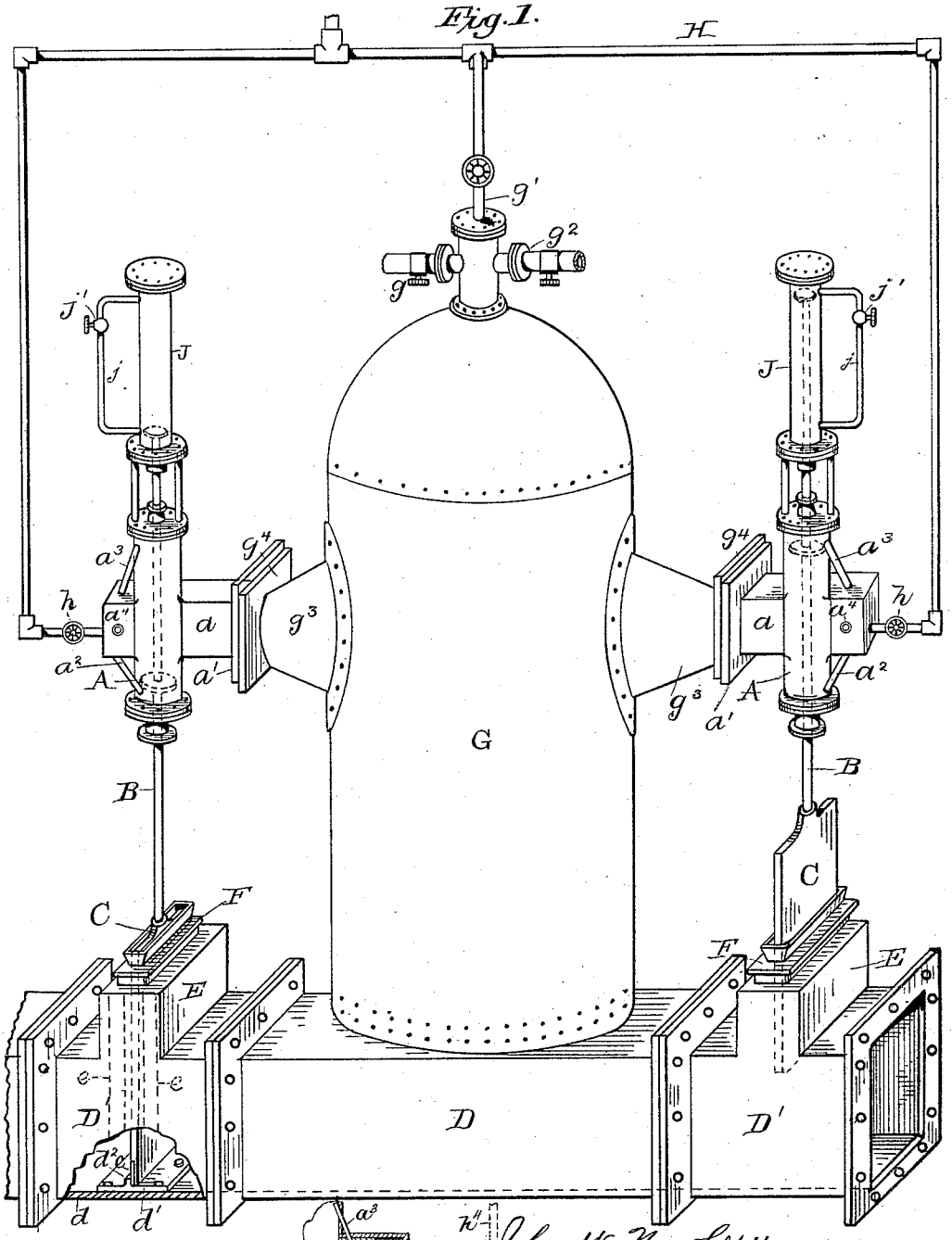
(No Model.)

J. W. NEWBERY.

STEAM VACUUM DREDGER.

