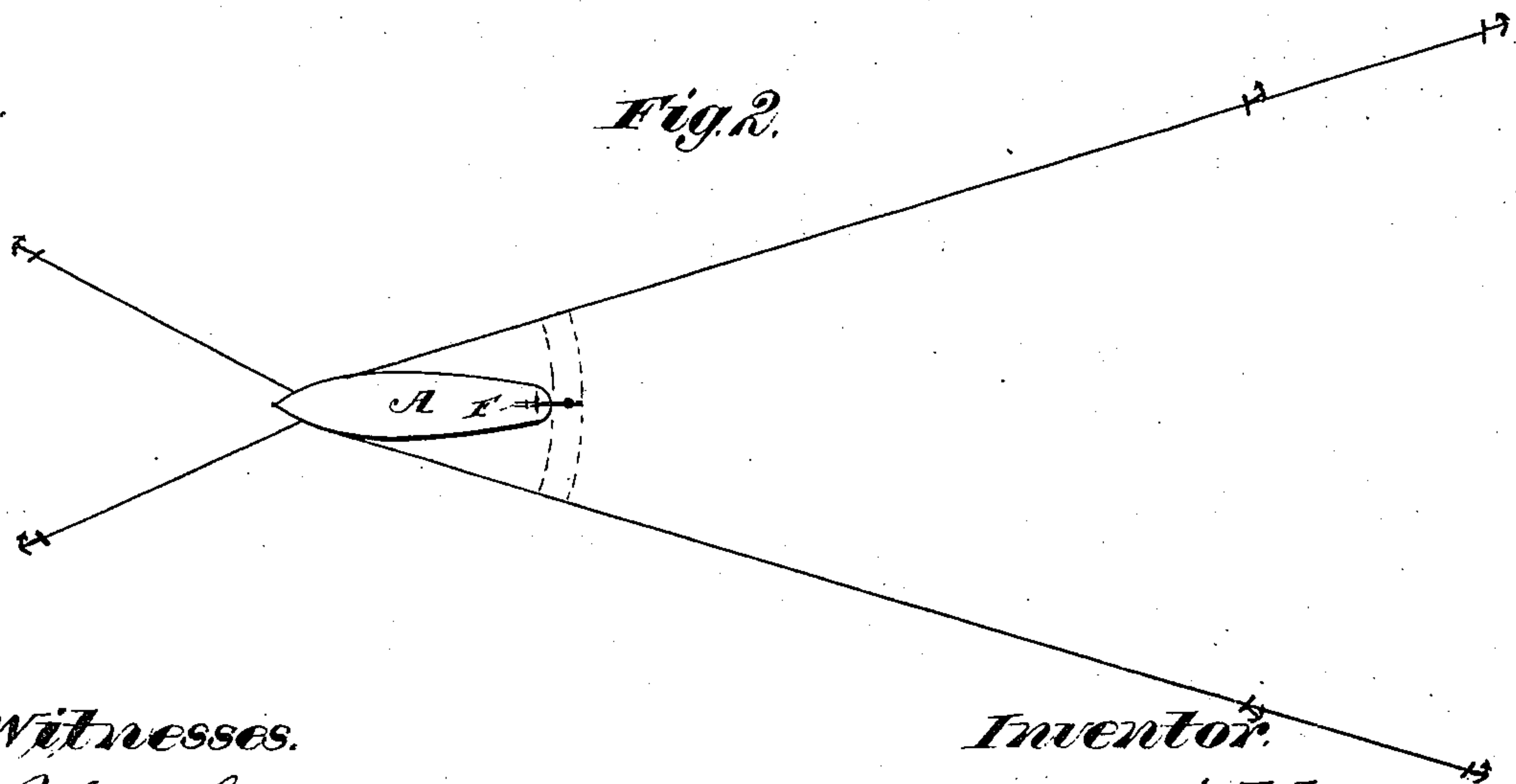
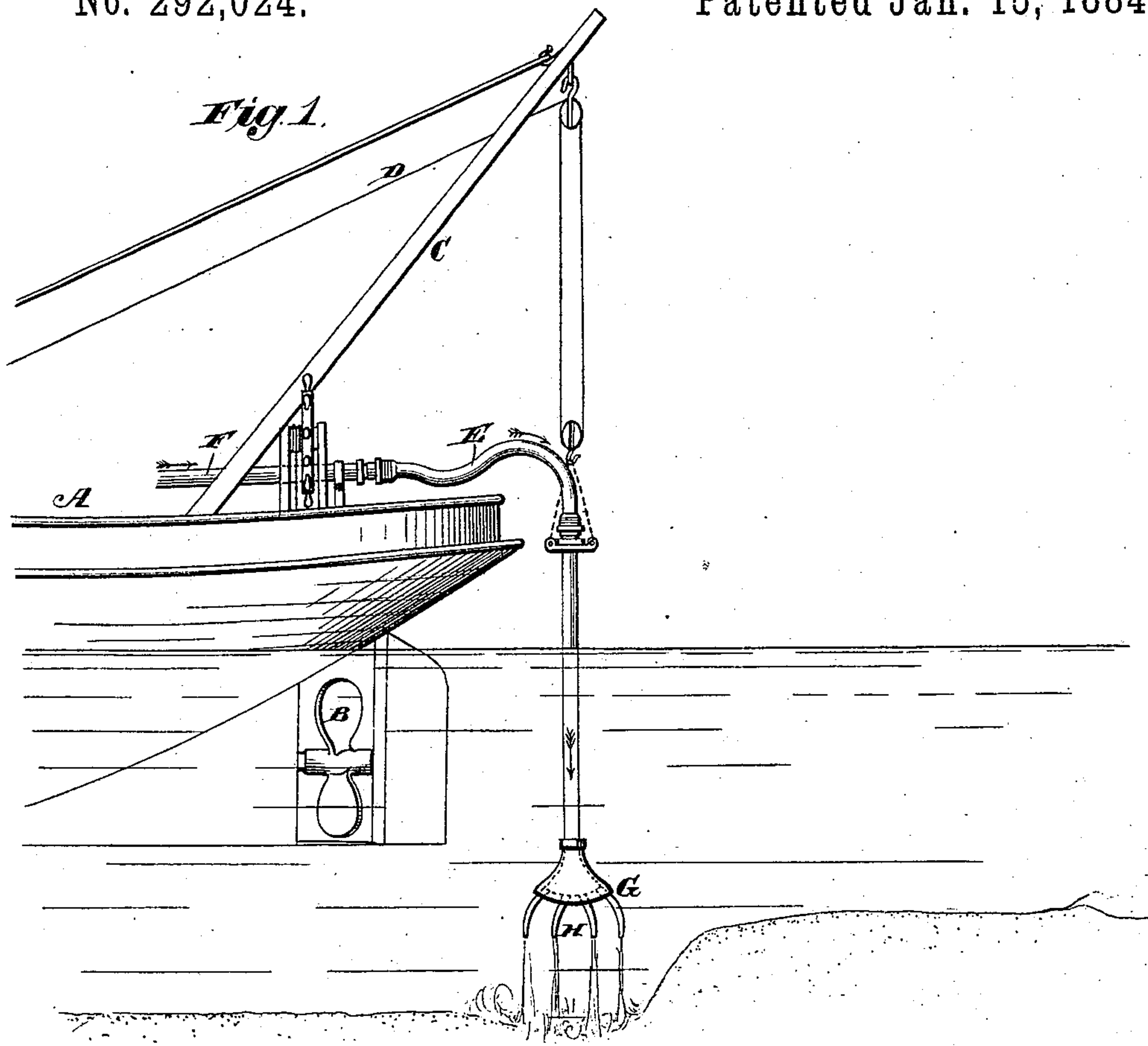


