

E. CHAQUETTE.  
DREDGING APPARATUS.

No. 523,807.

Patented July 31, 1894.

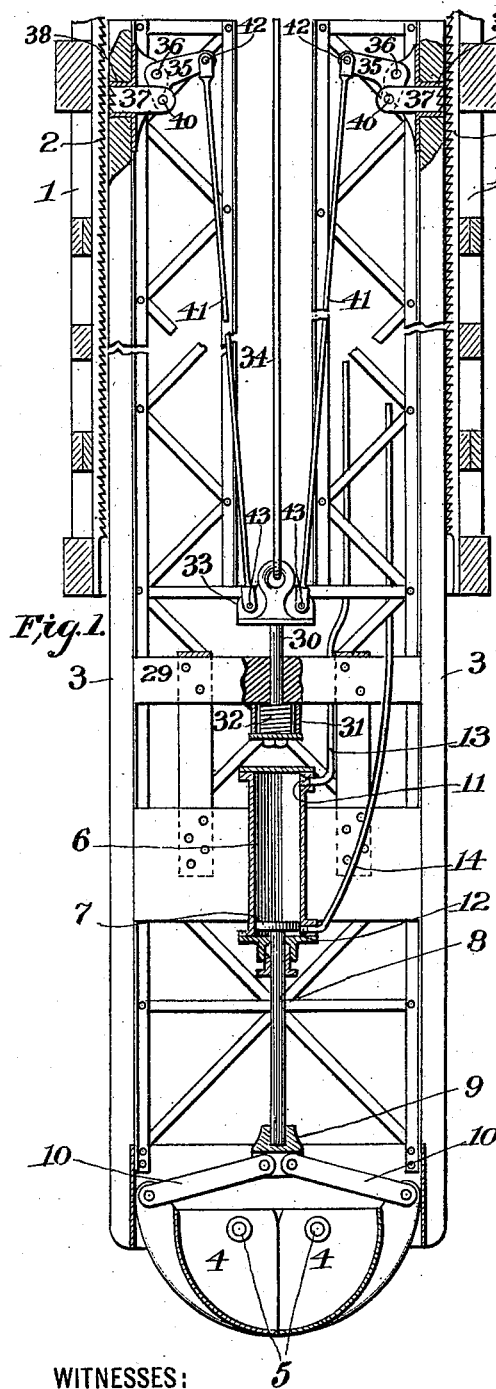


Fig. 1.

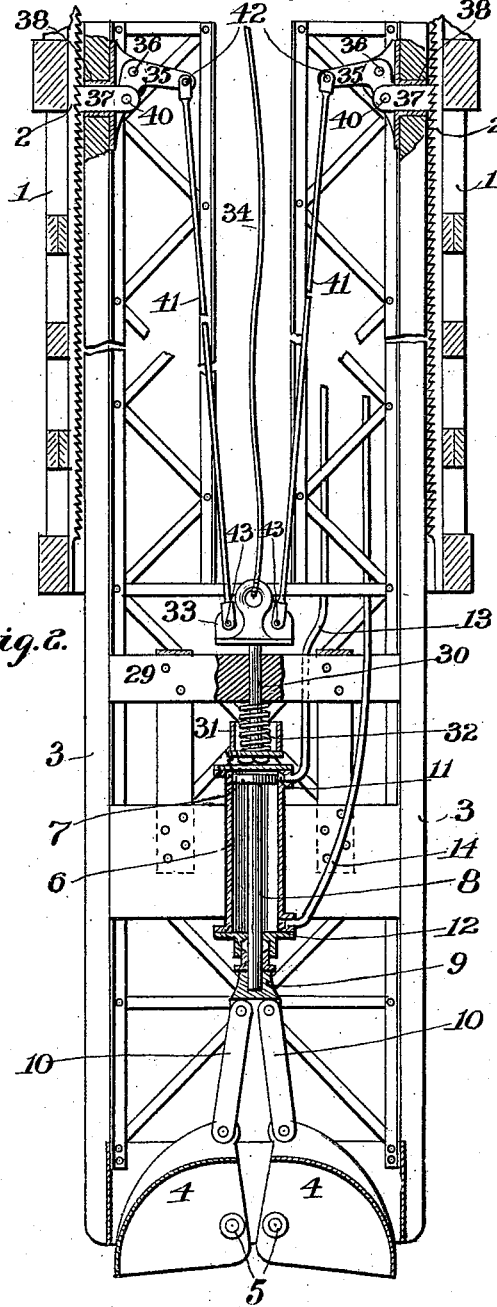


Fig. 2.

