J. R. WOOD.

PLACER MACHINE.

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912,766.

Patented Feb. 16, 1909.

Fig. 2.

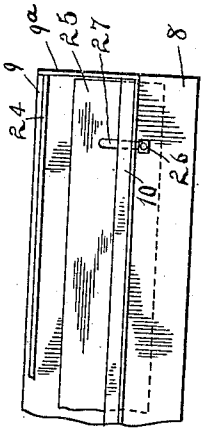


Fig. 3.

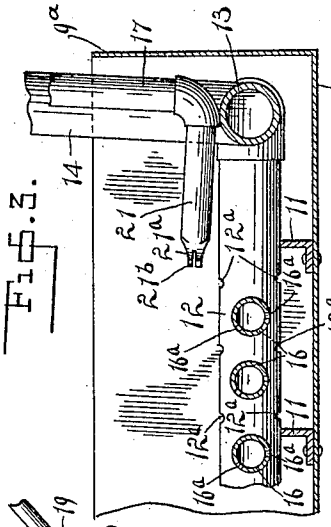


Fig. 4.

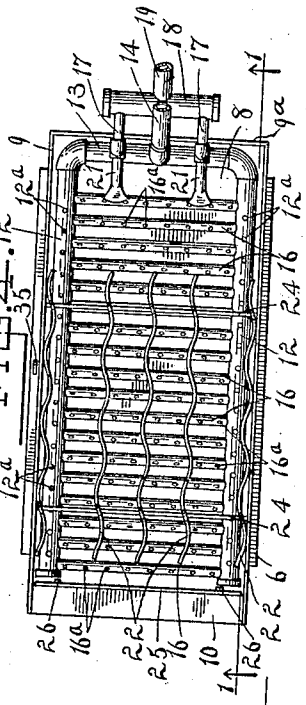
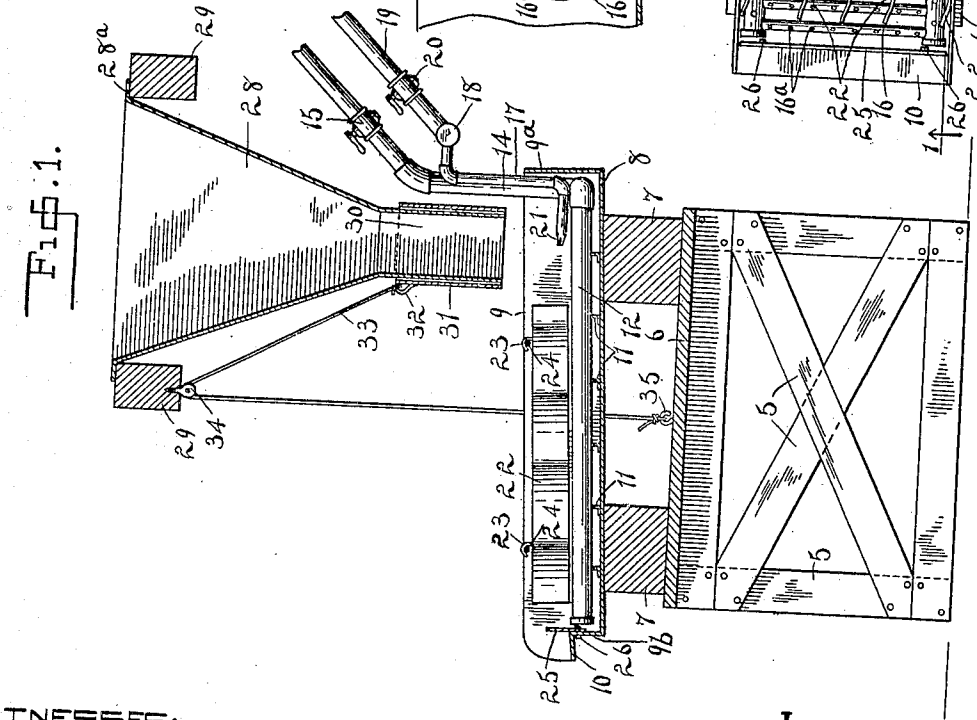


Fig. 1.



WITNESSES:

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PLACER-MACHINE.

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To all whom it may concern:

Be it known that I, JOHN R. WOOD, citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Placer-Machines, of which the following is a specification.

My invention relates to hydraulic mining and refers especially to apparatus for separating metals in the free state from base material such as sand, gravel, dirt and other substances with which they are found commingled in nature, the method being equally useful in extracting free particles of the precious metals from pulverized quartz.

