

No. 657,247.

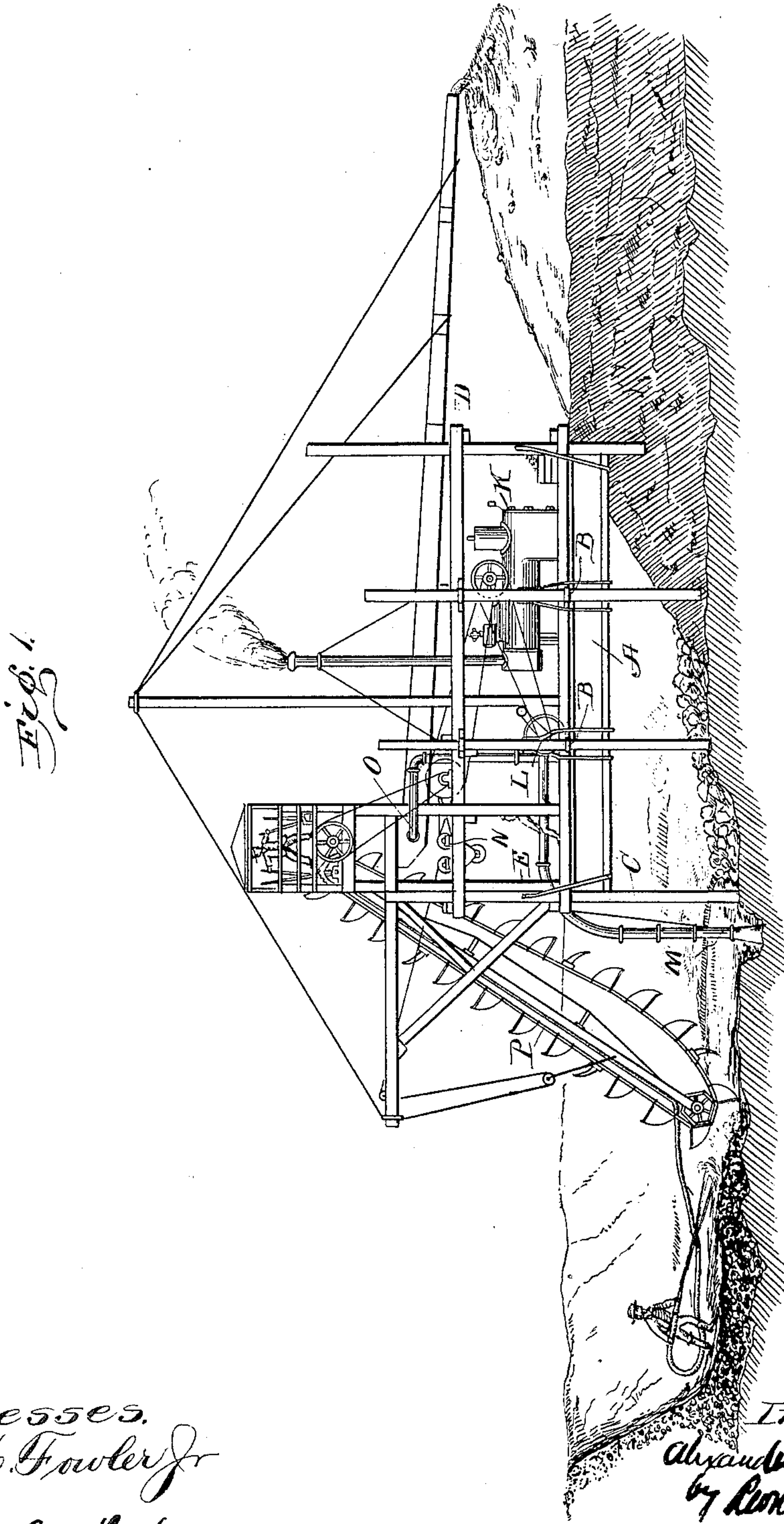
Patented Sept. 4, 1900.

A. McDOUGALL.
DREDGING APPARATUS.

(Application filed Jan. 2, 1900.)

(No Model.)

