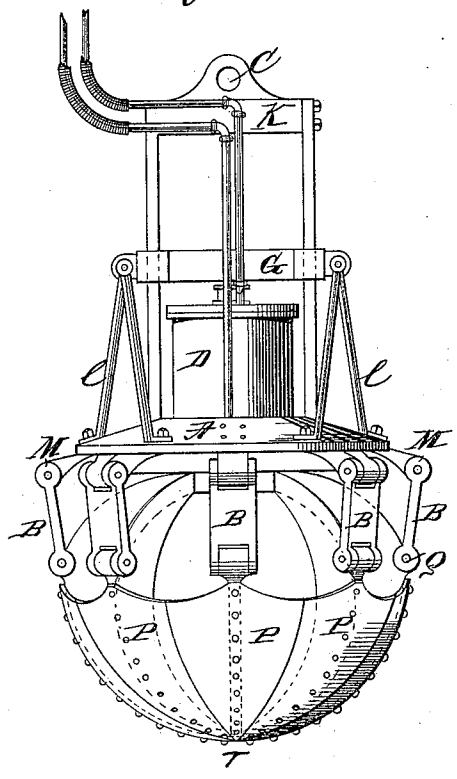
(No Model.) 2 Sheets—Sheet 1.

H. CLARK.

DREDGING AND GRAPPLING APPARATUS.

No. 326,627. Patented Sept. 22, 1885.

Fig. 1.



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(No Model.) 2 Sheets—Sheet 2.

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Fig. 4.

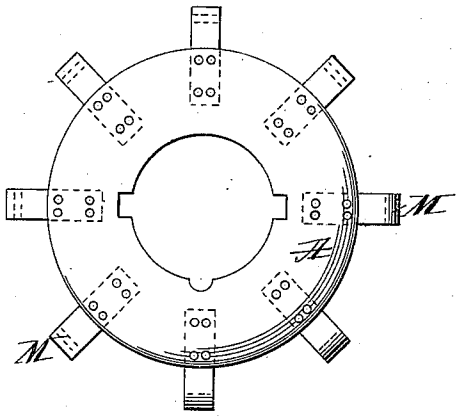


Fig. 2.

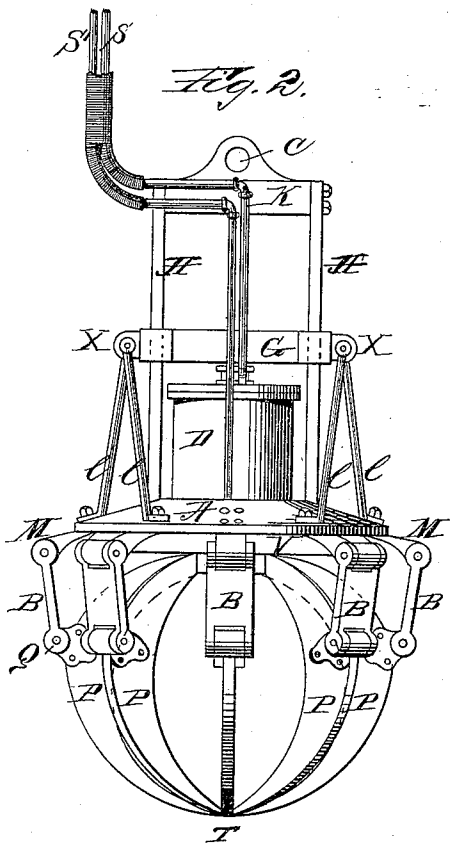
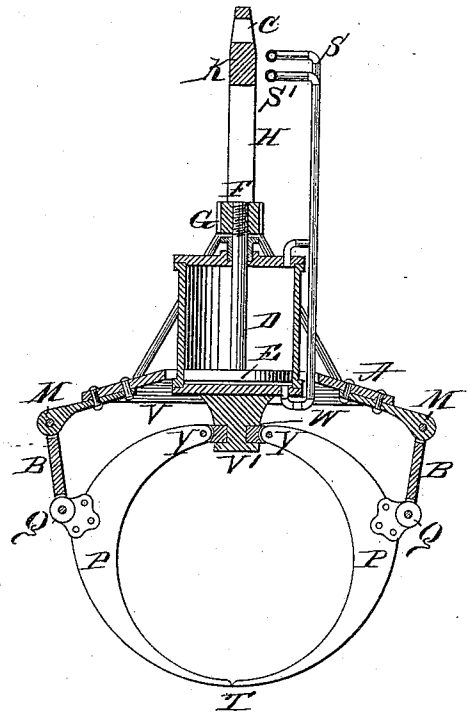


Fig. 3.



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UNITED STATES PATENT OFFICE.

HEMAN CLARK, OF NEW YORK, N. Y.

DREDGING AND GRAPPLING APPARATUS.

SPECIFICATION forming part of Letters Patent No. 326,627, dated September 22, 1885.

Application filed May 22, 1885. (No model.)

To all whom it may concern:

Be it known that I, HEMAN CLARK, of the city, county, and State of New York, have made an invention of a new Dredging and Grappling Apparatus; and I hereby declare that the following is a full, clear, and exact description of the same, reference being made to the accompanying drawings, making part thereof.

My dredging and grappling apparatus is designed to be used for excavating or removing various kinds of material by means of power applied to it through flexible connections for lowering and raising it and the load, and also, by means of power directly applied through flexible connections to the closing and opening of compound tongs or grapple, for seizing and releasing the load at any position desired by the operator within the reach of the apparatus.