WITNESSES:

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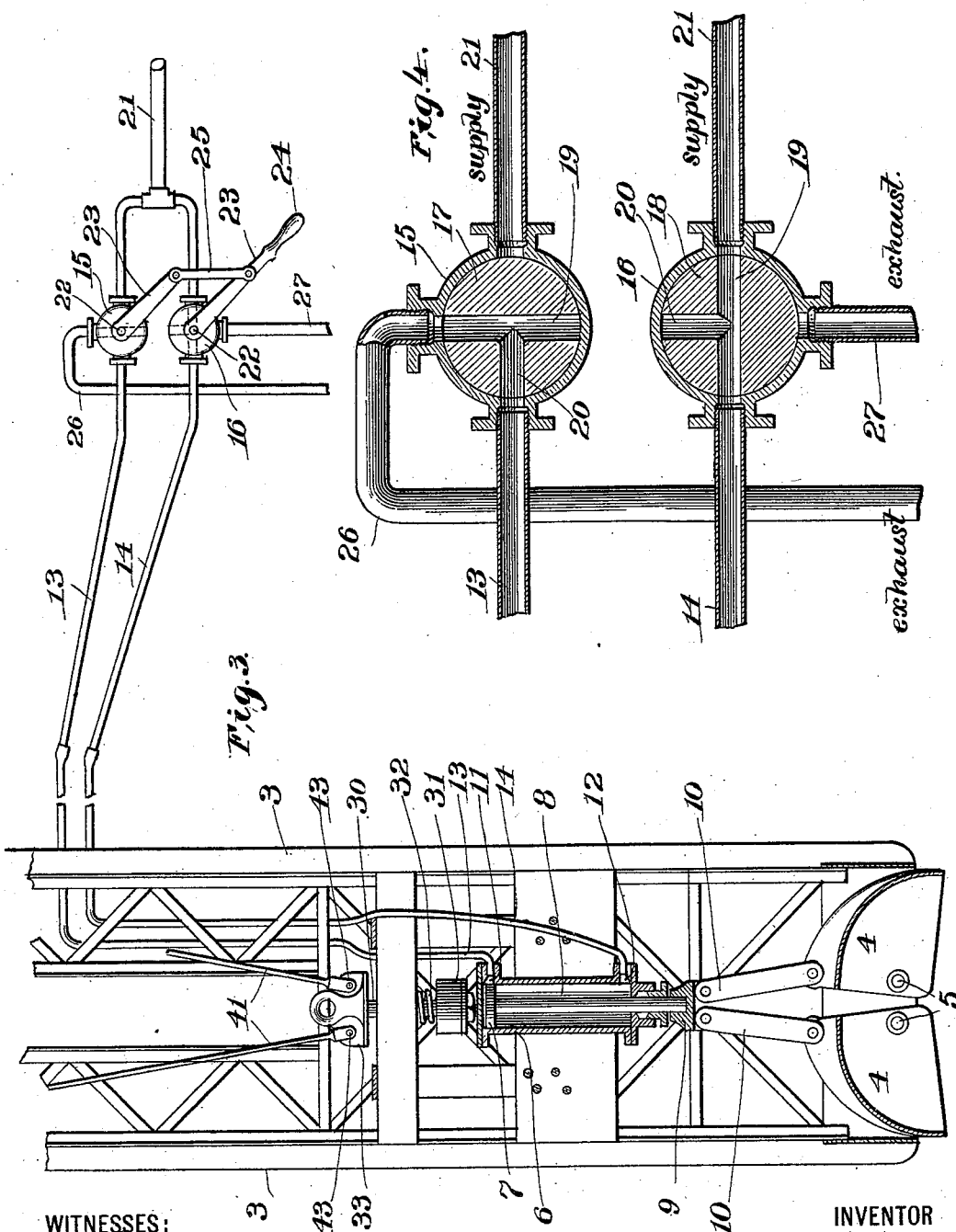
(No Model.)

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# UNITED STATES PATENT OFFICE.

EPHRAIEM CHAQUETTE, OF BRIDGEPORT, CONNECTICUT, ASSIGNOR TO  
THE CHAQUETTE CANAL AND HARBOR DREDGING COMPANY, OF SAME  
PLACE.

## DREDGING APPARATUS.

SPECIFICATION forming part of Letters Patent No. 523,807, dated July 31, 1894.

Application filed October 27, 1893. Serial No. 489,323. (No model.)

