

No. 670,868.

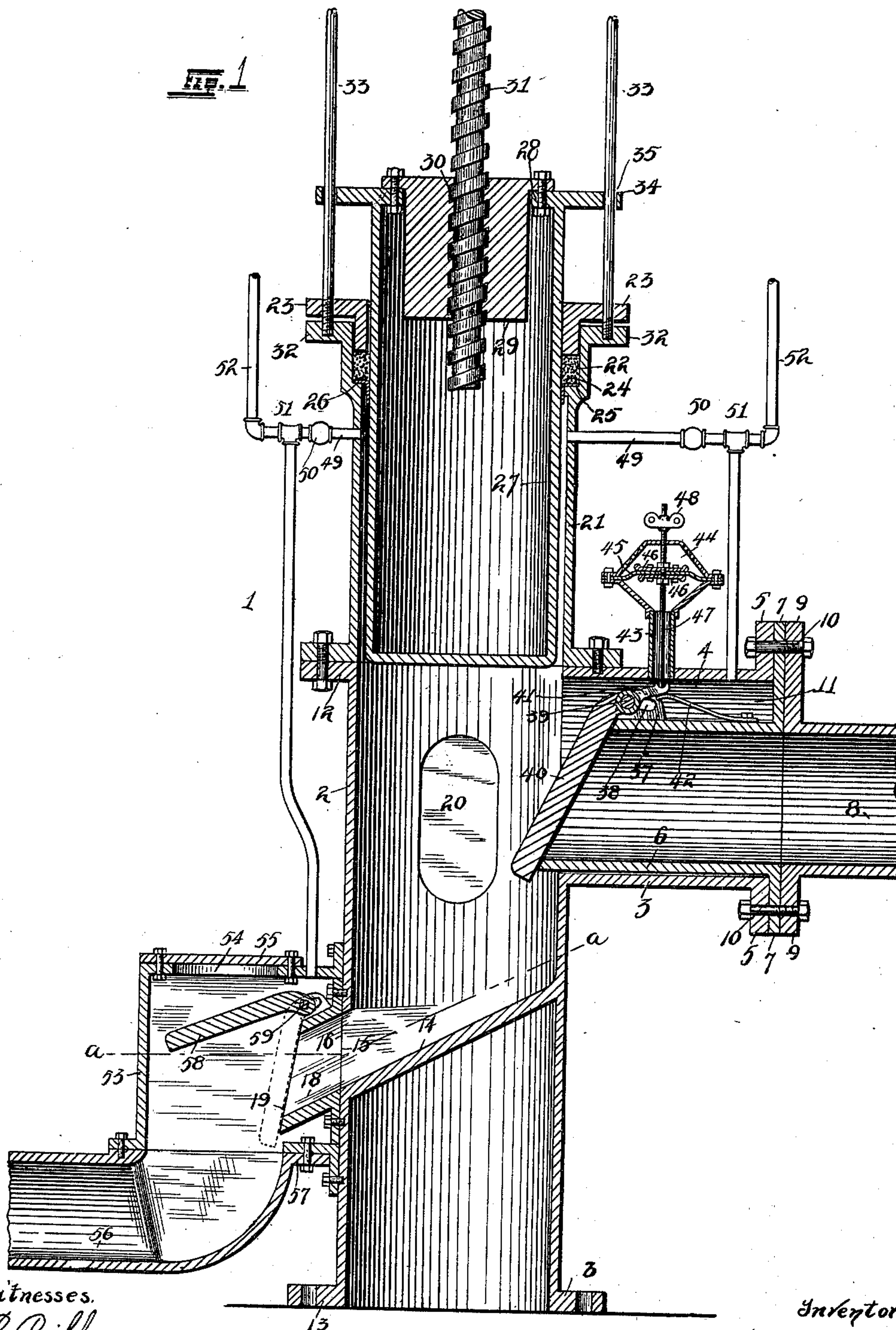
Patented Mar. 26, 1901.

P. J. BODE.
PUMP.

(No Model.)

(Application filed Oct. 28, 1898.)

3 Sheets—Sheet 1.



Witnesses.

B. Pillman
Peter Begg

Inventor

Peter J. Bode.
By Eichler and Lane Attys.

