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GOLD-SAVING MACHINE.

1,030,499.


To all whom it may concern:

Be it known that I, JAMES McDONALD WISHART, a citizen of the United States, residing at Pasadena, in the county of Los Angeles and State of California, have invented a new and useful Gold-Saving Machine, of which the following is a specification.

This invention relates to the class of gold saving devices wherein the gold bearing material is passed over one or more obstructing devices or riffles, and the main object of the present invention is to provide means whereby the said material will be kept in motion and prevented from packing during such passage. Where the material encounters the riffles or obstructions it is liable to become pocketed and to lose its motion, and to pack by reason of such loss of motion, and this invention is directed to the maintenance of the condition of motion in the material so that such packing will be avoided and only material of definitely high specific gravity, for example, gold, will be allowed to deposit or accumulate at the riffles or obstructions.

Another object of the invention is to provide a device which can be used either as a dry concentrator or as a wet concentrator, or in cases where water is used as a suspending medium for the gold bearing material, the said device can be used either in the necessary movement of the material for suspension in and movement through the water without necessity of motion of the water itself.

Other objects of the invention will appear hereinafter.

The accompanying drawings illustrate the invention, and referring thereto:

Fig. 1 is a vertical section of the machine. Fig. 2 is a plan thereof. Fig. 3 a rear elevation. Fig. 4 a detail section of one of the riffles or obstruction devices, Fig. 5 a detail section showing another form of obstructing device.

The machine comprises a chute or trough 1 mounted on a suitable frame 2 as by means of hangers 3. Said chute or trough is inclined to cause the material to feed therealong by gravity, and a hopper or supply means 4 is provided over the upper end of the chute to supply material thereto, said hopper being provided with a gate or discharge outlet means 5. It is preferred to provide for lateral oscillation of the chute to render the separating action more effective, and for this purpose the said hangers 3 are swingingly mounted by bearings 6 on shafts 7 extending longitudinally over the top of frame 2, said hangers being pivotally connected at 8 to side bars 9 on the side walls 10 of the chute or trough 1. The means for lateral oscillation of the chute or trough may consist of eccentrics 12 mounted on a shaft 13 journaled in bearings 14 on the frame 2 and provided with driving means 15 and fly-wheels 16. The bottom or floor 11 of trough 1 forms the table or surface for receiving the gold bearing material, and is inclined so that the material passes by gravity along said surface.

A preliminary material-receiving means, consisting of a plate or board 18 extending across the upper portion of the trough 1 between the side walls thereof, is preferably provided, and obstructions or riffle means are provided at the lower end of this preliminary material-receiving means and at various points along the floor of the chute or trough 1.

The riffles or obstructing means at the lower end of the preliminary receiving means may consist of a vertical plate 19 secured in fixed position at the lower and forward end of the member 18 and extending upwardly above the top of said member 18, and a flange or extension 20 at the top of the member 19 extending upwardly and rearwardly therefrom, forming a pocket or receptacle in the path of the material descending on theinclined receiving means 18.

Each of the riffles or obstructing means on the floor of the chute 1 may consist of a cross strip 21 extending from side wall to side wall of the chute or trough 1, and a top plate 22 extending upwardly and forwardly from said crossstrip. The floor of the chute 1 may be provided with a top plate 23 of sheet-iron extending the full width and length of said floor, and strips 24 of carpet or other suitable material may be provided between this plate 23 and the cross strips 24 to serve as packing. The floor of the riffle is exposed for a portion of its length above each riffle, so as to allow longitudinal travel of the material along the floor between the riffles, the riffles acting as obstructions to such travel.

Means are provided at each of the obstructions 19 and 21 for supplying air thereto in such manner as to preserve the condition of motion of the material at or in front.
of such obstruction to prevent the material from packing. For many purposes it is a desideratum to employ air for this purpose, thereby avoiding the necessity of water supply, and in some cases the air supply means may consist of pipes 25 extending through one side wall 10 of chute 1 directly in front of the obstructing means 19 and 21 and in the angle between said obstructing means and the floor member 18 or 1, said pipes 25 being provided with means for supplying compressed air thereto and being perforated in such manner as to cause the air to be expelled downwardly into the body of material on the floor at the obstruction, the perforations 26 in the pipes being along the bottom thereof or on the portion thereof directed downwardly toward the floor and said perforated pipes being below the top of the riffle strips 21 and at the rear thereof relatively to the direction of motion of the matter from the inclined floor. The tops of said pipes are imperforate, the perforations 26 therein being only on the bottom portion of the pipes so that the violent agitating action is restricted to the portion of the material below the pipes, said material being on the floor and in the corners of the riffle and being especially subject to packing, and the material passing over the pipe being subject only to gentle upflow of fluid, thereby minimizing the liability of heavy material being carried over the riffle in case such heavy material happens to pass over the pipe. Said pipes 25 may communicate with a manifold 27 through regulating valves 28, and a flexible hose 29 may be connected to said manifold and to any suitable source of compressed air, not shown.

