

June 19, 1923.

1,459,153

A. R. GRIESEMER

HYDRAULIC EJECTOR

Filed Aug. 9, 1922

Fig. 1

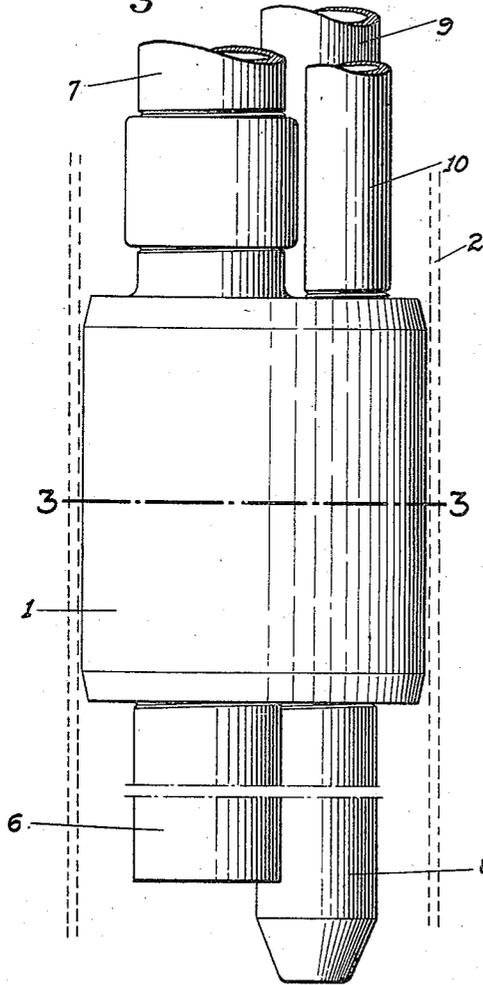


Fig. 2

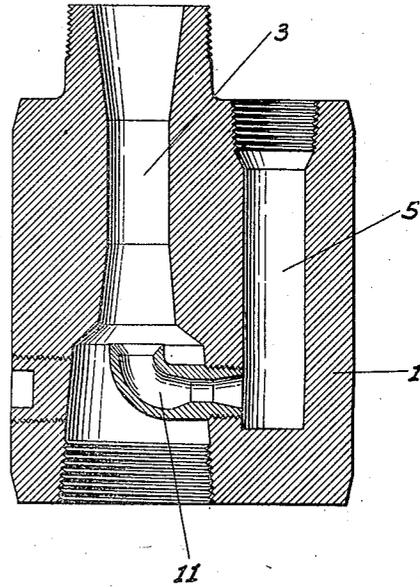
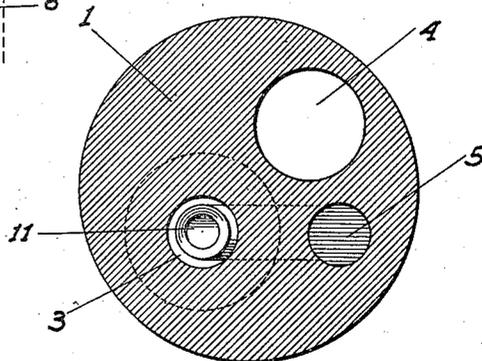


Fig. 3



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HYDRAULIC EJECTOR.

Application filed August 9, 1922. Serial No. 580,655.

To all whom it may concern:

Be it known that I, ABRAHAM R. GRIESEMER, a citizen of the United States, residing at San Francisco, county of San Francisco, State of California, have invented certain new and useful Improvements in Hydraulic Ejectors; and I do declare the following to be a full, clear, and exact description of the same, reference being had to the accompanying drawings, and to the characters of reference marked thereon, which form a part of this application.

This invention relates to improvements in devices for sinking holes, or in removing dirt etc from around piles and the like, and is especially adapted and valuable for use in connection with the sinking of holes in the beds of streams, bays and the like when necessary for construction work such as building piers, wharves, bridges and similar structures.

The principal object of my invention is to provide a device for the purpose, preferably used in connection with a casing, by means of which any silt, mud, sand etc may be removed from predetermined points below the water or underground without the necessity of a diver or other person having to descend to the point from which the material is to be removed, and without the aid of any augers or other cutting implements, which soon wear out owing to the abrasive action of dirt thereon, and which necessitate the use of long and heavy driving shafts.

The advantages with regard to speed and efficiency in accomplishing the work, with the attendant reduction of labor and other costs, will be appreciated by those in the profession.

For instance, the present method when an under-water hole is to be sunk for the reception of piers and the like is to employ a diver to loosen or break up the material to be removed before a suction or siphon mechanism is applied, is a very slow and expensive procedure, which the use of my device eliminates.