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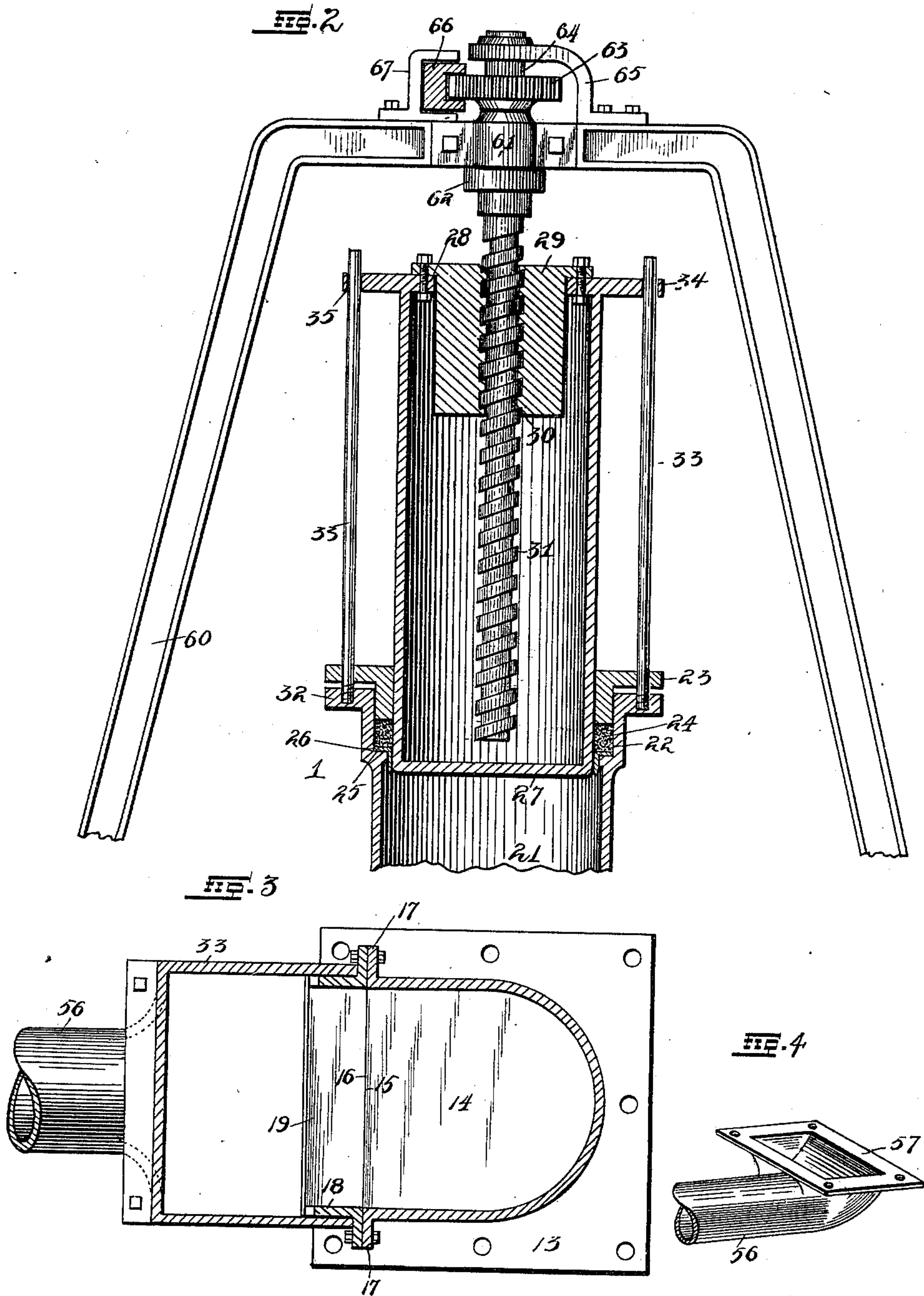
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