

J. M. LOW.
 PORTABLE PLACER MINING APPARATUS.
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 2 SHEETS—SHEET 1.

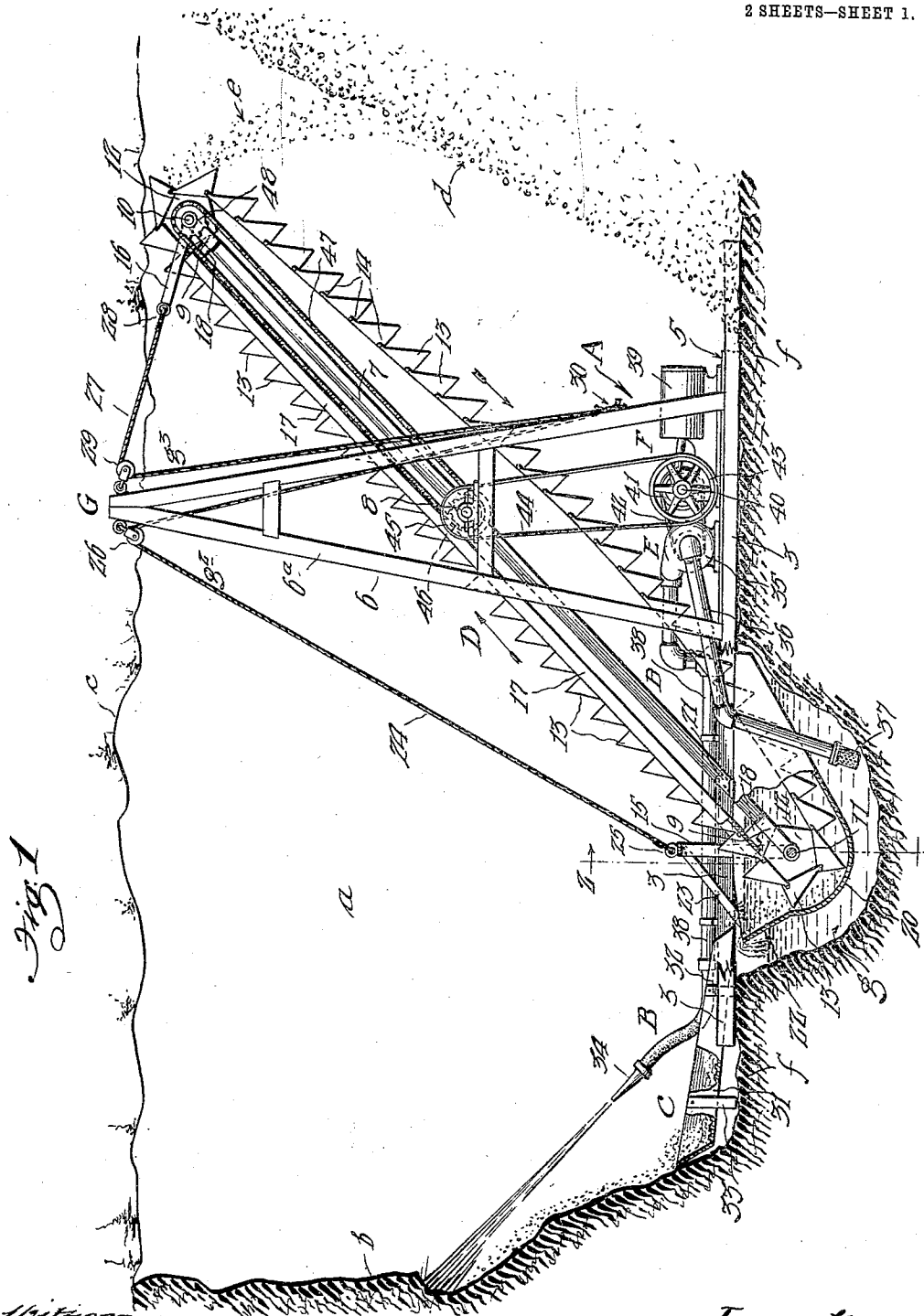


Fig. 1

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PORTABLE PLACER-MINING APPARATUS.

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Specification of Letters Patent.

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To all whom it may concern:

Be it known that I, JAMES M. LOW, a citizen of the United States, residing at Los Angeles, in the county of Los Angeles and State of California, have invented new and useful Improvements in Portable Placer-Mining Apparatuses, of which the following is a specification.

