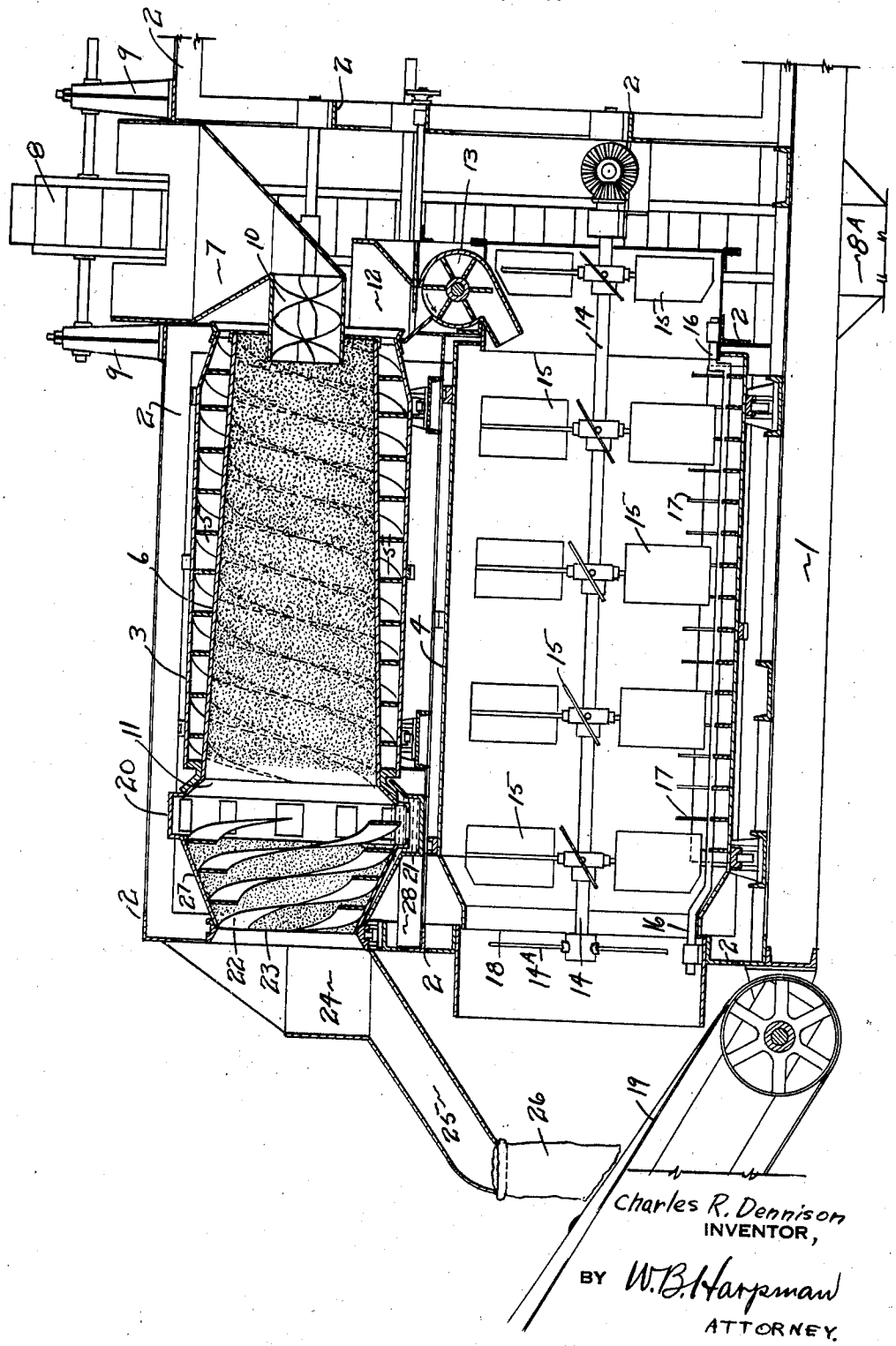
Jan. 20, 1942. C. R. DENNISON 2,270,275

DRY PLACER MINING MACHINE

Filed Oct. 30, 1939



Charles R. Dennison
INVENTOR,

BY W. B. Harpman
ATTORNEY.

Patented Jan. 20, 1942 2,270,275

UNITED STATES PATENT OFFICE

2,270,275

DRY PLACER MINING MACHINE

Charles R. Dennison, Youngstown, Ohio

Application October 30, 1939, Serial No. 301,940

2 Claims. (Cl. 209—200)

This invention relates to a dry placer mining machine.

