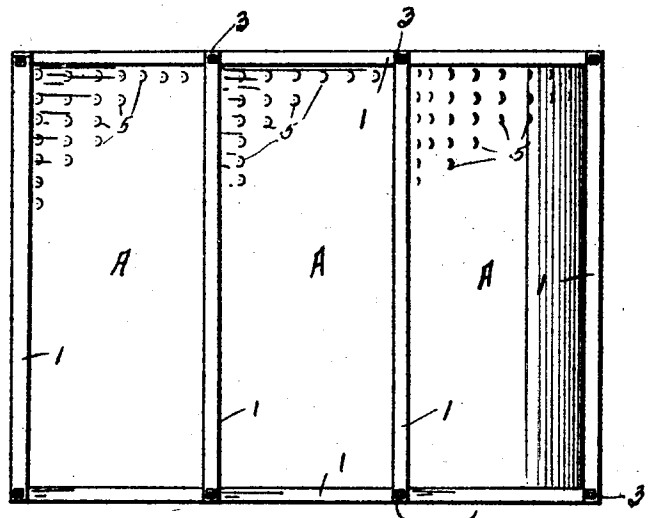
Feb. 10, 1931. W. H. CURRY ET AL 1,792,285

AERATOR

Filed Jan. 3, 1928

Fig. 1



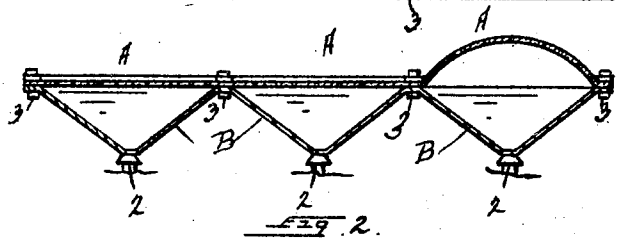


Fig. 2.

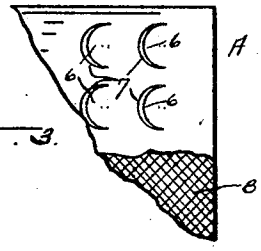


Fig. 3.



Fig. 4.

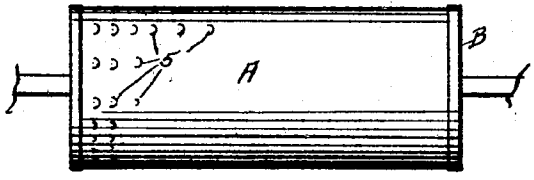


Fig. 5

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UNITED STATES PATENT OFFICE

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AERATOR

Application filed January 3, 1928. Serial No. 244,187.

Our invention relates to aerators used in oil flotation devices to separate mineral particles from the gangue or rock with which minerals are usually associated, and has for its object to provide a new and improved aerator which, when used in connection with the present practice of separating ore, will reduce the maintenance costs and will improve the present practice of separating ores.

A further object is to provide an improved aerator which will not require the frequent repairs and new installations which are necessary with the present mats used in flotation of minerals, and which will minimize the precipitation of lime on the mat.

A still further object is to provide an air mat which will be easily installed, will not require the removal for cleaning because it will not have a rough surface on which particles may catch, and which will divide the air into more and finer air bubbles, making a better froth on the top of the water than has heretofore been accomplished.

In the process of flotation air is introduced through the cell in many different means, all of which are to make a froth or mass of air bubbles on the top of the water in the ore pulp and which bubbles start at the bottom of the cell and pass up through the water and acids used and through the finely ground ore pulp to carry the mineral particles to the surface, forming a mineral-carrying froth on the surface of the cell, where it is skimmed off or carried over into launders for further treatment. In these processes where acids, oils, lime and other chemicals are used, the action thereof rots and disintegrates the usual types of mats used to form the air bubbles, and the lime precipitates on the mat, closing the opening therein, but with our mat, which we make of rubber, there is no rotting or disintegration from these sources, and the surface of the mat is smooth so that the lime will not precipitate as readily thereon, and the mat may be used a much longer period of time.