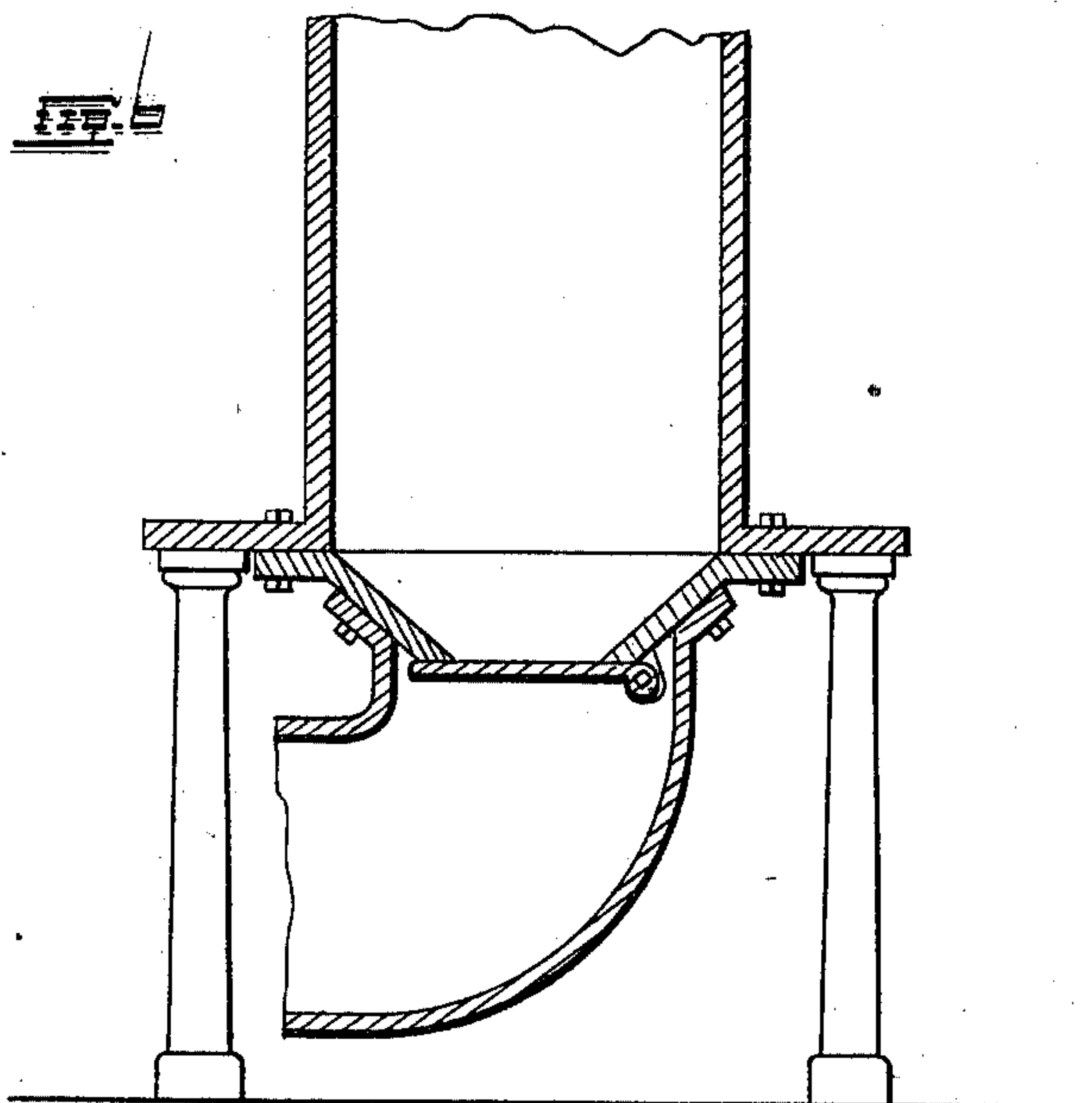
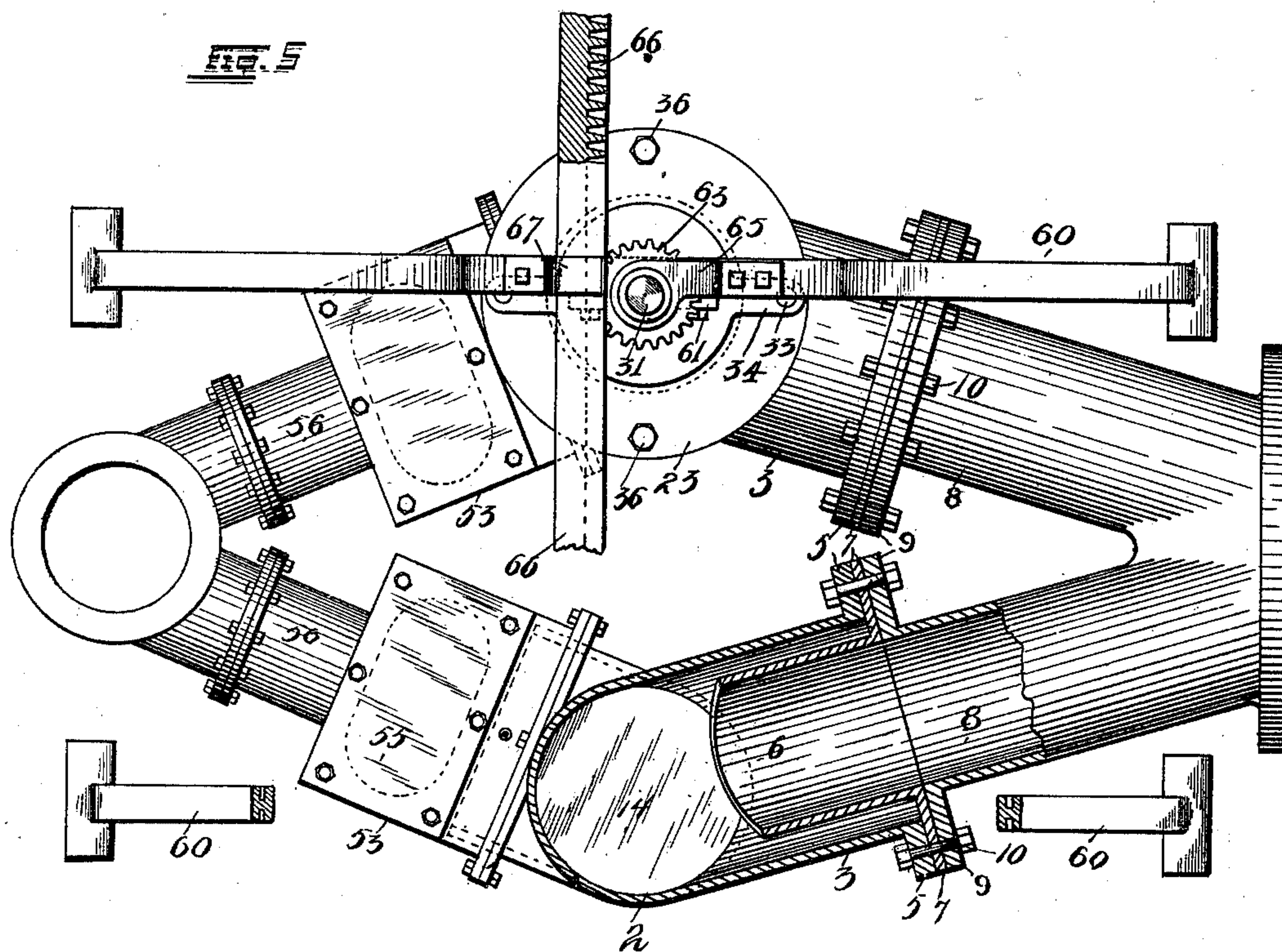
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Peter Begg