(No Model.)

S. M. MANSFIELD.
HYDRAULIC EXCAVATING MACHINE.

No. 292,024.

Patented Jan. 15, 1884.



Witnesses.

Robert Corbett,
J. A. Rutherford.

Inventor.

S. M. Mansfield,
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Atty.

UNITED STATES PATENT OFFICE,

SAMUEL M. MANSFIELD, OF GALVESTON, TEXAS.

HYDRAULIC EXCAVATING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 292,024, dated January 15, 1884.

Application filed July 9, 1883. (No model.)

To all whom it may concern:

Be it known that I, SAMUEL M. MANSFIELD, a citizen of the United States, residing at Galveston, in the county of Galveston and State of Texas, have invented a new and useful Hydraulic Excavating-Machine, of which the following is a specification.

My invention relates to a machine by which materials are removed from the bottom of ship-channels, rivers, and harbors, and the navigable depth of water increased thereby, and channels of deep water made in shoal places for removal of wrecks and stranded property; and it consists in combining a submerged propeller-wheel with a water-jet tube having a flexible connection with the supply-pipe, so as to permit the water-jet tube to rise and fall in the direction of its length, and also move laterally, whereby the tube will, when it meets an obstruction, yield sufficiently to prevent breaking, jarring, or injuring any of the parts, the water-jet tube and propeller bearing such relative positions to each other that the sand, mud, or obstructions disengaged by the jet will be held in suspension by the current induced by the propeller till taken and carried off by the natural current.