3 Sheets—Sheet 1.



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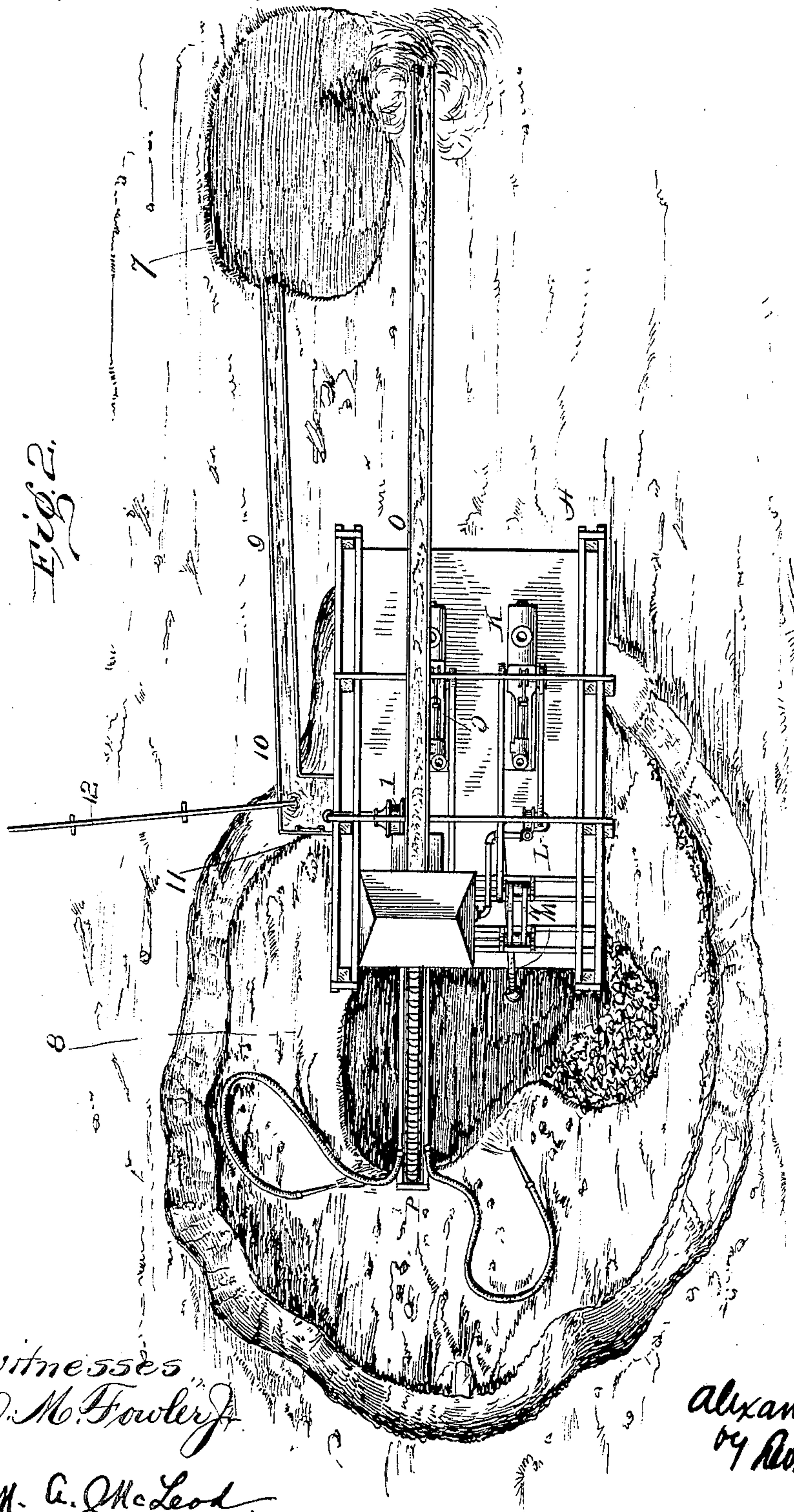
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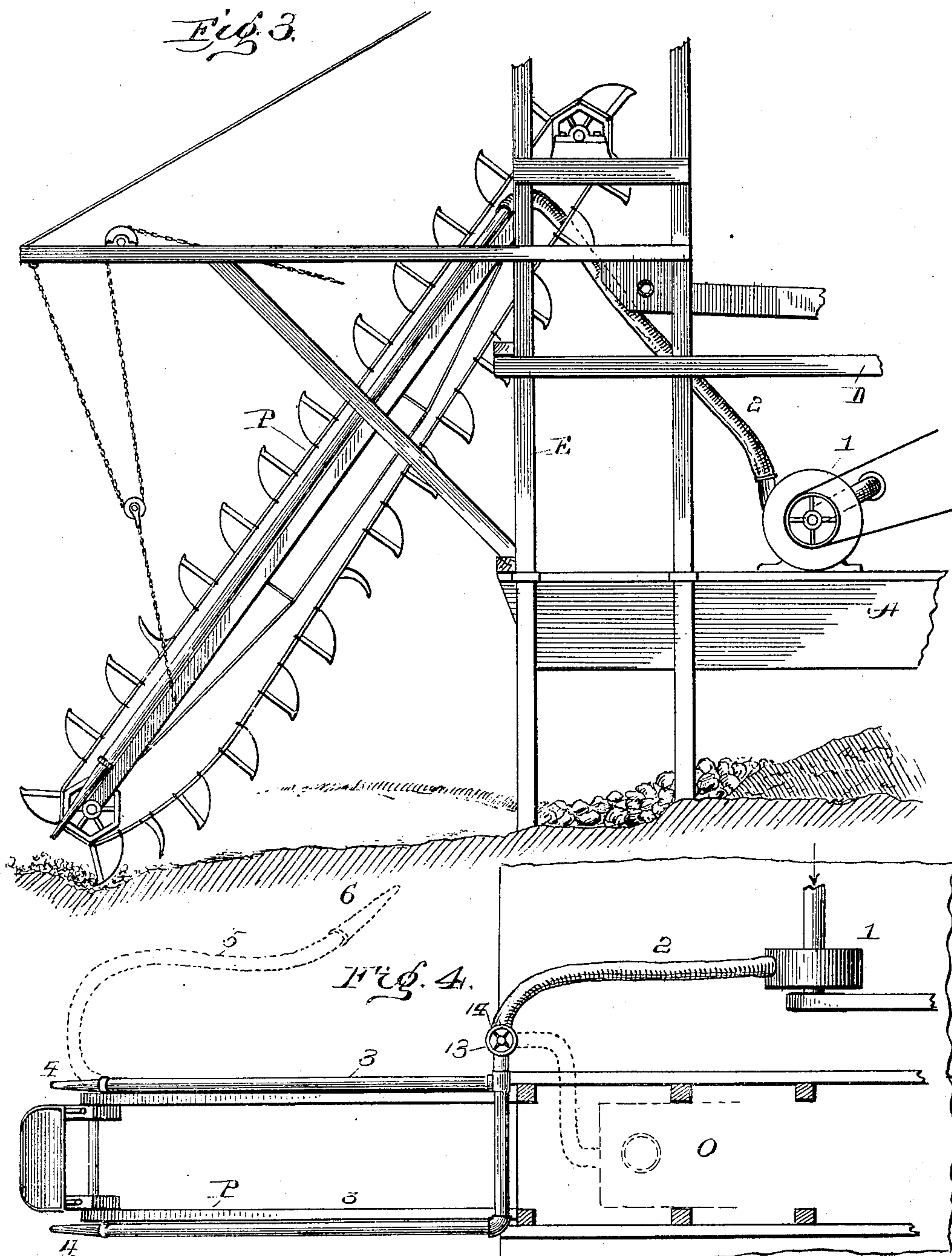
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UNITED STATES PATENT OFFICE.

