

No. 890,764.

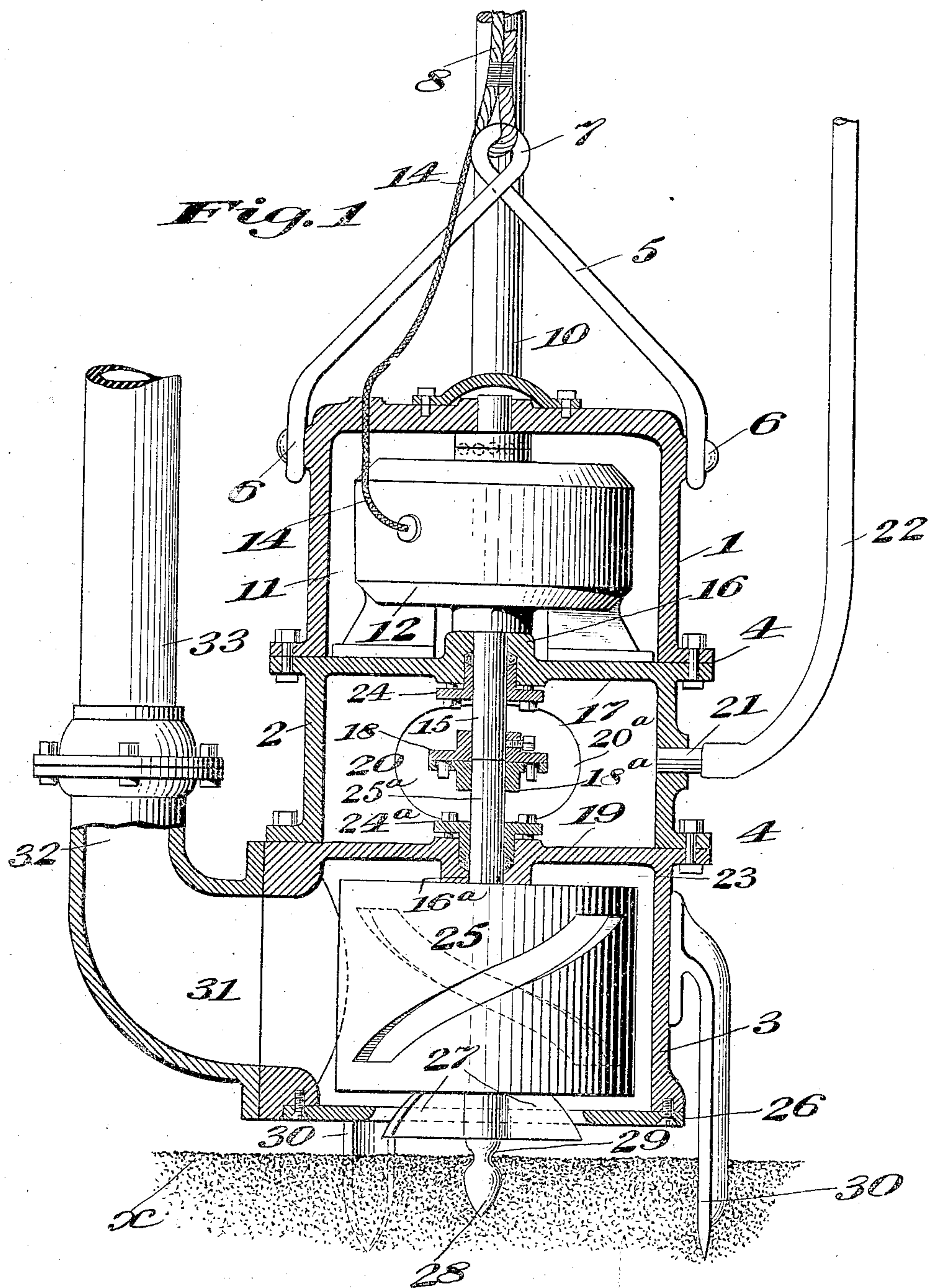
PATENTED JUNE 16, 1908.