This invention relates to portable placer mining apparatus, and it has for its object to provide an improved apparatus of such character whereby a continuous advance may be made, or a continuous cut produced in the formation to be mined; such cut being re-filled, in the operation of the apparatus as the apparatus advances in the performance of its work. In this manner, the tailings or segregated spoil, comprising the earth, sand, gravel or other material from which the values have been separated, are conveniently disposed of without obstructive accumulations; and the entire territory over or through which the mining operation is carried on is left with substantially the same surface conditions, as existed at the commencement of the mining operation.

By the use of placer mining apparatus constructed and organized according to the invention, wide ranges of value-bearing formations may be exploited rapidly, thoroughly and economically for the extraction, or separation of the values; and after such extraction or separation, all portions of the territory resume substantially the same surface appearance, as existed prior to commencement of the operation; such territory being thereafter equally adaptable as theretofore for agricultural, grazing or other utilization.

Further and particular objects of the invention comprise the provision of mining apparatus of the character described, which will be relatively simple, inexpensive in construction, and generally superior in point of positiveness of operation; convenience in control and general efficiency.

The invention consists in the provision, construction, combination, association and relative arrangement of parts, members and features, all as hereinafter described, shown in the drawings and finally pointed out in claims.

In the drawings:—Figure 1 is a side elevation partly in section and partly broken away for clearness of illustration, of improved portable placer mining apparatus,

embodying the invention, the same being shown in operative position, and the operations of breaking up the value-bearing formation, separating the values from the spoil, and disposing of the spoil or tailings for reconstruction of the formation, being under way; and Fig. 2 is a vertical transverse sectional view partly in elevation, of the structure and formation shown in Fig. 1, taken upon the line 2—2, Fig. 1, and looking in the direction of the adjacent arrows; parts being broken away and sectioned for clearness of illustration.

Corresponding parts in both the figures are denoted by the same reference characters.

Referring with particularity to the drawings, the improved placer mining apparatus comprises a land-traveling portable frame or body A which can be shifted from point to point in the development of the work by any suitable means, (not shown); hydraulic means B for tearing down the value-bearing formation; separating means C for extracting the values from the broken formation; conveying and re-forming means D for disposing of the spoil from which the values have been separated by re-forming the exploited territory or area rearward of the apparatus as the latter advances in its work; pumping means E for supplying the hydraulic means B; operating means F for the pumping means E and the conveying or re-forming means D; and adjusting means G for the conveying and re-forming means D.

The portable mining apparatus is designed and adapted to operate in a cut, one side wall or bank of which is shown at *a*, and the forward wall of which, which latter is being attacked by the hydraulic means B, is shown at *b*, the surface of the area or territory under exploitation being shown at *c*.

d designates the re-forming territory or area, which latter is being built up of the spoil *e* constituting the tailings of the apparatus, and from which the values have been separated.

f designates the bottom surface or low level of the cut, and upon the latter the portable frame or body A directly rests. As the cut is developed, a pit or sump *g* is developed from which the supply of water for the hydraulic means B is taken by the pumping means E. It will be understood that the cut and pit or sump are initially formed for the commencement of the mining oper-

ations, by any preferred method of excavation and after the apparatus has been installed in the cut, over the sump or pit, the operation of the same is continuous.

5 All of the above described parts and members of the mining apparatus are grouped and combined together for advancement as a unit through the working cut.

10 A particular preferred form of portable placer mining apparatus comprising the above parts and members and embodying the invention is as follows:—

The portable frame or body A comprises longitudinal members 3 and transverse base 15 members 4, upon the rearward portion of which is laid a floor 5. Rising from the rearward portion of the base members 3 and 4 is an upright frame 6, suitably braced, and including upwardly converging side frame 20 members 6^a. The conveying or re-forming means D include a longitudinal beam 7 which extends forwardly and rearwardly of the frame A, being mounted substantially centrally, for oscillation, upon a transverse 25 shaft 8 supported by members of the frame 6. The beam 7 is provided at each end with a yoke 9 in each of which is journaled a shaft, 10 and 11, respectively; and fixed to each of said shafts is a polygonal drum 12. 30 Around the drums 12, and extending above and beneath the beam 7 is trained a series of buckets 13, serially, pivotally connected, as at 14; said buckets being formed and arranged to carry loads rearwardly of the 35 apparatus. It will be understood that the terms rearwardly and forwardly with respect to the apparatus, are applied with reference to the forward wall *b* of the cut, which is being worked; the end of the apparatus next adjacent to said wall being the 40 forward or advancing end. A separate yoke 15 embraces the chain of buckets 13 at the forward end of the beam 7 and receives the shaft 11 at the ends of its arms. A similar 45 yoke 16 embraces the buckets 13 at the rearward end of the beam 7, and receives the shaft 10 at the ends of its arms.

