March 9, 1937. G. P. SILKE 2,073,122

PLACER MINING DEVICE

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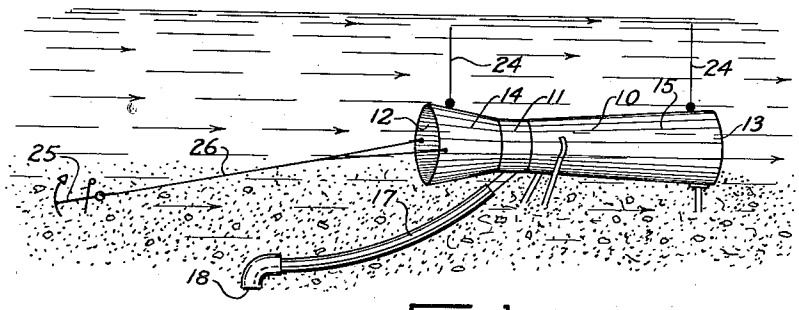


Fig. 1.

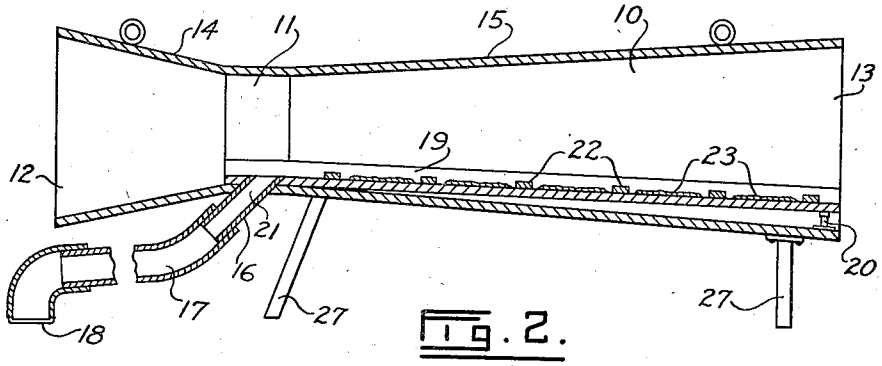


Fig. 2.

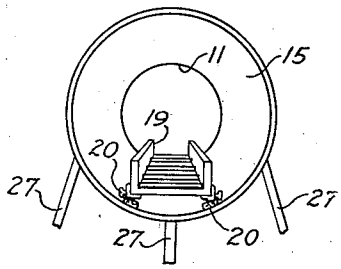


Fig. 3.

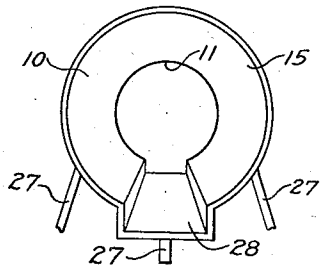


Fig. 4.

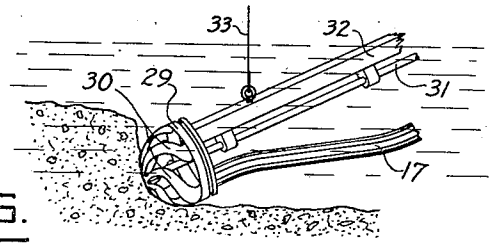


Fig. 5.

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PLACER MINING DEVICE

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8 Claims. (Cl. 262—2)

This invention relates to an improved placer mining device.

An object of the present invention is the provision of a placer mining device adapted to operate on the bed of a stream or river to recover valuable minerals therefrom such as gold, platinum, silver, etc.

Another object is the provision of a placer mining device adapted to lift the mineral bearing sand and gravel by suction created by the current and to sort the sand and gravel beneath the surface of the water in which the device is operating.

A further object is the provision of a portable placer mining device which may be operated without the use of power.

A still further object is the provision of a device of this character of very simple construction which cannot go out of working order.

