

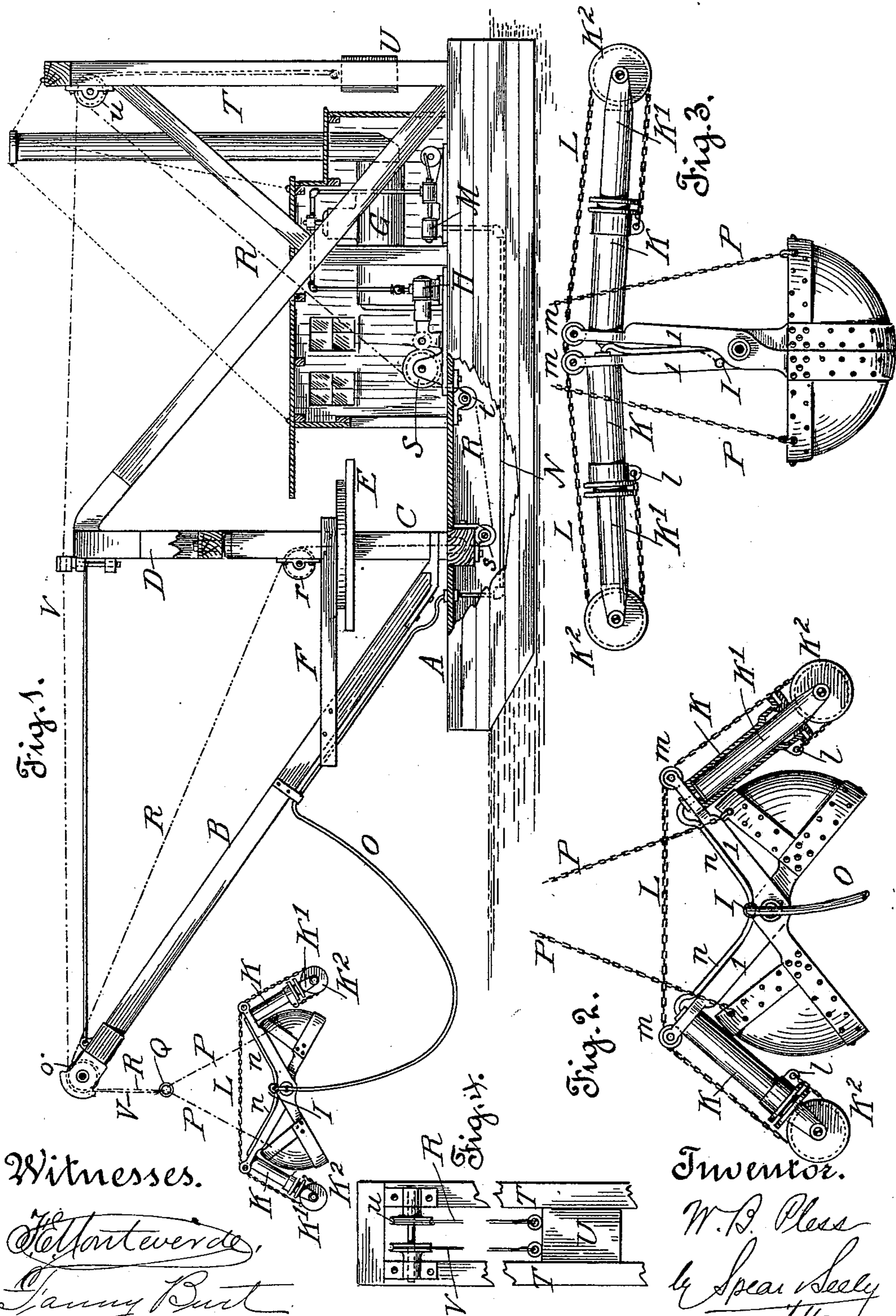
No. 644,457.

Patented Feb. 27, 1900.

W. B. PLESS.
DREDGER.

(Application filed May 26, 1899.)

(No Model.)



UNITED STATES PATENT OFFICE.