Beneath the buckets 13, as they move in 50 their upward rearward travel, extends a continuous trough 17, which is supported upon and connected with the beam 7 by props or legs 18 adjacent to the respective ends thereof. Each of the buckets 13 is perforated at 55 its lower portion, as at 19, whereby liquid material contained in the buckets escapes into the trough 17 on the upward rearward movement of the buckets and flows downward and forward, finally reaching the pit or sump *g*. Combined with the conveying 60 means D, at the lower forward end thereof, is a spoil and water receiver 20, which is suitably connected with the beam 7, as at 21, and through the side walls of which passes the shaft 11. The receptacle 20 projects 65 forwardly of the conveying means D, and

the buckets 13 thereof, and rearwardly of the shaft 11 to a predetermined distance, and is of sufficient depth and height to accommodate the drum 12 at the forward end of the beam 7, together with the buckets 13 as they 70 pass around said drum. The receptacle 20 dips downwardly beneath the base members 3 of the frame A into the sump or pit *g*; and said receptacle is provided with a forwardly projecting lip 22 over which the 75 liquid material accumulates in said receptacle and overflows into the sump or pit *g*. Suitable braces 23 connect the lip portion of the receptacle 20 with the yoke 15. The trough 17 terminates at its upper end just 80 beneath the drum 12 adjacent thereto, and at its lower end just above the drum 12 adjacent thereto. The adjusting means G for the conveying and re-forming means D, together with the receptacle 20, comprises a 85 forward member *g*² and a rearward member *g*³. The forward member *g*² comprises a rope or cable 24 connected at one end with the yoke 15, as at 25, and passing over a pulley 26 connected with the top portion of 90 the upright frame 6. The member *g*³ comprises a rope or cable 27, connected at one end with the yoke 16, as at 28, and passing over a pulley 29 connected with the top portion of the upright frame 6. The free ends 95 of the rope or cables 24 descend from their respective pulleys into position for convenient joint or separate manipulation, and may be secured in positions of adjustment, in connection with the upright frame 6, as at 30. 100 By manipulating the ropes or cables 24 and 27 the conveying and re-forming means D may be swung upon the shaft 8 so as to raise or lower the forward end portion of the same, together with the receptacle 20, and 105 oppositely adjust the other end of said means.

The separating means C comprising a sluice-box 31, connected with the forward 110 end portion of the longitudinal frame base members 3, as at 32, and provided with supports 33 adapted to rest upon the bottom surface *f* of the cut being worked, forward of the pit or sump *g*; said sluice-box extending 115 to the forward wall *b* which is being attacked by the hydraulic means B. The rearward end of the sluice-box 31 is positioned above the forward portion of the receptacle 20; whereby the tailings or spoil enter said receptacle over the buckets 13, 120 which are being successively carried through said receptacle. The sluice-box 31 may be of any preferred form and type of construction.

The hydraulic means B comprise an ejection 125 nozzle 34, projecting forwardly and upwardly from the forward portion of the frame or body A, and arranged to direct a stream of water upon the wall *b*; to the end that said wall will be turned down and de- 130

posited, together with the water from the nozzle 34, in the forward end of the sluice-box 31.

The pumping means E comprise a pump 35, of rotary or any preferred type, having a supply pipe 36 entering the pit or sump *g*, and provided at its lower end with a perforated head 37. The water drawn from the pit *g* and forced from the pump 35 enters a connection pipe 38 which extends from the pump to the ejection nozzle 34, preferably traversing one of the longitudinal frame base members 3.

The operating means F may comprise a prime mover of any preferred form, such as a hydrocarbon engine 39, which operates a shaft 40 suitably supported upon the flooring 5 and intermediate of the engine 39 by pump 35, which is also supported upon said flooring 5, beneath the upright frame 6. A pulley 41 fixed to the shaft 40 is belted in connection with the pump 35, as at 42; and the flywheel 43 of the shaft 40 is belted, as at 44, in connection with a pulley 45, locked to a sprocket-wheel 46, and rotatably mounted therewith upon the shaft 8. A sprocket-chain 47 operatively connects the sprocket-wheel 46 and a sprocket-wheel 48 fixed to the shaft 10 to which the drum 12 at the upper end of the beam 7 is fixed. Operation of the engine 39 will, it is manifest, cause operation of the pump 36 to force water from the pit *g* to the nozzle 34; and will cause motion of the conveying and re-forming means, in so far as the buckets 13 are concerned, causing the same to move in the direction denoted by the adjacent arrows in Fig. 1.

