Nov. 3, 1942. F. LYONS 2,300,680

GOLD DREDGER

Filed April 28, 1941 2 Sheets-Sheet 1

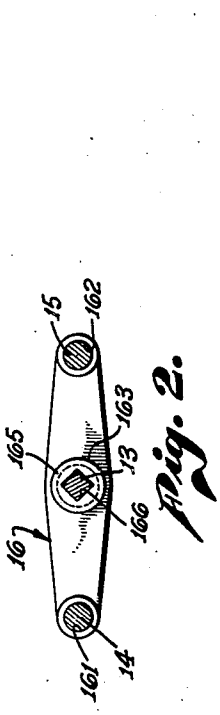


Fig. 2.

Fig. 1.

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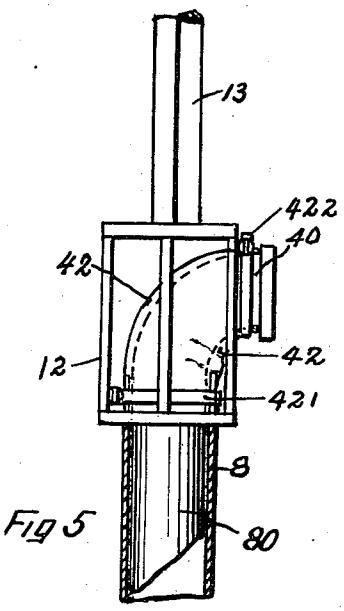


Fig 5

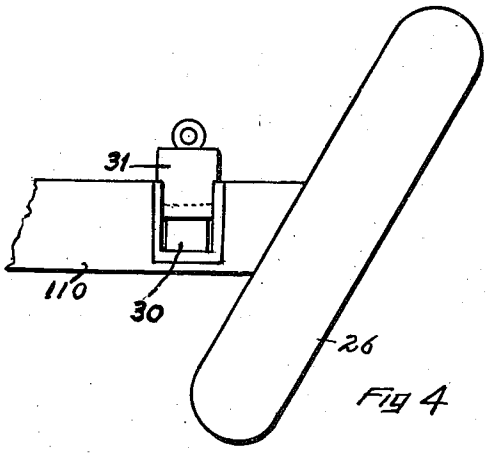


Fig 4

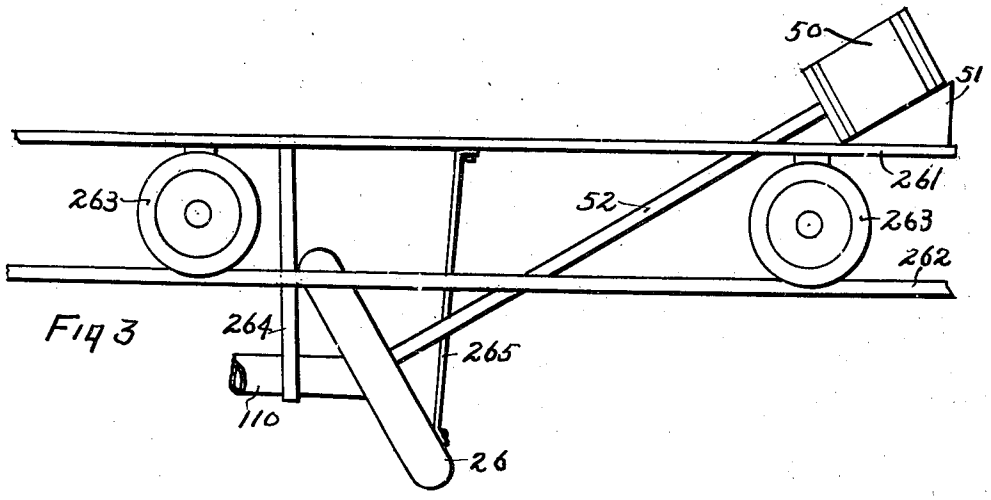


Fig 3

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2,300,680

UNITED STATES PATENT OFFICE

2,300,680

GOLD DREDGER

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Application April 28, 1941, Serial No. 390,722

5 Claims. (Cl. 37—58)

My invention relates to a dredger of the suction type, adapted for recovering precious metals, such as gold and platinum, from sand and gravel deposited under water. More specifically, this type of dredger consists of a floating base, a pump adapted to elevate water, sand and gravel to where it can be deposited on a device adapted to separate the precious metals from the conglomerate mass. This necessitates the use of a hollow suction pipe, connected with the pump, and adapted to be forced into the earth.

The objects I have accomplished are: An oscillating motion of the suction pipe when being forced into the earth, which keeps perforations in the free end of the pipe from being clogged with stones and debris. The connection between the discharge end of the suction pipe and the pump is kept approximately air tight, although it is flexible enough to permit the suction pipe to have a vertical movement and an oscillating movement. The pump may be attached to a carriage permitting its movement toward, or from the suction pipe while the device is in operation. Other objects will be hereinafter disclosed.

These objects are accomplished by means of the device hereinafter described, and illustrated on the accompanying drawings in which

Fig. 1 is a perspective side view of the dredger.