Heretofore attempts have been made to remove the valuable minerals from the beds of relatively deep rivers and streams by suction pumps but these have had varied commercial success for the following reasons: 1, the high initial cost for the purchase of the dredging or suction pump equipment, 2, the continuous cost of the power to operate this equipment, and 3, the difficulty of moving this necessarily heavy equipment up and down a fast running stream which may be very deep in some places and shallow in others. Furthermore, a device was produced attempting to utilize the current of the river to create suction but it is doubtful whether or not sufficient suction could be created to be practical and, even if it were possible to create sufficient suction, the device would soon fill up with sand and gravel due to the fact that there is not a free flowing stream of water passing through the sluice.

This invention overcomes these objectionable features by providing a portable device of very simple construction adapted to be anchored in a river or stream and which utilizes the current to create sufficient suction to draw sand and gravel from the bed of the river or stream into the device. At the same time the flow of water washes this sand and gravel through a sluice provided with riffles or matting by means of which the valuable minerals are saved while the sand and gravel is carried back into the stream.

The present invention consists essentially of a tube having a restriction closed to one end than to the other, adapted to be anchored in a stream and having a sluice box therein in which sand and gravel from the stream bed is sorted, said sand and gravel having been drawn into the tube by suction created by the current as more fully described in the following specification and illustrated in the accompanying drawing, in which—

Fig. 1 is a perspective view of the device anchored in operative position,

Fig. 2 is a longitudinal sectional view,

Fig. 3 is an end elevation,

Fig. 4 is a view similar to Fig. 3 of a modification of the invention, and

Fig. 5 is an enlarged elevation of an attachment for the device.

Referring more particularly to the drawing 10 may be a plain open-ended tube but it is preferably formed with a restriction 11 situated closer to the end 12 than to the opposite end 13, thus forming a Venturi tube. The section 14 of the tube 10 tapers rather abruptly from the relatively large opening at the end 12 down to the restriction 11 whence the section 15 gradually diverges to the opening at the end 13. For convenience the end 12 will hereinafter be referred to as the forward end of the tube. The tapered forward end of the tube forms a jet by means of which the speed of the water passing through the tube is increased.

A suction pipe 16, communicating with the interior of the tube 10 is secured to said tube either at the restriction 11 or adjacent thereto. This pipe may lie at right angles to the longitudinal axis of the tube 10 but it preferably extends forwardly forming an acute angle with said axis. A flexible suction hose 17 is attached to the pipe 16 and has a screen 18 at its free end.

A recovery or sluice box 19 is mounted in the section 15 with one end extending into the restriction 11 and the other end terminating at the end 13 of the tube 10. The lower end of the sluice is slidably mounted on standards 20 so that it may be raised and lowered as desired. The sluice box 19 is provided with an orifice 21 registering with the suction pipe 16 and a plurality of spaced riffles 22 extending throughout its length. Matting 23 may be placed on the bottom of the sluice.

Cables 24 are secured to the tube 10 by means of which it may be raised or lowered from a craft (not shown) on the surface of the stream in which the device is operating. The tube may be suspended in the stream and held in place by an anchor 25 secured thereto by an anchor cable 26 but, if desired, legs 27 may be provided upon which the device may rest on the bed of the stream. The anchor 25 will hold the device in any desired position and prevent it from being forced downstream by the current.

In the form of the invention illustrated in

Fig. 4, the section 15 of the tube 10 is formed with a trough 28 in which the sluice box 19 is mounted in the same manner as described above.

The screen 18 of the hose 17 may be replaced by a rotary cutter head 29, see Fig. 5, for the purpose of loosening tightly packed gravel when encountered. The cutter head consists of a hollow shell having blades 30 arranged in a spiral so as to give the maximum cutting effect with the least liability of choking. The cutter head is mounted on the end of a shaft 31 carried by a boom 32 pivotally mounted on the surface craft. The boom may be raised or lowered and otherwise manipulated by a cable 33. The shaft 31 and cutter head 29 are rotated by a suitable source of power situated in said shaft.