My apparatus is also extremely useful in removing the material from around wooden piles already sunk, when it is desired to protect them from the action of teredos and similar destructive organisms by placing a shell of concrete around the underwater portion of the pile.

A further object of the invention is to produce a simple and inexpensive device

and yet one which will be exceedingly effective for the purposes for which it is designed.

These objects I accomplish by means of such structure and relative arrangement of parts as will fully appear by a perusal of the following specification and claims.

In the drawings similar characters of reference indicate corresponding parts in the several views:

Fig. 1 is a side elevation of the device.

Fig. 2 is a sectional elevation of the body alone.

Fig. 3 is a cross section on the line 3—3 of Fig. 1.

Referring now more particularly to the characters of reference on the drawings, the numeral 1 denotes the body of the device, preferably made as a casting, and adapted to be lowered into a casing 2 of any desired form, which is first lowered and sunk around a pile or in a position to outline a hole to be sunk.

Parallel bores 3 and 4 of suitable sizes relative to each other extend from the top to the bottom of the body 1, while another bore 5, spaced from the others, extends from the top of the body to a point short of the bottom thereof.

Removably attached to the body at the lower end of the bore 3 is a suction pipe or nozzle 6 while at the upper end of said bore is a discharge pipe 7. Likewise removably attached to the body at the lower end of the bore 4 is a pressure jet or hydraulic nozzle 8, having a reduced outlet as shown. This member preferably projects somewhat below the pipe 6, and being removable, nozzles of different lengths and sizes of openings may be used as different conditions encountered may demand.

A pressure pipe 9 is connected to the body at the upper end of the bore 4, and is adapted at its upper end to be connected to a force pump and the like, so that a force of water of any desired pressure may be sent through the nozzle 8.

A high-pressure steam or air pipe 10 is connected to the body 1 at the outer end of the bore 5.

It is to be understood of course that the pipes 7, 9 and 10 may be made up of as many detachable lengths as necessary, depending on the depth to which the body is to be lowered from the operating mechanism at the surface.

Connected with the bore 5 near the lower end of the same and projecting thence into the bore 3 is a siphon-jet member 11, said member terminating in an upward bend 5 positioned concentric with the bore 3 and the latter being so spaced as to serve as a siphoning chamber.

In operation, the body is lowered inside the casing to the material to be removed, 10 being suspended from the pipes. Water under any suitable pressure is then forced through the nozzle 8 which, acting on the mud, silt and the like, loosens the same and causes it to be thoroughly stirred and mixed 15 with the surrounding water.

At the same time air or steam under high pressure is then forced through the pipe 10 and thence into the jet 11. Issuing from said jet into the chamber 3, the well-known 20 siphoning action is set up which creates a suction in the pipe 6, the water with the material loosened by the water-blast in suspension or solution therein being drawn into said pipe and then forced upwardly to 25 the surface by the air or steam pressure.

The device is of course lowered as the material is loosened and removed, until the desired depth has been attained.

I have found from experience that the 30 device will function efficiently in any kind of material which may be encountered, other than solid rock.

The device may also be used independently of a casing, depending on the work to 35 be performed, and for subterranean operations as well as those of a submarine nature.

If the device is operating at a considerable depth, the siphon 11 may require assistance 40 in order to maintain a constant discharge-flow.

Such assistance may easily be rendered by interposing additional siphons in the discharge line at as many points as may be necessary to "boost" the discharge, these

siphons being operated in the same manner 45 as with the siphon 11, and independent of the hydraulic pressure line.

From the foregoing description it will be readily seen that I have produced such a device as substantially fulfills the objects of 50 the invention as set forth herein.

While this specification sets forth in detail the present and preferred construction of the device, still in practice such deviations from such detail may be resorted to as do 55 not form a departure from the spirit of the invention, as defined by the appended claims.

Having thus described my invention, what I claim as new and useful and desire to 60 secure by Letters Patent is:

1. A hydraulic ejector comprising a body adapted to fit in a casing, a pair of vertical and spaced bores through the body, suction and pressure nozzles attached to and depending 65 from the body in alinement with said bores, suction and pressure pipes attached to and projecting upwardly from the body in alinement with the respective bores, a third vertical bore in the body closed at 70 the lower end, a jet from said third bore projecting into the bore to which the suction pipe is connected, and a pressure pipe attached to and projecting upwardly from the body in alinement with said third bore. 75

2. A hydraulic ejector including a body, a vertical bore through said body shaped to function as a siphoning chamber and having its largest diameter at its lower end, a jet member projecting upwardly into the 80 chamber and terminating adjacent the upper end of the enlarged portion thereof, and discharge and suction pipes connected to the body at the upper and lower ends of said chamber. 85

In testimony whereof I affix my signature.

ABRAHAM R. GRIESEMER.