R. E. S. GEARE.

DREDGING APPARATUS.

APPLICATION FILED JULY 18, 1907.

3 SHEETS—SHEET 1.



Witnesses:  
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*William J. Firth*

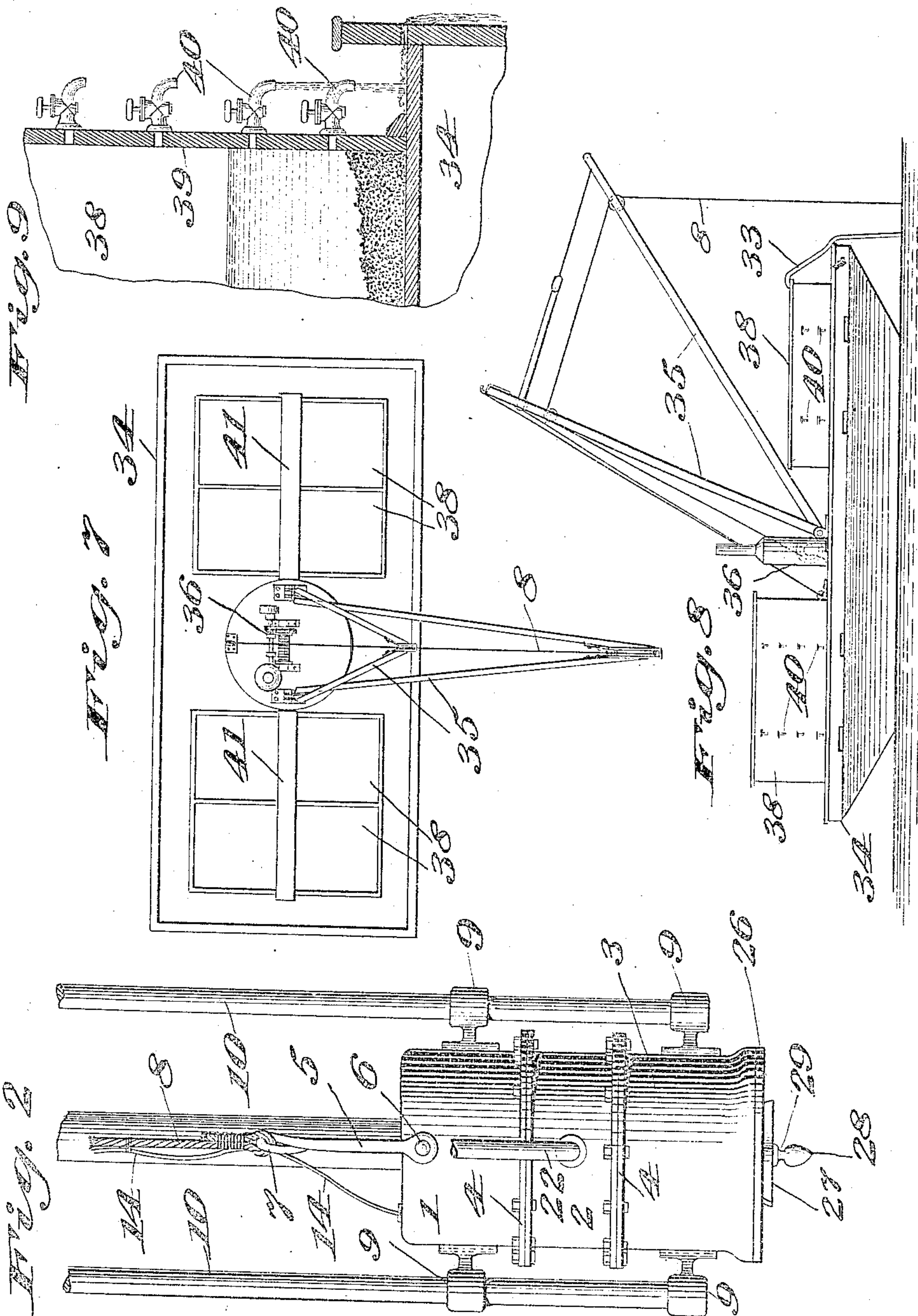
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R. E. S. GEARE.  
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3 SHEETS—SHEET 2.



