

(No Model.)

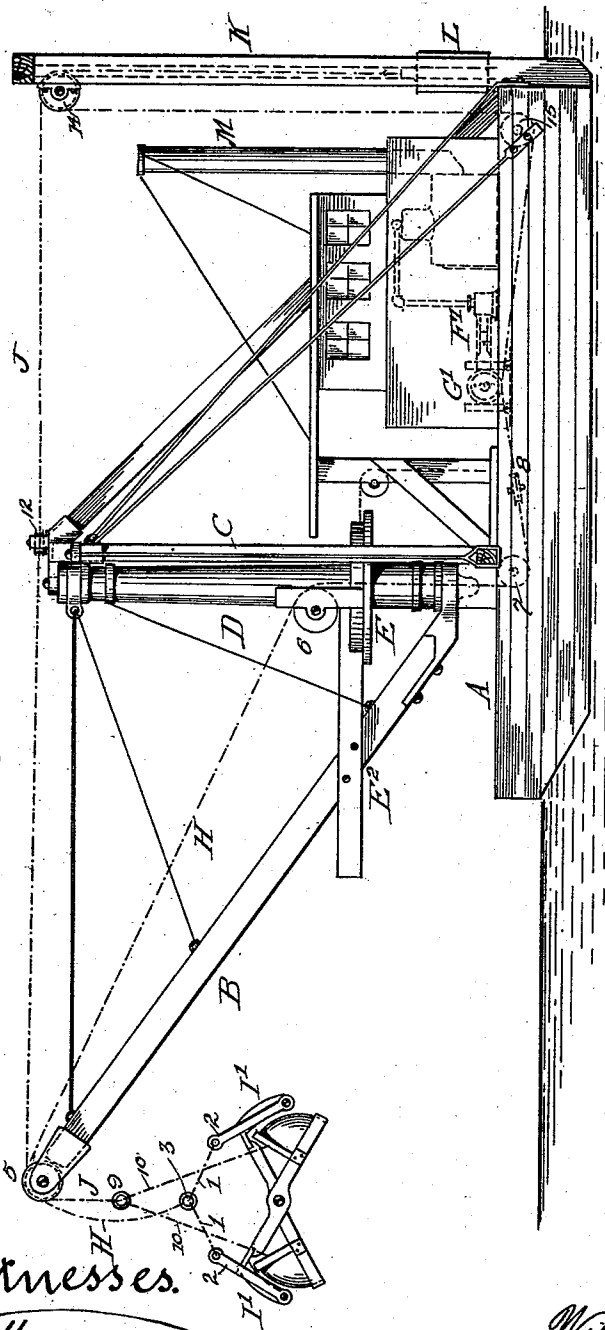
2 Sheets—Sheet 1.

W. B. PLESS.
DREDGING APPARATUS.

No. 572,769.

Patented Dec. 8, 1896.

Fig. 1.



Witnesses.

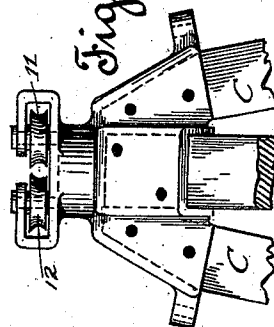
J. Monteverde.

Francis M. Burt

Fig. 2.



Fig. 3.



Inventor.

William B. Pless

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Fig. 4.

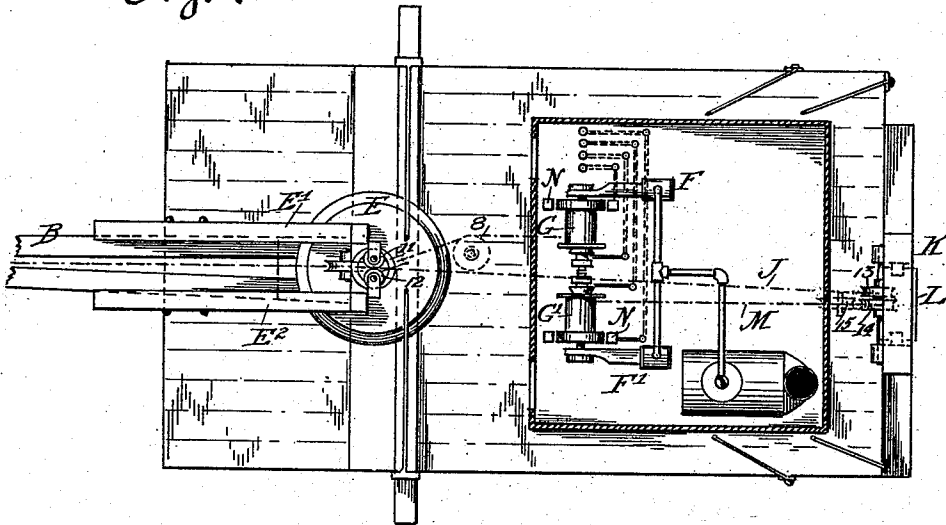


Fig. 5.

