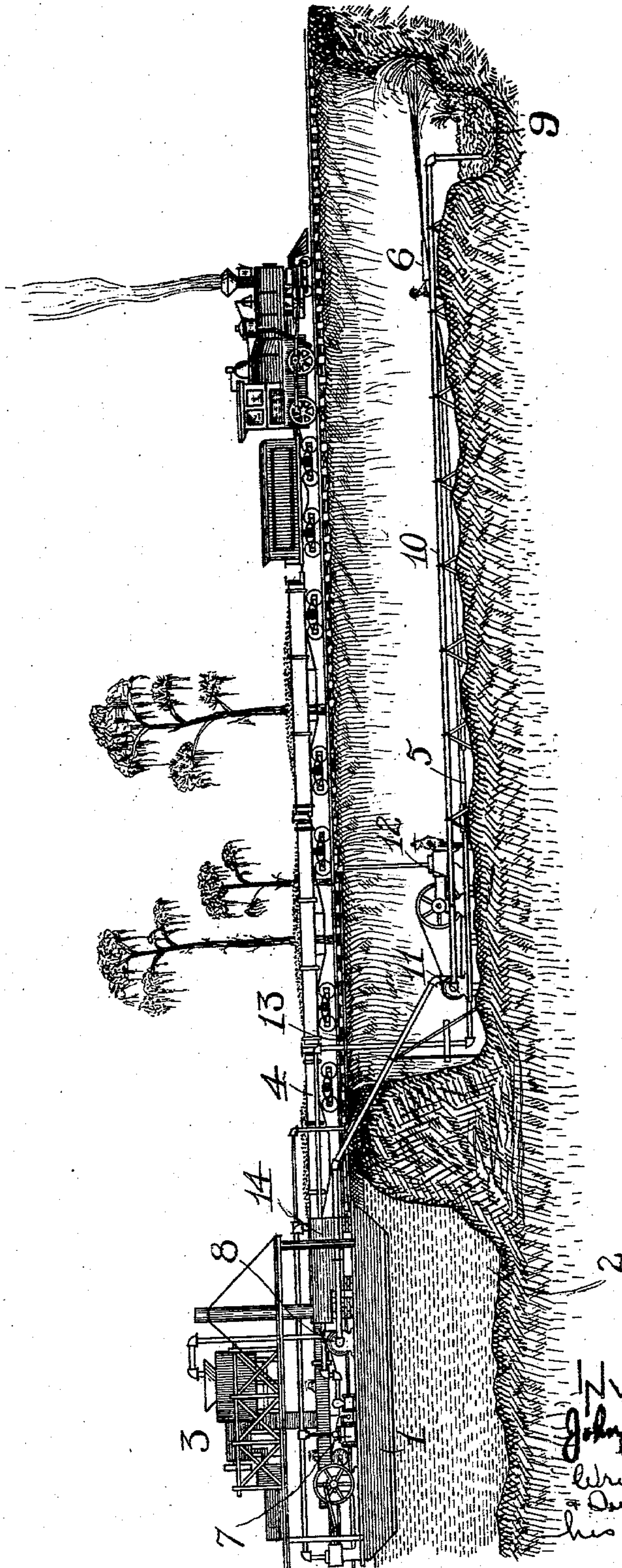


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J. BEATEY.
APPARATUS FOR MINING PHOSPHATES.
APPLICATION FILED JUNE 4, 1901.

NO MODEL.



WITNESSES:
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UNITED STATES PATENT OFFICE.

JOHN BEATEY, OF BONE HILL, FLORIDA.

APPARATUS FOR MINING PHOSPHATES.

SPECIFICATION forming part of Letters Patent No. 740,731, dated October 6, 1903.

Application filed June 4, 1901. Serial No. 63,055. (No model.)

To all whom it may concern:

Be it known that I, JOHN BEATEY, of Bone Hill, in the county of Polk and State of Florida, have invented certain new and useful Improvements in Apparatus for Mining Phosphates, of which the following is a specification.

The object of the present invention is the handling of phosphatic pebble and its delivery from the sump in the pit to the washing and cleaning mechanism.

As is well known, phosphatic pebble is found in deposits varying in thickness from one to twenty or thirty feet and is covered with an "overburden" of barren material from one to twenty feet deep. In mining the phosphate, as illustrated upon the accompanying drawing, an area of land is stripped of its overburden and the phosphatic pebble washed down by a powerful hydraulic stream. When the phosphate is exhausted, water is allowed to flow into the pit to float the dredge upon which the washing and cleaning apparatus is mounted, and a fresh pit is formed.