These objects we accomplish with the device illustrated in the accompanying drawings, in which similar numerals and letters of reference indicate like parts throughout the several views and as described in the specification forming a part of this application and pointed out in the appended claims.

In the drawings we have shown the best and most preferred manner of building my invention. Figure 1 is a plan view of the three mats used in a single cell with the one mat shown inflated as when the air is being passed therethrough. Figure 2 is a section on line 2—2 of Figure 1. Figure 3 is a small portion of one of the mats enlarged to show the shape of the perforations therethrough, with the rubber shown stretched to open the perforations. Figure 4 is a view showing the opening of the perforations should the rows be placed diagonally across the mat. Figure 5 is a diagrammatic view of the mat in use on the rotary type machine.

In the drawings we have shown the mats as A and the cells or pans over which they are secured as B. The said mats A are made of flat sheets of rubber and are secured to the pans B by the metal strips 1 and the bolts 3. Other means may be used to secure the mats to the pans, or rotors used. The said pans B are provided with air inlet openings 2, through which air under pressure is forced to inflate the mats. Semicircular or crescent-shaped perforations 5 are molded or cut through the rubber A from the bottom side so that the top surface of the rubber will be smooth with only the small cut of the perforation therethrough. The said rows of perforations are made longitudinally with the mat or can be made diagonally thereon, but the holes must be made in the direction of the bulge of the rubber when inflated. This is for the purpose that, when the mat is expanded by the pressure of the air, it will

stretch upwardly and open the cuts, allowing the air to pass therethrough. The said perforations are made with a very sharp tool and are so made that when the mat is deflated they are cuts and there is no opening through the rubber whatsoever, but when the air is introduced through the pans and the rubber inflated the stretching thereof will open the slots or moon-shaped perforations 5, allowing the air to pass therethrough.

The perforations are made closely together and in such number that the air, in inflating the mat, will not stretch the rubber mat A to such a great degree that it will not return to its closing position all of the time so that when it does return there will be no opening through the mat for the fine sand or gangue to get through the opening into the pans below the mat.

The perforations and the shape thereof are the prime factors of this invention and are so constructed, as will be seen from the drawings, that when the mat stretches the inner lip portion 6 of the crescent cut 5 will be forced upwardly and the outer periphery 7 of the cut will be drawn away from the portion 6, making a small crescent-shaped opening therein, and when the rubber is allowed to resume its primary position the lip portion 6 resumes its initial position, acting as a valve, and the periphery 7 is drawn back to contact with the portion 6, forming a slit through the rubber which will completely close the hole therethrough.

It will be seen that varying air pressures and volume will affect the bulge of the rubber mat and that the valve action of the lip portion 6 will open according to the pressure and volume used. In types of machines where the pressure varies much the rubber mat will be reinforced with a thin sheet of fabric 8, which fabric will limit the amount of bulge and tend to hold the outflow of air through the mat at a constant flow.

In using the mat on the rotary type of aerators the mat will be placed around the rotor and will be made in a tubular shape and will be held thereon by circular strips or hoops of metal or rubber bands slid over the ends of the rotor. Figure 5 of the drawings shows the use with the rotor, and it will be obvious that the mat can be used with all types of machines, using the porous medium for the distribution of air therefrom.

Having thus described our invention we desire to secure by Letters Patent and claim:

1. In a mat for use in distribution of air through liquids, the combination of a pan and a sheet of thin rubber secured over the top thereof, having rows of semi-circular perforations through said rubber adapted to open when air is introduced into said pans below said rubber, and to allow said air to pass through said perforations at varying pressures and volume.

2. In a mat for use in the distribution of air through liquids, the combination of a sheet of thin rubber; a sheet of reinforcing fabric secured therein; perforations through said rubber in the shape of a crescent with the inner portion of the crescent adapted to raise and lower as the rubber mat is inflated and deflated substantially as described.

In testimony whereof we have affixed our signatures.

WALTER H. CURRY.
HENRY F. DIETZ.