

R. A. GARDNER.

CAISSON DREDGER.

APPLICATION FILED APR. 5, 1909.

941,869.

Patented Nov. 30, 1909.

2 SHEETS—SHEET 1.

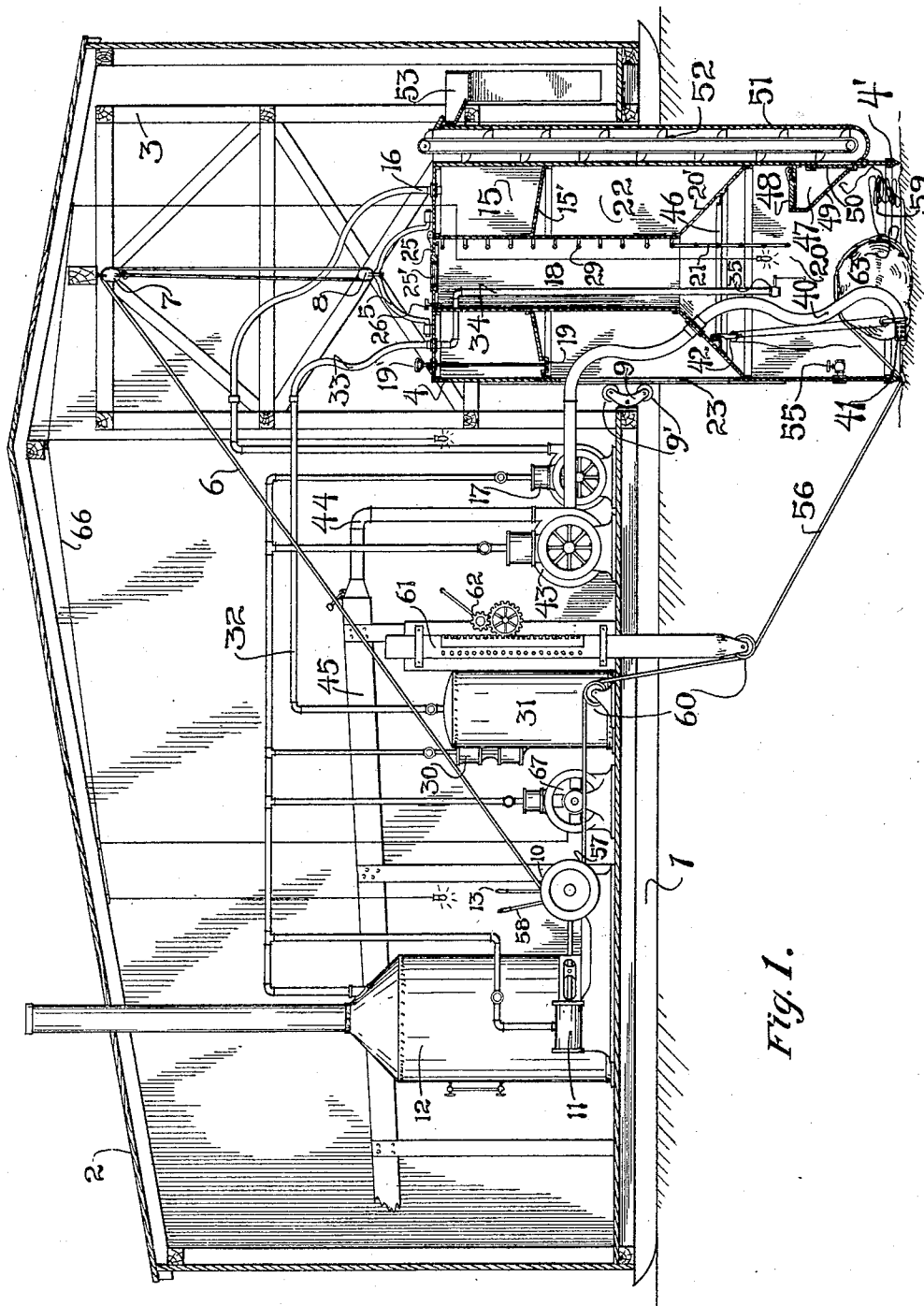


Fig. 1.

Witnesses:
C. O. Benton
J. M. Lashman

Raymond A. Gardner Inventor

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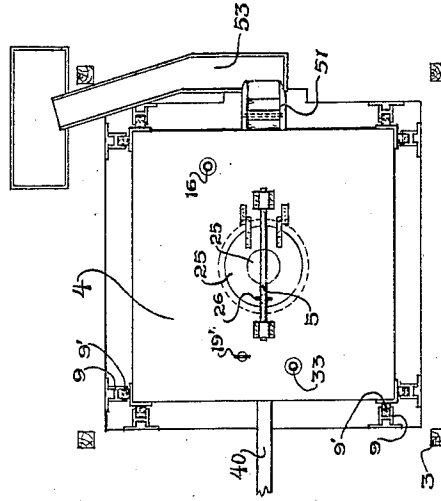


Fig 2.

