July 24, 1923.

1,462,584

D. K. SMITH

PLACER MINING MACHINE

Filed April 11, 1922

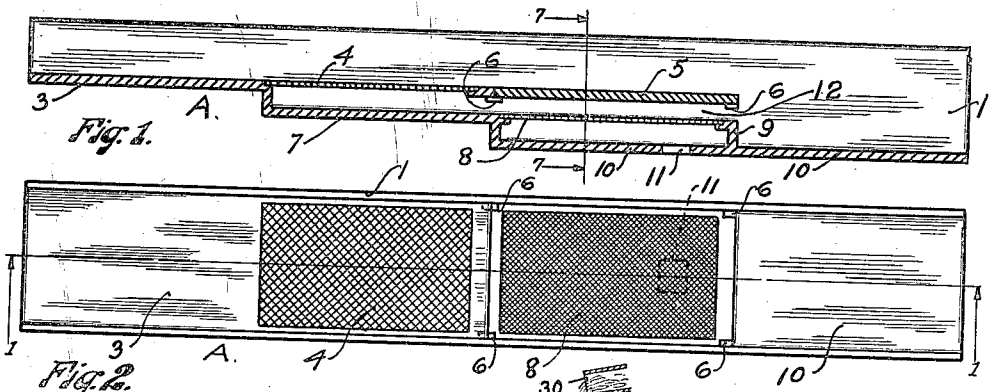


Fig. 1.

Fig. 2.

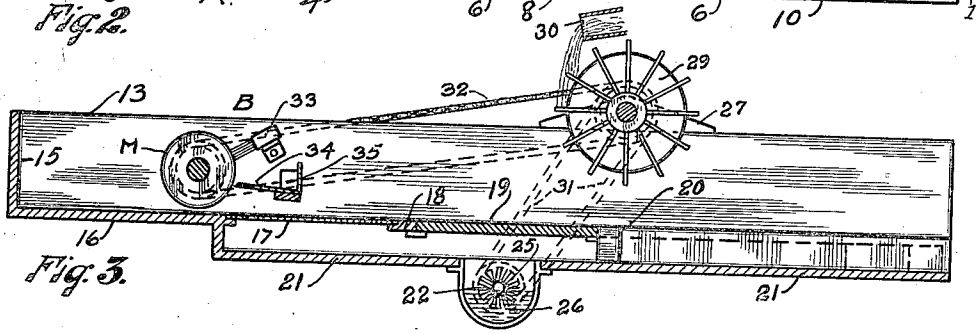


Fig. 3.

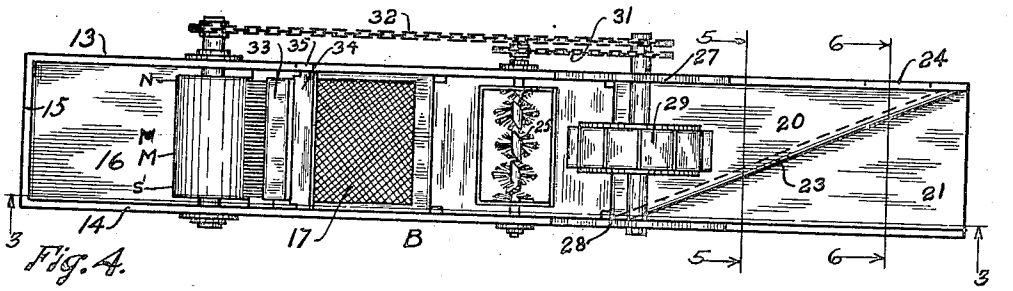


Fig. 4.

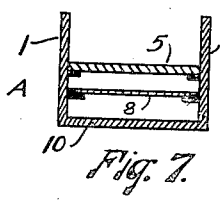


Fig. 7.

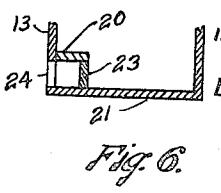


Fig. 6.