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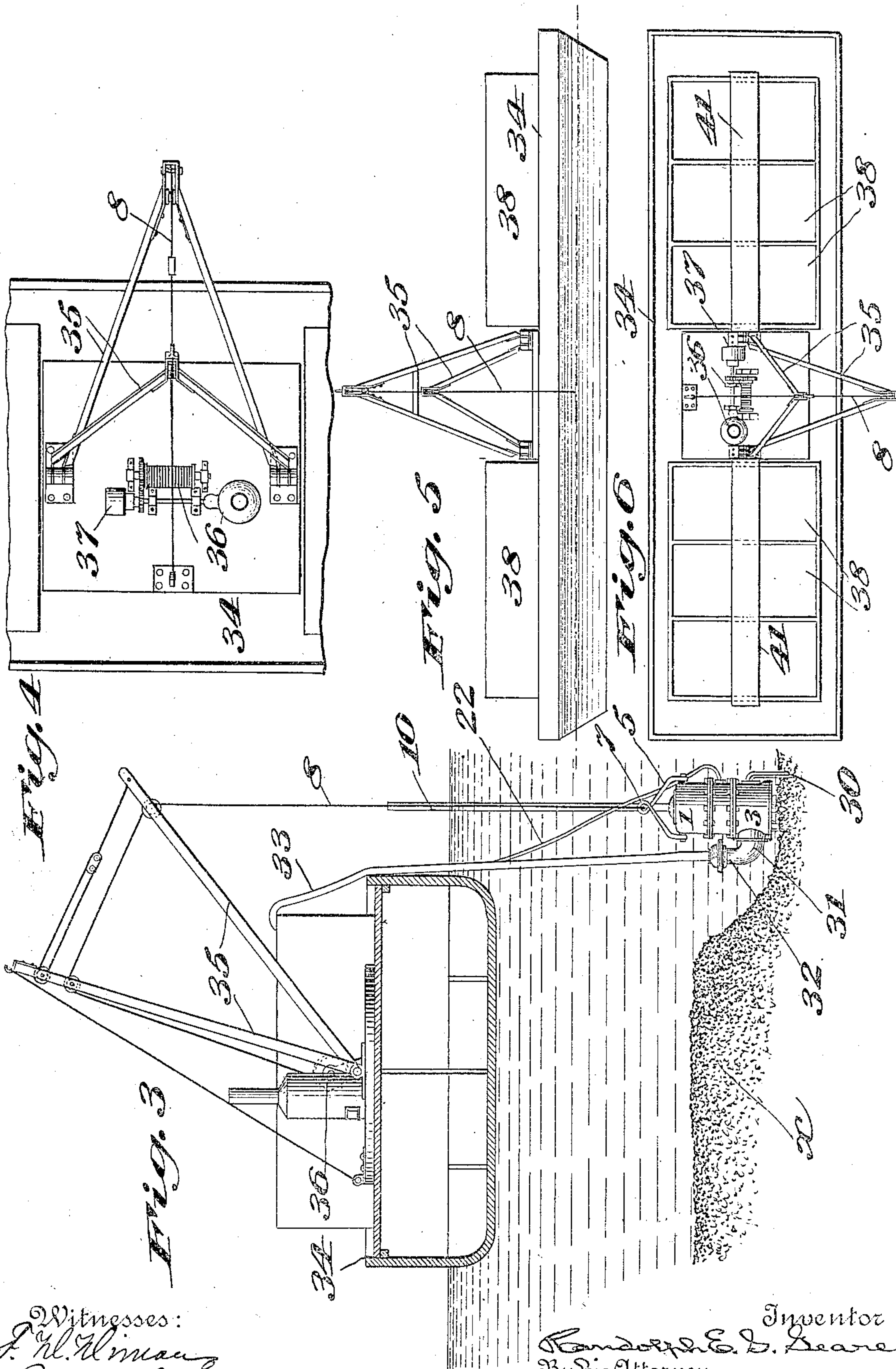
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3 SHEETS—SHEET 3.