*To all whom it may concern:*

Be it known that I, EPHRAIEM CHAQUETTE, a citizen of the United States, residing at Bridgeport, in the county of Fairfield and State of Connecticut, have invented certain new and useful Improvements in Dredging Apparatus; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

My invention has reference to certain improvements in dredging apparatus, but more particularly refers to the digging devices and means for opening and closing the digging clams and means for positively locking the frame which carries such devices so that the latter will not rise up during the operation of digging.

In the accompanying drawings—Figures 1 and 2 are broken sectional elevations showing my improved digging devices with the digging clams respectively closed and opened; Fig. 3 a view similar to Fig. 2, but with the guide cage omitted, and showing the devices employed for the purpose of opening and closing the digging clams, and Fig. 4 a detail broken sectional view illustrating the means which I employ for operating the piston for opening and closing the clams.

Similar numbers of reference denote like parts in the several figures of the drawings.

In a certain other application for Letters Patent of the United States filed on even date herewith, I have shown and described a complete dredging apparatus of which the present invention forms a part, and although I prefer to use my present improvement in connection with said apparatus, still I am not in the present instance limited to such use, for the invention herein to be described has nothing to do with any special apparatus but pertains solely to the opening and closing of the digging clams and to preventing the latter from rising during digging.

1 is a cage which is carried by the swinging element of a dredging boat but which is stationary as to any vertical movement. This swinging element above referred to may be either the usual crane employed on dredging-boats, or it may be the horizontally supported

swinging table referred to in my said other application. In either event the cage 1 has no movement save when it is carried horizontally by such swinging movement. 2 are ratchet bars secured vertically at opposite sides of this cage on the inside thereof, and 3 is a plunger frame contained and suitably guided within this cage so as to be capable of a free vertical movement therein. 4 are the digging clams pivoted at 5 within the lower part of this frame.

6 is a cylinder secured in vertical position within the frame and above the digging clams, and 7 is a piston within said cylinder and having depending therefrom in the usual manner a piston-rod 8. 9 is a block secured to the lower end of this rod, and 10 are toggle-levers pivoted to said block and to the upper outer ends of the digging clams.

From the foregoing it will be readily understood that the upward and downward movements of the piston-rod will respectively open and close the digging clams.

11, 12, are ports which lead respectively into the top and bottom of the cylinder 6, and 13, 14, are flexible tubes or pipes opening into said ports and leading from the valve casings 15, 16, which are supported at any convenient part of the dredging boat.

17, 18, are valve blocks closely fitting within the casings 15, 16, which latter are circular. These valve blocks have T-shaped ports therein formed by a duct 19 extending diametrically through the blocks from side to side, and a duct 20 extending at right angles from the center of the duct 19 to the outer edge of the blocks.

21 is a pipe which is branched and leads into the casings 15, 16, by means of which compressed air, water or steam may be supplied in the manner presently described.

22 are pins which extend concentrically from the valve blocks out through the valve casings and to these pins are secured cranks 23, one of which is provided with a handle 24. 25 is a link whose ends are pivoted to said cranks, whereby the latter will move in harmony.

26, 27, are exhaust pipes leading from the casings 15, 16. The blocks 17, 18, are assembled within the casing in such manner that

the ducts 19, 20, in one block extend in planes at right angles to the planes in which the corresponding ducts extend in the other block, and when said blocks are turned back and forth by swinging the cranks 23, these ducts 19, 20 will alternately be brought into alignment with the pipes which lead to the cylinder 6. When the ducts 19 are in alignment with said pipes, a direct communication is thereby effected between the latter and the supply pipe, but when these ducts 20 are in such alignment, the ducts 19 will lead directly into the exhaust pipes. It will therefore be readily understood that the operation of the cranks 23 will cause water, air or steam to be alternately introduced within and exhausted from the pipes 13, 14, thereby operating the piston 7 to open and close the digging clams.

It very frequently happens in an apparatus of this description, that the digging clams must operate in a substance which presents considerable resistance, such as hard sand, gravel and the like, and heretofore, when this has happened, the digging is accomplished under a great disadvantage in that such resistance will cause the frame which carries the digging clams to be thrown upward so that said clams can dig to a slight depth only. My invention provides for the overcoming of this difficulty in the following manner.

Extending loosely through a cross bar 29 of the frame 3 is a vertical lifting pin 30 to the bottom of which is secured the housing 31, within which latter and around the pin is a coil spring 32 confined between the bottom of the housing and the cross bar. Secured to the top of the pin 30 is a block 33 to which is attached the cable 34 for elevating the frame.