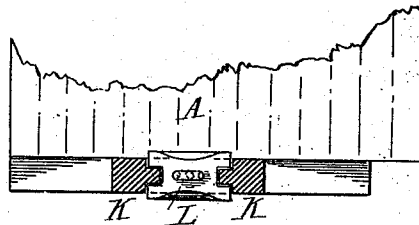
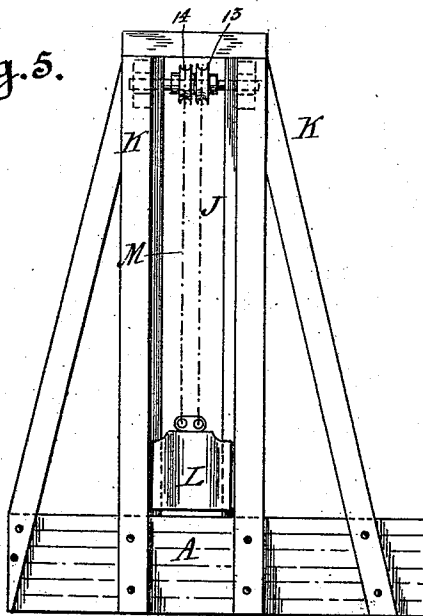


Fig. 6.

Witnesses.

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UNITED STATES PATENT OFFICE.

WILLIAM B. PLESS, OF SAN FRANCISCO, CALIFORNIA, ASSIGNOR TO THE
PLESS DREDGING AND RECLAMATION COMPANY.

DREDGING APPARATUS.

SPECIFICATION forming part of Letters Patent No. 572,769, dated December 8, 1896.

Application filed January 3, 1896. Serial No. 574,211. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM B. PLESS, a citizen of the United States, residing at San Francisco, in the county of San Francisco and State of California, have invented certain new and useful Improvements in Dredging Apparatus; and I do hereby declare that the following is a full, clear, and exact description thereof.

My invention relates to dredging apparatus of the so-called "clam-shell" type, in which the dredging-bucket is composed of hollow sections pivoted so that the sections can be closed together to take the load and retain it and can be opened to discharge it. The bucket is suspended from a boom or crane pivoted upon the hull of the dredger, which can be swung laterally or sidewise to deposit the spoil at the proper place. The bucket is operated by two chains, one of which closes and hoists it and is therefore connected to lever-arms secured to the bucket-sections, while the other may, for convenience, be called the "dumping-chain," since it is connected to the bucket-sections themselves and tends to open them when the hoisting-chain is slackened and the weight of the bucket comes upon such dumping-chain. Both chains pass over pulleys at or near the extremity of the boom and are thence guided to winding machinery on the hull.

The object of my invention is to so balance the weight of the bucket as to save a large amount of power ordinarily required in hoisting the loaded bucket, thus enabling me to use less power. In fact, the power required to hoist my bucket as now arranged will be found to be only slightly in excess of that required to close the sections in taking the load. I also reduce the strain on the hoisting machinery, and it follows, therefore, that I am enabled both to build and operate my dredger more economically than has before been possible with dredgers of this class, with a consequent reduction in the cost of dredging operations.

In the accompanying drawings, Figure 1 is a side elevation of a dredger embodying my invention. Fig. 2 is a plan view of the guide-pulleys at the top of the dredger-frame. Fig. 3 is a rear elevation of the same. Fig. 4 is a plan view of the dredger. Fig. 5 is an eleva-

tion of the counterbalance in its guides. Fig. 6 is a plan of the same with the guides in horizontal section.

A represents the hull of a dredger, B the swinging boom, and C the vertical framing, usually of A shape. The boom may be pivoted upon the forward deck, if preferred, but I prefer to bolt it to a casting at the base of a mast D, swiveled in the hull and also in the A-frame and having a turn-table E, the latter being pivoted with jaws E' E², which embrace the boom forward of the mast. This mast and turn-table and means for swinging the boom by communicating motion to the turn-table are well known and need no detailed description, they being shown in previous patents granted to me, such as No. 418,221, dated December 31, 1889, and No. 426,681, dated April 29, 1890.

F F' are the engines, and G G' are winding-drums on the engine-shaft provided with any suitable kind of clutch mechanism for rendering them active or idle, as required, and with proper brakes N and levers for operating the brakes and clutches, all of which are shown conventionally in Fig. 4.

One of the engines F and its drum G operates the closing-chain H. This chain is connected to the lever-arms I' of the bucket-sections I by shaft-chains 1, links 2, and a suspension-ring 3, Fig. 1.