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# UNITED STATES PATENT OFFICE.

RANDOLPH E. S. GEARE, OF NEW YORK, N. Y.

## DREDGING APPARATUS.

No. 890,764.

Specification of Letters Patent.

Patented June 16, 1908.

Application filed July 18, 1907. Serial No. 384,341.

*To all whom it may concern:*

Be it known that I, RANDOLPH E. S. GEARE, a citizen of the United States, and a resident of the city and State of New York, have invented certain Improvements in Dredging Apparatus, of which the following is a specification.

This invention relates to certain improvements in dredging apparatus, and has for its object to provide an apparatus of this general character of a comparatively simple and inexpensive nature and of a strong and compact construction which shall be capable of convenient and effective operation at various depths for removing and elevating sand and the like so as to be adapted for employment in dredging harbors, deepening water-ways and the like in a rapid and economical manner.

The invention consists in part, in an apparatus of this general character comprising a rotary pump and a motor therefor, said pump and motor being connected for operation at the bottom of a water-way, means for supplying energy to said motor to operate the same, and a discharge conduit extended from the pump and extended upwardly therefrom for discharge of sand and the like therefrom.

The invention also consists, in part, in a float or barge carrying receptacles wherein the sand discharged from said conduit is adapted to be received, said receptacles having means for discharging therefrom the water supplied from said conduit so that the sand is permitted to settle within the receptacles and is retained therein while such water supplied therewith is discharged from the receptacles.

The invention also contemplates certain novel features of the construction, and combinations and arrangements of the several parts of the improved dredging apparatus, whereby certain important advantages are attained and the apparatus is rendered simpler, cheaper and otherwise better adapted and more convenient and economical for use, all as will be hereinafter fully set forth.

The novel features of the invention will be carefully defined in the claims.

In the accompanying drawings which serve to illustrate my invention—Figure 1 is an axial section taken through the casing of the pump and motor and showing various features of construction thereof as will be hereinafter explained; Fig. 2 is a side eleva-

tion of the casing for the pump and motor of the improved apparatus, showing the rods and connections for elevating and lowering said casing and for laterally moving and guiding the same; Fig. 3 is a general sectional view taken transversely through a barge or float provided with my improved dredging apparatus and showing the same with the pump and motor casing lowered in position for use in dredging; Fig. 4 is a plan view of the central portion of the barge or float shown in Fig. 3; Fig. 5 is a side elevation of the barge or float as shown in Figs. 3 and 4; Fig. 6 is a plan view of the barge or float as shown in Figs. 3, 4 and 5; Fig. 7 is a plan view showing my improved dredging apparatus so applied to a barge or float as to be capable of being swung completely round for operation on opposite sides and at opposite ends thereof; Fig. 8 is a side elevation of the apparatus constructed as shown in Fig. 7, and Fig. 9 is a detail view showing the means for draining water from the tanks or receptacles of the barge or float according to my invention.