In connection with my apparatus I employ hoisting and lowering machinery worked by power, and located at some convenient point to be controlled by the operator. Sometimes I place said hoisting machinery and the boiler and engine by which it is driven on a boat or car, and to the same attach or arrange pumps and reservoirs for forcing and retaining air under pressure. Sometimes I place a dynamo-machine for the generation of electricity in connection with the hoisting-engine. In the former case I carry flexible pipes from the air-reservoirs to the dredging apparatus in order to act on a piston, to be hereinafter described, for opening and closing the compound tongs. In the latter case I connect insulated wires in a complete metallic circuit to convey electricity to a small dynamo-machine connected directly to the apparatus, to furnish power for moving in any convenient and practicable way, the compound tongs for seizing and releasing the load of material.

My invention consists in certain combinations of mechanism specifically set forth at the end of this schedule.

In order that persons skilled in the art may understand, make, and use my apparatus, I will proceed to describe the way it has been constructed by me, referring to the drawings, in which the same parts are designated by the same letters in the different figures.

Figure 1 represents a side view of the dredging apparatus, the form of the tongs making the inclosure complete. Fig. 2 represents a side view of the same, with the tongs of the grapple forming a cage, but not inclosing the entire surface of the sphere or its contents. Fig. 3 represents a vertical section through the center of the piston and cylinder of the apparatus, the plane passing at right angles to the cross-head of the piston vertically through two opposite connecting-levers and in front of one pair of tongs. Fig. 4 represents a top view of the combining-ring A, showing the position of attachment of the connecting-levers B.

The apparatus is suspended from a chain or other flexible support by means of the eye C in the cross-bar K, to which latter is attached the vertical supporting and guiding rods H H. The rods H H are connected at their lower ends to the frame V, to which the cylinder D is bolted. The frame V is provided with a depending bar, V′, grooved with a circular channel, W, to receive a ring having radial horns with eyes, to each of which is pivoted the upper end of one of the tongs P. The cylinder D, attached to frame V, is supplied with two pipes, the pipe S connecting with the top and the pipe S′ with the bottom of the cylinder. These pipes extend to the air or water under pressure or other reservoir of force, and are separately or together provided with valves or cocks to enable the operator to admit a pressure of air or such like fluid alternately to the top and bottom of the cylinder, and also to exhaust or let it out alternately from the top and bottom of the cylinder, after the manner of an ordinary air or steam engine, the admission and exhaust of the pressure being under the control of the operator as to time and pressure.

In the cylinder is fitted a piston, E, to which is attached a piston rod, F, extending through packing and a gland to the cross-head G, and firmly connected, so that the cross-head sliding on the guides H H may raise and lower the combining-ring A, bolted to the rods *l l l l*, and the latter to the ends *x x* of the cross-head.

To the combining ring A are bolted, at equal distances apart, the radial bars M, eight in number in the present instance, and the bars M are provided at their projecting ends with eyes, to which the upper ends of the connecting-rods B are jointed. Each of the connecting-rods B is jointed to a radial bar, M, and also at the lower end to the tongs P by the eye Q. Each and all the tongs are pivoted to the ring on bar V′ by means of an eye, Y, in the upper end thereof, and the eyes in the ring are held in the groove or channel W in V′. The tongs P are so shaped and connected that their lower ends are united at T when closed together, and inclose substantially a spherical form, whether in whole or in part depending upon the horizontal circumferential width of the tongs.

When the dredge or grapple is to be operated, it is attached to a chain or rope wound around a hoisting-drum, and allowed to hang by its gravity. To the reservoir of compressed air the pipes S and S′ are connected, (if such is the force to be used,) and the cock or valve of the pipe S is turned to allow the air-pressure to pass from the reservoir through the pipe S to the lower end of the cylinder D and under the piston E. The exhaust cock or valve in S′ having been opened to the air, the pressure on the piston will cause it to rise and carry with it the cross-head G, the combining-ring A, and the connecting-rods B. As the latter are attached by pivots to the tongs P, they open at T, turning around the pivots X X until the piston reaches the upper head of the cylinder. In the meantime the compressed air has been filling the cylinder and the piston has forced the air above it through the pipe S′ to the atmosphere. The tongs may be opened before the apparatus has been lowered to its work or after it has been so lowered. If the former, the whole apparatus, with its flexible tubes, is now lowered, with the tongs open, to the bottom of a river-bed or other place to be used, and the apparatus is allowed to rest by gravity on the bottom. The air-pipe S′ is now connected with the pressure in the reservoir and the pipe S with the atmosphere by turning the cocks in the pipes to the proper position. The piston E will now be forced to descend and cause the plate A and the connecting-rods B to force the tongs inward, and at the same time to seize and inclose within their fixed grasp whatever material their points may spread over or weight may be able to gather up. The hoisting apparatus is now set to work and the apparatus and its inclosed load is raised, and by again reversing the pressure from the top to the bottom of the piston by a change of the cocks the load may be emptied in any desired deposit, the tongs having been opened by the air-pressure, as in the first instance.

Having now fully described my dredging and grappling apparatus, what I claim as my invention is—

The combination, in a power-dredging apparatus substantially as herein set forth, of the combining-ring connected to the power-piston, and by connecting-rods jointed to the outside of the grappling-tongs, the latter being centrally pivoted to the frame by which the power-cylinder is supported, with the flexible raising and lowering apparatus and flexible power-supplying pipes, all constructed and arranged to operate substantially as described.

HEMAN CLARK.

Witnesses:
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J. E. WARNER.