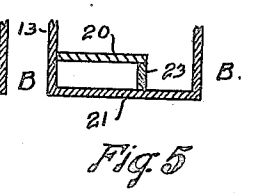


Fig. 5

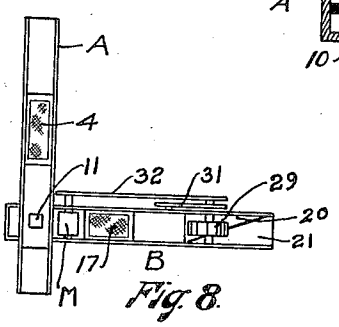


Fig. 8.

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UNITED STATES PATENT OFFICE.

DAVID K. SMITH, OF DENVER, COLORADO, ASSIGNOR OF ONE-HALF TO JOHN G. KIRSCHNER AND ONE-EIGHTH TO LEO C. HOLLBERG, BOTH OF DENVER, COLORADO.

PLACER-MINING MACHINE.

Application filed April 11, 1922. Serial No. 551,516.

To all whom it may concern:

Be it known that I, DAVID K. SMITH, citizen of the United States of America, residing at 208 South Kalamath Street, in the city and county of Denver and State of Colorado, have invented certain new and useful Improvements in Placer-Mining Machines; and I do declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to the characters of reference marked thereon, which form a part of this specification.

This invention relates to a placer mining machine and has reference to a machine especially designed for the mining of flour gold.

The object of this invention is to produce a simple and efficient machine that can be cheaply constructed, easily transported, that is adapted to be operated by water power, and which will collect and save the gold regardless of the small size of the particles.

It is well known that gold exists in the sands along streams in many parts of this country but it often exists in such fine particles that it has heretofore been impractical to mine gold which exists in this form.

By means of the machine invented by me flour gold can be successfully mined regardless of the size thereof, thus opening up a field of mining that has heretofore been undeveloped.

In order to more clearly describe my invention I shall have reference to the accompanying drawing in which:

Fig. 1 shows a longitudinal section of a sluice which is provided with a number of screws for separating the different sizes of material.

Fig. 2 is a top plan view of the sluice shown in section in Fig. 1 but having a portion removed to better disclose the construction.

Fig. 3 is a longitudinal section of the sluice in which the actual separation of the gold from the sand occurs.

Fig. 4 is a top plan view of the sluice shown in section in Fig. 3 but with a portion removed so as to better show the construction thereof.

Fig. 5 is a transverse section taken on line 5—5 Fig. 4.

Fig. 6 is a transverse section taken on line 6—6 Fig. 4.

Fig. 7 is a transverse section taken on line 7—7 Fig. 1 and

Fig. 8 is a plan view showing the two sluices in operative relation.

The same reference characters will be used to indicate the same parts in the several views.

Numeral 1 represents one side of the primary flume or sluice which I will indicate as a whole by the letter A, 2 represents the opposite side and 3, the bottom thereof. The bottom portion which is indicated by numeral 3 has an opening therein which is covered by a screen 4 preferably of quarter inch mesh. Below the screen 4 I provide a removable portion 5, which rests upon the top of cleats 6, or it may be held in place by any other suitable means. Below the screen 4 I provide a bottom member 7 to the lower end of which a screen 8 is attached; this screen is preferably a one eighth ($\frac{1}{8}$) inch mesh and has its lower end secured to the transverse partition member 9. A bottom member 10 is provided beneath screen 8 and extends to the lower end of the sluice; this bottom member has a hole 11, the purpose of which will hereafter appear. When sluice A is in use a stream of water is directed into the upper end thereof and the gold bearing sand and gravel is shoveled into the sluice on top of the bottom member 3. The water will then carry the gravel and other solid particles, which are too large to pass through the screen 4, downwardly over the same and over board 5 from whence they pass down onto member 10 and finally are discharged through the lower end of the sluice.

The fine sand and the flour gold drops through screen 4 onto the top of bottom board 7 and passes onto the screen 8 by which a further separation takes place, the particles that are too large to pass through the one eighth inch mesh screen passing out through opening 12, while the finer particles fall on the top of board 10 and are discharged through opening 11 onto the upper end of sluice B (Fig. 8) which I will now describe.