As shown in these views, the improved dredging apparatus comprises a combined pump and motor casing formed from an upper section 1, an intermediate section 2 and a lower section 3, said several sections being provided with flanges 4, 4, fitting flush upon one another and adapted for the passage of bolts or other securing means for holding said sections in relation, and the casing thus formed is provided at its upper part with a bail 5, the lower ends of which are pivotally connected, as seen at 6, 6, at opposite sides of the upper section 1 of the casing, while the central portion of said bail is provided with an eye as shown at 7, for connection with the lower end of a cable 8 by means of which the casing may be raised and lowered as will be hereinafter explained. The opposite sides of the casing thus formed are provided with lugs or bearings 9, 9, at top and bottom, and said lugs or bearings 9, 9, serve for the connection of rods or poles 10, 10, which are extended upwardly so as to be adapted for use by persons upon a float or barge above for guiding the casing of the dredging apparatus laterally during use of the same.

Within the upper section 1 of the casing is produced a chamber 11, wherein is arranged an electric motor 12 of any preferred type, and 14 represents the circuit conductors



therefor which are carried upwards through the top of the casing and along the cable 8 so as to be adapted for connection with a source of supply which may, according to my invention, be carried upon a float or barge from which the casing is suspended as will be hereinafter explained.

15 represents the armature shaft of the motor, extended downwards at the axis of the casing through a central bearing 16 formed of a boss upon a partition or diaphragm 17 separating the chamber 11 of section 1 from a similar chamber 20 produced in the intermediate section 2.

At the upper part of the lower section 3 of the casing is extended a transverse partition or diaphragm 19 serving to close the bottom of chamber 20 in section 2 and 25<sup>a</sup> represents a shaft extended axially through a central boss 16<sup>a</sup> in said lower partition or diaphragm, its upper end being alined beneath the lower end of armature shaft 15 and its lower end being extended down into a pump-chamber 23 produced in lower section 3. 24 and 24<sup>a</sup> represent stuffing-boxes located in chamber 20 of the intermediate section 2 at the central bosses 16 and 16<sup>a</sup> of the respective upper and lower partitions 17 and 19, said stuffing-boxes being accessible by way of a hand-hole 20<sup>a</sup> in the side of the intermediate casing section 2 and whereon a cover is applied in a well known way to close the same when the device is in operation.

At the adjacent ends of the alined shafts 15 and 25<sup>a</sup> in chamber 20 there are provided coupling members 18 and 18<sup>a</sup>, respectively, held upon the respective shafts and adapted for engagement with each other to produce a driving connection between the shafts while permitting a certain degree of flexure or lateral movement of one shaft relatively to the other without unduly straining the structure as would be liable to happen were said shafts fixedly connected. This connection is also accessible by way of the hand hole 20<sup>a</sup> in the wall of casing section 2, so that repairs may be readily effected. At one side the section 2 has a nipple 21 with which is connected a flexible pipe or hose 22 which extends upwards and is adapted for connection with a source of compressed air upon a float or barge from which the casing is lowered in such a way that compressed air is thereby supplied to chamber 20. The upper stuffing-box 24 will preferably be less tight than the lower stuffing-box 24<sup>a</sup>, which latter affords a substantially air-tight inclosure around the bearing of the lower shaft 25<sup>a</sup> at boss 16<sup>a</sup> and in this manner a certain leakage of air is permitted from the chamber 20 of the intermediate casing section 2 into the motor chamber 11 of the upper casing section 1, whereby a certain heightened air pressure is maintained within said upper motor chamber 11 to prevent the entry of

water therein and also to maintain the motor 12 itself at a proper low temperature during operation and prevent undue heating thereof.

The lower shaft 25<sup>a</sup> is extended down within the pump chamber 23 within the lower casing section 3 and carries therein the rotatory impeller 25 of a centrifugal pump which may be of any preferred character.

26 represents an annulus which is secured upon the base of the lower casing section 3 and has a central opening through which the blade 27 of the pump is extended in such manner as to be adapted to be engaged in the sand or earth underlying the casing to loosen said sand or earth and elevate the same within the impeller of the pump whence it is discharged under pressure in a lateral direction through a discharge outlet 31 at the side of the lower casing section 3.