Fig. 2 is an enlarged top view of a guide for the suction pipe assembly.

Fig. 3 is a side view of a modified form of mounting for the gravel pump.

Fig. 4 is an enlarged view of an auxiliary inlet and gate in the intake lead for the pump, adjacent to the pump.

Fig. 5 is an enlarged view of the swivel connection of the suction pipe and suction hose, having parts cut away to see the inside mechanism of the connection.

Referring to the drawings, I have provided duplicate floats, 5 and 5A, which are held apart in spaced relation by one or more ties 21. The space between the floats is designated 6. The purpose of space 6 is to position the working elements between the floats, making a more balanced unit when working.

A derrick 7 is provided to more effectively raise and lower suction tube 8 when the device is in operation, it being understood that said suction pipe 8 must be forced into the earth at the bottom of the river, or other body of water, in which the sand is being recovered to be washed for the gold. At the top of the derrick is pulley 9, which is to be used in conjunction with cable 10 for raising the suction pipe, as will be hereinafter more fully described. Suction tube 8 terminates at the free end with point 8A, said point being differently shaped for digging in different densities of earth. These digging points are not shown herein in detail, and are not specifically claimed as my invention. Suction pipe 8 has a plurality of perforations 8B near the lower end to admit water, sand and gravel. The size of the gravel permitted to enter suction pipe 8 is limited by the size of the perforations 8B. In my experiments I have found perforations 2 inches to 2½ inches preferable. The size of the perforations can be changed to suit the character of earth to be mined. The length of the suction pipe 8 can be varied to correspond with the depth it is desired to pump the sand and gravel.

At the upper end of suction pipe 8 is suction hose or lead 11, hereinafter more specifically described.

At the end of suction pipe 8, and opposite to the perforated end is a spider frame 12, adapted to connect an angular rod, or kelly 13, rigidly to said suction pipe, and to allow sufficient space between said suction pipe 8 and the angular rod for attaching suction hose 11 to the suction pipe.

It is noted that this device is primarily intended for dredging sand and gravel from the earth in the bed of a river or other water area, and the preferred use of the suction pipe is to insert it into the earth approximately vertically, although it can be inserted at any other angle, if advantageous, by slightly modified means. To hold the suction pipe vertically rigid, I have provided posts 14 and 15, which posts are anchored at the bottom to floats 5 and 5A. A guide 16 is also provided, said guide consisting of an elongated member having sliding bearings 161 and 162 at either end thereof, said bearings being adapted to slide on posts 14 and 15. The center of guide 16 is enlarged, and a female bearing 163 is formed therein so that a male bearing 164 fitted therein can be rotated at right angles to the slide bearings 161 and 162. Male bearing 164 can be provided with a flange 165 to better hold it in working position with guide 16. An angular hole 166 in male bearing 164 is adapted to fit around the angular rod, or kelly 13, the center line of hole 166 being parallel with the center lines of holes 161 and 162. It is noted that guide 16 can be moved on the angular rod 13, and on posts 14 and 15 until it rests on spider frame 12, and the bearings 161 and 162, encompassing posts 14 and 15, are resting on the top of floats 5 and 5A. If it is desired to lower the suction pipe below this point, the angular rod can slide through

hole 166 in the male bearing. If it is desired to raise the suction pipe assembly so that the spider frame is above the top of said floats, guide 16 can slide upward on posts 14 and 15.

Guide 17 is constructed similarly to guide 16, with a male bearing 163, and an angular hole 166 adapted to slidingly fit angular rod 13, the exception being that instead of sliding bearings 161 and 162, the guide 160 is attached at either end to posts 14 and 15.

It is noted that in the operation of this dredge, lifting water, sand and gravel from the river bed to gold recovery means, is accomplished only by forcing the end of the suction pipe into the earth, and then applying suction with the pump. To lower the suction pipe and force it downward into the earth, a cable 10A is attached to angular rod 13, preferably at or near the top, then passed around pulley 20 which is anchored to one of the floats 5 or 5A, and thence to a winch 19 where the cable can be tightened to force the suction pipe downward by the weight of the float. In this operation the suction pipe engages the earth and the float may be slightly raised if the suction pipe does not readily enter, merely by winding the cable on the winch, and the constant weight of the float, together with other movements hereinafter described, will cause the suction point to dig itself downward. To make the digging more effective, and for the purpose of keeping the perforations 8B clear of gravel, the suction pipe is oscillated with the following mechanism. A reciprocating member 22 is slidably attached to angular rod 13, and is pivotally attached with connecting rod 23 to a crank 24, which crank is rotated by a motor 25, or other form of power. It is noted that the oscillation of the suction pipe is far superior in keeping the perforations near the end of the pipe clear of gravel, than the rotary type now in use.

To raise the suction pipe, a cable 10 is attached to the kelly, near the top, then passed through a pulley 9 at the top of the derrick, and thence passed to a winch 18 located on the float, which winch can wind up the cable and thus lift the kelly and attached suction point.