The principal object of this invention is the provision of a dry placer mining machine capable of separating mineral values from dry placer deposits without the use of water.

A further object of the invention is the provision of a dry placer mining machine capable of handling large quantities of dry placer material and effectively separating the mineral values therefrom.

A still further object of the invention is the provision of a dry placer mining machine of a portable character adapted to be mounted upon a truck or a trailer so that it may be readily moved from place to place.

A still further object of the invention is the provision of a dry placer mining machine capable of separating coarse material of the placer deposits from the fine material and, in turn, separating the mineral values from both the coarse material and the fine material.

It is well known that many methods have been employed to procure gold and other mineral values in placer deposits. In practically all methods used heretofore a large amount of water has been an essential requirement, thus many dry placers, where there was little or no water available, have not been worked except in a few instances where they were exceptionally rich in gold value to make it economically possible to work a relatively few cubic yards per day. The dry placer mining machine shown and described herein has been designed to work dry placer deposits and is so constructed that considerable quantities of material may be handled and the mineral values thereof separated therefrom thus making it economically possible to work many dry placers heretofore rejected.

With the foregoing and other objects in view which will appear as the description proceeds, the invention resides in the combination and arrangement of parts and in the details of construction hereinafter described and claimed, it being understood that changes in the precise embodiment of the invention herein disclosed, can be made within the scope of what is claimed without departing from the spirit of the invention.

The invention is illustrated in the accompanying drawing, wherein the drawing is a cross-sectional side elevation of the dry placer mining machine.

By referring to the drawing it will be seen that the dry placer mining machine is assembled in the form of a unit adapted to be positioned upon a truck or trailer and is shown in the drawing as positioned upon a frame 1 thereof. The dry placer mining machine itself comprises a framework 2 which has rotatably mounted therein a pair of horizontally positioned separating cylinders 3 and 4, the cylinder 3 being mounted directly above the cylinder 4. These cylinders 3 and 4 are open at both of their ends so that dry placer material may be passed therethrough, for the purpose of separating the mineral values therefrom. In order to do this effectively the cylinder 3, or upper cylinder, is provided with a plurality of spiral veins 5 which completely surround a cylindrical screen 6 which is preferably formed of metal having a great number of small openings formed therein. In order that the dry placer material may be fed into this upper separating assembly a hopper 7 has been positioned in the frame 2 adjacent the front end of the cylinder 3 and a continuous elevator 8 has been mounted by means of brackets 9 on the frame 2 so that dry placer material may be shoveled into the lower end of the elevator 8A where it will be elevated and deposited in the hopper 7. Communicating with both the hopper 7 and the upper separating assembly contained in the rotatable cylinder 3 there is a spiral conveyer 10 which is adapted to feed a predetermined amount of dry placer material into an open end of the cylindrical screen 6 which is positioned within the cylinder 3. It will be seen that the cylindrical screen 6 is so formed that the opposite end 11 thereof is of a larger diameter thus effectively causing the dry placer material to roll toward this end 11. As it does so the fine placer material readily falls through the openings in the cylindrical screen 6 and is moved back toward the front end of the cylinder 3 by means of the spiral veins 5 where it is expelled out of the front end of the cylinder 3 and into a secondary hopper 12. Positioned below this secondary hopper 12 and communicating therewith there is a rotating measuring device 13 which is adapted to receive the fine material from the hopper 12 and pass it in even amounts downwardly into an open front end of the cylinder 4. This cylinder 4 is larger in size than the cylinder 3 and is adapted to separate the mineral values from the fine material fed into it at its front end by the measuring device 13 at a point well above its center line. Positioned through the center of this cylinder 4 there is a shaft 14 positioned by means of bearing housings one of which is positioned on the frame 2 and the other of which is positioned

on a spider 14A, upon this shaft 14 there are positioned a plurality of fan blades 15 the whole of which is adapted to be rotated so as to create an air current through this cylinder 4 which, like the cylinder 3, is rotatable.

