

(No Model.)

H. W. & M. WATSON.
DRY PLACER MACHINE.

3 Sheets—Sheet 1.

No. 529,340.

Patented Nov. 13, 1894.

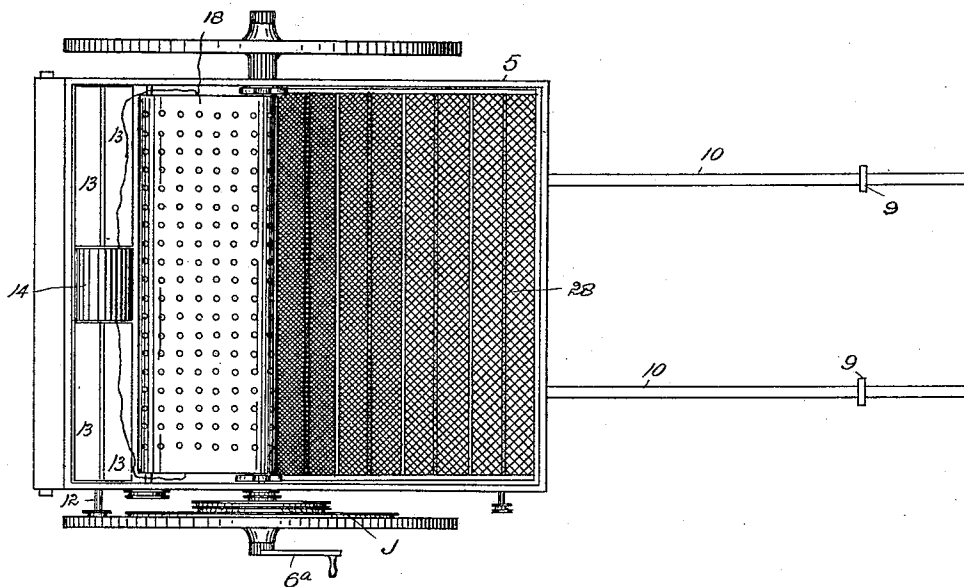
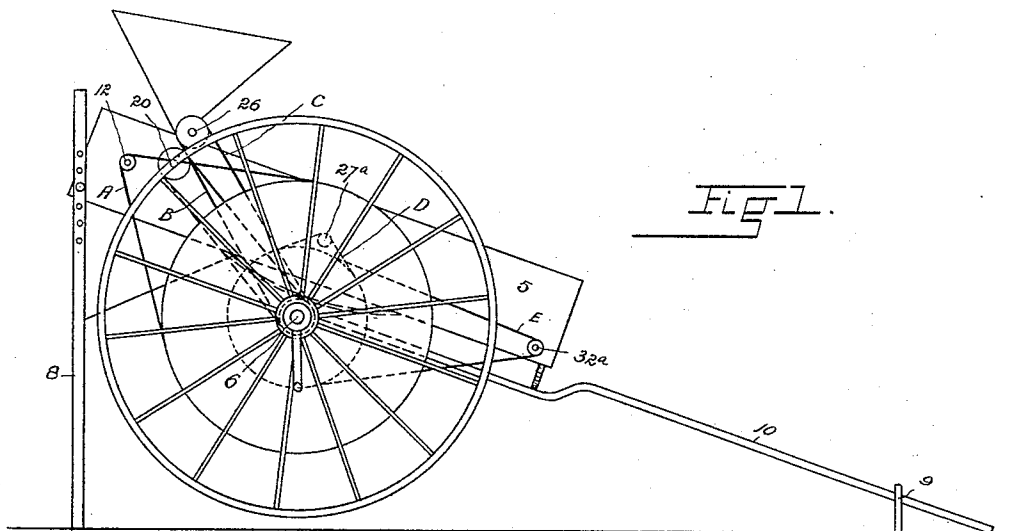


Fig. 2.