Figure 1 of the drawings is a side elevation illustrating my invention; Fig. 2, a plan view illustrating the mode of anchoring the vessel.

In the drawings, the letter A indicates the propeller, having at its stern an ordinary propeller-wheel, B, arranged in the usual way. To the stern of the propeller there is secured in any suitable manner a shear, C, across the upper end of which is passed the rope D, which will be connected at one end to a suitable windlass on the propeller, and at the other end will be connected with a suitable block-and-tackle device, D, which is connected to the shear and to the water-jet tube, so that the latter may be raised or lowered to any extent necessary. The water-jet tube is preferably made of iron, but may be of any other suitable material, of six inch or other diameter, and at its upper end it is connected to a flexible pipe, connection, or joint, E, made of rubber or other suitable material, which joint, at its other end, is connected to a six-inch or other sized supply-pipe, F, preferably made of iron, but which may be made of other

suitable material. This pipe will be supplied with water for the jet by means of a steam-pump of any well-known suitable construction, applied in any of the well-known ways. The lower end of the jet is preferably provided with a rose or nozzle, G, which may be provided with any desired number of nipple-jets H. I have used to good advantage four nipples of one and one-half inch bore placed two feet apart, by which I obtained eight feet sweep for the water-jet; but it is obvious that any desired number of nipples may be used, and that they may be placed at such distances apart as will produce the best results. I prefer to suspend the jet-tube, so that it will be vertical, as I consider that the best results are obtained therefrom, and a few feet back of the propeller-wheel, as illustrated; but I do not wish to confine myself to such vertical suspension. The propeller is anchored by cables or lines running aft from the bow of the boat, on both sides thereof, for a distance, say, of one thousand feet, each of which lines is preferably provided with two anchors, connected thereto at distances apart, as represented in the drawings. I also pass lines or cables forward from the bow of the propeller and connect them to anchors, as illustrated. By anchoring the propeller as stated, it is pivoted, as it were, at the bow, and by means of the rudder at the stern it may be made to travel on an arc whose chord is the desired width of channel, so that the water-jet and propeller-wheel will be caused to operate in the desired width of channel.

In operation the propeller-wheel and pump will be put into motion, and the water passing through the supply-pipe to the end of the water-jet tube strikes against the obstruction to be removed and detaches it and separates it into small particles, which are kept in suspension by the current induced or accelerated by the propeller-wheel until taken and carried off by the natural current. As the obstruction is removed by degrees, the propeller is gradually moved aft by taking in the stern lines and feeding out the forward lines, such feeding and taking in of the lines being effected in any of the well-known ways, which do not constitute my invention. By suspending the jet-tube, as described, and providing

it with the flexible connection it may be elevated and lowered to the depth desired, and when it strikes an obstruction, it will yield to the pressure without jarring or injuring any of the parts, and by combining the submerged propeller-wheel with the jet-tube, as described, the two parts are brought into such relation to each other that the one exerts such an influence upon the other that by the combined action of the two the obstructions are most effectually removed.

The hydraulic excavating-machine thus produced, besides being simple in construction and most effective in operation, is specially adapted for use in waters where the sea is rough, and where there are opposing currents, and where the use of other constructions is impracticable.

Having thus described my invention, what I claim is—

1. The combination, with a propeller-wheel, of a water-jet tube and a flexible coupling for connecting said tube with a support and permitting its longitudinal and lateral adjustment, substantially as described.

2. The combination, with a submerged propeller-wheel, of a water-jet tube having a flexible connection with a support permitting its longitudinal adjustment, and suspended

vertically in such proximity to the propeller-wheel that the current induced by the said propeller will hold in suspension till carried off by the natural current the material disengaged by the jet, substantially as described. 30

3. The combination of a submerged propeller-wheel, a water-jet tube adjustable longitudinally and laterally, and located in such proximity to said propeller that the currents induced by the propeller will hold in suspension till carried off by the natural currents the material disengaged by the jet, and means for elevating and lowering said tubes, substantially as described. 35 40

4. The combination of a submerged propeller-wheel, a water-jet tube connected with a support by a flexible coupling, permitting its longitudinal and lateral adjustment, and suspended in such proximity to the propeller-wheel that the currents induced by the said propeller will hold in suspension till carried off by the natural current the material disengaged by the jet, and means for elevating and lowering said tube, substantially as described. 45 50

S. M. MANSFIELD.

Witnesses:

W. L. FISK,

WM. M. DOUGLAS.