Sluice B like sluice A is formed by two

parallel sides 13 and 14 an end 15 and a bottom 16. The bottom consists of a number of sections, the upper end of which I have indicated as 16. At the lower end of part 16 I provide a screen 17, the lower end of which is secured to a transverse member 18. A removable section 19 extends from 18 to the upper end of the tapering board 20. Screen 17 is preferably a fourteen mesh screen and the particles that enter sluice B from the opening 11 in sluice A and are too large to pass through the openings in screen 17 flow downwardly over the tops of boards 19 and 20 and are finally discharged through the lower end of the sluice.

The flour gold and fine sand particles pass through screen 17 and onto the bottom board 21 which has a section thereof cut away so as to provide a space for the amalgamating tank 22 which will presently be described. I desire to call attention at this point to the fact that board 20 is downwardly tapering (Fig. 4). Between the tapering edge of board 20 and the upper surface of board 21, there is a spacing strip 23, side 13, bottom 21, top 20 and strip 23 form a box like flume or chamber through which all the sand and water which passes through screen 17 must flow. An opening 24 in side 13 permits the sand and water to be discharged at the side of the sluice. The amalgamator 22 is semi-cylindrical and has rotatably mounted in the sides thereof a brush 25, while mercury 26 fills the amalgamator to a point a short distance below the axle upon which the brush rotates.

In order to provide power for rotating the brush I mount in suitable bearings 27 and 28 a waterwheel 29 to which water for power is led by means of a flume 30. A chain 31 serves to transmit power from the wheel to the brush.

Mixed with the sand in which the flour gold is found there is often a considerable percentage of black or magnetic iron sand and it is preferable if this is not permitted to reach and pass through the amalgamator. In order to separate the black sand I provide a cylindrical permanent magnet M which is magnetized so as to make one end N a north pole and the other end S a south pole. A sprocket chain 32 serves as a power transmitting means whereby the water wheel rotates the magnet in a counter-clock-wise direction. The magnetic action of magnet M will cause the iron sand to adhere to its surface and be carried out of the stream as the magnet rotates. In order to remove the sand from the magnet I provide a brush 33 whose bristles contact with the magnet surface and cause the sand to fall into the non-magnetic trough 34 from which it flows out through the hole 35.

From the above it will appear that I have invented a mining machine that is of simple and cheap construction, which can be readily constructed and easily transported from place to place and which is so designed that it will collect and save the finest gold particles and it is therefore especially adapted for the mining of what is known as flour gold.

Although I have shown my machine as made in two sections for convenience in handling and in transporting I wish it distinctly understood that each section does not constitute a different invention but rather that the two sections form one machine and co-operate to produce a certain result.

Section A performs the grading function while section B performs the magnetic separation, the final grading and the amalgamating. Section B may be used by itself where the sand is so fine that the grading which is performed by section A is unnecessary, but section A cannot by itself be employed for the recovery of flour gold. For the above reasons I claim the entire machine in its assembled form as well as section B specifically.

Having now described my invention what I claim is:

In a placer mining machine; a sluice of substantially rectangular cross-section adapted to be mounted on an incline; a rotatable magnetic separator near the upper end thereof; a screen in the bottom of the sluice slightly below the separator; a removable section in the bottom of the sluice below said screen; a waterwheel in the sluice directly below the removable bottom section power transmitting means connecting the water wheel to the separator whereby they will be forced to rotate in unison; a second sluice located directly below the first named sluice and adapted to receive the material that passes through the screen; an amalgamator in the second sluice, a second power transmitting means connecting the amalgamator brush shaft to the water wheel whereby the latter will rotate the former, said amalgamator being located directly below the removable section and a passageway from said second named sluice opening on one side thereof whereby the waste material from said second sluice will be discharged to one side thereof.

In testimony whereof I affix my signature.

DAVID K. SMITH.