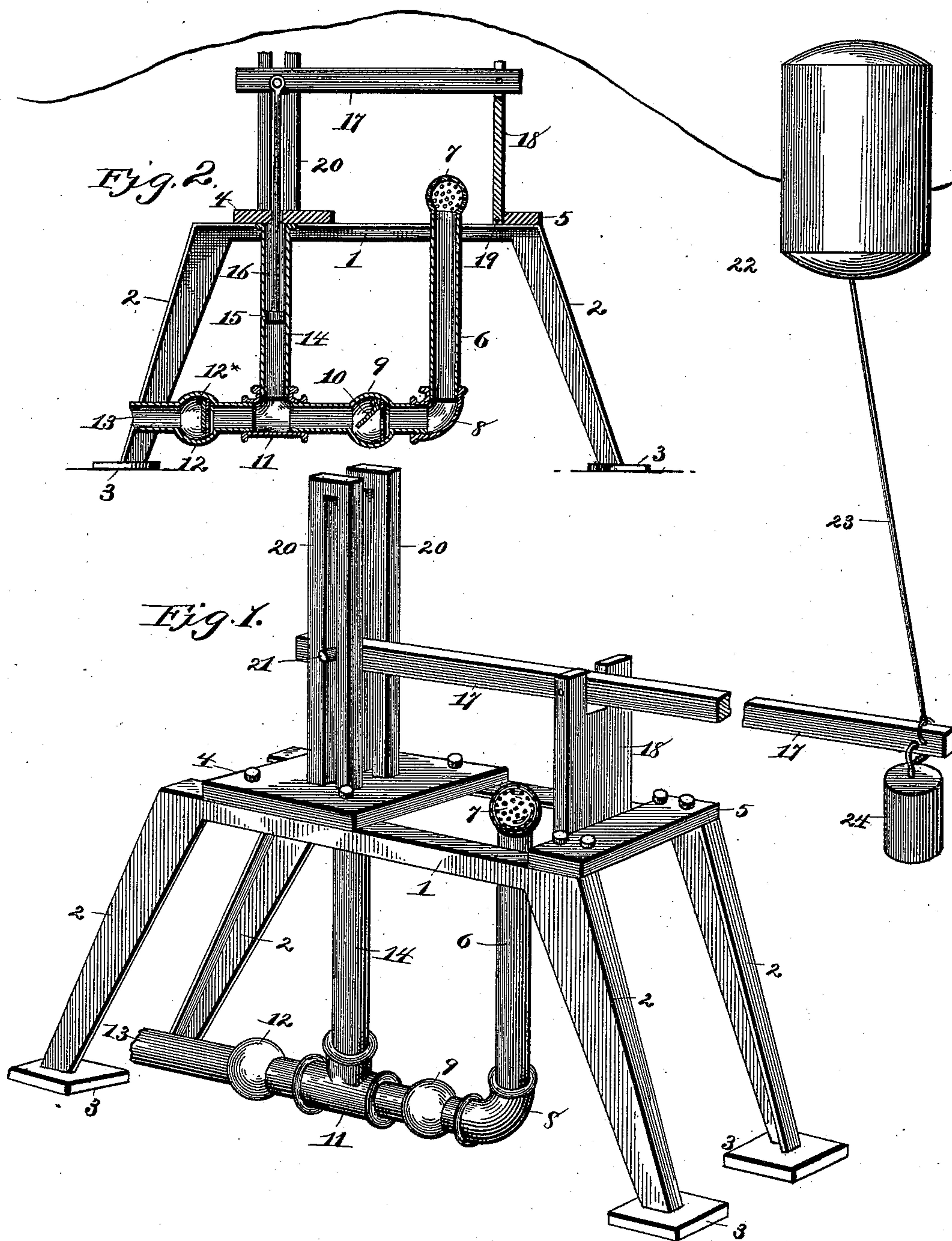


(No Model.)

J. E. GRAY.
WAVE POWER.

No. 429,617.

Patented June 10, 1890.



Witnesses:

E. Hurdman
W. Small

Inventor:

James E. Gray.

By *his* Attorneys,

C. A. Snow & Co.

UNITED STATES PATENT OFFICE.

JAMES E. GRAY, OF ELYRIA, OHIO.

WAVE-POWER.

SPECIFICATION forming part of Letters Patent No. 429,617, dated June 10, 1890.

Application filed February 5, 1889. Serial No. 298,783. (No model.)

To all whom it may concern:

Be it known that I, JAMES E. GRAY, residing at Elyria, in the county of Lorain and State of Ohio, have invented a new and useful Method of Operating Force-Pumps by Action of Waves or Swells of a Body of Water, of which the following is a specification.

