(No Model.) 2 Sheets—Sheet 1.

J. E. KAUSER.

DREDGING APPARATUS.

No. 491,843. Patented Feb. 14, 1893.

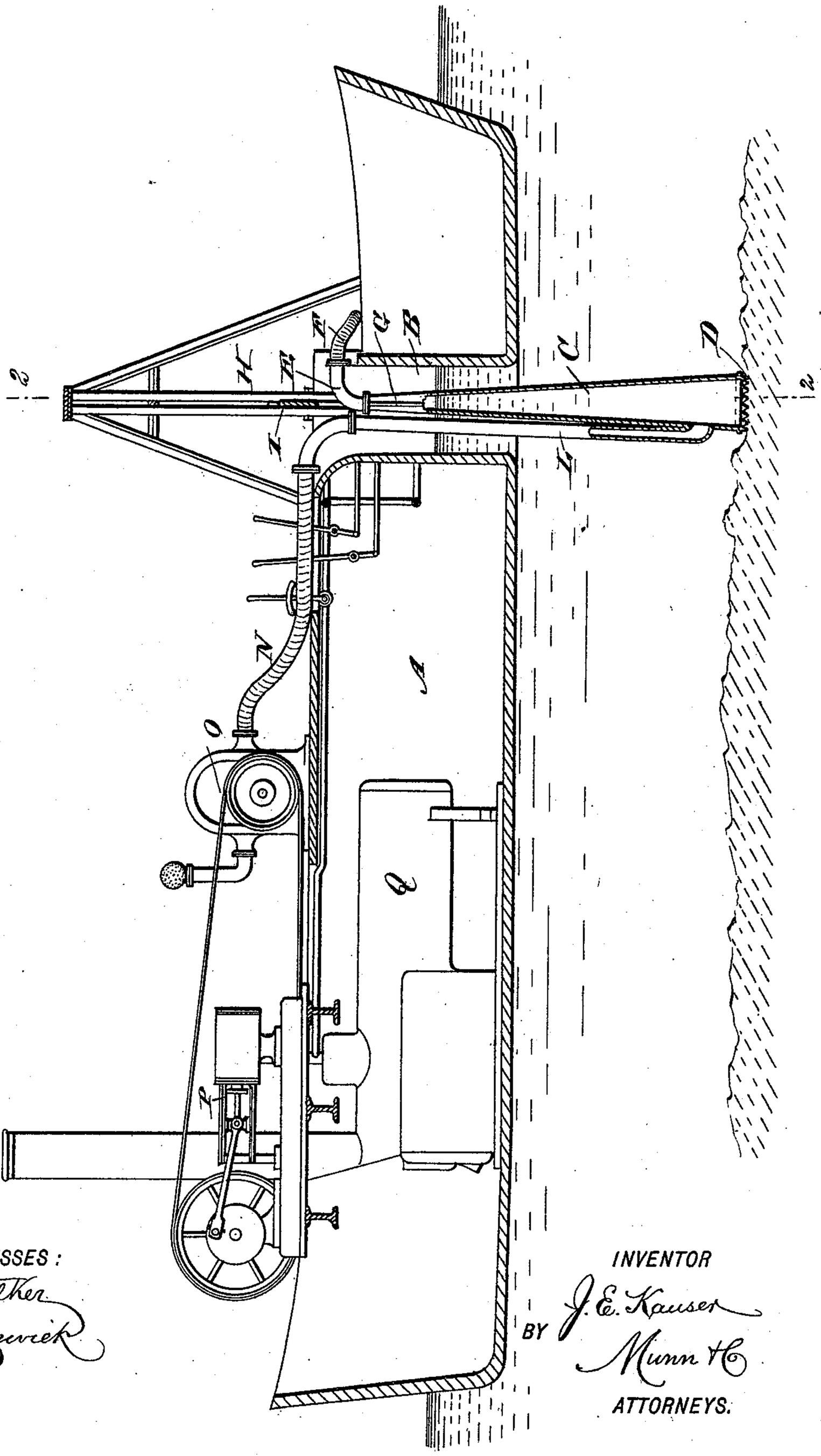

FIG 1

WITNESSES:
H. Walker
C. Sedgwick

INVENTOR
J. E. Kauser
BY Munn & Co
ATTORNEYS.