Witnesses:
E. O. Buntion
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UNITED STATES PATENT OFFICE.

RAYMOND A. GARDNER, OF LOS ANGELES, CALIFORNIA.

CAISSON-DREDGER.

941,869.

Specification of Letters Patent.

Patented Nov. 30, 1909.

Application filed April 5, 1909. Serial No. 488,106.

To all whom it may concern:

Be it known that I, RAYMOND A. GARDNER, a citizen of the United States, residing at Los Angeles, in the county of Los Angeles and State of California, have invented a new and useful Caisson-Dredger, of which the following is a specification.

This invention relates to an apparatus for dredging rivers or other bodies of water particularly for the purpose of recovering gold or other valuables from the material taken up from the bottom of the body of water.

The invention relates to dredgers employing a caisson extending from above the surface of the body of water to or near the bed.

One object of the invention is to provide means for supplying a water load to the caisson to sink the same, and for partial release of the load when it is desired to lift the caisson, thereby facilitating the operation of the machine by counterbalancing the buoyancy of the caisson.

Another object of the present invention is to provide means for leveling the caisson, that is to say, maintaining the same in an upright position or for permitting the same to accommodate itself to the bed of the river, as may be required.

Another object of the invention is to provide means for facilitating removal of material from the bed of the river without interfering with the condition of pressure within the caisson.

A further object of the invention is to provide means for handling and removing rocks, boulders, or other obstructions from the path of the caisson.

Other objects of the invention will appear hereinafter.

The accompanying drawings illustrate the invention.

Figure 1 is a vertical section of the dredger, somewhat diagrammatical. Fig. 2 is a plan of the caisson.

The dredge comprises a float or barge 1 which may have suitable protection or shed 2, and is provided with a frame or derrick 3 for supporting the caisson 4. Said caisson consists of a vertical shell, for example, of sheet iron having a bail 5 pivotally connected with its top, a suspension rope 6 being connected by suitable blocks 7, 8, with the said bail and with frame 3 and having a connection at one end with a winch or hoist drum 10 operated by an engine 11 to raise

or lower the caisson. Engine 11 is supplied with steam from a boiler 12. The winch or hoist 10 is controlled by lever 13 to draw the drum into or out of operation, it being understood that the caisson descends by gravity when allowed to do so by relaxation of cable 6. To insure such descent the upper part of the caisson is provided with a chamber 15 for containing water to overcome the buoyancy of the caisson in sinking. This water is supplied through an opening 16 by any suitable supply means, such as pump, indicated at 17, the floor of said chamber having a valve 19 provided with operating handle 19', whereby the ballast or sinking water may be let out when desired to allow the caisson to be lifted. This water load on the caisson is distributed uniformly around the caisson, which is an advantage over a load of rock ballast, etc. The caisson 4 is guided vertically in this movement by pairs of rollers 9' mounted on equalizing frames 9, pivoted to the barge, the rollers 9' engaging with the caisson to hold it in substantially vertical position, and the equalizing levers permitting automatic adjustment or yielding of the caisson, so that the caisson can hang plumb under all conditions.

The caisson is provided with a tubular passage 18 extending vertically and axially therein from the top of the caisson through the water chamber 15 and to the lower part of the caisson where it opens into the working chamber 20 which is of the full diameter of the caisson. The bottom of the caisson casing has a steel shoe 4'. Between the bottom 15' of the chamber 15 and the top 20' of chamber 20 is a chamber 22 around the tubular passage 18, the wall of this chamber 22 being perforated, for example, by means of a slot 23 extending vertically therein so that the water from the outside body of water has free access to this chamber 22 said slot 23 extending to the bottom of said chamber to allow drainage of said water from said chamber as the caisson is lifted. The passage 18 is for access to the working chamber 20 from the top of the caisson and is closed during the working operation by a trap door 25 hinged at one side to the caisson and fastened by clamping means 26 so as to maintain an air tight joint during the operation. A pane 25' of glass may be provided in this door so that persons on the outside can see what is being done in the working

chamber. Rungs 29 are fastened to the wall of passage 18 to serve as a ladder and a flexible ladder 21 is suspended from the wall at the lower end of said passage to enable persons to descend or to ascend from the bottom of the working chamber, that is to say, from the bed of the body of water.