In operation, the tube 10 is lowered to the bed of the stream and anchored in position with the current running in the direction of the arrowheads through the tube as shown in Fig. 1. The lower end of the hose 17 is placed on the stream bed and moved around as desired either by a diver or by cables extending from the surface craft. The velocity of the water flowing through the tube is greatly increased as it passes through the jet and the restriction 11 thus creating relatively great suction in the pipe 16 and the hose 17 and consequently drawing water together with material such as sand and gravel therethrough. As the sand and gravel is washed through the sluice box 19 by the water, the heavier minerals are retained by the riffles and the matting while the lighter tailings are discharged through the end 13 of the tube. The angle at which the sluice box is set will be determined by the rate of flow of the water in the stream. If the flow is rapid the outer end of the sluice may be raised and when the flow is relatively slow the outer end may be lowered. Obviously if this range of adjustment is not sufficient to meet the conditions, the after end of the whole device may be raised or lowered.

When the bed of the stream is composed of tightly packed gravel, the rotary cutter head attachment is used at the end of the hose 17 to loosen the gravel sufficiently to allow it to be sucked into the device

Any number of these devices may be placed in a stream with their positions marked by buoys and one craft would take care of them all, it being only necessary to lift each one at certain intervals to remove the minerals from the sluice box.

From the above it will readily be seen that a device has been provided by means of which sand and gravel is drawn from the bed of a stream by suction created by the current and in which the valuable minerals are extracted from said sand and gravel by the water flowing therethrough.

What I claim as my invention is:

1. A placer mining device comprising a tube adapted to be placed in a stream, a suction hose spaced from the end of the tube communicating with the interior thereof, means for creating suction in the hose whereby material is drawn from the bed of the stream into said tube, and means in said tube for extracting minerals from the materials as it is washed through the tube.

2. A placer mining device comprising a tube adapted to be placed in a stream, said tube being formed to increase the velocity of the water as it flows therethrough, means for drawing material from the bed of the stream into the tube by suction created by the flow of the water through the tube and means in said tube for extracting minerals from the material as it is washed through the tube.

3. A placer mining device comprising a tube adapted to be removably placed in a stream, means for holding the tube in operative position, said tube being formed to increase the velocity of the water as it flows therethrough, means for drawing material from the bed of the stream into the tube by suction created by the flow of the water through the tube and means for sorting minerals from the material by the flow of the water.

4. A placer mining device comprising a tube adapted to be placed in a stream, said tube having a restriction therein and spaced from the ends thereof, said restriction being adapted to increase the velocity of the water flowing through the tube, a suction hose communicating with the tube at said restriction through which material is drawn from the stream bed into the device by suction created by the water flowing therethrough and a sluice box mounted in the tube for extracting minerals from the material as it is washed through the tube by the water.

5. A placer mining device comprising a tube adapted to be placed in a stream, said tube having a restriction therein, a suction hose communicating with the tube adjacent to said restriction through which material is drawn from the stream bed into the device by suction created by the water flowing therethrough, a sluice box mounted in a trough in the tube and means for raising and lowering one end of the sluice box, said sluice being adapted to extract minerals from the material as it is washed through the tube by the water.

6. A placer mining device comprising a tube adapted to be placed in a stream, said tube having a restriction therein, means for holding the tube in operative position, a suction hose communicating with the tube at the restriction through which material is drawn from the stream bed into the device by suction created by the water flowing therethrough, means mounted on the free end of the hose for loosening the material in the stream bed, a sluice box mounted in the tube and means for raising and lowering one end of the sluice box, said sluice being adapted to extract minerals from the material as it is washed through the tube by the water.

7. A placer mining device comprising a tube, a jet formed at the forward end of the tube, a suction hose communicating with the interior of the tube adjacent the rearward end of the jet through which materials are drawn by suction into the tube and means beyond the jet for extracting minerals from the material as it is washed through the tube.

8. A placer mining device comprising a tube, a jet formed by the forward end of the tube narrowing down to a restriction, a suction hose communicating with the interior of the tube adjacent said restriction through which materials are drawn by suction into the tube and a sluice box beyond the jet for extracting minerals from the material as it is washed through the tube.

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