(No Model.) 2 Sheets—Sheet 2.

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Fig 2

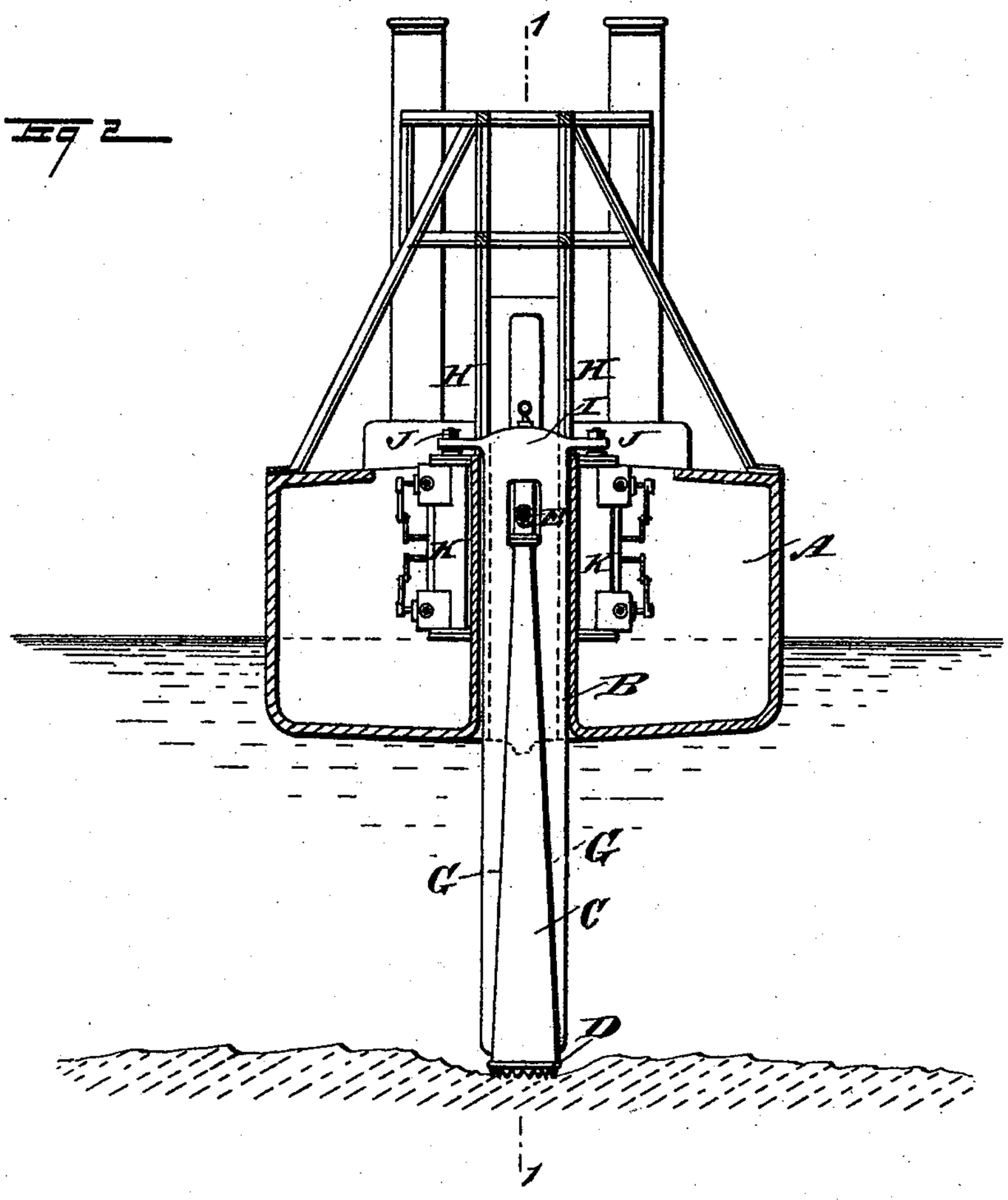
