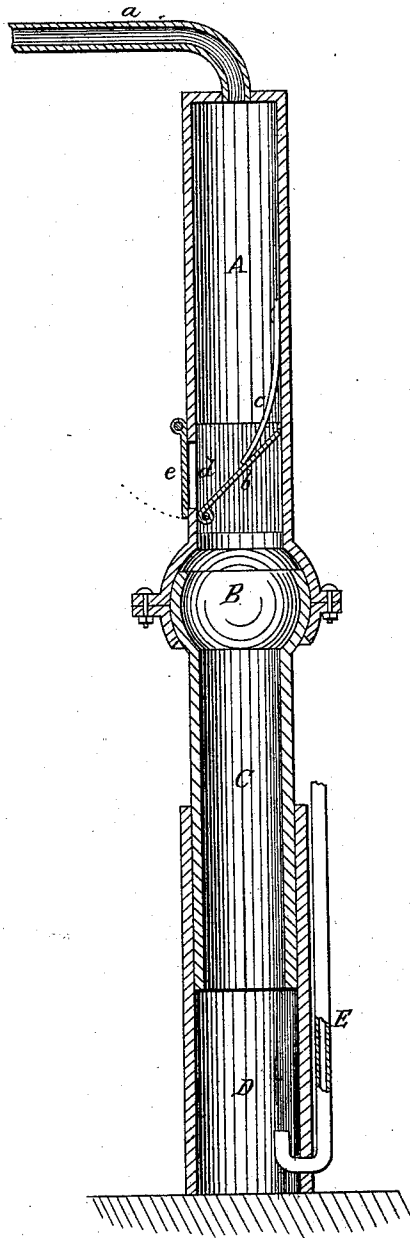


W. P. LEWIS.
Pneumatic Dredging Tube.

No. 216,686.

Patented June 17, 1879.



WITNESSES:

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WILLIAM P. LEWIS, OF OROVILLE, CALIFORNIA.

IMPROVEMENT IN PNEUMATIC DREDGING-TUBES.

Specification forming part of Letters Patent No. **216,686**, dated June 17, 1879; application filed December 12, 1878.

To all whom it may concern:

Be it known that I, WILLIAM P. LEWIS, of Oroville, in the county of Butte and State of California, have invented a new and Improved Pneumatic Dredging-Tube, of which the following is a specification.

The object of this invention is to provide an improved dredging apparatus for clearing out rivers and harbors, and for mining and other purposes.

It consists in raising the solid matter by creating a vacuum in the tube, and expelling it from the vacuum-chamber by the assistance of the direct action of steam; and the apparatus for doing this is composed of a tube with steam and water supply pipe at the top, and inlet and outlet valves at the bottom, the said pipe being connected by a ball-and-socket joint with a second pipe, and this in turn is telescoped in a third pipe that bears upon the bottom to be dredged, and in the lower part of this pipe is a water-pipe connected with a steam-pump, which, by injecting a stream of water upon the solid material, loosens it, so that it is readily forced up into the dredging-tube.

In the accompanying drawing a vertical longitudinal section of my improvement is shown.

Similar letters of reference indicate corresponding parts.

Referring to the drawing, A represents the tube forming the vacuum-chamber. The upper end is closed and provided with a steam and water pipe, *a*. The lower end of the chamber is provided with a valve, *b*, hinged at one end to the side of the chamber, while the free end lies against the opposite side in an inclined position, and is controlled by a flat spring, *c*, fixed at one end to the wall of the chamber, while the free end bears upon the upper side of the valve, and serves to keep it down, thus closing the bottom of the chamber.

In line with valve *b*, and opposite its upper side, is an opening, *d*, in the wall of the chamber, closed by a vertically-hung door, *e*, which is designed to be lined with india-rubber, forming a packing, so that it will cover tightly the opening *d*, making it as nearly as possible air-tight.

The end of tube A is connected, by a ball-and-socket joint, B, with another tube, C, and this in turn is telescoped in the tube D, which slides freely up and down on the former; it being designed to rest on the bottom or place to be dredged, and to accommodate itself to the unevenness of the surface on which it rests.

E represents a hydraulic pipe leading from a steam-pump to the lower end of pipe D and into the interior thereof. By means of this pump water is forced through pipe E against the solid matter to be dredged, loosening it, so that it can be readily carried upward by the pressure exerted upon the water.

The operation of my improvement is as follows: Tube or vacuum-chamber A is fixed to the bow of the dredging-boat, with tubes C and D hanging downward. Pipe *a* is connected with a steam and water supply, and hydraulic pipe E with a steam-pump. Steam is turned into chamber A through pipe *a*, and when it is full is cut off and water turned in sufficient to condense the steam. This creates a vacuum, and the solid material under tube D is forced up through pipes D and C, and, opening valve *b*, enters the chamber A, filling the same, and by its weight closing the valve. Steam is again turned into chamber A, and the material therein pressing against door *e* forces it open, and the material is delivered out of the same, the pressure of the steam on top accelerating its delivery. As soon as the chamber is empty the door *e* closes, and the steam again filling the chamber is condensed, and the operation is repeated as before.

In practice there can be two vacuum-chambers, A, with valves and supply-pipes working alternately, so that when one is expelling the material from its chamber the other is condensing and forming a vacuum. Thus a continuous discharge can be maintained.

The water forced through pipe E, being projected with great force against the places to be dredged, loosens the material and cuts it out, so that it yields readily to the pressure of the water.

There may be separate pipes at the top of vacuum-chamber A for the steam and water, if desired.

Having thus described my invention, I

claim as new and desire to secure by Letters Patent—

1. As an improvement in pneumatic dredges, the vacuum-chamber A, in combination with steam and water supply pipe *a*, valves *b e*, and tubes C D, substantially as described.

2. As an improvement in pneumatic dredges, the combination and arrangement of the tube A, forming a vacuum-chamber, provided with pipe *a*, for supplying steam and water, and the valves *b e*, for regulating the admission of the

material to the chamber and delivering the same, the tube C, connected with tube A by ball-and-socket joint B, and tube D, telescoped on tube C, and provided with hydraulic pipe E, connected with a steam-pump, substantially as and for the purpose described.

WILLIAM PERRY LEWIS.

Witnesses:

LEON D. FREER,
JOHN J. SMITH.