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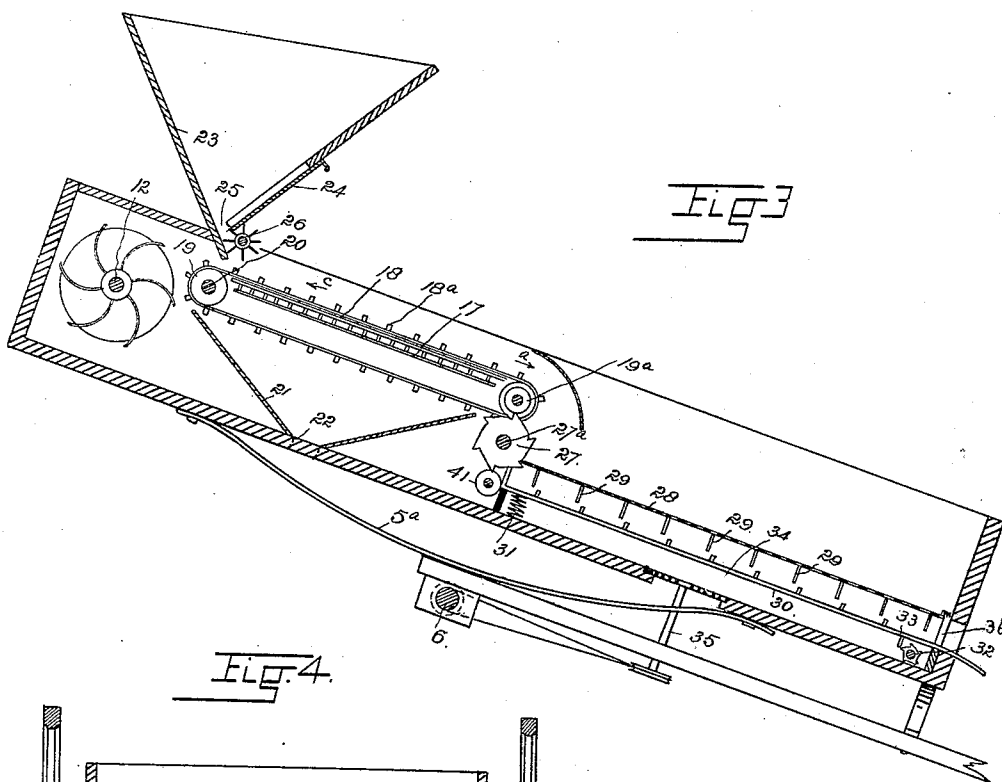


