

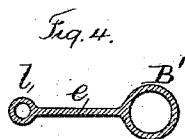
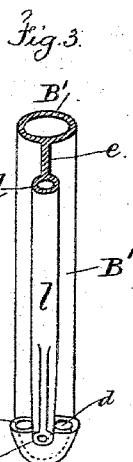
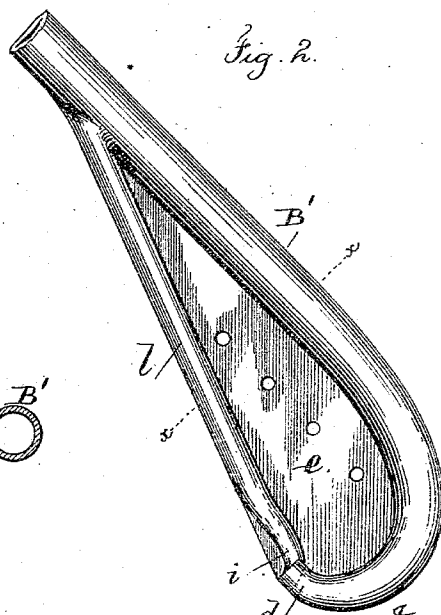
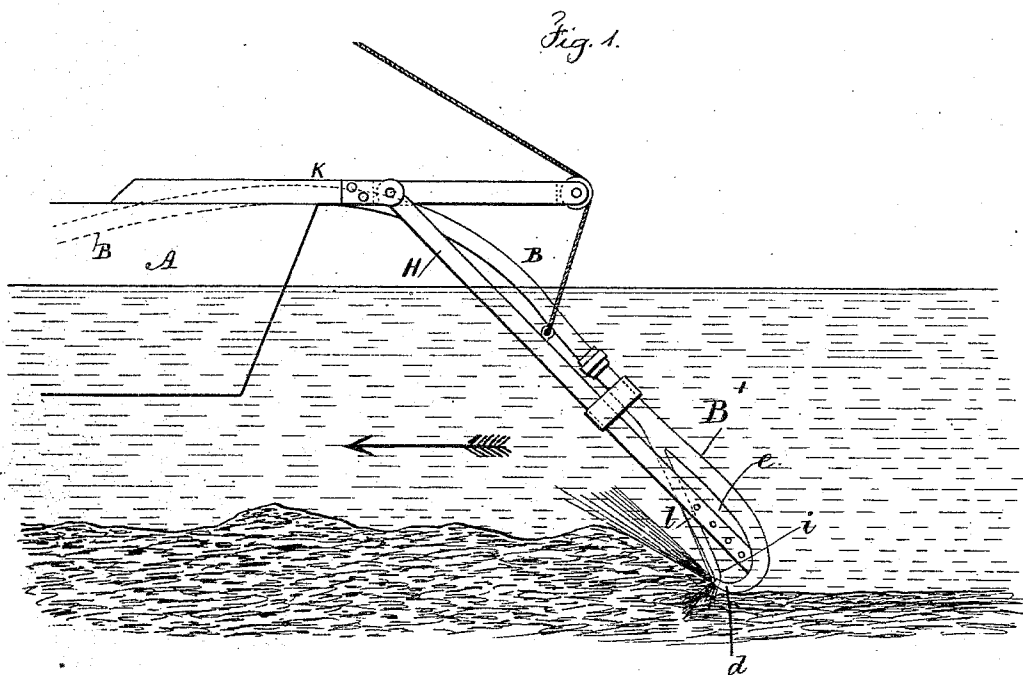
(No Model.)

R. STONE.

HYDRAULIC APPARATUS FOR REMOVING SAND BARS, &c.

No. 296,483.

Patented Apr. 8, 1884.



Witnesses
Chas. H. Smith
J. Stait

Inventor
Roy Stone
per Lemuel W. Perrell atty

UNITED STATES PATENT OFFICE.

ROY STONE, OF NEW YORK, N. Y.

HYDRAULIC APPARATUS FOR REMOVING SAND-BARS, &c.

SPECIFICATION forming part of Letters Patent No. 296,483, dated April 8, 1884.

Application filed September 24, 1883. (No model.)

To all whom it may concern:

Be it known that I, ROY STONE, of the city and State of New York, have invented an Improvement in Hydraulic Apparatus for Removing Sand-Bars, &c., of which the following is a specification.