WILLIAM B. PLESS, OF SAN FRANCISCO, CALIFORNIA, ASSIGNOR OF ONE-HALF TO P. F. DUNDON, OF SAME PLACE.

DREDGER.

SPECIFICATION forming part of Letters Patent No. 644,457, dated February 27, 1900.

Application filed May 26, 1899. Serial No. 718,362. (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 Dredgers, of which the following is a specification.

My invention relates to dredging apparatus employing a bucket of the clam-shell type composed of hollow sections pivoted together. This bucket is suspended from a swinging boom or derrick upon the dredger-hull and is connected to winding machinery for hoisting and lowering it.

The invention relates more particularly to a new and improved system of operation for lowering and hoisting the bucket and also to the said system in connection with an improved means of closing the bucket to take its load; further, to the construction of said closing means and also to details of construction throughout the dredging apparatus, which need not be particularly referred to here, but which are fully hereinafter described and are shown in the accompanying drawings.

In the drawings, Figure 1 is a side elevation of a dredge embodying my invention, the bucket being shown as raised and open. Fig. 2 is an enlarged side elevation of the bucket opened. Fig. 3 is a similar elevation of the bucket closed. Fig. 4 is a front elevation of the guides for the counterbalance.

The dredge-hull A carries the swinging boom or derrick B, which can be pivoted to the forward deck, or, as shown, is secured to a casting bolted to the pivoted mast C just above the deck. The mast is stepped in bearings at top and bottom, the upper bearing being in the vertical frame D. This mast is provided with a turn-table E, by means of which a rope, chain, or cable (not shown) is used to swing the mast. The connection between the mast and the boom is made by means of jaws F, which project forwardly and bear upon the sides of the boom, so that the turning of the mast swings the boom to either side, as may be desired.

G represents a boiler, and H an engine carried by the hull, and S is a winding-drum adapted to be driven in either direction by

such engine. A single drum only is required for the operations of hoisting and lowering. It should be provided with a suitable brake.

In Letters Patent No. 572,769, granted to me December 8, 1896, I described a system of closing, hoisting, and lowering a bucket of this class, in which a counterbalance was employed to nearly balance the weight of the bucket, and thus aid in hoisting it. That construction required three chains, one for closing and hoisting, one for dumping the bucket, and a third for hoisting the counterbalance, and it also necessitated the use of two winding-drums separately operated.

In my present invention I have greatly simplified the system of operation, so far as hoisting, dumping, and counterbalancing are concerned. I control the hoisting and lowering operations with a single drum and with a single chain or cable.

For closing the bucket-sections I employ fluid-pressure applied in a novel and at the same time a simple way. Upon each of the pivoted yokes or bails, which connect the bucket-sections, I place a cylinder K, having a piston K', their position being approximately at right angles to the said arms. Each piston carries at its end a pulley K², and a single chain L extends between lugs l on the two cylinders, passing around the pulleys K² and over guide-pulleys m on the bucket-arms and connected by flexible tubing n to the cylinders K. I prefer to use pneumatic power in this operation, and therefore provide an air-compressor M on the hull, from which an air-pipe N extends and which is continued by a flexible hose O to a suitable coupling I, to which the tubes n are connected. I have shown this tubing as guided along the boom for a distance and then continued with a long slack to the bucket. From the open position of Fig. 2 the bucket attains the closed position of Fig. 3 by admitting pressure to both cylinders. Both pistons are forced outwardly, drawing upon the connecting-chain and compelling the sections to close, and it is evident that the peculiar location of the cylinders makes the leverage an exceedingly-effective one.

From the corners of the bucket-sections four short chains P extend to a suspension-

ring Q. From this ring a single chain R passes over a sheave *o* at the end of the boom and is guided to the winding-drum S. For guiding the chain I prefer to use a sheave *r* on the mast and any convenient number of guide-sheaves, such as *s* and *t*, on the hull. The chain is given a sufficient number of turns on the winding-drum S to give plenty of chain, according to the depth of dredging.

