

APPLICATION FILED AUG. 23, 1916.

Patented Oct. 21, 1919.

2 SHEETS--SHEET 1.

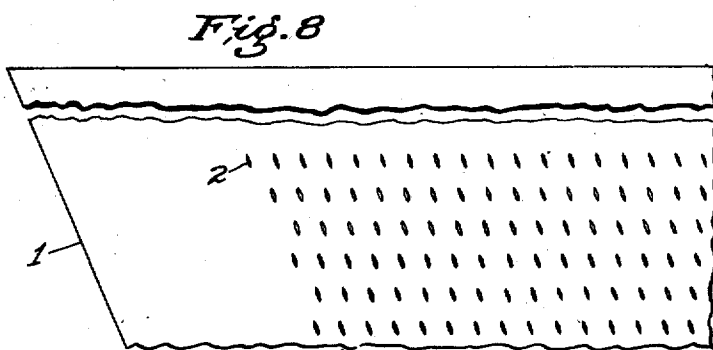
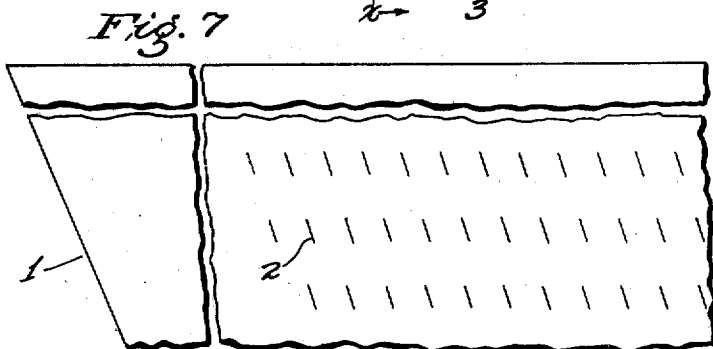
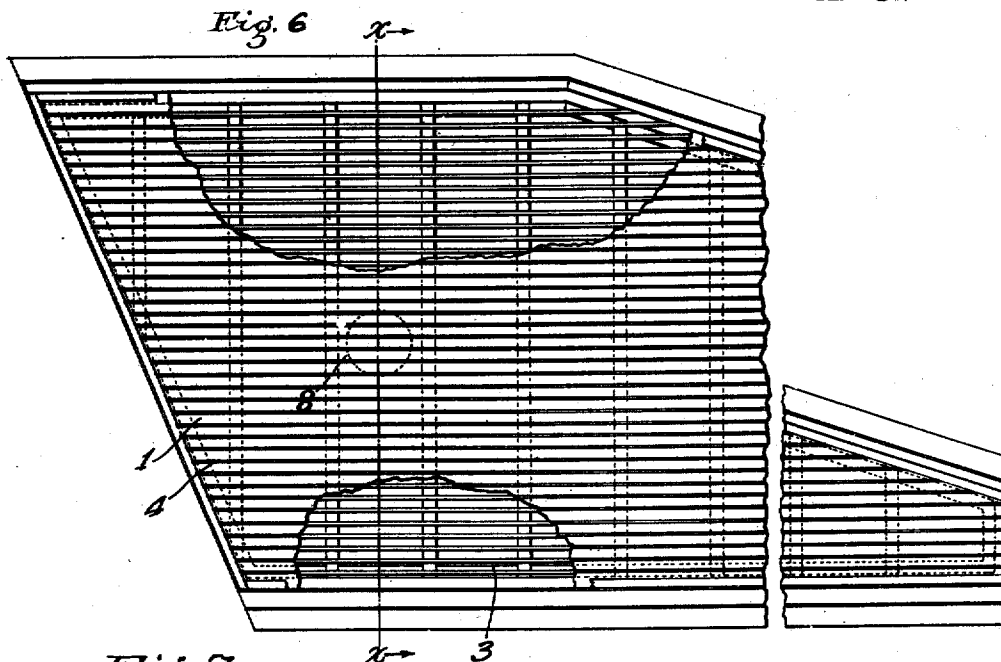


Fig. 14
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1,319,646.

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MINERAL SEPARATOR.
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2 SHEETS—SHEET 2.



Witness
C. C. Holly.

Inventor
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UNITED STATES PATENT OFFICE.

CHARLES W. ECCLESTON, OF LOS ANGELES, CALIFORNIA.

MINERAL-SEPARATOR.

1,319,646.

Specification of Letters Patent.

Patented Oct. 21, 1919.

Application filed August 23, 1916. Serial No. 110,555.

To all whom it may concern:

Be it known that I, CHARLES W. ECCLESTON, a citizen of the United States, residing at Los Angeles, in the county of Los Angeles and State of California, have discovered and invented a new and useful Mineral-Separator, of which the following is a specification.

This invention relates to devices for separating from each other particles and substances having different specific gravities.

An object of this invention is to provide superior means for carrying off the gangue in separators of the so-called dry washer type and for producing emulsion in flotation separating apparatus.

An object of this invention is to provide a highly efficient, durable mineral separator which will operate for an indefinite time with air passed freely in very minute and evenly distributed jets over a wide surface, but which will not allow fine particles of the material to pass down through the distributor when the air current is not active.

A further object of the invention is to provide an ore concentrating table that is automatically adjustable to allow the passage therethrough of a greater or less volume of fluid as the impelling pressure increases or decreases with minimum variation in the velocity of the fluid as it issues through the table, thus to adapt a device to handle various quantities of pulp in a given time without producing excessive blasts or jets of fluid which might be found determinental in the operation to be performed.