The operation, method of use and advantages of the improved portable placer mining apparatus constituting the invention will be readily understood from the foregoing description, taken in connection with the drawings and the following statement:—
With the apparatus in its entirety introduced into the cut being worked, as illustrated in the drawings, and with the pit or sump *g* supplying water for the hydraulic means B, the parts and members of the apparatus being substantially in the relative positions shown, the hydraulic means will cause the tearing down or disintegration of the forward wall *b* against which the apparatus is advancing, and the finely divided formation of the wall mixed with the water from the ejection nozzle 34, will flow into the sluice-box 31, wherein the values of the spoil will be retained, and the tailings or residues, of the spoil together with the admixed water, will flow into the spoil and water receiver 20, wherein the solid material will be picked up by the buckets 13 and carried rearwardly and upwardly to the upper rearward end portion of the conveying and re-forming means D where they will be

ejected to constitute the re-forming area *d* which closes up the cut behind the apparatus as it advances in the cut. The free liquid material taken up by the buckets 13 will drain through the perforations 19 into the trough 17 and reënter the receiver 20. The liquid material overflows the receiver 20 and reënters the sump or pit *g* to be withdrawn by the pumping means E for utilization by the hydraulic means B. The conveying and re-forming means D may be adjusted with respect to its inclination from the horizontal by the adjusting means G embodying the ropes or cables 24 and 27. The engine 39 constituting the operating means F continuously operates the pump 35 and causes a continuous movement of the buckets 13. The operation of the apparatus is therefore continuous. As the attacked wall *b* recedes from the apparatus, the portable frame or body A of the latter, together with the hydraulic means B, the separating means C, the conveying and re-forming means D, the pumping means E, the operating means F and the adjusting means G, associated with said portable frame or body, is, and all of said parts and members are, advanced as a unit, in any suitable manner, toward the attacked wall *b*, so as to bring the sluice-box 31 and the ejection nozzle 34 within working range of said wall *b*. As this advance of the entire apparatus takes place, the tailings or spoil from which the values have been removed is piled up rearwardly of the apparatus, filling up the cut behind the apparatus, and restoring the normal surface level of the exploited territory or area. The sump or pit *g* is likewise filled up from its rearward portion, and is extended at its forward portion by any suitable means of excavation.

It will be noted that the apparatus operates not only as a placer mining apparatus, but as an excavator and rebuilder; and with the use of such apparatus a large extent of value-bearing territory may be mined in a given length of time and the territory finally left substantially in its initial condition minus the values extracted from the formations thereof.

I do not desire to be understood as to limiting myself to the specific construction, provision, combination, relative arrangement and association of parts, members and features shown and described; but reserve the right to vary the same, in adapting the improvements to varying conditions of use, without departing from the spirit of the invention and the terms of the following claims:—

Having thus described my invention, I claim and desire to secure by Letters Patent:—

1. The combination, with a portable frame or body; of adjustable conveying and re-

forming means embodying a plurality of movable buckets, a receiver at one end of said conveying and said re-forming means and which receiver said buckets traverse, said receiver comprising a receptacle arranged for accommodation by a sump or pit into which the overflow of the receptacle passes, hydraulic excavating means for directing a stream of water upon the territory to be exploited, separating means receiving spoil supplied by the excavating means and leading to said receiver and discharging therein for removal by said conveying and re-forming means, and pumping means for delivering water from the sump to the excavating means; whereby the spoil minus the values is disposed of rearwardly of the apparatus to re-form the exploited territory.

2. The combination, with a portable frame or body adapted to form and traverse a cut and rest upon the bottom of the same; of hydraulic excavating means for directing a

stream of water upon the territory to be exploited, a receptacle arranged for accommodation by a sump or pit at the bottom of the cut into which sump or pit the overflow of the receptacle passes, separating means receiving spoil supplied by the excavating means and leading to said receptacle and discharging therein the spoil minus the values, pumping means for delivering water from the sump to the excavating means, and conveying and re-forming means entering said receptacle and whereby the spoil minus the values is disposed of rearwardly of the apparatus to re-form the exploited territory as the apparatus advances in the cut.

In testimony whereof, I have signed my name to this specification, in the presence of two subscribing witnesses.

JAMES M. LOW.

Witnesses:

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