From the drum the chain R is guided up to the top of the counterbalance-frame T, preferably situated at or near the stern, and, passing over a sheave *u*, is connected to the counterbalance-weight U, which is guided in the frame T and which is approximately of the same weight as the empty bucket. By this chain R and the single drum S the entire operations of raising and lowering the bucket are accomplished.

To lower the bucket from the raised position of Fig. 1, the drum is operated in one direction, paying out chain R toward the bucket and at the same time causing it to hoist the counterbalance-weight. In the latter operation the weight of the bucket assists, so that very little power is required at the drum. When the bucket is on the bottom, the fluid-pressure is applied to close the sections, and the pressure or a part of it is maintained during the hoisting operation. Since the chains P are connected to the bucket-sections, the hoisting strain tends to open the sections, and hence it is necessary to keep enough fluid-pressure in the cylinders to counteract this tendency. The leverage through which the fluid-pressure is exerted is so favorable compared to that of the hoisting-chains that very little pressure is required to keep the bucket closed. In hoisting, the engine and drum are reversed and chain R is paid out toward the counterbalance and hauled in from the bucket. When the boom and bucket have been swung to the proper point of discharge, the fluid-pressure is cut off and the bucket opens and discharges automatically, since it is suspended by the chains P, which are connected to the bucket-sections themselves, and there is nothing to oppose the tendency to open.

As a matter of precaution I prefer to employ a second chain V, which extends from the same point of attachment as chain R—that is, the ring Q—to the counterbalance, passing over the top of framing and being suitably guided there. This chain has no operative function to perform and simply connects the bucket and counterbalance. Should the chain R break, the chain V would prevent the bucket and counterbalance from descending with a run. If the bucket were loaded at the time, it would descend, but slowly and without injury. Should it be empty and the weight of bucket and counterbalance were equal, the bucket would remain suspended by the chain V.

I do not limit myself to details of construction herein described and shown in the drawings, as I desire to avail myself of such modifications and equivalents as fall properly within the spirit of my invention.

Having thus described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. In a dredger, a hull, a swinging boom, a suspended bucket, a counterbalance, a winding-drum, a chain or cable connecting the bucket and counterbalance, and having intermediate turns around said drum, means for operating and reversing said drum, and a second chain or cable connecting said bucket and counterbalance, and having the same point of connection with the bucket as the first chain or cable.

2. In a dredger, the combination of the hull, a swinging boom, and a bucket, a vertically-movable counterbalance, a chain extending from the bucket to said counterbalance, and having intermediate turns around a winding-drum, and a second chain connecting the bucket and counterbalance, and guided overhead upon the dredger-frame.

3. In a dredger, a sectional bucket, chains connecting the bucket-sections to a suspension-ring, and tending to open said sections, a counterbalance, a hoisting-chain connecting said ring to winding machinery and to said counterbalance, and a second chain connecting said counterbalance to the said suspension-ring.

4. A dredge-bucket composed of two sections pivoted together, a cylinder and piston carried by each section, fluid-pressure connections to both cylinders, and a flexible connection extending between the two cylinders, and guided on both pistons.

5. A dredge-bucket composed of two sections pivoted together by means of bails or yokes, a cylinder and piston secured to each yoke, a guide on each piston, guides on said yokes, a chain or cable connecting the two cylinders and passing over said guides, and fluid-pressure connections to both cylinders, whereby the outward movement of said pistons causes the bucket-sections to close.

6. A dredge-bucket comprising two sections pivoted together by bails or yokes, power-cylinders carried by said yokes, and set approximately at right angles thereto, a piston in each cylinder carrying a guide-pulley, guide-pulleys on said yokes, a chain or cable extending from one cylinder over said guide-pulleys to the other cylinder, and fluid-pressure connections to both cylinders.

In testimony whereof I have affixed my signature, in presence of two witnesses, this 19th day of May, 1899.

WILLIAM B. PLESS.

Witnesses:

L. W. SEELY,
GEO. T. KNOX.