The chief objects of the improvements which form the subject matter of this application are to provide a separator for metals that will be more efficient than those of ordinary construction and to furnish an appliance for the purpose stated that will be simple in construction and that will require only a moderate quantity of water to produce the desired results.

Further objects of this invention are to furnish an apparatus that will be less combersome than the usual appliances employed for the purpose, and by materially reducing the dimensions, the machine can be more readily transported and assembled, and for like reasons it can be manufactured economically and will be durable and reliable.

Among other advantages may be mentioned the opportunity of employing the machine in locations where the pressure and amount of water are not sufficient for the ordinary apparatus used in this method of mining.

I accomplish the above and other important results by the employment of the apparatus illustrated in the accompanying drawing, forming a part of this application, said apparatus described in a general way, comprising an inclined sluice provided with riffles and having a system of perforated pipes located above the riffles and connected to a source of water supply under pressure, a suitable support being provided for the apparatus, and a hopper suspended above the sluice to properly direct the material to be operated upon.

I have shown the preferred form of my improved metal separating sluice in the following views:—

Figure 1 is a vertical longitudinal section, taken on the line 1—1 of Fig. 4; Fig. 2 is a fragmentary view of the tail of the sluice-way the amalgamating plates being removed; Fig. 3 is a fragmentary sectional view of a portion of the upper end of the sluice-way, and Fig. 4 is a top plan view of the apparatus with the hopper and supports therefor removed.

Referring to the details of the drawing the numeral 5 indicates a substantial framework of suitable dimensions supporting a table 6, and upon this table are placed transverse removable timbers 7, upon which rests a sluice-way or pan, comprising a bottom 8 and sides 9. The upper surfaces of the timbers 7 are suitably beveled so that the sluice-way will have a proper inclination to cause the required velocity in the flow of water and material supplied thereto in the manner to be described. The upper end of the sluice-way or pan is closed by a head board 9^a, and the sides 9 are connected at the lower end by a vertical tail board 9^b which is narrower than the sides 9 and is joined to a strip 10 lying parallel with the bottom 8. At spaced intervals upon the inner surface of the pan are fixed transverse angle bars 11, which form riffles for the retention of amalgam, as in the ordinary sluice. Extending longitudinally upon either side of the sluice-way, and resting upon the said riffles 11 are water pipes 12 furnished above and below with series of perforations 12^a. The said pipes 12 are closed at their lower ends and connected at their upper ends by a transverse section 13, to the middle of which is a communicating supply pipe 14, extending upwardly to connect with a reserve tank (not shown) and furnished with a valve 15, for controlling the flow of water. The said pipes 12 are approximately co-extensive with the length of the pan or sluice-way and are connected at spaced intervals with transverse pipes 16 of less diameter than the side pipes 12 and provided with rows of perforations 16^a located both above and below a horizontal plane the upper perforations being placed at a slight inclination so that the general direction of the water as it flows therethrough will be towards the decline of the sluice. In addition to the system of water supply pipes thus described, I have provided an auxiliary apparatus consisting of vertical pipes 17, located at the head of the sluice and communicating with a horizontal section 18 connected with a water supply by means of a pipe 19, in which is a control valve 20.

Each of the vertical pipes 17 is supplied with a shorter horizontal branch 21, located just above the level of the pipes 12 and 16. These branches are directed towards the lower end of the sluice and their extremities 21^a are flattened to form narrow orifices 21^b, through which the water under pressure will issue in streams widely spreading laterally and by reason of the contracted orifices having an increased velocity over the flow in the supply pipes. Extending longitudinally in the sluice are a series of parallel corrugated amalgamating plates 22 suspended by hooks 23 from transverse rods 24 supported in the side 9. At the lower end of the sluice is located a vertical gate 25, adjustably supported by bolts 26 which pass through holes in the tail board 9^b and engage slots 27 in said gate 25.

Above the upper end of the sluice is located a feed hopper 28, having projecting flanges 28^a which rest upon supports 29. The lower end of the hopper terminates in a chute 30 and telescoping this chute is an adjustable sleeve 31, having an eye 32 at its upper margin for the attachment of suspending cables 33 which pass over grooved pulleys 34 and are secured to hooks 35 fixed to the table 6 at any convenient point.

It is obvious that the length depth or width of the apparatus may be varied as desired, and other changes can be made in the devices of my invention as herein disclosed without departing from the spirit and scope thereof and I do not wish, therefore, to be limited to the precise construction shown.

