

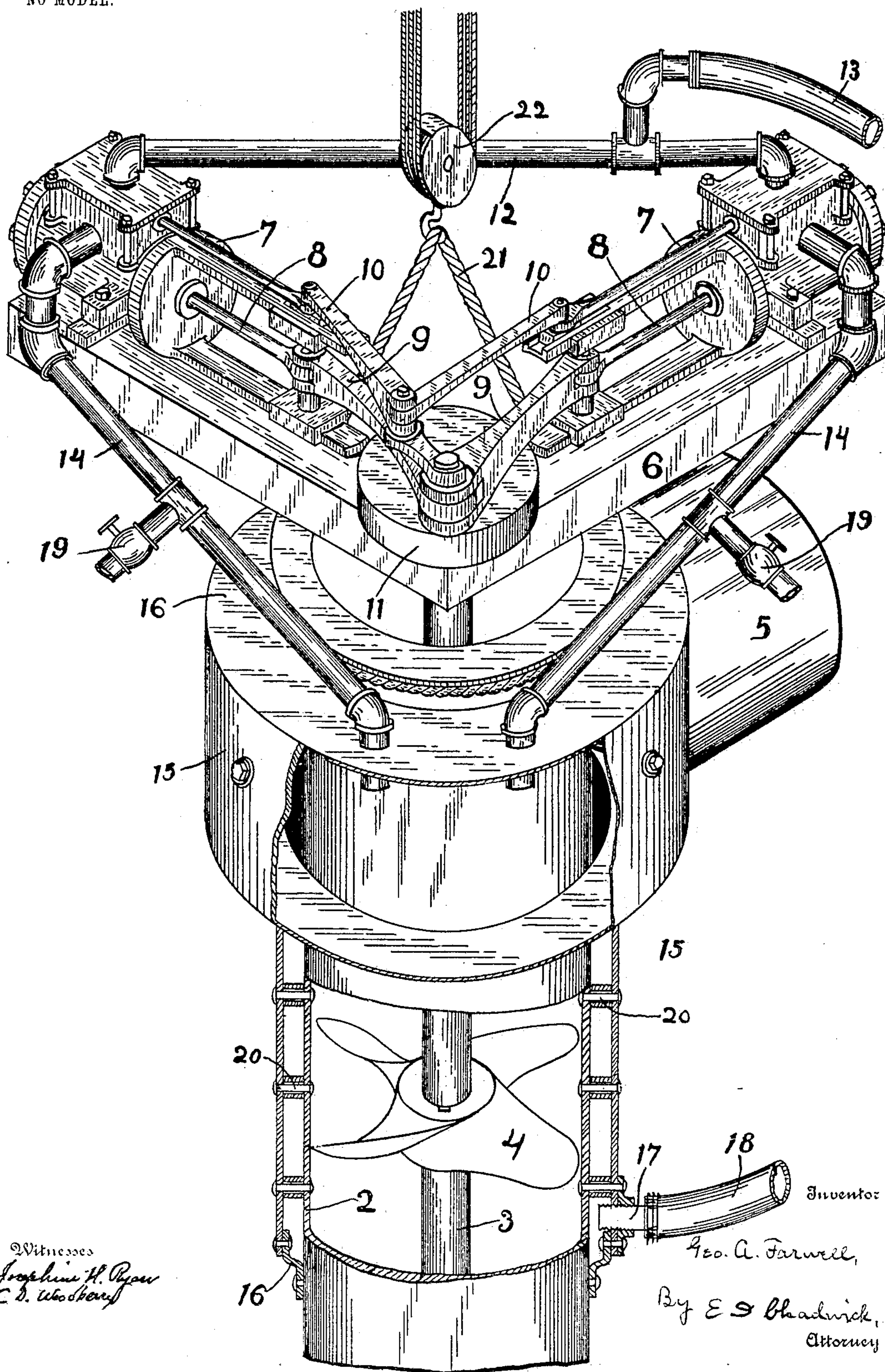
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G. A. FARWELL.
PUMPING AND DREDGING APPARATUS.

APPLICATION FILED JAN. 11, 1904.

NO MODEL.



Witnesses
Josephine H. Ryan
C. D. Woodbury

Inventor
Geo. A. Farwell,
By *E. S. Chadwick,*
Attorney

UNITED STATES PATENT OFFICE.

GEORGE A. FARWELL, OF BOSTON, MASSACHUSETTS, ASSIGNOR OF
ONE-HALF TO HERMAN L. WINTERER, OF PHILADELPHIA, PENN-
SYLVANIA.

PUMPING AND DREDGING APPARATUS.