Inventor

Peter J. Bode.

By Eicks & Lane Attys.

UNITED STATES PATENT OFFICE.

PETER J. BODE, OF ST. LOUIS, MISSOURI, ASSIGNOR OF ONE-EIGHTH TO
WILLIAM SCHMERMUND, OF SAME PLACE.

PUMP.

SPECIFICATION forming part of Letters Patent No. 670,868, dated March 26, 1901.

Application filed October 28, 1898. Serial No. 694,846. (No model.)

To all whom it may concern:

Be it known that I, PETER J. BODE, of St. Louis, in the State of Missouri, have invented certain new and useful Improvements in
5 Pumps, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, forming a part hereof.

My invention relates to improvements in
10 pumps; and it consists in the novel arrangement, construction, and combination of parts, as will be more fully hereinafter described, and set forth in the claims.

The object of this invention is to construct
15 a pump of the class used for dredging whereby any and all classes of coarse as well as fine material are received by its suction and smoothly discharged therethrough without injuring the valves and plunger in the least,
20 which is an important advantage over the present pumps now in use.

Another advantage is that the material when received in the pump-chamber is discharged downwardly or at a point lower than
25 the suction-pipe, and in connection with the force of the plunger its own gravity aids in its discharge, preventing any of the material communicating with the plunger.