ALEXANDER McDOUGALL, OF DULUTH, MINNESOTA.

DREDGING APPARATUS.

SPECIFICATION forming part of Letters Patent No. 657,247, dated September 4, 1900.

Application filed January 2, 1900. Serial No. 53. (No model.)

To all whom it may concern:

Be it known that I, ALEXANDER McDOUGALL, a citizen of the United States, residing at Duluth, in the county of St. Louis and State of Minnesota, have invented certain new and useful Improvements in Dredging Apparatus; and I do hereby declare the following to be a full, clear, and exact description of the invention, which will enable others skilled in the art to which it appertains to make and use the same.

My invention relates to improvements in apparatus for use in gravel or placer mining for gold, and is to be particularly employed in conditions wherein the gold-bearing sand and gravel is carried on bed-rock in connection with a greater or lesser amount of water.

The present invention is an improvement in apparatus invented by me and described and claimed in United States Letters Patent No. 619,601, dated February 14, 1899. As described in these Letters Patent the improved apparatus is in the form of a pit wherein is carried a float or scow provided with supporting legs or spuds and so arranged that it may be moored in the channel of a stream, the legs resting upon the bed-rock, the water of the stream being diverted or otherwise gotten rid of, whereby the dredge may be sustained within the pit some distance above the gold-bearing sand or gravel.