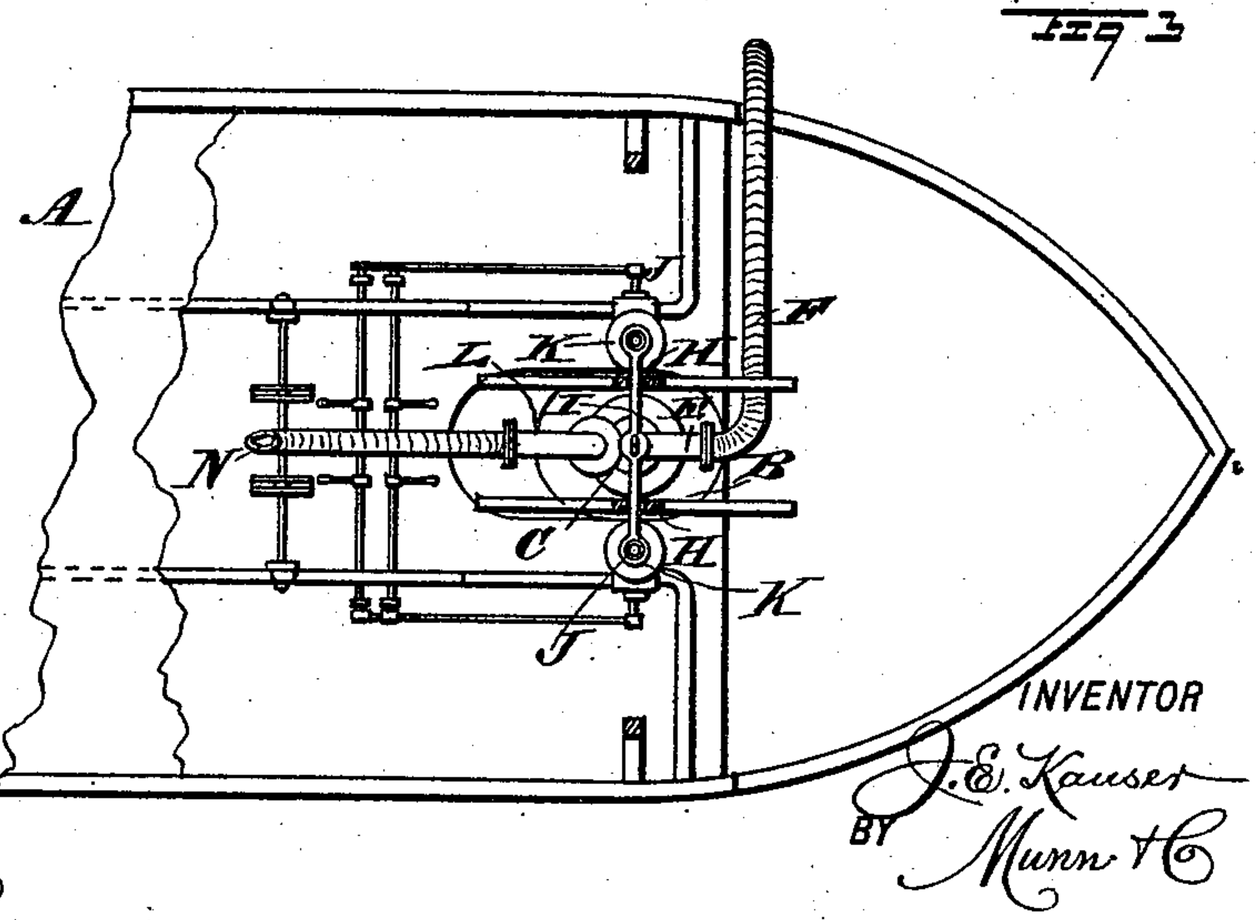


Fig 3



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ATTORNEYS.