By referring to the drawing it will be seen that the fan blades 15 are so formed that sand and fine particles are blown upwardly thus tending to carry them through the cylinder 4. While these fine particles are suspended in the air stream the heavier mineral values naturally drop to the bottom of the cylinder 4 thus effecting a separation of the mineral values from the other material chiefly because the other substances are of lighter weight and are, therefore, easily moved by the air stream. It is obvious that the volume of the air stream and the velocity of the same can be controlled so as to produce the best results. Positioned in the bottom of this cylinder 4 there is a secondary shaft 16 upon which are positioned a plurality of crescent shaped riffles 17. These riffles 17 are adapted to prevent the movement of the mineral values deposited therebetween as would otherwise result from the air stream being directed through the cylinder 4. In connection with these riffles 17 it is desirable that a pool of quicksilver be placed in the bottom of the cylinder 4 adjacent the riffles 17 at such times as placer material comprising a considerable portion of fine gold is being handled. This quicksilver together with the rotating action of the cylinder 4 forms an amalgam on the interior surfaces thereof which are formed of or lined with copper or silver coated copper so that quicksilver will adhere to the surfaces of the cylinder which is constantly coated with very fine floating gold which will gather in the pool in the bottom of the cylinder. Optional forms of the arrangements are thus possible being either the use of the riffle assembly 17 or the quicksilver pool or both and it is obvious that at such times as the quicksilver pool is used simple scrapers may be positioned on the shaft 16 and serve to efficiently remove the amalgam on each rotation of the cylinder 4. The remaining material being blown through the cylinder 4 is exhausted at an end 18 thereof whence it is directed onto a conveyer belt 19 which, in turn, conveys it to a point at a distance from the machine. It is obvious in this connection that suitable canvas curtains may be placed around the conveyer belt so as to direct the dust and fine particles emerging from the end 18 of the cylinder 4. It will thus be seen that the path of the fine gold bearing materials has been traced through the machine and that the mineral values have been separated effectively and remain deposited in the cylinder 4 between the riffles 17 or in the quicksilver pool in the bottom thereof. By again referring to the upper cylinder 3 it will be seen that the coarse material deposited therein on the cylindrical screen 6 would continue its travel through this cylinder 3 toward the end 11 thereof after the fine material has been separated as heretofore described. The coarse material then passes across an enlarged area 20 of the cylinder 3 wherein a pool of quicksilver 21 is provided which serves to trap the nugget values while the other material, being of lighter weight than the mineral values, passes across the surface of the quicksilver pool 21. At that point spiral veins 22 move the other materials outwardly through an end 23 of the cylinder 3 and into a receiving hopper 24 from which a tubular chamber 25, having a canvas skirt 26 affixed to its lower extremities, serves as a means of directing the discarded materials onto the conveyer belt 19. In connection with the spiral veins 22 it will be seen that they have positioned around them a screen 27 through which the quicksilver 21 may fall into a convenient receiving pan 28.

Thus the dry placer material has entered the machine by way of the elevator 8, been separated into coarse and fine classifications and the mineral values separated therefrom and the discarded materials conveyed away from the machine by means of a conveyer belt 19. It is obvious that a suitable winch may be employed for readily moving the conveyer belt 19 and it will be seen that the entire dry placer mining machine forms a compact, practical unit capable of separating the mineral values from the dry placer deposits and capable of handling volumes sufficient to make economically possible the workings of dry placer deposits low in mineral value.

It is obvious that a suitable power source will be utilized to rotate the separator cylinders 3 and 4 and to activate the fans 15 and the conveyer belt 19, this power source may well be the truck motor if desired.

What I claim is:

1. In a dry placer mining machine adapted to separate mineral values from dry placer deposits, a horizontally positioned rotatable amalgamating cylinder adapted to receive fine placer material and separate the mineral values therefrom, means for rotating the said amalgamating cylinder, said cylinder lined with metal to which mercury adheres and having a pool of mercury positioned therein, an axially extending shaft positioned within the said cylinder, a series of sets of fan blades mounted on the said shaft, with radial blades inclined with respect to the axis, and means independent of the cylinder rotating means to rotate said shaft and fan blades, the said fan blades adapted to create whirling air currents within the said cylinder to carry the said placer material against the interior of the said cylinder and permit the mineral values to be collected by the mercury thereon.

2. In a dry placer mining machine adapted to separate mineral values from dry placer deposits, a horizontally positioned rotatable amalgamating cylinder adapted to receive fine placer material and separate the mineral values therefrom, means for rotating the said amalgamating cylinder, said cylinder lined with metal to which mercury adheres and having a pool of mercury positioned therein, an axially extending shaft positioned within the said cylinder, a series of sets of fan blades mounted on the said shaft, with radial blades inclined with respect to the axis, and means independent of the cylinder rotating means to rotate said shaft and fan blades, the said fan blades adapted to create whirling air currents within the said cylinder to carry the said placer material against the interior of the said cylinder and permit the mineral values to be collected by the mercury thereon, together with blade like scrapers within the said cylinder transverse to the axis thereof and in the said pool of mercury and supported from without and adapted to engage the interior surface of the said rotatable cylinder so as to effectively remove mineral values adhering to the mercury coating therein.

CHARLES R. DENNISON.