Referring to the drawings, Figure 1 is a
30 vertical sectional view of my complete pump, showing the entire construction of its valves, plunger, &c., in operative form. Fig. 2 is a vertical sectional view of the upper portion of the pump and its plunger, showing the mechanism by which said plunger is operated
35 and also the supports for said mechanism. Fig. 3 is a horizontal sectional view of the pump, taken on the line *a a* of Fig. 1, showing the width of the discharge-passage. Fig. 4 is
40 a perspective view, to a small scale, of the discharge-pipe elbow. Fig. 5 is a top plan view with parts in section, showing my invention placed in pairs and its connection to the suction and discharge pipes and also showing a
45 part of the operating mechanism. Fig. 6 is a vertical sectional view of a portion of a modified form of discharge-valve which is designed to be used in pumps only for dredging sand and discharging the sand upon barges. This

is used where the pump is placed higher than 50
the barge.

In the drawings, 1 indicates my complete invention, which consists of a receiving-chamber 2, having a sideward extension 3, which acts as a valve-chest 4, having its end provided with a flange 5. In this chest is placed
55 a pipe 6, having a flange 7 to correspond with the flange 5, and to this pipe is connected a pipe 8, also provided with a flange 9, these three flanges being provided with suitable
60 packing and all held tightly together by means of bolts 10 passed therethrough. The pipes 6 and 8 are each formed out of center of the flanges and so constructed as to rest upon
65 the lower surface of the valve-chest and allowing a space 11 between the top of the valve-chest and the pipe in which is adapted to operate the valve mechanism, which will be
fully hereinafter described and set forth.

The top of the receiving-chamber is provided with a flange 12 and at its bottom with
70 a flange 13, by which said pump is secured and held to the floor or foundation. In the chamber is an inclined partition 14, which terminates in an opening 15, formed in said
75 chamber at the lowest point of the inclined partition 14. This hole or opening 15 is extended the entire width of said receiving-chamber and is provided with a flat face or
80 contact-surface 16, formed with a flange 17, to which a valve-seat casting 18 is securely bolted. It will be observed that the valve-seat casting corresponds in angle with the
85 partition 14, and its outer surface 19 or valve-seat is also at an angle.

In the receiving-chamber on a line with the suction-valve is a hand-hole 20, provided with a suitable cover, and is used for cleaning said
90 chamber in case of obstructions and for repairing in case of breakage.

Upon the receiving-chamber 2 is mounted and firmly secured the working barrel 21, having its upper portion provided with a larger
95 bore 22 for the insertion of a gland 23 and packing 24, which rests upon a shoulder 25, formed on the inside of said barrel, over which is also placed a rubber or leather packing-ring 26. In this barrel 21 operates the plun-

ger 27, having its upper inner end provided with a collar 28, on which is firmly and securely bolted a nut 29, in which are double spiral screw-threads 30 of large size, in which
5 operates the screw or spiral 31.

In the flange 32 of the barrel 21 is firmly secured two uprights or guide-rods 33, which extend upwardly a distance suitable for the highest point of the upward movement of the
10 plunger, which is guided by lugs or ears 34, forming a part of the plunger, and are provided with holes 35, which fit the rods 33. (See Figs. 1 and 2.) The gland 23 is suitably bolted to the flange 32 by bolts 36 or otherwise.

Upon the upper surface of pipe 6 are formed ears 37, provided with elongated slots 38, which are on a slight incline, and in these slots operate a shaft 39, which carries a valve
15 40, suitably secured thereto, and said valve being bent at the hinge portion so as to provide a place for the adaption of an arm 41, in which is a cup-shaped opening, in which rests a rod of the diaphragm hereinafter described. Upon the top of the pipe 6 is securely bolted
20 a spring 42, and its free or unfastened end comes in contact with the under side of the arm 41, keeping it pressed upward.

