

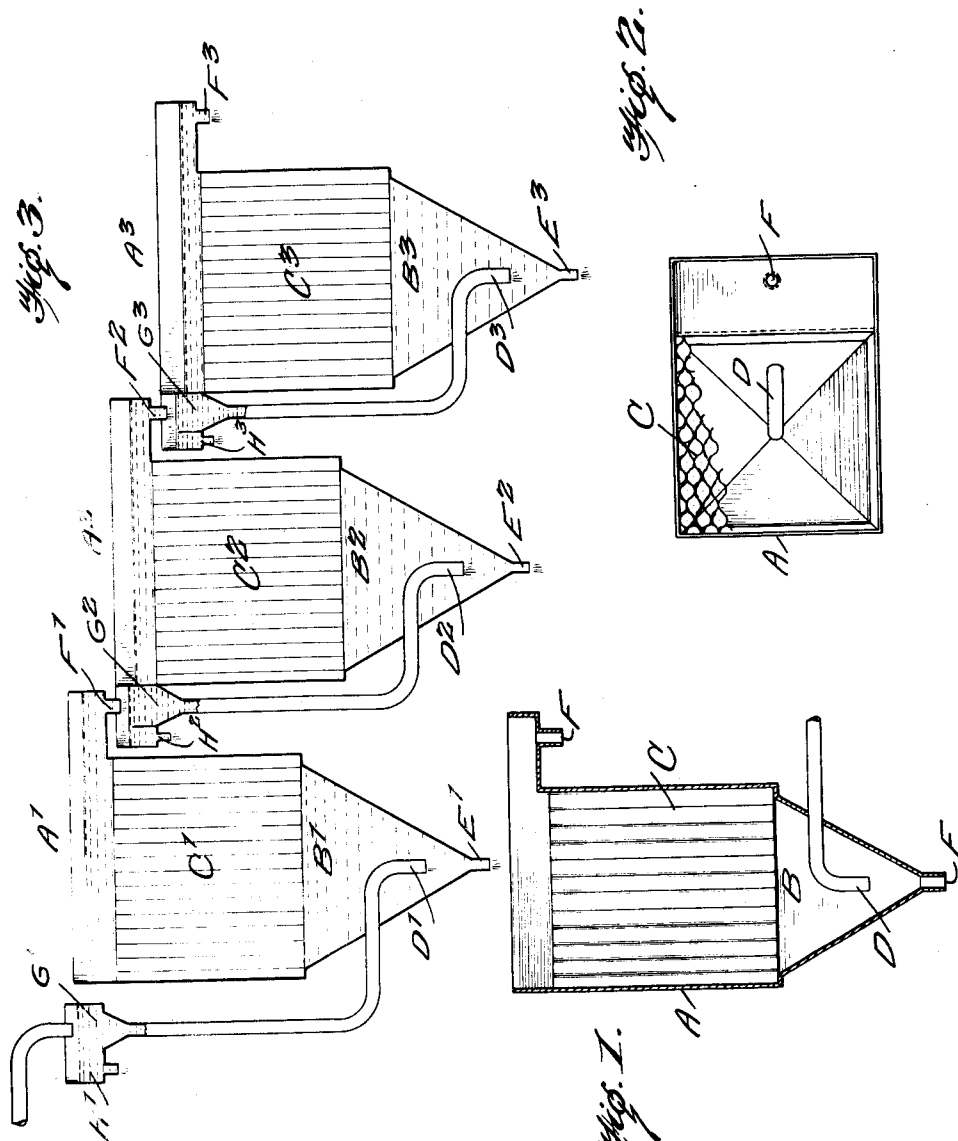
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METHOD AND APPARATUS FOR CLASSIFYING ABRASIVES SUSPENDED IN LIQUIDS

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METHOD AND APPARATUS FOR CLASSIFYING ABRASIVES SUSPENDED IN LIQUIDS

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The present invention has for its purpose to provide a method and apparatus for classifying abrasives suspended in liquids and more particularly abrasives for grinding and polishing glass.

In grinding and polishing glass, the rough sheet is first ground by coarse abrasives, and then grinding is continued with abrasives of smaller particles until rouge is used. It is therefore necessary to separate and classify abrasives into particles of a like size so that the collected like particles may be fed to grinding machines.

Solid particles are generally separated out of the liquid material in which they are suspended by the combined effect of gravity, of the specific resistance of said liquid and of the speed at which it moves, the proportion between the particles deposited and the particles that remain suspended varying with the size of the particles and the speed of the liquid in which they are carried.

Consequently, in order to obtain the separation of particles of determined size, it is necessary to control the speed of the liquid in which they are suspended and to render that speed as uniform as possible in all parts of any horizontal section of said liquid.

