

Silas G. Randall, Electro Magnetic Water Elevator.

No. 119,996.

Patented Oct. 17, 1871.

Fig. 1.

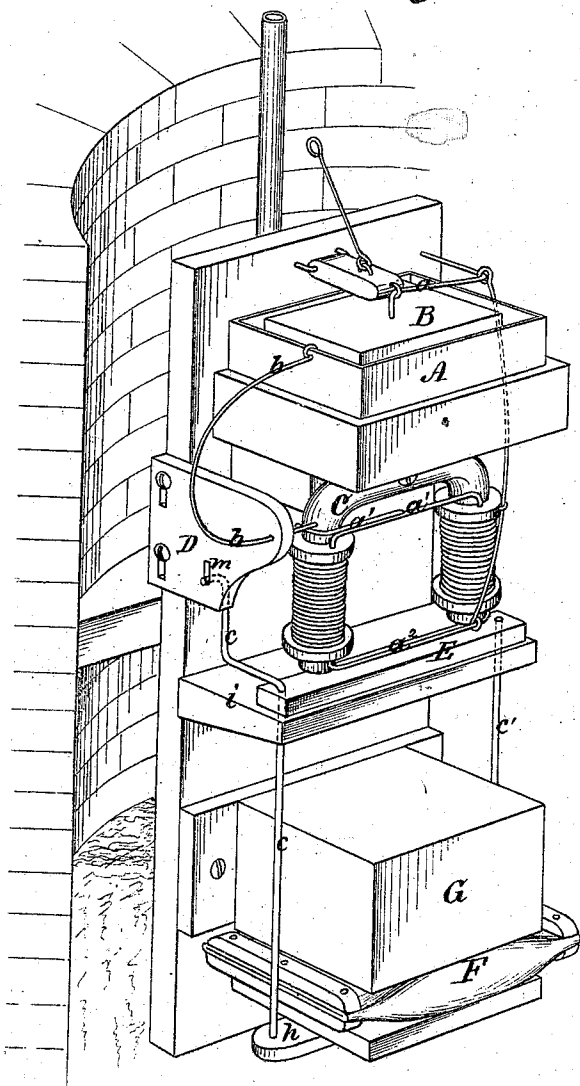
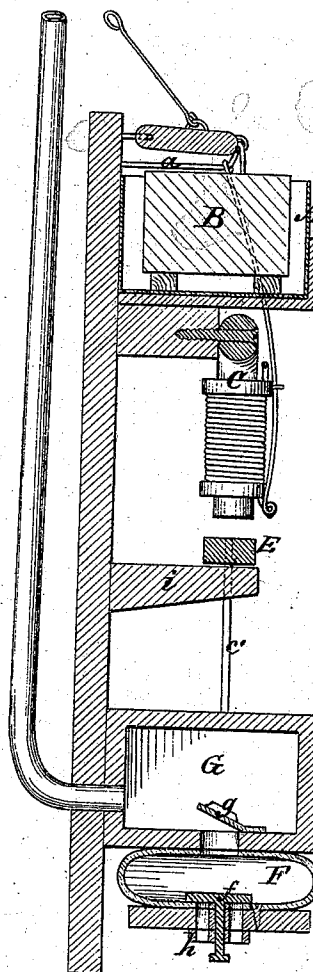


Fig. 2.



Witnesses.
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SILAS G. RANDALL, OF PROVIDENCE, RHODE ISLAND, ASSIGNOR TO AMELIA A. RANDALL, OF SAME PLACE.

IMPROVEMENT IN ELECTRO-MAGNETIC WATER-ELEVATORS.

Specification forming part of Letters Patent No. 119,996, dated October 17, 1871.

To all whom it may concern:

Be it known that I, SILAS G. RANDALL, of the city and county of Providence, and State of Rhode Island, have invented a certain new and useful Electro-Magnetic Water-Elevator.

My invention consists in combining an electro-magnet, operated by any suitable battery, with a water-elevating apparatus, in such a manner that the mechanism will be operated automatically by the magnetic force of the battery; and I do hereby declare that the following specification, taken in connection with the drawing furnished and forming a part of the same, is a true, clear, and exact description thereof.

Referring to the drawing, Figure 1 represents the apparatus in perspective. Fig. 2 represents the same in cross-vertical section.

A represents the outer vessel of a common form of battery; B, the inner vessel. C is an iron horse-shoe magnet secured to a suitable frame-work or vertical foundation. This magnet is in the usual form of electro-magnets, and is connected to the inner vessel B by the wire *a*. The two arms of the magnet are connected by means of the wires *a*¹ and *a*². The end of the wire *a*, adjacent to the vessel B, is pivoted so as to admit of its elevation or separation from contact with the battery. The outer vessel A is connected with the magnet by contact of the wire *b*, which, when its free end is in contact with the wire *a*¹, (which also has a free end,) perfects the circuit and charges the magnet. D is a slide, to which the lower or free end of the wire *b* is attached. When the slide is at its lowest point, the lower end of the wire *b* rests upon the free or outer end of the wire *a*¹. This slide is so set that it will not fall of its own weight, being held in any position it may be placed in by light frictional bearings. E is an iron armature with rods *c* and *c'* passing upward through each end, with insulated connections. The rod *c* is so bent that it enters a slot, *m*, in the slide D. Both of the rods pass through guide-apertures in the shelf *i*, which support the armature. F is a pump. It is composed of a self-expanding chamber of rubber, an induction-valve, *f*, and an eduction-valve, *g*. Beneath the chamber and in close contact

with it is a cross-bar, *h*, to each end of which is secured the rods *c* and *c'*, connecting it with the iron armature E. G is an air-chamber, so called, communicating with the pump by means of valve *g*. Suitable pipes are attached to this chamber by which water is conveyed to any desired point. It is to be observed that a wire or cord is attached to the upper or pivoted end of the wire *a*. The other end of this wire or cord may be placed at any desired convenient position. By it the action of the apparatus may be controlled by elevating or lowering the end of the wire *a*, by which the electric circuit may be broken or continued.

The operation of the apparatus is as follows: It is to be assumed that the battery is properly charged, and the pivoted end of the wire *a* in contact with the battery, with the ends of wires *a*¹ and *b* also in contact. An electric current charges the magnet C, which attracts the armature E. As the armature ascends the upper end of the rod *c* moves freely up along the slot *m* in slide D until the curved portion of the rod comes in contact with the upper end of the slot. By the slight continued upper movement of the armature and its rod *c*, the slide D is elevated sufficiently to lift the lower end of the wire *b* from contact with the outer end of the wire *a*¹, thus breaking the circuit and causing the magnet to drop the armature. As the armature descends the curved end of the rod *c* moves freely down the slot *m* until it comes in contact with its lower end, when it carries down the slide so that the wires *b* and *a*¹ are again brought in contact, when the operation described is repeated, and so on, alternately up and down, continuing as long as the battery is supplied with chemicals, or so long as the upper end of the wire *a* is left in contact with the battery. The lower ends of the rods *c* and *c'* being connected to the ends of the cross-bar *h*, and the latter being connected to the under side of the expansive pump-chamber F, it is obvious that every movement of the armature causes a corresponding movement in the pump, by which water is drawn into and forced from it in a continuous stream. A self-expansive chamber is deemed preferable to

a piston and cylinder, on account of its operation being in a measure frictionless. If desired, the self-expansive chamber may be assisted in its operation by suitable springs or weights.

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

In combination with the electro-magnet, the armature and the pump, the latter being op-

erated automatically by the movement of the armature attached to a suitable circuit-breaking device, as and for the purposes specified.

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