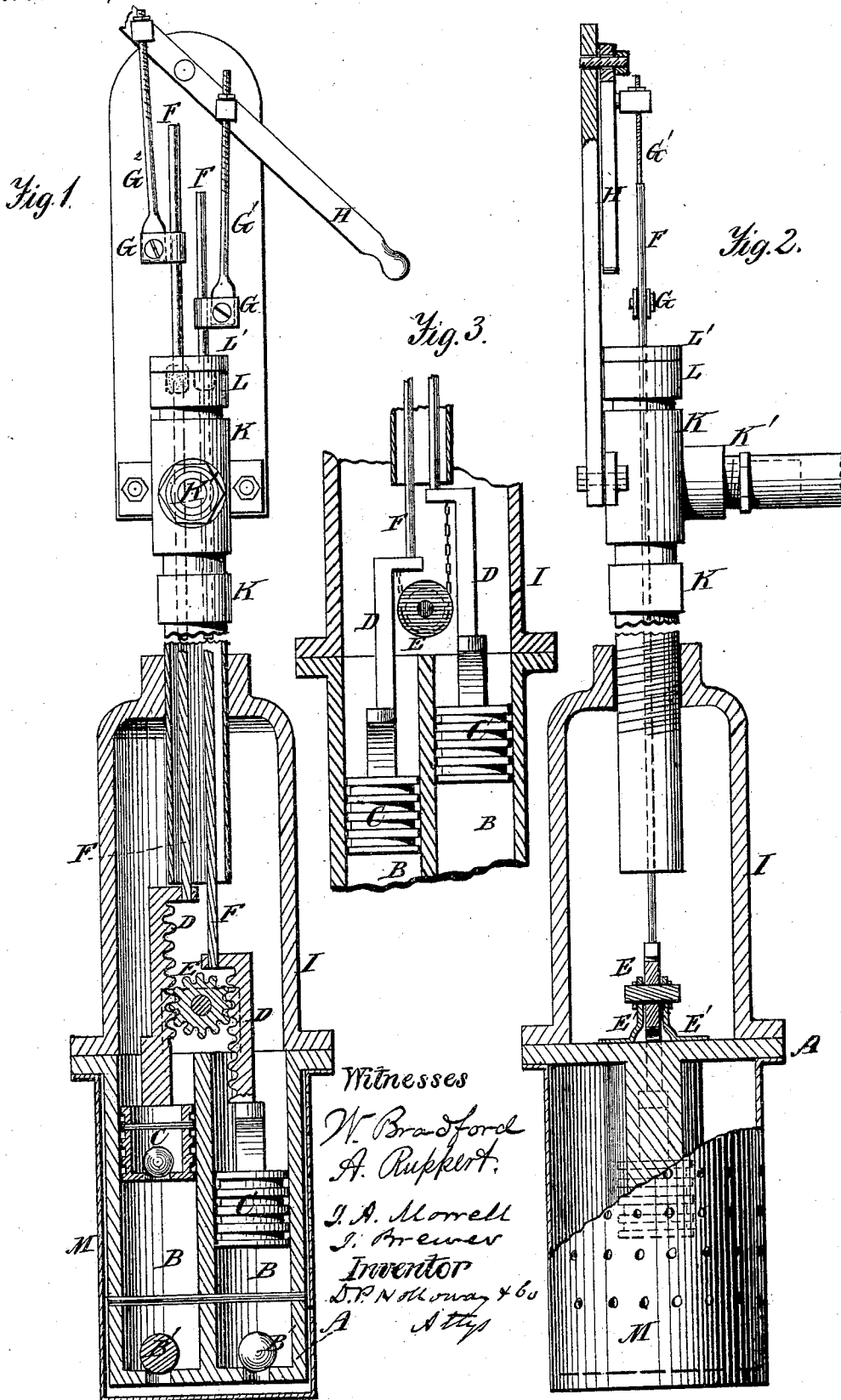


J. A. MORRELL & J. BREWER.
Submerged Pumps.

No. 141,807.

Patented August 12, 1873.



UNITED STATES PATENT OFFICE.

JAMES A. MORRELL AND JOHN BREWER, OF NEW YORK, N. Y.

IMPROVEMENT IN SUBMERGED PUMPS.

Specification forming part of Letters Patent No. **141,807**, dated August 12, 1873; application filed June 28, 1873.

To all whom it may concern:

Be it known that we, JAMES A. MORRELL and JOHN BREWER, both of New York, in the county of New York and State of New York, have invented certain new and useful Improvements in Submerged Pumps, of which the following is a specification:

Figure 1 is a vertical elevation of our improved pump, a portion being shown in section, the parts represented being the lever by which it is operated, the adjustable connecting-rods, the piston-rods, stuffing-box, air-chamber, racks and pinion, cylinders, pistons, and valves. Fig. 2 is a side elevation, partly in section, showing the discharge-pipe in connection with the other parts; and Fig. 3 is a sectional elevation, showing a portion of the pump-cylinder and the air-chamber, the pistons, and a portion of their rods, with a chain and wheel for uniting them.

Corresponding letters refer to corresponding parts in the several figures.

Our invention relates to submerged pumps; and it consists in the construction and combination of some of its parts, as will be more fully explained hereinafter.