UNITED STATES PATENT OFFICE.

JOSEPH E. KAUSER, OF PENSACOLA, FLORIDA.

DREDGING APPARATUS.

SPECIFICATION forming part of Letters Patent No. 491,843, dated February 14, 1893.

Application filed April 9, 1892. Serial No. 428,518. (No model.)

To all whom it may concern:

Be it known that I, JOSEPH E. KAUSER, of Pensacola, in the county of Escambia and State of Florida, have invented a new and Improved Dredging Apparatus, of which the following is a full, clear, and exact description.

The object of the invention is to provide a new and improved dredging apparatus which is simple and durable in construction, very effective in operation and arranged to facilitate the removal of subaqueous matter at a low cost and without danger of injury to the working machinery.

The invention consists principally of a conical discharge or ejector pipe having a reciprocating motion, the lower base end of the said pipe being immersed while at work and the upper end forming a discharge.

The invention further consists of a blast supply pipe connected with a suitable source of air supply and discharging into the reciprocating discharge or ejector pipe at or near the base thereof.

The invention also consists of certain parts and details and combinations of the same, as will be hereinafter described and then pointed out in the claims.

Reference is to be had to the accompanying drawings forming a part of this specification, in which similar letters of reference indicate corresponding parts in all the figures.

Figure 1 is a longitudinal sectional elevation of the improvement on the line 1—1 of Fig. 2; Fig. 2 is a transverse section of the same on the line 2—2 of Fig. 1; and Fig. 3 is a plan view of the improvement.

The improved dredging apparatus is mounted on the dredging boat A, formed with one or a series of wells B, arranged vertically and extending through the bottom of the boat to the top of the same, as plainly shown in Figs. 1 and 2. In each of the wells B is held a discharge or ejector pipe C, made slightly conical and constructed of sheet iron, steel or other material, the lower base end of the pipe being provided with a serrated edge D, for breaking up the hard material on the bottom of the river or other place to be dredged. The upper contracted end of the discharge or ejector pipe C is provided with an elbow E, connected with a discharge hose F, leading to a barge or other vessel stationed to receive the dredged matter, or leading to a receptacle provided in the hold of the boat A. I do not limit myself to the conical shape of the discharge pipe C, as the same may be made in trumpet or other form. The lower end, however, must be somewhat larger than the upper end.

The discharge or ejector pipe C has a reciprocating motion in such a manner, however, that the lower base end is always immersed in the water during the time the pipe is reciprocating. In order to impart a reciprocating motion to the said pipe C, the latter is provided with transversely-extending guide ribs G, fitted to slide in bearings H, formed partly in the sides of the well B, and also on separate frame-work erected in the boat A. The upper end of the pipe C is also provided with a transversely-extending cross head I, connected at its ends with pistons J, of steam engines K, located in the boat A at opposite sides of the well B.

By actuating the engines K, a reciprocating motion is given to the cross head I and consequently to the discharge or ejector pipe C to move the same up and down with the lower or base end immersed in the water during the time the dredging apparatus is at work. When not at work, the pipe C is raised so that the lower or base end D is about on a level with the bottom of the boat A.

It is understood that according to the well-known physical laws, the up and down motion of the conical discharge or ejector pipe C causes the matter entering the base end D of the pipe C to be forced upward in the pipe and to be discharged through the elbow E into the hose F. The matter is thus discharged through the said ejector pipe, the elbow E, and hose F at a velocity varying in direct ratio according to the velocity of the reciprocating motion given to the pipe C. The pipe C strikes with its serrated edge D the bed or bottom of the river, channel or other place to be dredged; and as its strokes succeed each other at regular intervals and under pressure, they loosen and disaggregate the bottom or bed, while the upward current through the pipe C, the elbow E and the hose F, produced

by the up and down motion, brings up and discharges the loosened material in more or less solid lumps and masses mixed with water.