To the top or upper part of the valve-chest is secured a pipe 43, and upon the pipe 43 is
30 mounted a diaphragm-casing 44, composed of two parts, the upper part being provided with a number of holes, through which air is adapted to pass. Between the halves of the casing is placed and held a diaphragm 45, of
35 leather or rubber, and is held in the center between two plates 46, which are carried by the diaphragm-plunger 47 and held thereto by nuts or other means. The intention of the casing 44, containing the leather or rubber
40 diaphragm 45, plunger 47, and its pipe connection to the valve-chest, is for the purpose of equalizing the vibration of the valve 40 during the upstroke of the plunger and to sufficiently aid in opening the valve, so as to al-
45 low foreign material to enter the receiving-chamber, which, as a rule, is probably fifty to seventy-five per cent. of the area of the suction-pipe, such as rocks, gravel, sticks, boulders, &c. It is a well-known fact that pump-
50 valves held in place by hinges would vibrate to such extent as to prevent material such as mentioned from freely passing said valve. The explanation of the use of the diaphragm is as follows: After the discharge-valve has
55 closed, the pump, owing to the upstroke of the plunger, produces a vacuum in the receiving-chamber and up into the lower space of the leather or rubber diaphragm-casing 44. The atmospheric pressure is herewith utilized on
60 the upper surface of the diaphragm, which presses thereon, and said pressure ascertained is exerted through the rod of said plunger 47, at its lowest end, which is in communication with the arm 41, located on the valve 40, and
65 in this manner the pressure will aid in raising said valve. When the plunger 27 begins to descend and the entire interior of the

pump is filled with water, there will be a pressure produced, and therefore the vacuum is destroyed until the next upstroke of the plun- 70
ger, when such vacuum is produced. The pressure will also exert its power in the lower space of the diaphragm-chamber, which has then a tendency to relieve the rod of its ac- 75
tion, and it will therefore allow the spring 42 to exert its power to help to close the suction-
valve 40 quickly, so as to avoid what is termed "valve-leakage" as much as possible. An-
other feature is that in streams where fine sand only is pumped up, the thumb-screw 48 80
(seen on the outside and on the rod 47 of the diaphragm and its plunger) can be screwed down onto said diaphragm-casing, so as to avoid the downstroke of said diaphragm, it
being when the plunger and diaphragm are 85
raised high up that the suction-valve will have its natural sway.

On the working barrel 21 there are placed pipes 49, valves 50, and T's 51 for a so-termed
"flush-pipe," the pipe connections communi- 90
cating from said working barrel to the valve-chambers, its purpose being to drain and carry away such water and air as might lodge in the top of the working barrel 21 around the
plunger. This water is conveyed through the 95
piping down into the valve-chest 4 at the point behind the suction-valve to wash away material that might lodge therein. The air is allowed to escape through the pipe 52 by means of a check-valve formed in its elbow. 100

The construction of the discharge-valve (shown in Figs. 1, 3, and 5) shows said valve on a cylindrical receiving-chamber opposite the suction-valve, but a little to one side and in communication with the inclined bottom. 105
This construction is necessary to raise material such as lead, copper, or iron ore a certain height above the pump by means of the flow and pressure of water, which is provided with a fast current. Over this discharge- 110
valve and valve-seat is placed a casing 53, secured to the pump in any desirable manner and made perfectly air and water tight and provided at its top with a hand-hole 54, duly provided with a cover 55. To the bottom 115
of the casing 53 is secured the discharge-pipe 56, having its contact end, by which it is in communication with said casing, hopper-shaped, (see particularly Fig. 4,) and is secured thereto by flanges 57, formed thereon. 120
This discharge-pipe 56 is reduced in size to one-fourth the area of the plunger, as is shown in Figs. 1 and 5, and planned in construction (see Fig. 5) to avoid unnecessary elbows and T's in the discharge-pipe of the pump where 125
two are placed together, as well as on the suction end. The intention of this is to avoid one stream of one pump acting against the other, it being that they are single acting each.

The pumps are preferably operated in pairs, 130
as will be seen by referring to Fig. 5, and are placed between or under standards 60, which are securely fastened to the floor or ground in any desirable manner. These uprights

have the top horizontal and upon this formed a bearing 61, and in this bearing operates the screw 31, which is provided with a collar 62, which bears against the under surface of the bearing 61, and upon said bearing and secured to the screw 31 is a toothed wheel 63, provided with a collar 64, upon which rests a brace 65, which fits over the top end of said screw 31, bracing the same, and securely bolted to the uprights. This toothed wheel 63 is operated by a rack-bar 66, provided with a flange on each side of the teeth, which acts as a guide and prevents said rack from becoming disconnected from the wheel. The bar 66 is held in place by means of braces 67, firmly secured to the uprights. The one rack-bar comes in communication with the wheels on each pump, and when adjusted the bar by its sweep backward and forward operates both pumps, one in the act of suction and the other discharging, and vice versa. This rod is operated in any desirable manner from any part of machinery, which I deem unnecessary to show and describe.

