

THE BENNETT DREDGE AND AMALGAMATOR.

Placer mining in America, of late years, has been so unsuccessful and expensive that it seems to have become almost entirely abandoned in many good paying districts. One reason is because the miner or prospector prefers a "lead" or a "prospect," something where the returns appear to be greater, quicker, and more permanent than "so many colors to the pan," "so many cents to the yard of gravel," and the hard work of handling water and bowlders. There appears, however, to be a prospect of the return of many "old timers" to this branch of mining, not on account of better pay, but principally for the reason of the advancements in methods and machinery for the saving of the precious metal, the new finds on old grounds, and the late discoveries of entirely fresh fields in Idaho, Utah, Arizona, New Mexico, California, Colorado, Old Mexico, Australia, and other sections. Many new devices for the handling and saving of gold in this condition have been, and are being, continually experimented with by prominent and capable men, who believe that money can be made from the bars and other like deposits containing gold, as was done in 1849. In

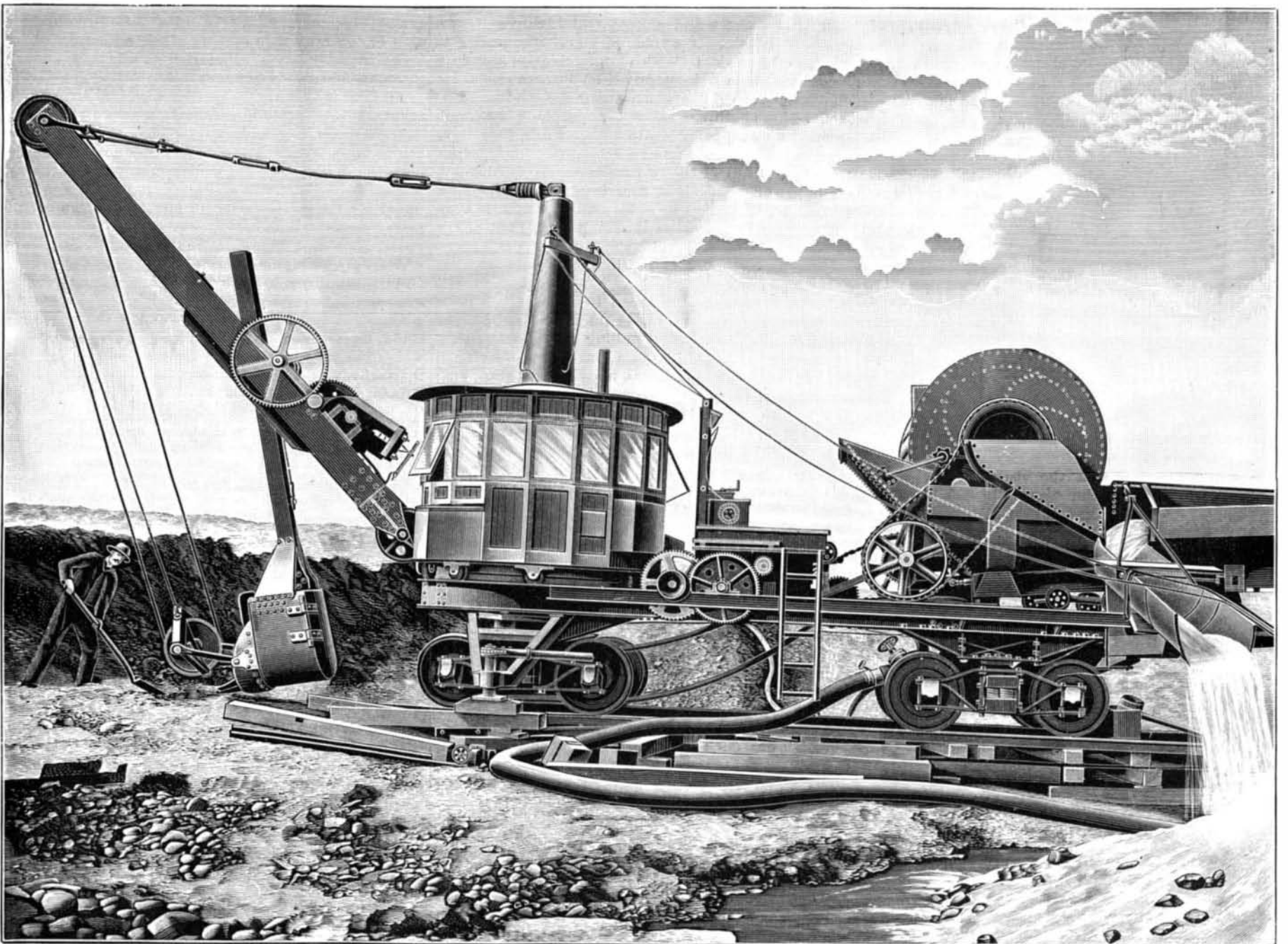
control of a single operator. These switches are so arranged and connected with an electro-magnetic brake as to reduce the number of levers requisite to thoroughly control all the operations of this plant to three, thus enabling one operator to easily control the operations of the entire plant, even of the largest capacity.