I have discovered that all of the requirements hereinbefore called for and pointed out may be met by providing a riffled concentrating table having a flexible, elastic, stretchable rubber sheet, of the kind used for surgical bandages, dentists' rubber dams, inner tubes of pneumatic tires and the like, perforated by a fine point, such as a cambric needle, or by a flat needle or a needle angular in cross-section, and applied in unstretched condition to form a part of the table top. I have discovered that a concentrator table constructed with such a sheet is of far greater efficiency than concentrator tables heretofore known in that the separation is effected more evenly and that the liability of clogging and wearing out is practically eliminated.

I have discovered that an ore concentrating table top of this character will auto-

matically eliminate all liability to clog and will remain free and constantly ready for action during use and non-use.

Other objects, advantages and features of novelty may appear from the accompanying drawings, the subjoined detailed description and the appended claim.

The invention may be understood by reference to the accompanying drawings.

Figure 1 is a fragmental sectional elevation of a dry process ore concentrator constructed in accordance with this invention.

Fig. 2 is a view analogous to Fig. 1 illustrating the application of the invention to a flotation concentrator cell.

Fig. 3 is a fragmental plan of the device shown in Fig. 1.

Fig. 4 is a full size detached fragmental view of the normally unstretched ore concentrator table top sheet shown in Figs. 1, 2 and 3. The width of the slits is exaggerated.

Fig. 5 is an exaggerated fragmental view of the concentrator in action.

Fig. 6 is a fragmental plan of a concentrating table of the character shown in Fig. 1.

Fig. 7 is an exaggerated fragmental plan of the sheet or surface shown in the preceding views.

Fig. 8 is a fragmental plan on the scale of Fig. 4 showing the onward face of the table top sheet as the same may appear when stretched.

The slits are so narrow that they are invisible in Figs. 1, 2, 3 and 6.

The stretchable sheet 1 is preferably of india rubber, thus securing an impervious character, high elasticity, great durability, and high power of resistance to the acids and chemicals likely to be present or to be used in metallurgical and other arts in which this invention will be found useful. The sheet is provided with normally closed perforations 2. Said perforations may be produced in various ways, and I have produced in a rubber sheet perforations of the character indicated; said perforations being made by means of a pointed needle having a triangular cross-section with sharp corners. Said needle may be operated by means of an ordinary sewing machine mechanism, the lines of perforations being made by running the sheet through the sewing machine in the same manner as though the sheet were being stitched by the machine. These perforations may be made as large or small as deemed advisable, and the rows as

close together as desired; and I have employed perforations consisting of slits each of which is about $\frac{3}{8}$ of an inch in length extending through a sheet somewhat less than $\frac{3}{8}$ of an inch in thickness. These proportions or others may be employed as found advisable.

It is deemed preferable to make the perforations in the form of slits so that as the material is stretched, the openings there-through may be very narrow and fine but capable of allowing considerable liquid or air to flow through when the sheet is stretched.

It is understood that various thicknesses of material may be employed and that various lengths of perforations may be made in such material, the principle being that the material shall be of such character that when the element is normal, that is to say not stretched, the slits will be closed and the material will be impervious to the passing of fluids and other highly mobile materials under a limited pressure which may be predetermined for the different concentrator tables.

In Fig. 1 the normally closed perforated stretchable highly elastic sheet 1 is shown mounted upon supporting bars 3 and held in place by strips 4 above a pressure chamber 5 formed of a frame 6 and a sheet metal bottom 7, air being admitted to said pressure chamber through a compressed air pipe 8, said bottom being supported by a shaking frame 9 which may be operated by any of the well known means for operating a separating table. Said floor is also shown provided with a channel 10 and a draw-off spout 11 closed by a plug 12 for the periodic discharge of any material that might be accidentally forced into the air chamber.

In the practical operation of this device the pulp will be fed on to the table by hand or any other well known means while the air pressure is on, and such pressure will be regulated to stretch and distort the material in the inter-strip spaces 13, so that the air will pass through and buoy up the pulp above the separating surface 1 of the table. Whenever the air pressure is reduced to a determined point the distortion ceases and the perforations are automatically closed, and in practice no particles of the solid material will pass through or even gain admission to the perforations, so that

the flow of air may cease without allowing a portion of the solid pulverized material to pass below the upper face of separating surface 1.

In the apparatus shown in Fig. 2, 14 indicates the frame of the separating cell through which the pulp to be emulsified is passed over the separating surface 1, which is of the same character as that shown in Fig. 1. The air is applied from the air chest 15 supplied through air pressure pipe 16 in practically the same manner as in Fig. 1.

In the several views the character *c* indicates a cell one superficial boundary which is formed by a perforated elastic expansible sheet such as above described having perforations, slits or pores 2 adapted to be expanded by expansion of the sheet; and it is understood that the means to apply pressure to one side of the sheet to stretch or distort the sheet and thus to open and expand the perforations, slits or pores 2 therein may be of various characters, as compressed air apparatus effective through compressed air pipe 8, or any other means that may be employed to distort the sheet over limited areas in which expansion may occur.

A new application for patent, Serial No. 241,707, filed June 24, 1918, and co-pending herewith has been filed for a riffled pneumatic ore concentrating table, and said new application includes claims to the specific application to the pneumatic concentrator table top and which are not claimed herein under requirement of division made in the prosecution of this application.

I claim:

A mineral separator comprising a table, a top therefor formed of a rubber sheet having slit like needle perforations there-through that are normally closed and that are adapted to be opened by air pressure; means whereby air pressure is applied there-through from below to comminuted material to separate the gangue from the values, and means for delivering comminuted material to the table top.

In testimony whereof, I have hereunto set my hand at Los Angeles, California, this 17th day of August, 1916.

CHARLES W. ECCLESTON.

Witness:

JAMES R. TOWNSEND.