By referring to Fig. 1 it will be seen that the receiving-valve and its pipe are placed at the extreme height of the receiving-chamber and low enough so that when the plunger of the pump is at the lowest point of its stroke it leaves an open space, or, in other words, so many cubic inches or feet to receive coarse material, which has a tendency, being heavier than water, to fall on the inclined plane, and at the same time it will allow the valve to have a full swing in order to open wide into said receiving-chamber.

My experiments have shown that the proper plan to pursue is to let water and other articles that are to be handled come in at the highest point and allow it to descend on an incline toward an outlet lower than the inlet, so as to leave the valves easier or more free to act until it presses through such valves and into the discharge-pipe, it being found that the material is very easily handled after it has left the valves by means of a fast current produced by the downstroke of the plunger.

The motion for operating the pump as described by using a spiral and nut and horizontal rack-bar is adapted for special purposes only. The intention is for pumps to be placed in the hold of a vessel or barge which would bring the pump nearer to the level of the water-surface of a stream, which is a very important matter in saving space in a small craft. It is used in places where there is little room above the pump, but plenty of space to work the horizontal rack-bar.

In places where I have unlimited space I desire to work the pump in the ordinary manner by having a cross-head attached to the pump-plunger and work it in pump style.

I may on some occasions place the discharge-valve of the pump at the bottom of the receiving-chamber, as shown in Fig. 6. This style I use where it is not necessary to

force the water or material to any particular place, and it is placed on a paige or like device, and the sand is allowed to be discharged on the surface of the barge.

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

1. In a pump of the class described, constructed to handle dredging material, a working barrel mounted upon a receiving-chamber, a plunger operating in said working barrel, and a means for propelling said plunger, a suction-valve placed in a chamber formed on the upper side of said receiving-chamber, and a discharge-valve placed in a discharge-chamber formed on the lower side of said receiving-chamber, said valves arranged opposite one another and their chambers connected by an inclined bottom, a diaphragm mechanism communicated with the suction-valve for aiding its operation, said diaphragm mechanism operated by atmospheric pressure, substantially as shown and for the purpose set forth.

2. In a pump provided with a base which acts as the receiving-chamber, a working barrel mounted upon said receiving-chamber, said chamber provided with a suction-valve chamber at its highest point, and a discharge-valve opening at its lower side, an inclined bottom formed in said chamber, its highest point being a short distance below the receiving or suction chamber, and its lowest end communicating with the discharge-opening, a valve-seat casting having an inclined bottom secured to said casing communicating with the bottom or inclined partition forming an extension thereto, a casing placed over said valve-seat, and a hopper-shaped discharge-pipe secured to the under side of said casing, a valve placed upon said valve-seat casting and operating in said casting, a suction-pipe placed in said receiving valve-chamber, formed as a casting provided with a flange which is secured to the flange of the chamber, and the suction-pipe leading therefrom, a valve located on said suction-pipe casting, and provided with an arm, said arm communicating with a diaphragm mechanism, a plunger operating in a working barrel, an operating mechanism operating said plunger, substantially as set forth.

3. In a pump composed of a working barrel mounted upon a receiving-chamber, a plunger operating in said working barrel, a rack-and-screw mechanism operating said plunger by means of a nut formed in said plunger, and held and guided by rods, a suction pipe and valve located at the upper side of said receiving-chamber and a discharge pipe and valve located on the opposite lower side of said chamber, an inclined bottom or partition formed inside said receiving-chamber, below the receiving or suction valve, and above the discharge-pipe, yet communicating therewith, and so constructed to allow

the material to always fall away from the valves, a diaphragm mechanism connected to the suction-chamber and communicating with the valve, pipe connections provided with
5 valves connecting said valve-chambers with the working barrel, an angular pipe connection, connecting said suction-pipes to the main, and the discharge-pipe to its main, sub-

stantially as shown and for the purpose set forth. 10

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

PETER J. BODE.

Witnesses:

ALFRED A. EICKS,
B. PILLMAN.