The pressure on the ejector or discharge pipe C is increased or diminished according to the toughness of the soil worked upon. This variable pressure may be brought about by the pipe's own weight, which is accordingly increased or diminished, or in case of motive power arrangement, by a blow off arrangement from the cylinder or steam cylinders, imparting a reciprocating motion to the pipe C, or it may be brought about by a friction gear or by other mechanical means.

In order to avoid injury to any part of the machinery by the pipe C striking a rock or any other solid matter on the bottom or bed of the channel, the maximum of the pressure in question is to be calculated with a view to its possible contingency. It is understood that the dredging apparatus may be fitted out with pipes C of different length to suit the different depths at which dredging is to be performed.

In order to increase the velocity of the matter passing up through the pipe C, a blast pipe L is provided, connected with and forming part of the pipe C, the said blast pipe being arranged on the outside of the pipe C and discharging into the pipe C at or near the base end thereof, as plainly shown in Fig. 1. The upper end of the blast pipe L is connected by a flexible hose N, with a blower O, of any approved construction and operated from an engine P, located in the boat A or from other convenient and suitable source. The boiler Q, located in the boat A serves to furnish the necessary steam for the engines P and K.

Now it will be seen that in addition to the working of the apparatus as above described, the force of the blast passing through the pipe L into the lower end of the discharge pipe C, causes the matter already on an upward movement in the said pipe, to be moved with great speed so that the efficiency and capacity of the dredging apparatus are considerably increased.

Two physical agents, governed in their compound action as per herein described combinations, constitute the general compound function of this dredging apparatus. They are: First.—The hydro-dynamic force given by the reciprocating motion of a conical pipe with its base end immersed in some liquid, producing in the said conical pipe an upward force current in the direction of the cone's axis. Second.—The pneumatic pressure on the liquid applied near the starting point of the said current to the object of accelerating its velocity by entering into action with its buoyancy and also by rendering the specific gravity of the water column inside the pipe smaller than that outside of it. The actual energy of discharge produced by this combination is such as has not heretofore been attained by any known combination of appliances in dredging apparatus worked by means of physical agencies. It is understood that the dredged matter only comes in contact with the discharge pipe C and the outlet therefrom, so that all the working parts of the apparatus are kept completely out of contact with dredged matter in motion.

I do not limit myself to a vertical up and down motion of the discharge pipe C, as the latter may be inclined in either direction if desired, it being, however, understood that while in motion, the base end of the pipe must be immersed in the water.

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

1. A dredging apparatus provided with a conical discharge or ejector pipe having a reciprocating motion, the lower base end of the said pipe being immersed, while the pipe is at work, and the upper contracted end connected with the discharge, substantially as shown and described.

2. A dredging apparatus provided with a discharge pipe or ejector having a reciprocating motion and having its lower or base end larger than the upper end, which forms a discharge, and a blast pipe connected and moving with the said discharge or ejector pipe, the blast pipe being connected with a suitable source of air supply and discharging into the said discharge pipe at or near the base end thereof, substantially as shown and described.

3. A dredging apparatus provided with a conical discharge or ejector pipe having a reciprocating motion and having its lower or base end serrated and the upper end contracted, forming a discharge, substantially as shown and described.

4. In a dredging apparatus, the combination, with a conical discharge or ejector pipe having its base end serrated and provided at its contracted upper end with a discharge or outlet, of means, substantially as described, for imparting a reciprocating motion to the said ejector pipe to force the lower serrated base end into contact with the bed or bottom of the river or channel to be dredged, substantially as shown and described.

JOSEPH E. KAUSER.

Witnesses:
W. J. PEMBERTON,
SAMUEL PAYNE.