35 are bell-cranks pivoted at 36 to the inside of the frame 3 and on opposite sides thereof, and 37 are pawls which extend through and are guided within sockets 38 in the sides of the frame and are capable of engaging and interlocking with the ratchet bars 2 on the inside of the cage 1. The lower legs of the bell-cranks are loosely pivoted at 40 to the pawls, while connecting rods 41 are pivoted at 42, 43, to the upper legs of said cranks and to the block 33 respectively.

When the weight of the plunger frame is sustained by the cable 34, the block 33 will be pulled upward thereby compressing the spring 32 and bringing the housing 31 into abutment against the cross bar 29, while at the same time the rods 41 will be elevated, thereby keeping the pawls 37 out of engagement with the ratchet 2. As soon as the digging clams strike the bottom to be dredged, the cable 34 will be relieved and will slacken, and the spring 32 will distend thereby lowering the rods 41 and throwing the pawls 37 into engagement with the ratchets 2 to lock the plunger frame as against any upward movement which would otherwise be caused by the closing of the clams 4, especially if

the latter, as above set forth, are operating in hard soil or other substance which offers considerable resistance. This locking of the frame which carries the digging clams has the effect of greatly increasing the daily capacity of a dredging apparatus, since it insures a full load within the clams, and moreover renders the latter capable of successful operation in instances where the usual digging devices would fail. Also the opening and closing of the digging clams by the application of hydraulic, compressed air or steam power is a very important feature, since it insures rapidity, and moreover does away with the unwieldy chains heretofore used in this connection.

I claim—

1. In a dredging apparatus, the combination of the vertical cage, the plunger frame guided and operated therein and carrying the digging devices, a cable whereby said frame is elevated and lowered, and means dependent upon the slacking of said cable for automatically locking said cage and frame together, substantially as set forth.

2. In a dredging apparatus, the combination of the vertical cage supported by the dredging boat, the plunger frame guided and operated within said cage, the digging devices carried by said frame, the cable whereby the latter is elevated and lowered, and appliances secured in part to the cage and in part carried by said frame and adapted to be automatically operated by the slacking of said cable to lock said frame and cage together, substantially as set forth.

3. In a dredging apparatus, the combination of the vertical cage and plunger frame guided and operated therein and carrying the digging devices, and automatically operated locking devices secured in part to the cage and in part carried by the frame for locking said cage and frame together, substantially as set forth.

4. In a dredging apparatus, the combination of the vertically guided and operated plunger frame, the digging clams pivoted at the bottom of said frame, instrumentalities carried by said frame and operatively connected to the digging clams for opening and closing the latter, and means for operating said instrumentalities, substantially as set forth.

5. In a dredging apparatus, the combination of the stationary vertical cage having ratchet bars, the plunger frame guided and operated therein, the pawls carried by said frame and capable of being thrown into and out of engagement with said bars, the bell-cranks pivoted to the frame and loosely connected at their lower legs to said pawl, the vertical resiliently acting lifting pin carried by said frame and having at its upper end a block to which is secured the hoisting cable, and the rods 41 pivotally connected to the upper legs of said bell-cranks and to said block, substantially as set forth.

6. The combination of the stationary verti-

cal cage having vertical ratchet bars on the  
inside thereof, the plunger frame guided and  
operated therein and carrying at its lower  
end the digging clams, the vertical lifting pin  
5 extending freely through a cross bar of said  
frame and having secured to its lower end be-  
low said cross bar with a block, the coil spring  
within the housing and around said pin and  
confined between the cross bar and the bot-  
10 tom of the housing, pawls carried by said  
frame and capable of being thrown into and  
out of engagement with said ratchet bars,  
bell-cranks pivoted to said frame and having  
their lower legs loosely connected with said  
15 pawls, rods having their ends respectively piv-  
oted to the upper legs of said cranks and to  
said block, and means—as a cable—secured  
to said block for operating the frame, substan-  
tially as set forth.

7. The combination of the plunger frame 20  
and the digging clams pivoted at the lower  
end thereof, the cylinder carried by said frame  
and having at the top and bottom inlet ports,  
the piston within said cylinder and extending  
downwardly therefrom and having on its lower 25  
extremity a block, the toggle levers pivotally  
connected to said block and to the digging  
clams, and means for introducing steam alter-  
nately into said cylinder through said ports,  
substantially as set forth. 30

In testimony whereof I affix my signature in  
presence of two witnesses.

EPHRAIEM CHAQUETTE.

Witnesses:

F. W. SMITH, Jr.,  
A. J. TANNER.