Fig. 3

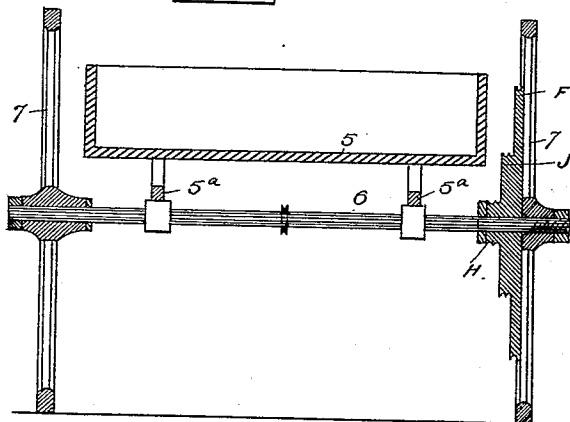


Fig. 4

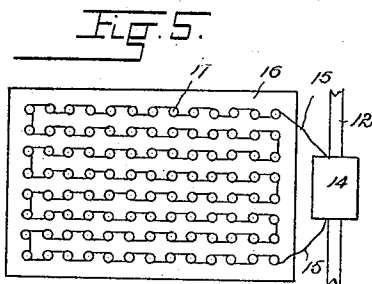


Fig. 5

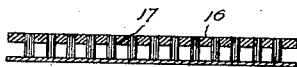


Fig. 6

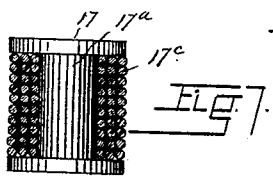


Fig. 7

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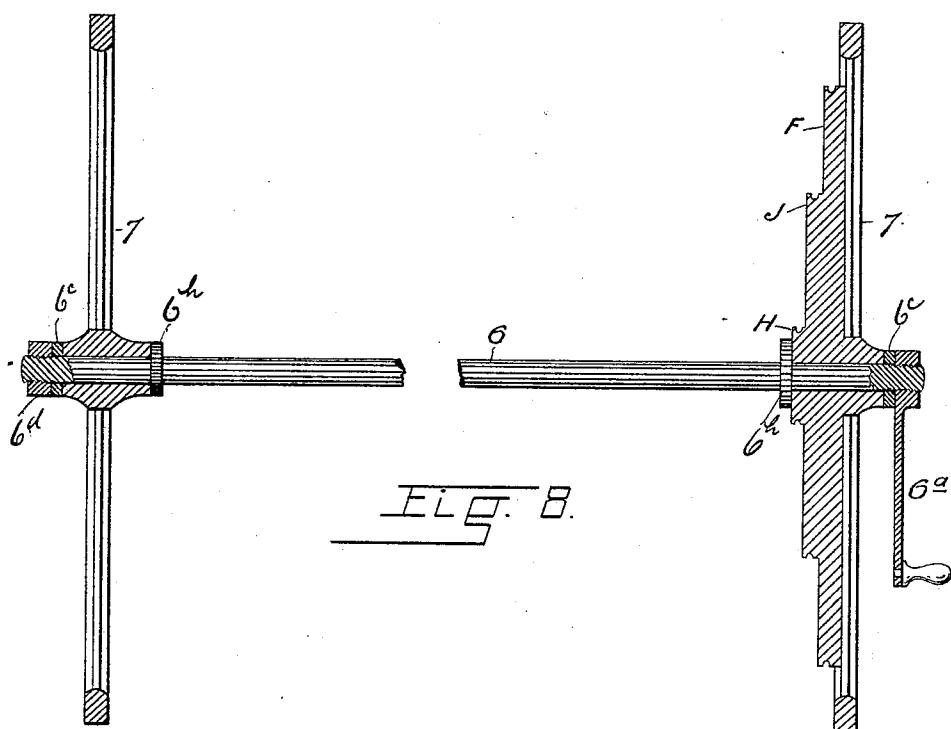
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H. W. & M. WATSON
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No. 529,340.

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UNITED STATES PATENT OFFICE.

HENRY W. WATSON AND MINNIE WATSON, OF DENVER, COLORADO.

DRY PLACER MACHINE.

SPECIFICATION forming part of Letters Patent No. 529,340, dated November 13, 1894.

Application filed May 21, 1894. Serial No. 511,911. (No model.)

To all whom it may concern:

Be it known that we, HENRY W. WATSON and MINNIE WATSON, citizens of the United States of America, residing at Denver, in the county of Arapahoe and State of Colorado, have invented certain new and useful Improvements in Dry Placer Machines; and we 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 letters and figures of reference marked thereon, which form a part of this specification.

Our invention relates to improvements in dry placer and concentrating machines, or those adapted to separate the free gold and other metallic values, from placer material and pulverized ore.

From a standpoint of convenience and general utility, we construct our improved machine in the form of a cart, whereby it may be hauled about from place to place by a horse, and when the desired location is reached, put in position for operation in a few minutes, enabling the miner to prospect easily along the road. This is an important advantage in a machine of this class.

The machine is set up by fastening the cart shafts to the ground and elevating the frame upon standards sufficiently to raise the wheels from the ground. When the machine is in use, the wheels are made fast to the axle, and revolved therewith. The mechanism of the machine may be actuated by means of cranks attached to the axle on either side of the wheels.

The invention consists further of the construction hereinafter described and claimed, all of which will be fully understood by reference to the accompanying drawings in which is illustrated an embodiment thereof.

In the drawings, Figure 1 is a side elevation of the machine ready for work. Fig. 2 is a top or plan view of the same. Fig. 3 is a longitudinal section on an enlarged scale taken through the separating box, the interior mechanism being shown in elevation. Fig. 4 is a vertical cross-section taken through the box and wheels. Fig. 5 is a plan view of the

electro-magnetic separating plate, connected in circuit with an electrical generator. Fig. 6 is a section taken through said plate. Fig. 7 is a detail view on an enlarged scale of one of the magnets composing said plate, the coil being shown in section. Fig. 8 is an enlarged sectional elevation of the wheel and axle construction, showing the manner of fastening the wheels to the axle when the machine is in use.

Similar reference characters indicate corresponding parts or elements of the mechanism in the several views.

Let the numeral 5 designate the separating box supported on springs 5^a made fast to the shaft 6 mounted on the wheels 7. Attached to the rear extremity of the box are the adjustable and readily detachable standards 8 which support the wheels 7 above the ground; and in addition to the fastening 9 applied to the shafts 10, maintains the machine in a position sufficiently stable for all practical purposes. In the rear extremity of the box, or that shown at the left in Figs. 1, 2 and 3, is journaled a shaft 12 to which are attached the fan blades 13, and a small electrical generator 14 from which lead circuit wires 15 to the plate 16 composed of magnets 17 suitably wound and connected in circuit with the generator.

The magnets 17 are preferably composed of steel spools 17^a, whereby they will become permanent magnets after the current has passed through their coils 17^c a sufficient length of time. Hence, should the generator thereafter get out of repair, the permanent magnetism of the plate will be sufficient for the purpose. This plate 16 is made fast between the sides of the box 5.