The operation is as follows:—The gold bearing material, which is assumed to have been screened, if necessary, to remove any pieces too large for treatment in the machine, is deposited in the hopper 4 and allowed to pass by gravity from said hopper by opening the gate 5 to the required extent. The material falls from said gate onto the preliminary receiving plate 18, said plate being inclined so that the material will move forwardly thereon by gravity and will tend to move toward and against the obstructing means 19 at the forward end of said plate. Compressed air is supplied by the pipes 25 into the space back of said obstructing means, said air being directed downwardly toward the plate 18 so that the currents of air will be deflected from said plate and will have a lifting and conveying action on the body of material on said plate tending to raise the material from the plate and to keep it in motion and in separated condition, thereby preventing packing and clogging of the material back of the obstruction 19. The direction of the air may be controlled to suit the varying conditions in the gold bearing material by turning the pipes 25 to the required position. The material thus being kept in separated and mobile condition, it is caused to eventually flow over the top of the obstructing means 20 and in front of the obstructing means 19 and to fall onto the main plate or floor 11 of the trough 1. Said floor being inclined rearwardly, the material passes rearwardly by gravity thereon and at each of the obstructions or riffles 21 is subjected to retarding action together with the agitating effect of the air currents from the pipe 25, whereby the material is prevented from packing at such obstruction, but is retained for sufficient time with reduced progressive velocity to enable the heaviest particles, such as those of gold, to separate to the lowest point of the riffle, namely, the corner between the obstructing or riffle means and the floor. This separating action is expedited and insured by the lateral oscillation given to the table or trough 1 by means of the operating mechanism above described, gold being thereby caused to accumulate at the lowest portion of each of the riffle means on the plates 18 and 11.

It is well understood that if the gold bearing material can be kept in an open agitated condition, the difference in specific gravity of the gold will eventually cause its separation, and the function of the air supply is to cause such separation and mobility of the mass at the places where the progressive or forward motion of the material is temporarily retarded, thereby causing the material to drop the gold.

It will be understood that the invention is applicable for the saving of other material besides gold where the specific gravity of such material is sufficient to enable it to settle out under the agitating and separating effects of the air.

The invention is applicable in connection with any form of riffle or obstructing means wherein the progressive or forward motion of the gold bearing material is temporarily arrested or retarded.

In the form shown in Figs. 1 to 4, the riffle is provided with the overhanging plate 28 or 22 forming a pocket within which the air is supplied, the air in such case serving to eject the lighter materials from said pocket. As shown in Fig. 5, however, this overhanging plate may be omitted, and, if required, the obstructing strip shown at 29 may in that case be made as shown in order to furnish the required amount of obstruction, and the air supply serving to keep the air in the corner between the obstruction and the floor 11 in a state of agitation and separation as above described. The valves 23 provide for variation of the air supply to the respective riffles so that at each riffle the air may be supplied with just sufficient...
pressure and velocity to carry the lighter material or gangue over the obstruction without preventing the settling of the gold, and where a series of rilles are provided, as shown, it may be desirable to provide for different pressure in front of the different rilles, the pressure decreasing, for example, at successive rilles so that the first rilles save the coarser gold and the latter rilles save the finer gold. The action of the air in opening up the material is somewhat similar to the action of water with an ordinary rille in that it causes agitation and ebullient action, but is differentiated from the ordinary rille by the fact that the air is directed downwardly onto the table or bed 13 or 11 and is then deflected upwardly from said table or bed so that it exercises a lifting action directly upon the surface of the table or bed, preventing any settling or packing of relatively light material on said table or bed. By "relatively light material" is meant not only quartz, etc., but material such as black sand, which is heavy enough to have a strong settling or packing tendency, but is sufficiently lighter than gold to enable it to be lifted away from the bed or table by means of the air currents provided as above described.

While I consider air as the best medium for carrying out the process, the same effects may be produced by the use of water supplied through the pipes 25, where water is used in the separation, and deposited on or run over the rilles along with the gold bearing material, or air may be supplied through the pipes 25 to prevent packing of the material at the rilles where water is deposited on or run over the rilles along with the gold bearing material.

What I claim is:

1. A gold saving machine comprising a floor for receiving the gold bearing material, said floor being inclined to cause said material to pass therealong by gravity, rille strips extending transversely of said floor, said floor being exposed for a portion of its length above each rille, to allow longitudinal travel of the material along the floor between the rilles, the rilles acting as obstructions to such travel to cause temporary retardation of the movement of the material along said floor, a pipe extending transversely of the floor in the angle at the rear of said rille strips, and means for supplying compressed air to said pipe, said pipe having an imperforate top and being perforated along its bottom to discharge and direct air onto the floor in the angle at the rear of said rille strips, said perforations being near the rille strips and below the top thereof so that the air issuing from the perforations and directed downwardly against the floor will return upwardly through the material at the rear of and above the rille strips, thereby maintaining separation and mobility of the material during the time of retardation, to prevent packing of the material and allow separation of the gold therefrom and passage of the lighter material over the rille strips.

2. A gold saving machine comprising a floor for receiving the gold bearing material, said floor being inclined to cause said material to pass therealong by gravity, rille strips extending transversely of said floor, said floor being exposed for a portion of its length above each rille, to allow longitudinal travel of the material along the floor between the rilles, the rilles acting as obstructions to such travel to cause temporary retardation of the movement of the material along said floor, a flange on said strip extending rearwardly over said floor from each rille strip forming a pocket at the rear of each rille strip and an air supply pipe extending transversely of said floor within said pocket and beneath said flange, said pipe having an imperforate top and being provided with perforations along its bottom located adjacent to the floor for directing the air onto said floor, whereby said air in returning from the floor passes upwardly through said pocket and prevents the material from packing therein.

In testimony whereof, I have hereunto set my hand at Los Angeles, California, this 4th day of February, 1910.

JAMES McDONALD WISHART.
In presence of—

ARTHUR P. KNIGHT,
FRANK L. A. GRAHAM.

 Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."