The lower part of the blade 27 of the pump carries a downwardly extended head 28, having a neck portion of reduced diameter as shown at 29 and said neck portion by preference has detachable connection with said blade 27, the arrangement of these parts being such that said downwardly extended head will penetrate the sand or earth to a point below the lower portion of blade 27 during the operation of the pump so that if rock be encountered, said blade is prevented from coming into contact therewith and being thereby broken. Should the head 28 be broken off at its reduced neck portion 29, it may be readily replaced without material cost or loss of time.

30 represents a plurality of downwardly extended blades or fingers which are extended downwardly around the perimeter of the casing, being secured at their upper ends to the lower section 3 thereof and having their tip ends sharpened in such a way as to be adapted to sink into the sand or earth sufficiently to prevent any tendency to rotative movement to which the casing might otherwise be exposed, and whereby damage might be done to the suspending means or to the air or power connections.

The discharge or eduction passage 31 of the pump chamber 23 is laterally directed therefrom and has an upwardly curved and contracted neck portion 32, wherewith is connected an upwardly extended flexible conduit 33 which is to be carried upward to the barge or float when the sand or earth discharged from the centrifugal pump casing is to be loaded thereon. An ordinary foot-valve may be arranged at the base of this flexible conduit to support the sand and water discharged through the same, but as such a valve is an ordinary expedient I have not illustrated the same herein.

34 represents the barge or float from which the improved dredging apparatus constructed according to my invention is operated as herein shown, and 35 represents a derrick



supported thereon for use in raising and lowering the motor and pump casing in practical use, while 36 represents a hoisting engine and windlass from which the cable 8 is operated in raising and lowering the casing. Upon the barge or float are located tanks or receptacles 38, 38 into which the sand discharged through the flexible conduit 33 from the pump casing is supplied and 37 represents a generator for supplying current for the motor 12. A foot-board 41 is shown extended across the tanks or sand receptacles 38, 38, to be traversed by the workmen guiding the upper end of the flexible conduit so that the tanks or receptacles may be uniformly filled for trimming the load and as shown in Figs. 8 and 9, the walls 39 of said tanks or receptacles are provided at suitable elevations with outlets controlled by cocks 40 and serving for the discharge of water which will of course be supplied from the conduit 33 together with the sand. By this arrangement, the sand is permitted to settle in the tanks or receptacles, while the water overlying the same will be rapidly discharged so as to permit the effective loading of the barge or float. The cocks 40 may, of course, be omitted when desired, since the outlets will be closed by the rise of sand at the base of the tank or receptacle.

In the construction shown in Figs. 4, 5 and 6, the barge or float has tanks at its opposite ends and the derrick 35 is arranged for operation at opposite sides of the vessel, but in Figs. 7 and 8, I have shown the derrick mounted upon a turn-table 42 which by being rotated, permits the pump and motor casing to be operated at the ends of the barge or float as well as at opposite sides thereof, wherefore this construction is better adapted for use in certain cases.

In practical use, the barge or float is moored at the point at which the dredging is to be accomplished, and the pump and motor casing is lowered therefrom with the conduit 33 arranged to discharge the ejected sand and water to the desired tank or receptacle. The cable 8 is preferably sufficiently slack to permit the casing suspended therefrom to sink by its own weight and rest upon the bottom as the dredging operation proceeds. When it is desired to shift the position of the apparatus, the casing will be first sufficiently raised to withdraw the fingers 30 from the underlying sand or earth after which the casing may be moved laterally to the position desired. Should rock be encountered, the head 28 affords an effective protection against breakage of the blade 27 thereby, since said head maintains the blade above such rock at all times. The fingers 30 also operate in a similar manner and may be readily replaced when broken, being held by bolts or the like to the lower casing section 3.

