(No Model.)

J. H. HUFFER.

APPARATUS FOR REMOVING SAND BARS IN RIVERS, CUTTING CHANNELS IN HARBORS, &c.

No. 260,200. Patented June 27, 1882.

Fig. 1.

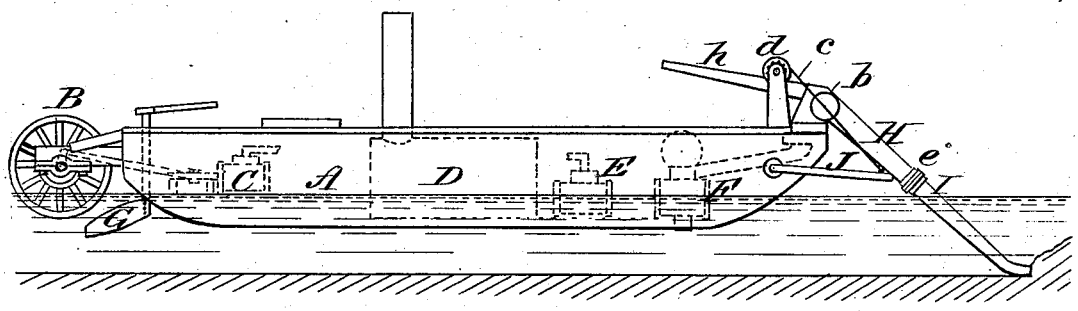
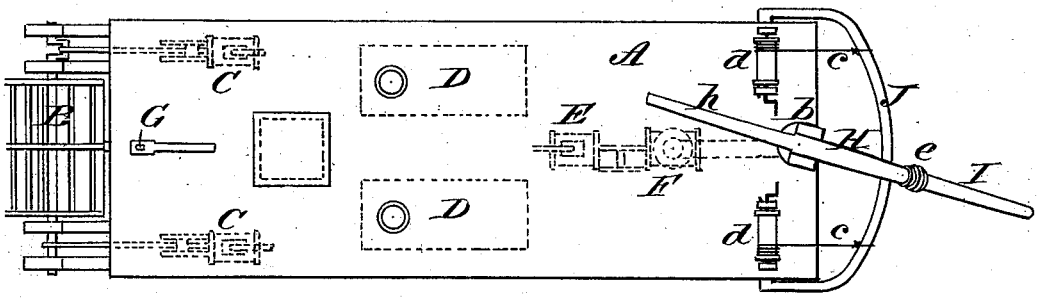


Fig. 2.



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APPARATUS FOR REMOVING SAND-BARS IN RIVERS, CUTTING CHANNELS IN HARBORS, &c.

SPECIFICATION forming part of Letters Patent No. 260,200, dated June 27, 1882.

Application filed February 13, 1882. (No model.)

To all whom it may concern:

Be it known that I, JOHN H. HUFFER, of Jacksonville, in the county of Jackson and State of Oregon, have invented certain new and useful Improvements in Apparatus for Removing Sand-Bars in Rivers, Cutting Channels in Harbors, and other purposes, of which the following is a full, clear, and exact description.

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

Figure 1 is a side view of a boat, when afloat, with my invention applied; and Fig. 2 is a plan view of the same.

Among the various purposes or uses to which this invention is proposed to be applied are the removal of sand-bars that obstruct the navigation of rivers, cutting channels in harbors, deepening landings, and floating stranded vessels by removing the sand or mud from about them and cutting a channel or outlet for their passage into deeper water.

The invention consists in a hydraulic apparatus of novel construction, carried by a boat, for submarine excavating purposes, by means of a jet or jets of water projected by said apparatus against the sand or mud to be removed; and it further consists in certain constructions and combinations of parts, whereby numerous conveniences and advantages are secured in the performance of the work, substantially as hereinafter described.

A represents a stout flat-bottom boat for use in shallow water, and specially adapted for carrying the machinery employed in connection with or forming part of the apparatus and the fuel necessary to propel the boat and work the apparatus. Said boat may be moved from place to place and held in position against end thrust produced by the working of the apparatus at the bow of the boat by means of a stern-wheel, B, driven by one or more engines, C, which are supplied with steam from one or more boilers, D. These boilers also serve to work a steam force-pump, of which E is the steam-cylinder and F the water-cylinder of the hydraulic apparatus, said water-cylinder having an air-vessel on its top. Said engines, boilers, and steam-pump may all be of any suitable construction and be arranged within the boat wherever it may be found most convenient, but preferably below deck to protect them from the weather, and with the steam-pump as low as possible, or beneath the water-level, to facilitate the supply of water from the exterior of the boat to the pump, which is here shown as taking in water through the bottom of the boat to avoid the drawing in of drift-wood, which would disable the pump. A rudder, G, with suitable steering apparatus, should be combined with the boat.