Surrounding the magnetic plate is an endless apron 18 provided with projections 18^a composed of cork, iron or any proper material, and secured to the apron in any suitable manner. This apron is mounted on rollers 19 and 19^a. The roller 19 is made fast to the shaft 20 journaled in the sides of the box. The upper side of the apron, when in operation, moves in close proximity to the magnetic plate; and the magnetism acting through the fabric of the apron holds the magnetic mineral thereon until said material is carried over

and discharged into the receptacle 21 underneath, since the under side of the apron is so far removed from the magnetic plate that the latter has no effect thereon. The magnetic and other material collected in the receptacle 21 is removed through an aperture 22 in the bottom of the box 5, and shown by dotted lines in Fig. 3.

The material to be treated is fed from a hopper 23 mounted on the box 5 and provided with a gate or sliding valve 24 to regulate the size of the discharge opening 25, which is further controlled by a feed roll 26 having yielding blades or projections. The material, as it escapes from the hopper, falls upon the moving apron 18, and is subjected to an air current from the fans 13, whereby the fine gold, the gangue and non-magnetic material are carried downward over the apron in the direction indicated by arrow *a*. It must be understood that the apron is moving in the opposite direction, or that indicated by arrow *c*. The magnetic material, together with the heavier particles of gold which will resist the air blast, is carried over against the air current and discharged into the receptacle 21.

The function of the pins or projections 18^a is to afford hiding places for the mineral particles whereby they are protected from the action of the air current which carries away the gangue whose particles are of less specific gravity. In practice it is observed that the mineral particles take up positions behind the pins under the influence of the air current, which carries away the lighter particles of the gangue. This is supposed to be owing to the eddies created in the air current by the pins whereby the mineral particles are carried behind the pins, or to a position opposite the direction from which the air current proceeds. In other words, it is believed that the pins co-act with the air current and the magnetic influence to effect the separation of the magnetic and other mineral particles of the material from the gangue.

The roller 19^a, around which, the apron passes, as heretofore explained, rests upon a rotating cam 27 mounted on a shaft 27^a journaled in the sides of the box 5. By this means, a vibratory movement is imparted to the apron 18.

The material which is carried over the apron by the air blast, falls upon a screen 28 which is attached to the top of a movable pan. The screen is provided with depending riffles 29 attached to its under surface. The mesh of this screen is finest at the top, or where the material first falls to contact therewith, and becomes gradually coarser toward its lower extremity, where it is coarsest. Hence, the finer gold or mineral will pass through the upper part of the screen, while the coarser grade will pass through the screen nearer the lower extremity, according to the size of the particles, thus sizing the material for treatment in the several compartments of the pan. Underneath the screen 28 is a pan 30 com-

posed of a frame having transverse, upwardly projecting riffles, and a porous bottom composed of wire cloth, bolt silk, or other suitable material, attached to the riffles and the side pieces of the frame. The riffles of the pan are located slightly below the respective, corresponding depending riffles of the screen 28. The pan 30 is supported by springs 31 engaging its upper extremity, and resting upon the bottom of the box 5. To the upper extremity of the pan 30, and just below the rotating cam 27, is attached a roller 41. The engagement of said cam with the roller, imparts a vibratory movement to the pan; while another cam 32 located beneath the pan's lower extremity, further facilitates its vibratory action. The cam 32 is mounted on a shaft 32^a journaled in the sides of the box 5; and as the cam rotates on the shaft, it engages a projection 33 on the bottom of the pan.

The separation of the material in the pan is further facilitated by a blast from a fan 34 mounted on a shaft 35, the fan being supported just above an opening in the bottom of the box 5. The air current generated by this fan passes up through the porous bottom of the box 30 and raises the gangue and float gold, while the heavier mineral is allowed to settle in the bottom of the pan. The gangue is discharged from the pan 30 through an opening 36 in the lower extremity of the box 5, through which opening, the lower extremity of the pan projects. The object of the depending riffles 29 is to force the material to the bottom of the pan; and also to prevent the light flake gold which the blast keeps on top of the material treated, from escaping.

The entire mechanism of the machine is operated by cranks 6^a screwed upon the extremities of the axle. These cranks act as clutches and make the wheels fast on the axle, which becomes the propelling shaft of the machine.

The nuts are removed from the axle extremities before applying the cranks. The machine may, of course, be operated by using one or both cranks, according to the power required.

It is evident that the wheels may be otherwise locked to the axle, and handles attached to the wheels at any distance from their centers, whereby a leverage equal to that of the cranks is obtained.

