right angles thereto respectively, and clamping means for removably holding the fibrous covering and the screens in close contact with one another and in place on the table.

3. In a concentrator, the combination of an elongated table sloping longitudinally, a liquid supply for causing a flow down the length of the table, a removable woven corduroy covering on the floor of the table, with the upright fibres of the weave standing in lines across the length of the table, two layers of wire mesh screen superimposed on said corduroy covering, both screens of the same size mesh opening but differing in diameter of wire and having the wires in both screens woven at right angles to one another and running parallel with the length of the table and at right angles thereto respectively, means for oscillating the table to cause the wire in the screens lying across the table to temporarily beat against the current of liquid flowing down the length of the table, and clamping means for removably holding the corduroy covering and the screens in close contact with one another and in place on the table.

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