The method of using the apparatus is as follows: The first step is to open the valves 15 and 20 thus allowing a full supply of water to enter the pipes, and the pressure will force the water in numerous jets through the orifices 12^a and 16^a in the pipes 12 and 16, respectively, while the water in the auxiliary system will escape from the nozzles 21 in laterally deviated sheets as previously described. As soon as the water is turned on the material to be treated is fed into the hopper 28 and passing down through the chute 30 comes in contact first with the sprays from the nozzles 21 and then with the jets from the system of perforated pipes. The action of the sprays from the nozzles thoroughly wets the material as it issues from the mouth of the chute and forces it broadcast over the sluice, thus furnishing the material uniformly over the entire pan. The numerous jets issuing with great velocity from the perforations further wet and agitate the material until the latter attains a semi-fluid state and the disintegrated mass is forced by the current along the sluice and over the riffles aided by the inclination of the sluice-way. Proper quantities of mercury having been placed in the channels formed by the riffles, and upon the amalgamating plates 22 the gold and other precious metals will be caught by the riffles or held by the amalgamating substances and plates, while the water and waste material will be carried over the gate. The said gate can be adjusted vertically to suit the relative supply of water and material and the inclination of the sluice may be changed by varying the distance between the blocks 7 or by replacing them with others of different heights.

Having thus described my invention what I claim is:—

1. In a placer machine, the combination with a suitable supporting frame, a sluice-box on said frame, and riffles arranged in the sluice-box, of water pipes arranged transversely and longitudinally above the riffles, the said pipes having perforations at an angle from the horizontal, a hopper an adjustable chute for the hopper and a spraying nozzle arranged in the upper part of the sluice box, said nozzle having a contracted mouth adapted to deliver a laterally extended sheet of water below the discharge opening of the said chute.

2. In a placer machine, the combination with a suitable frame, a sluice box supported thereon, means for varying the inclination of the sluice box, and a series of riffles in said box, of perforated pipes arranged longitudinally and transversely in the sluice box above the riffles, a spraying nozzle having an expanded mouth adapted to deliver a laterally expanded jet, a hopper arranged to feed the material from above and in front of the spraying nozzle and vertically corrugated amalgamating plates suspended longitudinally above the riffles.

3. In a placer machine, the combination with a suitable support, a sluice box adjustably mounted thereon, and a series of riffles in the sluice box, of water pipes arranged transversely and longitudinally in the sluice, said pipes having perforations arranged to project the water downwardly and forwardly, a hopper above the sluice, an adjustable chute for the hopper, a spraying nozzle arranged below the chute, and a series of removable vertically corrugated amalgamating plates suspended above the perforated pipes.

4. In a placer machine, the combination with a sluice box removably and adjustably supported, and a series of riffles therein, of water pipes arranged longitudinally and transversely above the riffles and provided with perforations extending upward and downward, a removable hopper, an adjustable chute for the hopper, spraying nozzles arranged below the chute and having laterally expanded mouths, a plurality of corrugated amalgamating plates arranged above the riffles, rods extending transversely above said plates, and hooks attached to the amal-

gamating plates and removably engaging said rods.

5. In a placer machine, the combination with a sluice box provided with riffles, a series of perforated water pipes arranged above the riffles, a hopper, and a chute, of a plurality of spraying nozzles having laterally expanded mouths, a series of corrugated amalgamating plates extending longitudinally above the water pipes, with their corrugated surfaces vertical, a fixed tail board extending above the riffles, and an adjustable gate supported on said tail board.

6. In a placer machine, the combination with a sluice-box, a series of riffles formed of angle bars secured to the bottom of the sluice box, perforated water supply pipes arranged longitudinally along the sides of the sluice-box, a series of transverse pipes connecting the supply pipes, said transverse pipes having perforations opening upwardly and downwardly, and spraying nozzles adapted to discharge the water in a horizontal sheet above said pipes.

7. In a machine of the class described including a sluice box, and a suitable support therefor, the combination with a series of riffles arranged in said sluice box, of water pipes arranged longitudinally and transversely in the sluice box above the riffles, said pipes having perforations adapted to project the water upwardly and downwardly, a series of removable vertically corrugated amalgamating plates suspended above the perforated pipes, and means for introducing water to said pipes.

8. In a machine of the class described, the combination with a receptacle adapted to contain water, of a plurality of water pipes arranged longitudinally and transversely in the bottom of the tank, said pipes having perforations arranged to project the water upwardly and downwardly, a series of removable vertically corrugated amalgamating plates suspended above the perforated pipes, and means for introducing water into said pipes.

In testimony whereof I affix my signature in the presence of two witnesses.

JOHN R. WOOD.

Witnesses:
F. BENJAMIN,
T. M. POYNTON.