As shown in the drawings (see Fig. 8), only one crank is employed. In making the wheels fast to the axle, the nuts 6^d are removed and washers 6^e employed to cover a part of the threaded extremities of the axle; one of the nuts is then replaced and screwed against the washer until the wheel is made fast on the axle, or will turn therewith. A nut having a crank 6^a is applied to the opposite extremity of the axle and screwed against the washer until the adjacent wheel is made fast on the axle. When the washers are not in place, the nuts cannot be screwed far enough on the

axle extremities to lock the wheels, since the length of the screw threads is so limited that when the nuts have reached the end of the thread, there will still be sufficient space left
 5 between the nuts and the wheel-hubs to allow the wheels to rotate freely on the axle.

The reference characters 6^h designate shoulders made fast on or formed integral with the axle. These shoulders are engaged by the
 10 hubs of the wheels.

As the wheels are turned, motion is transmitted to shafts 12, 20, roll 26, and shafts 27^a and 32^a, through the medium of belts A, B, C, D and E, respectively. These belts are
 15 connected with pulleys F, H and J formed on the propelling wheel, and suitable small pulleys made fast to the respective shafts. Pulleys J and H on the wheel are double.

As shown in the drawings, the shaft 12 is rotated with the greatest rapidity, and will turn many times for each rotation of the propelling wheel. This rapidity of movement is for the purpose of creating the necessary air blast, and at the same time propel the
 25 armature of the generator sufficiently fast to generate the current required to magnetize the plate 16.

The machine may be held in position by two supports fastened together immediately under the axle, and hung on hinges. This drawing, however, is not made to scale, and the gearing may be regulated differently from the arrangement shown therein, and according to the necessities or requirements
 30 of the case.

Having thus described our invention, what we claim is—

1. In a dry placer and concentrating machine, the combination of the movable endless apron, the air blast, the magnetic plate, means for imparting a vibratory movement to the apron in addition to the separating movement, a screen located below the apron and having depending riffles, a pan located
 45 below the screen and having upwardly projecting riffles and a porous bottom, and an air blast located in suitable proximity to the bottom of the pan, substantially as described.

2. In a dry placer and concentrating machine, the combination with the screen having a varying mesh and depending riffles, a vibrating pan located below the screen having a porous bottom and upwardly projecting riffles, and an air blast located below the
 55 bottom of the pan, as and for the purpose set forth.

3. In a dry placer and concentrating machine, the combination of the separating pan having a screen provided with depending
 60 riffles supported above the bottom of the pan, said bottom being composed of cloth or fibrous material attached to a suitable support and provided with upwardly projecting riffles, and air blast mechanism so located
 65 that the induced current shall pass upward

and engage the bottom of the pan, substantially as described.

4. In a dry placer and concentrating machine, the combination with the framework, of the axle journaled therein, the wheels made
 70 fast thereon, one wheel being provided with pulleys, a movable endless apron supported on rollers, one of which is provided with a pulley, a magnetic plate surrounded by the movable apron, one side of which passes suf-
 75 ficiently close to the plate to allow the magnetism to act through the apron, a shaft carrying suitable air blast mechanism so located that the current engages the top of the apron and moves in a direction opposite to that of
 80 the apron's movement, and means for connecting the pulleys on the wheel with other pulleys on the air blast shaft and the apron roller, substantially as described.

5. In a dry placer machine, the combination with the framework, of a movable endless apron provided with projections, air blast mechanism located in suitable proximity to the apron and so arranged that the air current strikes the upper side of the apron and
 90 moves in a direction opposite the apron's movement, the magnetic plate located in suitable proximity to the upper side of the moving apron, and means for discharging the material to be treated upon the upper side of
 95 the apron, substantially as described.

6. In a dry placer machine, the combination with the framework, of the endless apron having projections, air blast mechanism located in suitable proximity to the apron and
 100 so arranged that the induced air current takes a direction opposite that of the apron's movement and strikes the upper surface of the apron, and suitable means for discharging the material to be treated upon the upper side of
 105 the apron, substantially as described.

7. In a dry placer machine, the combination with the frame, of the axle journaled therein, the wheels engaging the axle, means for raising and supporting the frame so that
 110 the wheels clear the ground, means for securing the wheels on the axle whereby they rotate therewith, said means consisting of washers engaging the threaded extremities of the axle and nuts screwed tightly thereagainst, a hand
 115 crank applied to one of the wheels, pulleys formed on one of the wheels, suitable separating mechanism mounted upon the frame, and means for connecting the pulleys on the wheel with other pulleys on the operating
 120 shafts of the separating mechanism, substantially as described.

In testimony whereof we affix our signatures in the presence of two witnesses.

HENRY W. WATSON.
 MINNIE WATSON.

Witnesses:

G. M. ALLEN,
 PERRY LEWIS.