This object has been realized in my invention, by moving the liquid with the particles suspended therein through a succession of depositing vessels or grading tanks, without the addition of any other liquid, the volume of the liquid which passes through each vessel during the same time being controlled in order to obtain in successive vessels decreasing velocities for the deposit of particles of decreasing size from the liquid carrying the particles. This is accomplished by feeding the liquid into each vessel through an overflow in order to regulate the velocity of the liquid for the deposit of each size of particles and also by feeding the liquid upwardly to a series of vertical or inclined parallel channels of such restricted cross section that variations in the velocity of the liquid in each channel and the formation of eddy currents is prevented, both of which would cause deposits of particles of different sizes.

In the drawing forming part of this specification,—

Figure 1 illustrates a separating vat embodying my invention.

Figure 2 is a horizontal section of Figure 1.

Figure 3 shows a series of separating vats like that shown in Figure 1.

In the drawing, A designates a vat, the lower part of which forms a funnel B. The vat contains a series of parallel partitions C, vertical or inclined, preferably undulating, the apices of which abut, forming a honeycomb, through the undulations of which the liquid carrying the solid particles rises, the liquid being fed into the funnel B, near its bottom, through the pipe D, passing from the funnel upwardly through the several channels formed by the partitions C, and discharging into the out-flow F. The coarser solid particles fail to rise with the liquid in the channels, and drop to the bottom of the funnel B, from which they are evacuated through the outlet E, while the finer particles are carried on with the liquid through the out-flow F.

In Figure 3 I have shown a series of separating vats A₁ A₂ A₃ connected together. The liquid carrying the particles to be classified is fed into a receptacle G₁ provided with an overflow H₁ in order to maintain a constant level of said liquid; then it is conveyed through tube D₁ into funnel B₁ of the first vat A₁.

The coarsest particles being separated out and remaining in vat A₁, the liquid containing finer particles is fed through out-flow F₁ into receptacle G₂ and conveyed through tube D₂ into funnel B₂ of the second vat A₂, which extracts a part of these particles, while still finer particles are extracted in vat A₃. While I have only shown three vats, any number of vats can be connected in series so as to extract from the liquid, the particles in proper order, and to the desired degree of fineness.

The size of particles separated out in each vat is determined by the rate of rise of the liquid, which rate is regulated by controlling the amount passing through tubes D₁ D₂ D₃,

outlets E_1 , E_2 , E_3 and outflows F_1 , F_2 , F_3 . This control is obtained by maintaining constant the level in liquid in receptacles G_1 , G_2 , G_3 by means of overflows H_1 , H_2 , H_3 and regulating the issue of solid particles through outlets E_1 , E_2 , E_3 . It will be seen that the height of over-flows in relation to the out-flows F_1 , F_2 , F_3 regulates the head pressure in their respective vats, the excess liquid which would cause increased head pressure and hence increased speed being discharged through these openings.

Besides, I contemplate connecting at outlets E_1 , E_2 , E_3 devices for regulating density like that shown in French Patent 593,937.

Having thus described my invention what I claim as new, and desire to secure by Letters Patent is;—

1. In an apparatus for classifying solid particles and depositing the same from a liquid by which they are carried, a vessel having a series of undulating parallel partitions having their apices in contact to form a series of parallel passages of restricted cross section, in combination with means for feeding the liquid below the partitions and withdrawing it from above the same, means for controlling the hydrostatic head between the feed and withdrawal points, and means for regulating the density of the classified material.

2. The method of classifying out of liquid solid particles suspended therein which comprises causing the same to flow upwardly in the vessel to an overflow near the top thereof, withdrawing from the base of the vessel particles deposited in the upward flow of the liquid and maintaining the rate of upward flow in the vessel constant, regardless of the rate of withdrawal of the separated particles from the base by feeding the liquid to the base of the vessel through a connection having an overflow chamber.

3. In an apparatus for classifying solid particles and depositing the same from a liquid

in which they are carried, a vessel having a series of corrugated partitions arranged so as to have their apices in contact to form a series of parallel vertical passages of restricted cross section in combination with means for feeding the liquid below the partitions and withdrawing it from above the same, and an over-flow for controlling the hydrostatic head between the feed and withdrawal points.

4. In an apparatus for classifying solid particles and depositing the same from a liquid in which they are carried, a vessel having a series of partitions arranged to form a series of parallel vertical passages of restricted cross section with means connected to an over-flow for feeding liquid containing solid particles into said vessel below said partitions, but above the collecting area for the separated particles.

5. The method of classifying out in successive vessels particles of decreasing size suspended in liquid which comprises moving the mixture upwardly successively through similar vessels with decreasing upward velocity in the successive vessels without addition of other liquid and controlling separately the volume of mixture which enters each vessel and the amount of separated particles evacuated from each vessel.

6. The method of separating solid particles out of liquid carrying the same, which comprises feeding the liquid successively into the bases of a series of vessels, withdrawing it from the upper part of each vessel, evacuating the particles separated at the bottom thereof, varying separately the feed to and the rate of evacuation from each vessel to control the volume of liquid which passes through said vessel, and to obtain the proper velocity for the deposit of particles of the predetermined size.

In testimony whereof I hereunto affix my signature.

LUCIEN BERGUERAND.