Means are provided for maintaining a condition of pressure within the working chamber, said means consisting, for example, of an air pump or compressor 30 direct driven and operated by steam connection from the boiler 12, said pump supplying compressed air to tank 31 from which a pipe 32 leads to a flexible connection 33 connected to a pipe 34 extending within the working chamber and having a valve 35, whereby the air pressure may be controlled by the operation within the working chamber.

The invention provides for the removal of sand, gravel, etc., by sluicing or pumping action after the manner of a hydraulic dredger, and for this purpose a hose or flexible pipe 40 is provided, having a screen nozzle 41 adapted to take up finer solid from the bed of the river, the pipe 40 being of sufficient length to lie on the bed of the river when the caisson is depressed and extending through the upper part of the working chamber 20 and connected at its upper end to a direct driven steam operated pump 43 supplied by steam from the boiler 12, the discharge from said pump passing through the pipe 44 to the sluice way 45 which may be provided with the usual means for recovering values. Block and tackle means 42 running on a track 46 may be provided for handling this hose. A pipe connection with a valve 55 is provided for admitting water, when desired, to the working chamber, when the caisson is resting on bed rock. Bed rock materials have to be removed by more positive means, and for this purpose a hopper 47 is provided at one side of the working chamber into which such materials may be shoveled by the operators within the said chamber, the said hopper having an outside door 48 in its top and having an inclined bottom 49 and an inside door 50 at the bottom of said hopper, these two doors constituting a lock, permitting passage of the material from the working chamber to an elevator tube or riser 51, without breaking the air pressure in the caisson. In the elevator tube 51 is provided the elevator 52 of any suitable construction for raising the material deposited in the tube from the hopper, this elevator discharging into a suitable sluice way 53 which is provided with means for recovering values.

In case larger bodies are encountered, for example, boulders, or rocks of considerable size, that cannot be handled, it is desirable to provide means for drawing or dragging the same to one side out of the way of the

caisson. For this purpose a drag rope 56 is provided connected at one end to a working drum 57 operated by the engine 11 and held by a lever 58, said cable passing over guide pulleys 60 on a vertical slide bar 61 and having its farther end provided with a grapple 63 so that by passing the end of said cable under the shoe 4' of the caisson and engaging the grapple over the rope or boulder to be removed and then operating the drum 57 the boulder can be pulled to one side leaving the bed of the stream clear for further operations. At the grapple end is attached a retaining rope 59. The slide beam 61 is provided with means 62, such as a winch, pinion or handle for vertical adjustment thereof, so as to bring the line of draft of the cable 56 into the proper horizontal plane.

Suitable illuminating means may be provided, indicated by the lamp in the working chamber, connected by a suitable wire 66 with a direct driven steam operated dynamo 67 supplied with steam from the boiler 12.

The operation is as follows: The barge is brought to proper position so that the caisson 4 is directly over the part of the bed to be worked, the sinking chamber 15 having been suitably loaded with water, the operators having entered the working chamber and the door 25 having been closed and a condition of pressure developed in the working chamber by operation of the pump 30, the caisson is allowed to descend by releasing rope 6 until the shoe 4' at the bottom thereof rests on the bed, the air pressure within the working chamber holding back the water from the outside so that it does not rise within the working chamber. The pump 43 being set in operation sucks water and sand from the bed at the bottom of the working chamber and thereby carries away all the lighter solid matter, such as sand, gravel, etc., which are treated, if desired, in the sluice way 45 to recover the values. When bed rock is reached and the bottom of the caisson rests on the bed rock, the water pump is stopped and the bed rock materials containing most of the values are shoveled by the operators into the hopper 47, the door 48 thereof being open for the purpose, and when the hopper has been filled the door 48 thereof is closed and the door 50 is opened, allowing the contents of the hopper to discharge into the elevator chamber 51 and to be raised by the elevator 52 and discharged into the sluice way 53, where the values are recovered.

What I claim is:

1. The combination of a floating structure and a caisson vertically movable in relation thereto, of a guide means on the floating structure consisting of equalizing frames pivoted to the floating structure and carrying rollers engaging with the caisson.

2. In a caisson dredger, the combination with a floating structure, the caisson movable vertically with relation thereto and provided with a working chamber, boulder removing means consisting of a grapple rope, means for traction thereof, and means on said floating structure for guiding the grapple cable to bring the line of tension in proper horizontal plane relatively to the top of the boulder, said means being adjustable 10 vertically.

In testimony whereof, I have hereunto set my hand at Kansas City, Missouri, this 31st day of March, 1909.

RAYMOND A. GARDNER.

In the presence of—

E. O. BURTRON,

F. M. CALHOUN.