SPECIFICATION forming part of Letters Patent No. 775,267, dated November 15, 1904.

Application filed January 11, 1904. Serial No. 188,452. (No model.)

To all whom it may concern:

Be it known that I, GEORGE A. FARWELL, a citizen of the United States, and a resident of Boston, in the county of Suffolk and State of Massachusetts, have invented new and useful Improvements in Pumping and Dredging Apparatus, of which the following is a specification.

My invention is intended to provide an improved apparatus for pumping and dredging purposes, and particularly for pumping out the hulls of wrecked vessels and the like. In order that this may be done effectively, it is necessary in many cases to provide a pump having a great capacity and requiring considerable power to run it, and such pumps as heretofore constructed have been so heavy that it has been necessary to bring them up alongside of the wreck in a wrecking tug or lighter and then to transfer them directly therefrom to the wreck and secure them in operative position. In doing this much difficulty has been experienced heretofore by reason of the fact that it is often impossible for the wrecking-boat to tie up to the wreck or to lie closely alongside of it, owing to the roughness of the water, the presence of reefs or bars on which the wreck lies, or the like.

The main object of my invention is to overcome the difficulties above referred to, and to this end I provide a pump of the propeller type and I secure to its upper end a steam-motor of any suitable construction, which motor is directly connected to the pump-shaft to drive the same, the combined pump and motor being so constructed and arranged that they may be freely suspended from a boom or the like in operative position in the hull of the wreck and raised or lowered at will. I also provide flexible power-transmitting connections leading from the motor to the source of power, which may be located on the wrecking vessel itself, thus making it possible to anchor the wrecking vessel at any convenient distance from the wreck and to operate the motor and pump from said vessel. A propeller-pump consists, essentially, of a tubular

casing containing a central rotatable shaft provided at intervals with sets of propeller-blades so arranged that when the shaft is rotated water is drawn in through the lower end of the pump, lifted through the tubular casing, and discharged through a suitable outlet above the propeller-blades. Such a pump when properly constructed has a very high capacity in proportion to its weight, so that my apparatus may be made so light that it may be taken to a wreck in a dory or other small boat which can be readily brought up to the wreck. Such a pump, moreover, is especially useful for the purpose above referred to because it will lift water charged with solid particles, such as pieces of coal and the like, which would inevitably clog the valves of a lift-pump or force-pump of the ordinary type, and it also has the advantage that it requires much less power to run it in proportion to its capacity than wrecking-pumps of the type heretofore employed, so that I am able to make not only the pump proper, but also the motor, much lighter than has been possible heretofore.

My improvements thus provide an apparatus which may be placed in the hull of a wreck, suspended freely in any suitable manner, and then operated from the wrecking vessel while lying at a distance from the wreck itself without requiring the presence of any operator on the latter.

My improvements also include certain other features hereinafter fully described.

An apparatus embodying my invention is illustrated in the accompanying drawing, in which the figure is an isometric view, partly in section, showing the complete apparatus and as much of the auxiliary connections as is necessary for an understanding of my improvements.

Referring to the drawing, 2 indicates the tubular body of the pump, 3 its central shaft, and 4 a set of propeller-blades secured thereto. The pump-body 2 is provided at or near its upper end with the usual outlet 5. These parts may be of any suitable construction—

such, for example, as is shown and described in my prior United States Letters Patent, No. 691,123, dated January 14, 1902.

To the upper end of the tubular body of the pump is rigidly secured a strong frame or casting 6, on which is mounted a motor of any suitable construction, herein represented as a two-cylinder steam-engine comprising cylinders 7, piston-rods 8, connecting-rods 9, and valve-operating connections 10, the connecting-rods 9 being coupled directly to a crank-disk 11, secured to the upper end of shaft 3.

12 indicates a cross-pipe connecting the steam-chests of the motor.

13 is a flexible supply-pipe leading from the pipe 12 to a steam-boiler, (not shown,) which may be located on the wrecking vessel or at any other convenient point, and 14 14 represent exhaust-pipes leading, respectively, from the steam-chests of the motor.