Bars in rivers and harbors are sometimes formed by freshets and high tides, and become so hard and compact that the ordinary current does not wash them away. In most cases, however, the current is sufficient to carry away the sand or other material if loosened up and to deposit the same in deep water, or in other places where the current runs less rapidly. Devices have been proposed for stirring up sand-bars and similar obstructions; but they are liable to become entangled in snags and not to cut the channel to a uniform depth. I make use of a submarine plow composed of one or more jet-pipes at the lower end of an inclined drag-frame that is moved along gradually and will rise as it passes over an obstruction. Water is forced through the jet-pipes and cuts away the sand and induces a current of water that conveys the sand into the main current or stream, so that it is washed away; and I use downwardly or horizontal jets to insure uniformity in the depth of the cut, and to prevent the excavating apparatus rising on the sand as it is moved along over the bar.

In the drawings, Figure 1 is an elevation representing my improved apparatus. Fig. 2 is a side view of the nozzles in larger size. Fig. 3 is a front view, and Fig. 4 a section at the line *xx*.

The vessel A is to be provided with the necessary engine and pumps for forcing a powerful current of water through the pipe or hose BB', leading to the excavating apparatus. The submarine plowing device is hollow, so that the water from the pipe or hose B B' passes through the same, and there are one or more jet-tubes, *d*, that point upwardly at an angle of about forty-five degrees and diverge laterally, and there is a web, *e*, of metal, that occupies a forward inclined position and serves as a fender to cause the plow to rise and pass over any ordinary obstruction—such as a stone or snag—as the vessel and apparatus are moved along in the direction of the current.

The pipe B may be of metal, and provided

with a joint or hinge at the edge of the vessel, so that no other support for the submarine plow is employed; but usually it will be preferable to make use of a flexible hose-pipe, B, and to connect the plow and pipe B' by a beam or frame, H, with the sill-pieces K upon the vessel by joints, so that the same may be raised or lowered, as required, and drawn along by the movement of the vessel in the current or otherwise.

A jet opening or tube is provided at *i*, and it is preferably between the two tubes *d d*, and supplied with branch pipe *l*, that passes from the pipe B' down the front edge of the plow. The jet may issue horizontally or at a downward inclination, and project from the lowest part of the tube B', or be supplied by the tube *l*, as desired. The end of the horizontal nozzle should be slightly to the rear of the front edge of the web. When in use the water issuing from the jet-tubes *d* at an upward inclination cuts away the sand-bar or similar obstruction, and also sets up an induced circulation in the water, and the earthy matters are carried up into the stream or current of the river or harbor and taken away thereby into deeper water, or to places where the current is not so rapid, and where portions of such earthy matters subside. The jet at *i* loosens the earth in a downward or horizontal direction and insures uniformity of depth.

If this apparatus is placed upon a suitable vessel and kept in active operation, the vessel may be permitted to float downstream with the current, as the action of the loosening-jets is so very rapid that they will usually plow up the channel as rapidly as the boat is moving.

When the bottom is a muddy deposit, the jets may be projected more nearly horizontally and diverge at both sides.

There may be a beam or frame, and its plow and jet-tubes at each side of the vessel.

I usually prefer to make use of the branch or divided pipe in the plow, one tube *l* going down nearly vertical to the jet *i*, the other terminating in a curve behind the jets *d d*, so as to supply the water to them with uniformity.

I claim as my invention—

1. The combination, with the vessel or float and an inclined connection or drag, of a curved water-pipe at the lower end terminating in

the jet-tube *d*, having an upward inclination, and acting to project the solid materials upwardly into the current in the river, substantially as set forth.

5 2. In a hydraulic excavating apparatus, the pipe *B'*, the jet-tubes *d d*, having an upward inclination, and a jet-tube, *i*, between the tubes *d*, substantially as set forth.

10 3. The combination, in a hydraulic plow, of a pipe through which water is forced, jet-nozzles for the issuing water at upward and downward inclinations, to loosen and raise the solid materials into the current of the river, and a web, *e*, at the front of the water-pipe, to cause

the plow to rise and pass over any obstruction 15 that is not removed by the water, substantially as set forth.

4. In a hydraulic excavating apparatus, the pipe *B'*, web *e*, jet-tubes *d*, branch pipe *l*, and connections to the scow and to the water- 20 pumps, substantially as set forth.

Signed by me this 22d day of September, A. D. 1883.

ROY STONE.

Witnesses:

GEO. T. PINCKNEY,
WILLIAM G. MOTT.