The improved dredging apparatus con-

structed according to my invention is of an extremely simple and comparatively inexpensive nature and is especially well adapted for use by reason of the readiness and convenience with which it may be operated below the water, there being no mechanical driving connection requisite for the pump, and the motor being wholly inclosed and directly connected to the pump and effectively protected against defective operation through leakage, and it will also be obvious from the above description that the apparatus is susceptible of some modification without material departure from the principles and spirit of the invention and for this reason I do not desire to be understood as limiting myself to the precise form and arrangement of the several parts of the apparatus herein set forth in carrying out my invention in practice.

Having thus described my invention, what I claim and desire to secure by Letters Patent is—

1. An apparatus of the character described comprising a casing having its top and side walls inclosed to produce a chamber within it, and adapted to be lowered from a float and to be completely submerged beneath the surface of the water, a motor within the casing, means for supplying energy to operate the motor, a pump driven from the motor and also adapted to be submerged below the surface of the water, and a discharge conduit extended from the pump to a point above the surface of the water.

2. An apparatus of the character described comprising a casing having its top and side walls inclosed to produce a chamber within it, and adapted to be lowered from a float and to be completely submerged beneath the surface of the water, a motor within the casing, means for supplying energy to operate the motor, a pump also inclosed in the casing and driven from the motor, and a discharge conduit extended from the pump to a point above the surface of the water.

3. An apparatus of the character described comprising a rotary pump, an electric motor having an armature shaft whereon the pump is mounted, an inclosure for the motor, means for supplying electrical energy to the motor and a discharge conduit extended from the pump and adapted to be extended above the surface of the water.

4. An apparatus of the character described comprising a rotary pump, an electric motor operatively connected therewith, an inclosure for the motor, means for supplying electric energy to the motor and means for maintaining increased pressure within said motor inclosure.

5. An apparatus of the character described comprising a rotary pump, an electric motor operatively connected therewith, an inclosure for the motor, means for supplying elec-



tric energy to the motor and means for supplying compressed air within the motor inclosure.

6. An apparatus of the character described comprising a casing having a diaphragm dividing it into two chambers, a motor housed in one of the chambers, means for supplying energy to the motor, a shaft extended from the motor, a pump driven from said shaft, means for supplying compressed air to the other chamber and a connection between said chambers for supplying such compressed air from one to the other chamber.

7. An apparatus of the character described comprising a casing having two chambers, a motor mounted in one chamber and having a shaft extended in the other chamber, a pump on said shaft in such other chamber and having blades extended therefrom for engagement in sand or the like, means for supplying energy to the motor and a discharge conduit connected with the pump chamber and adapted to receive sand or the like therefrom to be conveyed above the surface of the water.

8. An apparatus of the character described comprising a casing having two chambers, a motor mounted in one chamber and having a shaft extended in the other chamber, a pump driven from said shaft in such other chamber and having blades extended therefrom for engagement in sand or the like, means for supplying energy to the motor and a part carried by the pump and extended below the blades thereof and adapted to penetrate such sand or the like.

9. An apparatus of the character described comprising a casing having two chambers, a motor mounted in one chamber and having a shaft extended in the other chamber, a pump driven from said shaft in such other chamber and having blades extended therefrom for engagement in sand or the like and parts extended from the casing below said blades of the pump and adapted to penetrate such sand or the like.

10. An apparatus of the character described comprising a casing having two chambers, a motor mounted in one chamber and having a shaft extended in the other chamber, a pump driven from said shaft in such other chamber and having blades extended therefrom for engagement in sand or the like, means for supplying energy to the motor, and a part detachably connected with the pump and extended centrally therefrom below said blades and adapted to penetrate such sand or the like.

11. An apparatus of the character described comprising a chambered casing, a motor therein, means for supplying energy thereto, a shaft for the motor, a pump having a shaft extended adjacent to the motor shaft and a flexible connection for driving the pump shaft from the motor shaft.

In witness whereof I have hereunto signed my name this 28th day of June 1907, in the presence of two subscribing witnesses.

RANDOLPH E. S. GEARE.

Witnesses:

H. G. ROSE,  
WILLIAM J. FERTH.