The form of apparatus described in the aforementioned Letters Patent is more especially adapted for mining in meadows or creek-bottoms—as, for instance, where a creek passes through a meadow and has large margins of gravel bottom and with a large amount of water present. An ordinary dredge can be employed for the removal of the uppermost gravel; but such dredges are not adapted for or capable of use in removing the gravel in pockets, cracks, and crevices found upon the surface of the bed-rock and which contain practically all the placer-gold. As described in the aforementioned Letters Patent the scow is provided with the usual steam-pumps and in addition thereto the usual screens and sluice-boxes. The sluice-boxes preferably extend behind. A bucket or ladder dredger which extends from the forward end of the scow is also provided. It has been found in practice that the bucket dredger

will work to much greater advantage if a jet or jets of water under high pressure be directed upon the gravel immediately adjacent to the working end of the dredge. It has also been found in practice that after the bed-rock has been reached and the greater part of the gravel removed therefrom by means of the dredger the remainder, which is particularly rich in gold, can be removed easily and cheaply by means of a jet of water under high pressure. The idea of using the jet of water under high pressure for assisting the operation of the dredger and of using the same means for cleaning the bed-rock forms part of the subject-matter of this application. Means whereby this may be carried out will be described hereinafter.

In addition to the foregoing device my invention relates to means whereby the dredging can be accomplished by the use of a very small quantity of water. This water is supposed to be contained in a reservoir or pond adjacent to the pit. This pond or reservoir may be of any shape or size desired. I prefer, however, in frozen districts, like parts of Alaska, to make the pond of large area and small depth, whereby the atmosphere will have an opportunity to warm the water. In hot dry localities, on the contrary, the pond is to be made deep and of small area to reduce evaporation.

This invention is to be understood to apply in the broadest sense to the use of water under high pressure for assisting the operation of the bucket dredger and for cleaning the bed-rock. The preferred form of employing this means is generally as follows: In addition to the main steam-pump a smaller centrifugal or other pump is supported upon the deck of the scow and operated by suitable means. A flexible pipe connects with this pump with a metal pipe attached to the elevator-leg of the bucket or ladder dredger, which pipe passes down to the bottom of the said leg. At the same point one or two nozzles directs a jet or jets of water into the gravel at a point where the buckets first come in contact therewith. At the time the pit is being made a pond or reservoir is constructed adjacent thereto, preferably to the rear of the scow and below the exits of the chutes. The pond is then connected to the

pit by means of a box-flume, within which is arranged a gate or valve. After the hole or pit has been completed the water is pumped out into the pond, and the scow settles down upon its legs. The nozzle part at the bottom of the elevator-leg which forms a jet can then be removed, and one or two sections of hose can be attached in lieu thereof, whereby sand and gravel may be forced from any place in the pit to the sump and there be removed by the elevator or large pump. While the scow is elevated, the small pump will receive its supply either from the adjacent creek or river or from the reservoir.

In order to better understand the nature of my invention, attention is called to the accompanying drawings, forming a part of this specification, in which—

Figure 1 shows a side view of the scow and pit; Fig. 2, a top view of the same; Fig. 3, a side view; and Fig. 4, a top view of the ladder or bucket dredge, drawn on a larger scale.

In all the several views like parts are indicated by the same characters of reference.

The scow A is preferably provided with guards B, through which the legs C pass. In order that these legs may be held with sufficient rigidity to support the scow some distance above the bed-rock, a superstructure D is arranged, carried upon supports or uprights E at the corners and at intermediate stations on the side of the scow. One or more suitable boilers and engines K are mounted upon the scow and serve to operate the centrifugal pump L. This pump connects with the swinging pendulum suction end M, as described in my above-mentioned patent. A steam-winch or other hoisting device N is employed for adjusting and swinging the pendulum end, and the material from the pump L passes into the chute O. All of these features of invention are fully described in my before-mentioned patent. In addition an endless-chain bucket dredge P is employed, and which may be operated by the same engine or, if desired, by an independent engine Q. The winch N can be used if it is desired to warp the dredge about.

The details of scow, pump, dredges, and sluices are immaterial to the present invention, which lies in the broad idea of applying a jet of water at high pressure to assist the operation of the elevator and to wash the gravel and sand into the sump and in providing a pond or reservoir adjacent to the pit wherein may be stored a sufficient quantity of water to wash the sand therein by using it over and over again.

The scow is provided with an auxiliary pump 1. This pump may be of any form, centrifugal or plunger, and may be operated by the same engine that drives the main pump, or, if desired, an independent engine may be used. This pump is connected, by means of a flexible hose 2, to a pipe or pipes 3 3, attached to the legs of the elevator P. The lower extremities of the pipe or pipes 3 3

are secured to the nozzles 4 4, which, if desired, may be removable. If these nozzles are arranged to be removable, sections of hose or pipe 5 5 may be substituted in lieu thereof, the said sections of hose carrying nozzles 6 6 thereon.