No. 417,933. Patented Dec. 24, 1889.

Fig. 1.



WITNESSES:

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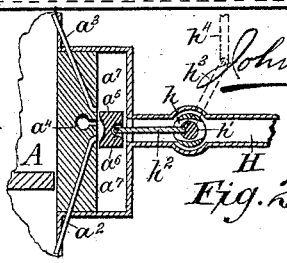

Fig. 2.

UNITED STATES PATENT OFFICE.

JOHN W. NEWBERY, OF BROOKLYN, NEW YORK.

STEAM VACUUM-DREDGER.

SPECIFICATION forming part of Letters Patent No. 417,933, dated December 24, 1889.

Application filed January 10, 1889. Serial No. 296,001. (No model.)

To all whom it may concern:

Be it known that I, JOHN W. NEWBERY, a citizen of the United States, and a resident of Brooklyn, county of Kings, and State of New York, have invented a new and useful Improvement in Steam Vacuum-Dredgers, of which the following is a specification.

My invention relates to that class of pumps primarily used for dredging and mining purposes, in which the pressure of the atmosphere is utilized to elevate gravel or any other solid material into a vacuum-chamber, the vacuum being formed in the pump by the condensation of steam, and in which the pressure of steam is afterward used to force the material out of the pump again; and it has for its object the provision of a device simple in construction, certain in operation, and efficient in practical use.

To attain the desired end my invention consists in the construction and arrangement of parts hereinafter fully set forth.

In the drawings which form a part of this specification, Figure 1 represents a perspective view with part broken away, and Fig. 2 a detail view of my invention.

Similar letters wherever they occur refer to corresponding parts in both views.

A A represent steam-cylinders provided with cylinder-heads and steam-chests, as shown, the steam-ports a^2 a^2 a^3 a^3, and exhaust-ports a^4 a^4, whereby the up or down movement of the pistons is regulated by the manipulation of the valves h h of the steam-pipe H. Each valve h is constructed so as to freely admit the steam through the pipe H into the chamber a^7 at all times; but by the manipulation thereof, as by means of the dotted levers h^3 h^4, connected with the valve-stem h', the bar h^2 (one end of which is rigidly attached to the valve-stem h', and the outer extremity of which is pivoted at a^6 to the valve a^5 within the chamber a^7) is moved so as to admit the steam passing from the pipe H into the chamber a^7 either into the port a^3 or the port a^2, according to the position of the valve a^5, the steam being allowed, after performing its work in moving the piston within the cylinder A, to escape through the exhaust a^4, in the manner well known in the art.

At the lower extremities of the piston-rods B B are gate-valves C C. These vertical gate-valves are constructed with parallel sides and work in grooves *e e*, and are planed or trued so as to slide smoothly through the stuffing-boxes E E, the tops of which are provided with glands F F, the upper part of the same being formed in funnel shape in order to contain water. The object of allowing water to drip in the funnel-shaped boxes is to make the valves tight, as water will then be drawn in instead of air, and the frequent renewal of packing will be avoided and the apparatus enabled to pump sand and stones and grit of all kinds.

The grooves *e e* are preferably formed in castings, which may be bolted to the sides of the channel-way of the valve-chambers D′ D′ and serve to guide the gate-valves C C in their stroke up and down. The gate-valves C C also conform in size to the general shape of the channel-way of the valve-chambers D′ D′, and are provided with wearing-strips *c c* on the edge of the valve, which may be unbolted or unriveted therefrom and replaced with new ones whenever desired, the object of the same being to take the shock of the gate-valves when they land, and also to keep the corners from wearing out.

The bottom *d d* of the channel-way of the valve-chambers D′ D′ is provided with strips or sills *d′ d′*, placed beneath the gates and adapted to receive the jar of the gate-valves C C when they descend, and also by means of the lips d^2 d^2 to assist, in connection with the strips *c c* of the gate-valves C C, in making tight joints when the gate-valves are closed. The sills *d′ d′* may be bolted to the bottom *d d* of the channel-way of the valve-chambers D′ D′.