It is one of the features of my apparatus that I am able to provide in a very simple manner an arrangement for condensing the exhaust-steam without materially increasing the weight of the apparatus, and I can thus not only increase the efficiency of the motor, but also use the same water over and over again in the boiler. This is important in practice, for the reason that it avoids any liability of the giving out of the supply of fresh water necessary for feeding the boiler, which otherwise would have to be carried by the wrecking vessel. My condensing apparatus consists simply of a jacket or casing 15, surrounding the upper end of the pump-body 2 and closed at its upper and lower ends, as at 16, thereby providing a condensing-chamber the inner wall of which is formed by the pump-body itself, through which the cold water drawn up by the pump is constantly passing. A sufficient area of the pump-body thus kept cold is inclosed by this chamber to effect the required condensation of the exhaust-steam from the motor, which is thus accomplished without the use of circulating-pumps or other special apparatus. The exhaust-pipes 14 14 lead into the upper end of this chamber, as shown, and from the lower end of said chamber is led a discharge-pipe 17, through which the water of condensation is carried away. This pipe 17 is connected by a flexible pipe 18 to the usual air-pump or similar arrangement, (not shown,) which will be located on the wrecking vessel or wherever the boiler may be and will effect the transfer of water of condensation to the usual hot-water tank, from which it will be fed to the boiler in the usual manner.

19 19 represent relief-valves applied, respectively, to the exhaust-pipes 14 to permit the escape of steam in case the water of condensation is not removed from the condensing-chamber as fast as it is formed therein.

20 20 represent stay-bolts interposed at intervals between the inner and outer walls of

the condensing-chamber in order to prevent the collapse of the outer wall under the external atmospheric pressure.

My apparatus may be suspended in the wreck in any convenient manner and at any angle. The means shown in the drawing for this purpose consist of a sling 21, passed around the flanged upper end of the pump-body 2 and carried by a tackle-block 22, which will be suspended from any suitable support and arranged to provide for the raising and lowering of the apparatus at will either from the wreck itself or from any convenient point.

In using my apparatus it is carried on the wrecking tug or lighter to a convenient distance from the wreck, at which point the wrecking vessel is anchored, and the apparatus is then put aboard the wreck by means of a small boat and suspended freely in operative position. The attached ends of the pipes 13 and 18 are carried with the pump and motor to the wreck from the wrecking vessel, and said pipes are thus extended between the two vessels and are preferably suspended from hawsers secured to the two vessels in order to keep them out of the water as much as possible. The motor and pump are thereupon operated from the wrecking vessel until the pumping action has been completed, whereupon the apparatus may either be removed from the wreck or, in case the wreck is floated and docked, the pump may be left in the wreck and the pipes 13 and 18 disconnected and carried back to the wrecking vessel.

My apparatus is useful not only for wrecking purposes, as above described, but also for pumping out various structures used in marine engineering, such as the coffer-dams used in laying piers and the like, for sinking shafts and foundations, and for other mining and building operations. It will be evident that any other suitable form of direct-connected steam-motor may be employed for operating the pump-shaft instead of the motor shown in the drawing so far as my main improvements are concerned, provided said motor is capable of being operated from a distance by a flexible connection leading to the source of power.

I claim as my invention—

1. In an apparatus of the character described, the combination of a portable rotary pump of the propeller type, a steam-motor rigidly secured to the upper portion of said pump and connected directly to the shaft thereof to rotate the same, a flexible supply-pipe leading from said motor to its power-supply, and means for freely suspending the combined pump and motor in operative position, substantially as described.

2. In an apparatus of the character described, the combination of a portable rotary pump of the propeller type, a steam-motor rigidly secured to the upper portion of said pump and connected directly to the shaft there-

of to rotate the same, a flexible supply-pipe leading from said motor to its power-supply, a condenser carried by said pump, and a flexible return-pipe leading from said condenser, substantially as described.

3. In an apparatus of the character described, the combination with a pump comprising a tubular body portion having an inlet at its lower end and an outlet at its upper portion, and a rotatable shaft centrally journaled in said body portion and provided with sets of propeller-blades, of a steam-motor rigidly secured to the upper portion of said pump and directly connected to said shaft to rotate the same, a steam-pipe leading to said motor, a casing surrounding the upper portion of the pump and providing a condensing-chamber, an outlet-pipe leading from said chamber, and connections between said chamber and the exhaust-pipes of the motor, substantially as described.

4. In an apparatus of the character described, the combination with a pump compris-

ing a tubular body portion having an inlet at its lower end and an outlet at its upper portion, and a rotatable shaft centrally journaled in said body portion and provided with sets of propeller-blades, of a steam-motor rigidly secured to the upper portion of said pump and directly connected to said shaft to rotate the same, a flexible steam-pipe leading to said motor, a casing surrounding the upper portion of the pump and providing a condensing-chamber, connections between said chamber and the exhaust-pipes of the motor, and flexible pipe connections leading from said chamber for removing the condensed steam, substantially as described.

In testimony whereof I have hereunto subscribed my name this 9th day of January, 1904.

GEORGE A. FARWELL.

Witnesses:

E. D. CHADWICK,

JOSEPH T. BRENNAN.