As shown more clearly in Fig. 2, 7 is a reservoir arranged adjacent to the exit end of the chute O. 8 is a pit, within which is supported the scow. 9 is a box-flume connecting the reservoir 7 to the auxiliary reservoir 10 adjacent to the scow. 11 is a valve-gate by means of which the water from the auxiliary reservoir can be admitted to the pit 8 and regulated, if desired. 12 is a pipe connected with the creek or river for supplying additional water to take the place of that lost by leakage, evaporation, and the supply for the boilers. The flexible hose 2 is connected to the pipe 3 by means of the coupling 13. By use of a two-way valve 14 in the pipe the former can empty into the inlet of the chute O, (see dotted lines, Fig. 4,) which may be useful in the event of the latter becoming clogged.

The operation of the completed apparatus is as follows: A hole is dug in the meadow adjacent to the bed of the creek two or three feet deep and large enough to float the scow. The machinery and sluice-boxes are then placed on board and water from the creek turned on and the machinery started. By the combined action of the bucket dredge and the jets of water under high pressure a larger and deeper hole will soon be made in front of the scow, and the latter with its own power can pull itself into this larger hole or pit, the sluice extending far enough astern to dump clear thereof. At the same time the pond or reservoir 7 is constructed and connected to the pit by means of the box-flume 9. This excavation goes on until the pit is, say, sixty feet long by fifty feet wide and down close to the bed-rock. The scow is then lowered into the pit by shutting off the water-supply and pumping out the pit until the same is nearly dry. The scow will now be resting on its legs or spuds, the after side of the scow resting upon the bank to steady itself, and by any suitable means the scow is leveled or trimmed to suit the after end, the sluice-boxes extending back of the scow, so that the water will run into the pond. The tailings will be dumped adjacent thereto. Sufficient water is then turned into the pit by manipulating the valve or gate 11 to supply the main centrifugal pump through the medium of the pendulum end M. The small centrifugal pump 1 receives its supply directly from the creek or flume by means of the pipe 12 or auxiliary reservoir 10, the large pump furnishing water to sluice with and the small one furnishing water at great pressure to push or force the sand, gravel, and gold to the elevator or into the sump, from whence it can be lifted into the sluice-boxes. As soon as the bed-rock is freed of water a part of

the same is first cleaned. Then all of the large stones, which are usually found on the bottom, are piled up, and after the first shift they can be thrown under the scow. When the bed-rock is nearly all clean in this pit, by a careful test the direction in which best pay is found is determined and a spot selected for the sump, where the pendulum suction M is to be located for the next shift. This is usually the lowest spot that can be secured on soft bed-rock where the pendulum can work its way down to get a deep sump. When necessary, however, a larger hole can be made by blasting, for it is important that the pendulum suction should be much lower than any other part of the pit, so that water can be kept out when cleaning the bed-rock. When the next sump is selected, ranges or marks are made on top of the ground for the purpose of locating the spot while the pit is full of water. When the bed-rock is clean and the sump is located, the pit is filled and the scow floated and moved ahead. After the first pit has been made it is much easier to excavate or extend the same, as the bucket-dredger can be worked against the bank, and the force-pump can operate two strong jets of water against the gravel just at the point where the elevator-buckets are breaking it loose at the bottom. When this is dredged as low as can be done to advantage, the float or scow is hauled back and moored, so as to bring the pendulum end directly over the new sump.

The pond or reservoir 7 is to be constructed to suit the exigencies of the work. In cold countries, as Alaska, it is to be shallow and of some extent, whereby it will get the full benefit of the heat of the sun. To assist the action of the sun's heat in preventing freezing, the exhaust from the engines can lead into

said pit. In dry hot countries, on the contrary, the pond is to be made deep and of small area to reduce evaporation as much as possible.

I claim—

1. Means for mining comprising in combination, a scow adapted to be used in a pit or excavation, means for supporting the scow above the bottom of the pit, a pump on the scow for draining the pit, connection from said pump adapted to draw from a reservoir, a flume or chute connecting the reservoir and scow, a second pump on the scow, a flexible pipe or pipes connected to said second pump, by means of which the entire bottom of the pit may be washed, and the pit may be flooded and drained at will, substantially as described.

2. Means for mining comprising in combination, a scow adapted to be used in a pit or excavation, an excavator thereon, for removing the front wall of the pit, means for supporting the scow above the bottom of the pit, a pump on the scow for draining the pit, a connection from said pump adapted to draw from a reservoir, a sluice adapted to connect the excavator with the rear wall of the pit, a flume or chute adapted to connect the reservoir and scow, a second pump on the scow, a flexible pipe or pipes connected to said second pump by means of which the entire bottom of the pit may be washed, and the pit may be flooded and drained at will, substantially as described.

This specification signed and witnessed this 23d day of November, 1899.

ALEXANDER McDOUGALL.

Witnesses:

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