The upper ends of the piston-rods B B are provided with heads which work in cylindrical dash-pots J J, the two extremities of each of which are connected by pipes *j j*, in which are placed valves *j′ j′*. The dash-pots J contain water, and the violent concussion in opening either of the gate-valves C C is prevented by means of the pressure upon the water in forcing the same from one end of the cylinder to the other through the pipe *j*, a water cushion thus being formed. The flow of the water may be regulated by means of the valves *j′*.

The valve-chambers D′ D′, integral with or

attached by rivets to the base D, are placed at each end of the same, which is also provided with an interior channel-way conforming to those of the valve-chambers D′ D′, and which is surmounted by a vacuum-cylinder G, which may also be cast with or bolted on the same. The steam-cylinders A A are also attached to the sides of the vacuum-cylinder G by means of the adjustable brackets g^3 a. The vacuum-cylinder G is also provided with water-pipe valve g, steam-pipe valve g', and exhaust-valve g^2. The steam-pipe H serves to supply steam to the vacuum-cylinder G and to the steam-cylinders A A.

The operation of parts is as follows: The left-hand suction gate-valve C being opened and submerged and the right-hand discharge gate-valve C being closed, or in positions reverse to that shown in the drawings, a vacuum is formed in the cylinder G by first filling the same with steam and then condensing the same by the admission of cold water. The submerged end being placed below the level of the ground, or leading into a pit filled with gravel or other solid material, the pressure of the atmosphere will force the gravel or other solid material through the suction-pipe and valve-chamber D′ into the cylinder G. When the vacuum is filled, steam is again let into the cylinder G through the valve g', and simultaneously the left-hand suction gate-valve C is closed, and the right-hand discharge gate-valve C is opened, the parts now being in the positions represented in the drawings, and the material is thereby discharged through the valve-chamber D′ and forced to an elevation of fifty to one hundred feet above the level of the ground, thus making an artificial grade or dump for the débris, after which discharge the parts are reversed, and the operation is again gone through with.

My invention may be utilized for other purposes than those mentioned, being applicable wherever atmospheric pressure is used for moving or elevating any solid material.

The controlling-valves h h g g' g^2 may be operated manually independently or in pairs, or they may be operated automatically by the use of a ball or float placed within the cylinder G in the manner well known in the art and adapted to operate the suction gate-valve when the cylinder is empty and to operate the discharge gate-valve when the cylinder is partially filled with water.

As it is evident that many slight changes in the construction and relative arrangement of parts might be resorted to without departing from the spirit and scope of my invention, I would have it understood that I do not restrict myself to the particular construction and arrangement of parts shown and described; but

What I claim as new, and desire to secure by Letters Patent, is—

1. The combination, with the vertical valve-gates C C, of the operating steam-cylinders A A and the vacuum-cylinder G, provided with the controlling-valves h h g g', substantially as and for the uses and purpose set forth.

2. In a condenser-pump, the combination, with the vacuum-cylinder G, the vertical suction-pipe gate-valve C, and with the vertical discharge-pipe gate-valve C, of the base D and valve chambers D′ D′, whereby a continuous channel way is provided, substantially as described.

3. The combination, with the valve-gates C C, of the stuffing-boxes E E and the glands F F, provided with funnel-shaped boxes, as and for the uses and purpose set forth.

4. The combination, with the valve-gates C C and with the valve-chambers D′ D′, of the strips c c and sills d' d', substantially as described.

5. The combination, with the valve-gates C C, the valve-chambers D′ D′, and steam-cylinders A A, of the dash-pots J J and pipes j j, substantially as described.

In testimony that I claim the foregoing as my invention I have signed my name, in presence of two witnesses, this 5th day of January, 1889.

JOHN W. NEWBERY.

Witnesses:
J. O. FOWLER, Jr.,
ABM. I. ELKUS.