My invention has relation to that class of force-pumps adapted to be operated by wave-power; and among the main objects in view are to provide a suitable pump of simple construction so arranged and mounted as to be readily transported from one point to another, and to so construct and connect the means for operating the pump that the same will not be affected by buffets received by the waves or by boats plying the stream in which it is located.

Other objects and advantages of the invention will hereinafter appear, and the novel features thereof will be particularly pointed out in the claims.

Referring to the drawings, Figure 1 is a perspective of a pump constructed and arranged in accordance with my invention. Fig. 2 is a central longitudinal section of the pump detached from its lever.

Like numerals of reference indicate like parts in both the figures of the drawings.

In constructing the frame-work for the support of my pump I provide two opposite inverted-U-shaped side sections 1, the opposite arms 2 of which terminate in flared feet 3. Transverse end plates 4 and 5 connect the sections 1 at their rear and front ends, respectively, and complete the supporting-frame. Projecting between the sides 1 is the induction-pipe 6, the receiving end of which is provided with a strainer 7, which is located at a suitable height above the frame-work. An ordinary elbow-section 8 connects the lower end of the pipe 6 with one end of a valve-section 9, provided with an ordinary inwardly-opening clack-valve 10. To the opposite end of the section 9 is connected an ordinary three-way coupling 11, provided at its opposite end with a valved section 12, having an outwardly-opening clack-valve 12*, to which is connected the discharge-pipe 13, leading to any point of use.

14 designates the pump-cylinder, the lower end of which is connected to the intermediate

port of the three-way coupling, and the upper end of which is received and supported by the rear transverse plate 4. A piston 15 is mounted for movement in the cylinder, and to the same is connected a piston-rod 16, the upper end of which is pivotally connected with a lever 17, fulcrumed in a standard 18, the lower end of which is pivotally connected by a bolt 19 to the transverse plate 5. Vertical guides 20 are arranged at each side of the piston 16 for opposite guide-lugs 21, projecting from the sides of the rear end of the lever 17, said guides being secured to the rear transverse plate 4.

22 represents a buoy or float designed to ride upon the surface of the water, and is connected by a flexible connecting medium—such as a cord, cable, or chain 23—to the free end of the lever 17, said free end of the lever also being provided with a return-weight 24.

In practicing my invention I prefer to cast the frame-work and bolt the same together in any suitable manner.

The frame and pump described are located upon the bed of a river, lake, creek, or other body of water, and the connecting medium 23 formed of such a length as to permit the buoy or float to float upon the top or surface thereof. The force of the waves serves to raise the buoy, and in so doing depresses the piston 15 through the medium of the lever 17 and the connected piston-rod. This downward movement of the piston-head serves to force any water within the pump-cylinder and the sections 9 and 11 out through the valve 12 and into the discharge-pipe 13, the valve 12 opening outwardly for this purpose and the valve 10 closing against the back-pressure. As the force of the wave passes by, the weight 24 acts with force to return the lever, and in so doing raises the piston-head, thus causing a vacuum in the cylinder, which opens the valve 10 and permits the entrance of water into the sections 9 and 11 and the cylinder 14, and a constant flow of water passes through the pump.

By reason of the flared or flanged feet 3 the pump is prevented from sinking in the soft muddy bottom.

Having thus described my invention, what I claim is—

1. The combination, with the frame-work

carrying the pump-cylinder 14, having the head 15 and rod 16, of the opposite slotted guides mounted on the frame-work, the lever 17, having lugs 21, mounted in the guides and
5 connected with the upper end of the rod 16, the pivoted standard 18 for the lever, the weight 24, mounted at the outer end of the lever, the buoy 22, and the flexible connection 23, substantially as specified.

10 2. The combination, with the side frames 2, secured together and to the standard 18, and opposite slotted guides 20, projecting therefrom, the cylinder 14, located between the guides, the three-way coupling 11, secured to
15 the lower end thereof, the valved sections 10 and 12, connected with the ends of the coupling and provided with valves opening in similar directions, the induction-pipe 6, secured to the section 10, and the eduction-pipe 13, secured to the section 12, of the piston 15 20 and its rod 16, the lever 17, pivoted in the standard 18 and guided by the guides 20 and connected with the piston-rod, the weight 24 on the outer end of the lever, and the buoy or float 22, connected to said end by the con- 25 nection 23, the entire apparatus being located under water, substantially as specified.

JAMES E. GRAY.

Witnesses:

W. L. FAY,
M. B. CATER.