Instead of the steam-pump any other suitable water-forcing device may be used, if desired.

H I is a hydraulic tube, into which the water is forced by the pump through a suitable pipe-connection. This tube is fitted firmly in the bow of the boat, and reaches to the bottom of the river or other piece of water. Its lower or discharging end faces in a forward direction and is bent so as to eject the water which passes through it in nearly a horizontal course, to facilitate the forcing action of the jet on the sand or mud and to produce a current downstream—that is, when the apparatus is working in a stream. Said hydraulic tube H I may be of any suitable construction; but it is preferred to use a tube similar to that used in hydraulic mining, in which provision is made for turning the tube to any desired angle, the same being hung on a swivel-joint, as at *b*, and being provided with an extension or handle, *h*, for manipulating it. It is supported below said joint by a shear or shears, J, pivoted to the sides of the bow end of the boat, and constructed to cross and form a rest for the tube in front of the bow. This hinged or pivoted support J serves to receive the back thrust caused by the reactionary pressure of the water on the tube at its bent or discharging end, and one or more chains, *c*, are attached to said shears and connected with one or more windlasses, *d*, on deck for raising and lowering the shears to suit different angular positions of the hydraulic tube. The tube H I should also be constructed to admit of its being lengthened or shortened to adapt it to work at different depths, for which purpose it is made in two sections, H I, united by a joint, *e*, so that the lower section may be detached and another lower section of different

length and, if desired, of different caliber and size at its discharging end be substituted for it.

It is not necessary here to specify any particular dimensions for the hydraulic tube or for the area of it at its discharging end, neither for the pump or its connections, as these may all be varied to suit the work to be done.

For removing a sand-bar in a river the boat containing the apparatus is brought to the upper end of said bar and the hydraulic tube H I sufficiently lowered to cause the water that is ejected from it to forcibly remove a given depth of material from the surface of the bar, the stern-wheel of the boat at the same time being put in motion to counteract the back thrust on the boat by the reactionary pressure of the water under discharge on the hydraulic tube. During this operation the boat is made to move downstream with a velocity equal to the current of the stream until it passes over the bar. The boat is then returned to the upper end of the bar, and the operation of removing another like thickness or depth of material from the surface of the bar repeated, and so on for any number of times, until the necessary depth of water over the bar is secured. The depth and width of material that is removed from the bar by the jet from the hydraulic tube at each operation of passing over the bar will be regulated by the nature of the deposit on the bar, and the removed deposit will be distributed in the deeper water below the bar or be carried downstream.

To cut a channel where there is no stream, the hydraulic tube should be headed or adjusted to discharge a series of jets successively, either at right or other angle to the line of channel to be cut and on opposite sides of it. A like method of operation may be observed in removing the sand or mud from around a vessel that has run into shoal water and become stranded and in cutting a channel for passing said vessel into deep water.

In the operation of the apparatus the first impulse of the jet from the hydraulic tube meets with considerable resistance; but as the jet continues to flow the water alongside of it is put in motion in the same direction and flows with a velocity nearly equal to the jet, thereby reducing the resistance and increasing the excavating action of the jet, and producing a forced current which carries the excavated material far away from its place of excavation.

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

1. The combination, with a boat, of a hydraulic tube arranged at one end thereof and adjustable into different angular positions, and with its delivery end bent, as described, means carried by said boat for forcibly ejecting the water through said tube for the purpose of operating upon a river or other water bottom, and a propeller at the opposite end of the boat for moving the boat from place to place and for staying it against the reactionary effect of the water discharged from the tube, substantially as specified.

2. The combination, with the boat and hydraulic tube arranged at the one end thereof and made capable of being raised and lowered and adjustable into different angular positions, as described, of a shears or support to said tube, hinged or pivoted to the sides of the boat, and means on or in the boat for raising and lowering said support, essentially as herein set forth.

3. The hydraulic tube, constructed with a removable lower section, I, having its outer discharging end bent at an obtuse angle, substantially as described, whereby the water will be ejected horizontally, as set forth.

4. The combination of the boat A, having a stern propeller, B, one or more engines, C, for driving said propeller, one or more boilers, D, the steam force-pump E, the swiveled hydraulic tube H I at the bow end of the boat, and means for raising and lowering the same, essentially as herein described.

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Witnesses:
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CHRIS ULRICH.