The gravel pump 26 can be either of several types in common use, the specific form of pump not being claimed herein as my invention. The discharge of the water, sand and gravel to a plant for recovering the gold therein, which plant is not shown or specifically claimed herein, can be made through discharge pipe 27. The pump and discharge pipe 27 can be firmly attached to floats 5 and 5A, as shown in Fig. 1, or, as shown in Fig. 3, the pump can be suspended from a carriage 261, which carriage is on track 262 and is moveable thereon toward or from the suction pipe.

The suction hose, or connecting lead 11 between the pump and the suction pipe is described as follows: At the pump there is a telescopic connection, pipe 110, attached to the intake of the pump, which enters the end 111 of pipe 11. Pipe 110 has an opening 30, adjacent to pump 26, and not covered by pipe 11, which opening 30 is regulated by a gate 31. Gate 31 can be opened or closed by a handle 32. The purpose of this opening and gate is to normally keep the gate approximately closed so that the suction created by pump 26 will normally draw through suction pipe 8, but if the pump should become clogged with sand and gravel, gate 31 can be opened to admit clear water from near the surface of the river in which the floats are located, and thus wash the sand and gravel through the pump. The pump, and more especially the intake opening of the pump is preferably positioned under the water.

The connection between the suction pipe and the lead extending from the suction pipe to the pump should be such that the suction pipe can oscillate while the connection does not oscillate, and the connection can maintain a vertical movement to compensate with the vertical movement of the suction pipe. This feature of my invention is shown more clearly in the enlarged view in Fig. 5.

Elbow 40, fractionally shown in Fig. 1, and shown enlarged in Fig. 5, has extension 80 thereon adapted to telescope within suction pipe 8, the fit being loosely enough so that suction pipe 8 can oscillate around extension 80. A spider frame 12 is attached at one end to kelly 13, and at the other end to suction pipe 8 so that when kelly 13 is given an oscillating movement, such oscillations are directly communicated to suction pipe 8. Elbow 40 is positioned within the spider 12. The discharge end of elbow 40 is attached to lead 11 by means of flanged connection 41, or by other well known means not shown. A sleeve 42, of rubber, or other pliable material encloses the telescopic connection of extension 80 with suction pipe 8. Sleeve 42 is attached to suction pipe 8 with a band clamp 421, and to elbow 40 with band clamp 422 as shown in Fig. 5. Sleeve 42 maintains an approximately air tight connection of said telescopic joint whether the joint is under the water or out of the water.

An auxiliary feature to keep sand from interfering with the oscillating movement of the suction pipe 8 around extension 80 consists of auxiliary pump 45, operated by motor 25, adapted to pump clear water adjacent to the dredger through pipe 46 into sleeve 42. The suction of pump 26 when operating will draw water deposited in sleeve 42 through open spaces in the telescopic joint between extension 80 and suction pipe 8 into which sand might lodge, thus keeping such sand washed out.

Having described my invention, I claim:

1. In a dredger of the character described, a floating base, a pump adapted to lift water, sand and small gravel, a lead adapted to carry the material raised by the pump and deposit it at a selected place, an intake for said pump consisting of a suction pipe, means for forcing the suction pipe into the earth consisting of applying vertical pressure on said suction pipe, and contemporaneously with such vertical pressure, applying an oscillating movement to said suction pipe by means of an arm extending outward at approximately right angles to said suction pipe, a crank, means for rotating the crank, a connecting rod pivotally attached at one end to said arm and at the other end to said crank, and an intake lead connecting the suction pipe with the pump.

2. In a dredger of the character described, a floating base, a pump adapted to lift water, sand and gravel, a suction pipe adapted to be lowered into the earth, an extension to said suction pipe, means for forcing the suction pipe into the earth consisting of a cable attached to the suction pipe extension, a pulley attached to the floating base, a winch attached to the floating base, said cable extending from the suction pipe extension around the pulley and to the winch, means for rotating the winch, means for imparting an oscillating movement to the suction pipe, and a lead connecting the suction pipe and the pump.

3. In a dredger of the character described, a

floating base, a pump adapted to lift water, sand and small gravel, a discharge opening for the pump, a suction pipe having the free end pointed and having perforations adjacent to the point, means for forcing the suction pipe into the earth, and contemporaneously therewith for oscillating the suction pipe, a lead connecting the outlet of the suction pipe with the intake of the pump, said connection consisting of a telescopic connection of the suction pipe and lead, adapting the suction pipe to be oscillated on that portion of the lead within the suction pipe, and a sleeve of pliable material adapted to encase the connection between the suction pipe and the lead, said sleeve being attached at one end to the suction pipe, and at the other end to the lead.

4. In a device described in claim 3, an auxiliary pump and means connected therewith adapted to force a stream of water into the sleeve assembled with the suction pipe and the elbow.

5. In a dredger of the character described, the combination of a floating base, a pump adapted to lift water, sand and small gravel, a suction pipe having openings adjacent to the bottom thereof, means for forcing said suction pipe into the earth, means for giving the pipe an oscillating movement, a lead from the suction pipe to the intake opening of the pump, an opening in the lead, adjacent to the pump, and means for regulating the size of said opening.

FRANK LYONS.