The pebble is washed down into an artificial hollow or sump, from which it has heretofore been drawn, with the water, by a primary centrifugal pump mounted on the dredge and delivered to the washing and cleaning apparatus. By reason of the depth of the pit it has hitherto been impossible to utilize the pump to its fullest capacity, for a pump of the character described cannot by suction lift water alone over (about) thirty feet, and hence by reason of the greater specific gravity of the phosphatic pebble the latter has not been raised with the water. As the distance between the pump on the dredge and the inlet of the suction-pipe is frequently thirty feet, or thereabout, great difficulty has been experienced in raising the phosphate after it has been washed down by the hydraulic stream, and much phosphate has been consequently left in the deposit, as the pump would not lift the phosphate that lies below a depth of twenty-six feet.

In mining land-pebble phosphate there are to be found many deposits where the overburden is from fifteen to twenty feet deep, with a like depth of phosphate underneath, and under the old system of mining this could

not be worked. With my present system or apparatus I have removed fifteen to twenty feet of overburden, and twenty to twenty-five feet of phosphate deposit is successfully mined. This is done by first removing the overburden with steam-shovels and in other ways excavating or mining out a pit to the depth of ten to fifteen feet in the phosphate and then placing the pump and engine in the bottom of this pit, so that at times the machinery is down to a depth of forty feet from the surface of the earth.

I employ two centrifugal pumps, one set upon a level with the surface of the earth and the other upon the bottom of the pit, and by this arrangement I have successfully mined six acres of the deposit without moving the machinery. The pump in the bottom of the pit lifts the phosphate from the sump-hole, (a depth of from ten to fifteen feet from the bottom of the hole to the center of the pump,) then discharging it through a pipe to the pump located on the boat or pumping-station on the surface. The latter raises the material to the point of discharge, lifting it at times over forty feet in height. From the point where the suction-pipe takes up the material at the bottom of sump-hole to the point of discharge I have successfully pumped through over five hundred feet of pipe and and raised the material from where it enters the pump to where it discharges into the rotary screen—a total height of eighty-two feet.

Thus it will be seen that by my present invention I have surmounted the difficulties hitherto found almost insurmountable and am able to deliver the pebble in great quantities and without loss of power to the dredge.

On the drawing the dredge is indicated at 1, and it is floated on the artificial pond 2. On the dredge is placed the washing and cleaning apparatus, (illustrated conventionally at 3,) from which the pebble is delivered to the cars 4. The water is forced into the pipe 5, connected at its end to a giant nozzle 6, by a pump 7, also mounted on the dredge. There is a so-called "primary" centrifugal pump 8 on the dredge, upon which reliance has hitherto been placed for drawing the mixed water and phosphate from the sump 9 through a pipe 10.

According to the present invention I locate at the bottom of the pit, intermediate of the pump 8 and the sump 9, a centrifugal pump 11, which sucks the material from the sump 5 and assists the pump 8 in elevating it to the apparatus at 3. The pump 11 is driven by an engine 12, to which steam may be conveyed by a pipe 13 from the boiler 14 on the dredge. The engine or motor 12 for driving 10 the lower pump 11 is separate from and independent of the engine or motor on the dredge which operates the pump 8, and therefore the relative positions of the two pumps may be readily altered when occasion demands it. 15 Moreover, one pump may be driven faster than the other, if desired, or if the apparatus is to be used where no great elevation of the material is required the lower pump may be readily disconnected. By reason of this arrangement of mechanism I am able to elevate 20 more material than where two independent pumps are placed upon the dredge.

An attempt has been made to obviate the difficulty referred to by mounting the primary 25 pump upon an independent dredge and coupling it in tandem with the pump adjacent the washing apparatus; but it has not yet proved successful, owing to the depth of pit and sump and the impossibility of raising the material to the desired height. 30

So far as I am aware, I am the first to have coupled a pump in tandem with the "primary" pump (so called) and to have arranged it at the bottom of the pit, whereby it is possible to mine phosphate where it was not possible before, the production has been immensely 35

increased, and the cost lessened, and the mining of phosphate practically revolutionized.

Having thus explained the nature of the invention, and described a way of constructing and using the same, although without 40 having attempted to set forth all of the forms in which it may be made or all of the modes of its use, I declare that what I claim is—

An apparatus for mining phosphatic pebbles, comprising a station having washing and cleaning apparatus for the material and a pump and motor therefor for elevating the material thereto, a pipe extending from said pump to the sump, and an auxiliary pump 50 having an independent motor, said auxiliary pump being coupled with said pipe and intermediate the first-named pump and the sump end of the pipe and arranged in a plane considerably below that of the first-mentioned 55 pump and at or near the level of material in the sump for drawing said material from the sump and forcing it to the first-mentioned pump in the upper plane, the pipe connection between the two pumps being directly to the 60 inlet of the upper one from the outlet or discharge of the lower one, whereby there is no opportunity for settling of material between the two pumps, means being provided for furnishing power from the station for operating the lower pump. 65

In testimony whereof I have affixed my signature in presence of two witnesses.

JOHN BEATEY.

Witnesses:

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