The chain H passes over a pulley at the extremity of the boom, and is thence guided to the drum G by other pulleys 6 7 8, arranged at convenient points to give the chain its proper direction. When this chain is being wound upon its drum G, the bucket-sections are being closed and are taking their load. As ordinarily constructed, the bucket is hoisted by continuing the strain on this chain, such strain keeping the bucket closed while being elevated. In the present case such action is somewhat modified by the operation of devices yet to be described.

In dredgers of this class as heretofore constructed the chain which I have called the "dumping-chain" has been led to a similar winding-drum, so that when the hoisting-chain was slackened the strain on the dumping-chain would cause the bucket-sections to open. The dumping-chain in the present construction is not connected to the drum. Its

connection with the bucket remains, however, the same. This chain J is attached to a suspension-ring 9, from which short chains 10 extend to the four corners of the bucket-sections themselves. The chain J passes over a pulley 5 at the extremity of the boom, and thence is carried back to the top of the A-frame and between two horizontal guide-pulleys 11 12, placed at the top of such frame. This is to furnish a bearing for the chain at that point when the boom swings sidewise in either direction. The chain J continues to the stern of the boat, at which point is built a vertical guide-frame K for the counterbalance L. At the top of the guide-frame are two sheaves 13 and 14, over one of which the chain J passes, extends down, and is secured to the counterbalance. Another chain, M, is secured to the counterbalance, passes up and under a sheave 14, and thence is guided down under a sheave 15 and to the drum G'.

The counterbalance is a weight somewhat heavier than the bucket. Its guide-frame at the stern of the boat projects beyond the latter, so that the weight, in case its chain should break, will have a clear run into the water without doing any damage to the hull or machinery.

In describing the operation of the bucket I will suppose the parts to be in the position of Fig. 1, the bucket raised and open, the counterbalance at its lowest position, and the closing-chain slackened. The drum G' is put in gear with its engine and the chain M commences to wind upon the drum. This raises the weight and the bucket commences to descend, and as the weight of the empty bucket approximates that of the counterbalance, the engine, after the movement commences, has only to overcome the difference. The bucket falls upon the bottom and the drum G' is disengaged, but held by its brake, the counterbalance being now elevated. The strain is now put upon the hoisting-chain H, causing the bucket to close and take its load. The drum G' is then released, the gravity of the counterbalance is added to the closing strain on the chain H, and the bucket rises. The closing strain is exerted through the bucket-arms by a leverage so favorable that the tendency of the weight to open the bucket cannot be successful until the chain H is slackened. The strain on the chain H need, therefore, only be sufficient to close the bucket and keep it closed. The strain is maintained on the chain H until the boom has been swung to the proper point for discharging its contents, when the chain H is slackened and the weight of the bucket brought upon the chain J, which causes it to open. The boom is then swung back and the operation proceeds as before.

I do not limit myself to any particular means for swinging the boom, but have illustrated the mast and turn-table as being what I consider the most effective means and therefore preferable. Likewise, when I refer to "chains" as the means for suspending and

communicating motion to the bucket or counterbalance, it must be understood that ropes, cables, or other equivalent devices can be used instead.

In cases where hydraulic or light power is employed for putting the closing strain upon the bucket the latter can be counterbalanced in the same way as before described.

What I claim is—

1. In a dredging-machine, the combination of a bucket with a movable counterbalance, devices connecting said bucket and counterbalance together, mechanism for raising said counterbalance and independent mechanism for raising the bucket, substantially as described.

2. In a dredging-machine the combination of a bucket with a movable counterbalance, a chain connecting the bucket with the counterbalance, a winding-drum, and an independent chain extending from the drum to the counterbalance, for hoisting the latter, substantially as described.

3. In combination in a dredging-machine, the bucket a chain adapted to close and hoist the bucket, a counterbalance-weight approximating the weight of the bucket, a cord or chain connecting the counterbalance with the bucket and tending normally to open the same, said counterbalance aiding in the hoisting of the bucket and opening the same when the closing and hoisting chain is slackened, substantially as described.

4. In a dredging-machine, the combination of a bucket, with a movable counterbalance, a chain directly connecting the bucket with the counterbalance, a winding-drum, a chain extending from the drum to the counterbalance for hoisting the latter, and means for stopping the drum and holding the counterbalance in suspension, substantially as described.

5. In combination with the hull of a dredger, its swinging boom and suspended bucket, a guide-frame on the hull projecting beyond its edge, a counterbalance movable in said guide-frame, and mechanism connecting said counterbalance and bucket, substantially as described.

6. In a dredger and in combination with the laterally-swinging boom and the bucket suspended from said boom, an elevated structure on the hull having guide-pulleys attached thereto, a chain extending from the bucket between said pulleys a vertically-movable counterbalance to which said chain is directly connected, and winding machinery connected to said counterbalance, substantially as described.

In testimony whereof I have affixed my signature, in presence of two witnesses, this 18th day of December, 1895.

WILLIAM B. PLESS.

Witnesses:

L. W. SEELY,
FRANCES M. BURT.