In constructing pumps of this type we use a cylindrical base or lower part, A, in which there are formed two cylinders, B B. These cylinders are to be as near to each other as possible and leave the required amount of metal between them, the object being to place them in such relation to each other that a pinion may be placed between their toothed piston-rods at their lower ends, and that the upper portion of said rods may both pass up through the discharge-pipe. These cylinders are formed by boring cylindrical apertures into the base, which pass nearly through the same, as shown in Fig. 1, but which leave a head or diaphragm closing the lower ends thereof. These heads or diaphragms have apertures formed in them, which serve as induction-passages for the water, and are controlled by valves B' B', which are arranged within the cylinders, and so as to close down upon the upper surfaces of their lower heads, and thus allow the water to pass in as the piston in either is raised up, and to close as the pistons descend, and prevent the water from being forced out at that point.

Within the cylinders B B there are placed pistons C C, which may be of any approved form of construction; but we prefer the grooved form shown, in order that the water may form the packing thereof, which it will do, as, if there is any leak past the first ring of the piston, it will be checked by falling into the first groove or recess, and then, if any passes the second ring, it will be still further checked by the second groove, and so on to the end, the result being that no water can pass the entire length of the head while the piston is making its stroke.

These pistons we prefer to make hollow, and to place a spherical valve inside of their bottom heads, with a rod across the heads above said valves to prevent their being lifted out of their places; but it is apparent that a head with apertures through it may be used, and that its valves may be placed upon its upper surface, and be of a different form from that shown, if such form be preferred.

To the upper portions of the pistons there are attached rods D D, having upon their inner surfaces cogs or teeth, and upon their upper ends inwardly-extending projections, the cogs being for the purpose of meshing into a pinion, E, which is placed upon a shaft which has its bearings in brackets E' E', which are secured to the upper end of the base A. The projections upon the upper ends of these racks are for the purpose of carrying the parts to which the upper portions of the piston-rods are attached inward, so as to permit them to pass up through the water-discharge pipe.

The office of the pinion and racks above described is to insure the opposite movement of the pistons at one and the same time, whether one or both are connected with the operating-lever at the top of the well or cistern, and at the same time to preserve the parallelism of the rods when the pump is used in deep wells, or where the rods above are of great length.

We have shown in Fig. 3 a modification of the devices used for the purpose just stated, which consists of a wheel or pulley in place of the pinion, said wheel having a chain passed around it, with its ends secured to the projections upon the upper ends of the lower portions of the rods, which are marked D; or a lever may be used in place of the wheel.

Those portions of the piston-rods which pass up through the discharge-pipe are designated by the letters F F, their lower ends being attached to the projections upon rods D D, either by being screwed therein or by nuts upon their ends. From this point they extend upward through the pipe and through packing-boxes, soon to be described, above which they are embraced by clamps G G, which are made to embrace them, while the outer ends of said clamps are constructed for the reception of the ends of connecting-rods G¹ G², which extend from the clamps to which they are pivoted to the operating-lever H, to which, or to projections upon which, they are adjustably connected by means of screws on their ends, which pass through threaded holes in the lever or in its projections, and by set-nuts upon their outer ends, the object being to provide for the proper adjustment of the racks and pinion or of the chain, so that in changing or reversing the movement of the pistons there shall not be any lost motion, and, consequently, no jar upon the pistons. In order that a proper air-chamber may be provided, a vessel, I, is placed upon and bolted to the upper end of the base A, the interior diameter of which is about the same as that of the base, while its upper end is prepared for the reception of the discharge-pipe, which may extend down therein, as shown in Figs. 1 and 2, so as to form a space for air in the upper end of the vessel; but this downwardly-projecting pipe may be cast with the vessel, or diaphragms may be extended downward from its upper surface and the same result produced. This vessel also forms the connection between the discharge-pipe and the cylinders, while it incloses the pinion and the racks and forms the upper head of the base A. From the upper end of the air chamber or vessel I the discharge-pipe K extends upward for any desired distance, according to the depth of the well or cistern in which the pump is placed, it being provided with a discharge-nozzle, K', through which the water passes off to any desired locality. Upon the upper end of the discharge-pipe there is a cap or cover, L, having apertures through it for the passage of the rods F F, and in it are formed cups for the reception of packing, which is kept in place by a gland, L', which may have screws for forcing the same down upon said packing. This cap

and the packing form a guide for the rods, and, together with the water passing up through the pipe, prevents any bending of such rods while in use. In order that the pump may rest upon the bottom of the well or cistern and not be liable to be choked with any débris or mud which may accumulate therein, a case, M, is placed around the base A, which extends upward to the flange on the upper end thereof, to which it is secured, its lower end being closed by a solid head, and a portion of its vertical wall being also solid or non-perforated, while another portion thereof is perforated to such an extent as to admit a flow of water into it, and from thence to the pistons of the pump.

The non-perforated portion of the wall being at the lower end of the case, it follows that no dirt or other substance will be carried into the pump-cylinders by the rising of the pistons, and as all the water which is pumped up has to pass through the perforations in the case above, no sticks, leaves, or other substances sufficiently large can gain access to the valves to affect their operation.

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

1. In combination with a base, A, into which the pump-cylinders are bored, and which receive the water from the bottom, an external enveloping casing, M, perforated only on the sides, so as to serve as a screen, and also as a support for the cylinders B B, which is suspended within it upon its flanges, substantially as set forth.

2. The combination of the adjustable connecting-rods G¹ G², clamps G G, or their equivalents, piston-rods F F, and an operating-lever, H, substantially as and for the purpose set forth.

3. The combination of the adjustable connecting-rods G¹ G², piston-rods F F, toothed rods D D, and their intermediate pinion, or their equivalents, and the pistons C C, substantially as and for the purpose set forth.

In testimony whereof we have signed our names to this specification in the presence of two subscribing witnesses.

JAS. A. MORRELL.
JOHN BREWER.

Witnesses:

FRANK THAYER,
ADDISON SANFORD.