The dredge is mounted upon its own truck or car and can be moved forward or backward by simply turning a switch. Both it and the amalgamator are constructed throughout of steel and aluminum iron, graphite bearings being used throughout the plant to obviate the use of grease or oil. Chains are replaced by steel wire ropes and gears are rendered unnecessary through the system of reduction in speed being adapted to the work performed.

The dredge illustrated, and which is taken from a photograph showing it at work near Denver, handles with ease two dippers per minute, in hard cemented gravel and bowlders, such as are usually found in placer ground. At the point shown the dredge had dug at least three feet below the track to clean low bedrock, and at times cut its way through high bedrock. The dipper dredge has a capacity of a cubic yard, and auto-

that are discharged at its opposite end through a shoot or otherwise on to the previously cleaned up bedrock, while the pay dirt, sifted through the separator, enters the tank, where it is subjected to the treatment above referred to, and is then discharged, by means of the tailing wheel, into the overflow water, whence it may be conveyed by pipes or sluices to any desired point for settling and reuse if necessary, or may be thrown upon the cleaned up bedrock of a previous cut. In a high breast it becomes necessary to employ a carrier to pile the tailings higher, it being understood that the machine is constantly moving away from these piles.

The power employed may be generated either by steam or water, but electricity is preferred for many and obvious reasons. The plant is adapted to run day and night, and is supplied with the proper electric lights; a 30 horse power engine is required to run this No. 1 plant, exclusive of pumping. The water necessary is 80 miner's inches, kept in circulation through its jets, but it is capable of treating its full quantity of stuff with from 1 in. to 3 in. of supply, by using the water over and over, which it is arranged to do, when necessary. In fact, it may be mentioned that the machine



ELECTRIC DREDGING AND AMALGAMATING MACHINE.

this connection we illustrate and describe a process that has been before the public for some time in California and Colorado, and which is now brought to a practical shape. The work done by the machinery is of sufficient importance to attract the attention of placer miners, on account of the fine gold it saves, as well as the coarse, and for the new and advanced construction of the entire plant.

This plant consists of the Bennett amalgamator, dredge, electric plant, and power house. The machines are built in three sizes. No. 1 has a capacity of 2,000 yards per day, No. 2 has a capacity of 4,000 yards per day, and No. 3 has a capacity of 8,000 yards per day. They are built of steel, and are adapted for handling cemented gravel and bowlders. The dredge is arranged to be propelled forward or backward on a screw, or on its own track, by its own power (as will be seen in the engraving, which shows a No. 1 machine). Mounted on the dredge are four electric motors, one of which handles the dipper, another lifts it through its cut, a third swings the dipper to the hopper, while the fourth operates the amalgamator which is upon the rear of the platform. The features of the dredge are its simplicity, absence of any necessity for stays and braces, and the ability to swing the dipper through a circle, there being no interference from stays or braces. The motors are operated by switches conveniently placed in the rotating cab, and all are under the perfect con-

matical opening and closing at the proper points. The weight of a No. 1 dredge, without amalgamator or motors, is about 25 tons.

The amalgamator, seen on the body of the dredge, consists of a cylindrical separator, set upon a peculiarly shaped tank, which is lined throughout with amalgam plates of new construction. It receives the water from numerous jets so placed in its bottom as to cause each particle that enters the tank to be thrown upward and toward the plates a sufficient number of times to insure not less than 400 contacts with the mercury held in bulk and otherwise, by the peculiar formation of the plates, and further, each particle, in its transit from the inlet to the outlet of this tank, is subjected to twelve severe scourings, by means of which coated or rusted gold is prepared for instant amalgamation, and in its transit each particle is placed twelve times in comparatively still water, thus allowing gravitation its perfect action. This machine is so constructed as to entirely avoid the flowering of mercury, and to prevent the usual loss through this cause. In fact the amalgamator can be profitably used for the recovery of the mercury and amalgam so lost. A full description of the amalgamator and its mode of operation would require more space than is at our disposal, but it may be explained that the dipper discharges its contents into the cylindrical separator, which traveling in water thoroughly screens out and washes the coarser parts

illustrated has been worked near Denver for several weeks on less than a miner's inch of supply. Where the power is generated by water, the necessary staff consists of but three men, two of whom are laborers; the same number of hands are required for the other size of machine. The maximum capacity of the plant is stated to be 1½ yards a minute.

The time required for an ordinary clean-up need not exceed two hours, and may be made daily, weekly, or monthly. The tank can be provided with a steel cover, which can be furnished with a lock, so that no one can interfere with its contents. The ground upon which this plant has been operating has been variously estimated as paying from 7 to 10 cents per yard, but by the process we have described about 40 cents were extracted for each yard handled, 75 per cent. of which was in particles so fine as to be invisible to the naked eye, and so light as to be held in suspension in otherwise clear still water several minutes. The amalgamator, like the dredge, is built of steel and aluminum iron, all its journals being provided with graphite bearings; the only wearing points are the cylinder and tailing wheel, each of which can be replaced on the ground in an hour or two. The largest machine is evidently best adapted to river bed dredging, its capacity being 8,000 yards per day at a cost of operating of less than 1 cent per yard. The machine is made by the Bennett Amalgamator Company, of Summit Co., Colorado.—*Engineering.*