2 Sheets—Sheet 1.

D. BICKFORD.

Portable Pump or Engine.

No. 213,276. Patented Mar. 18, 1879.

FIG. 1.

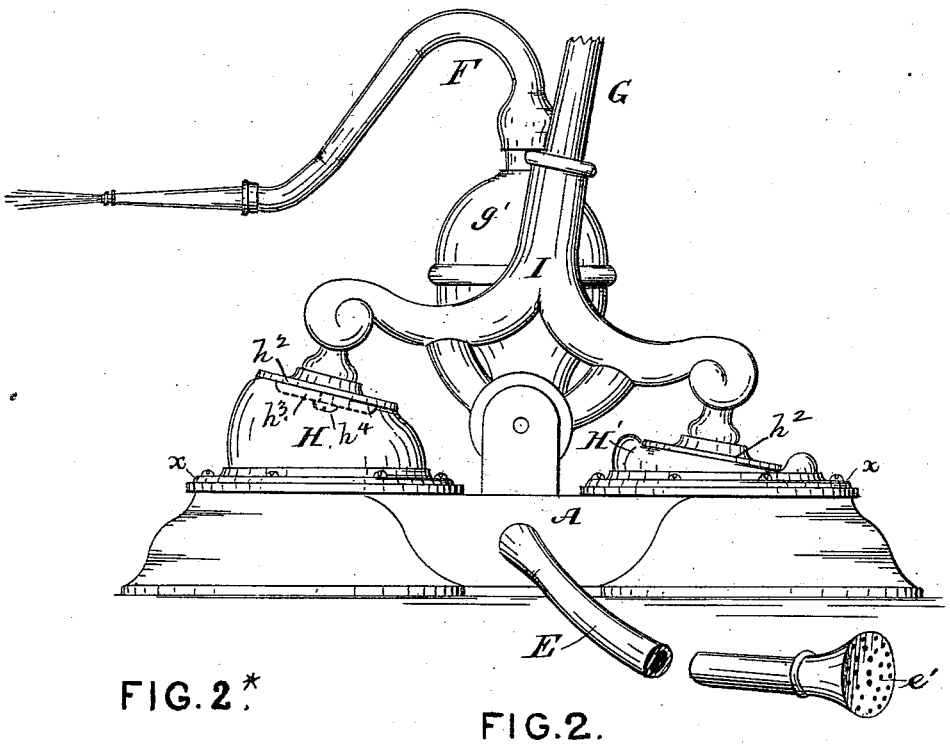


FIG. 2.*

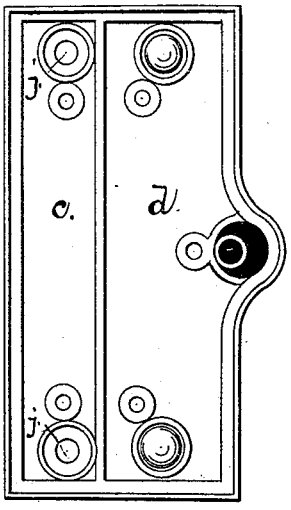
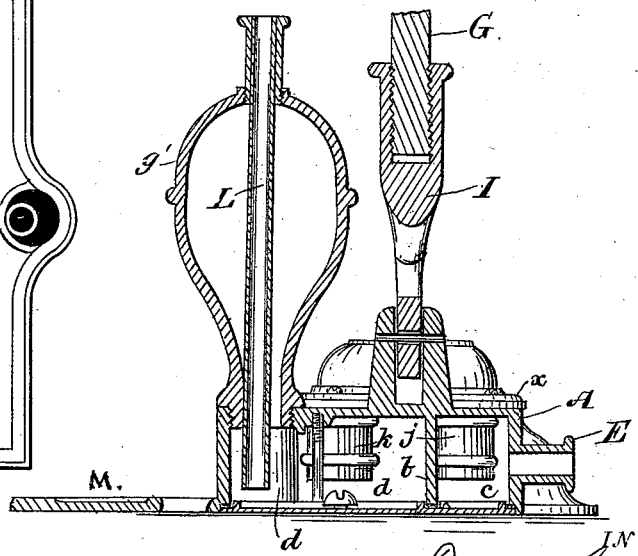


FIG. 2.



WITNESSES

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INVENTOR.

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FIG. 3.

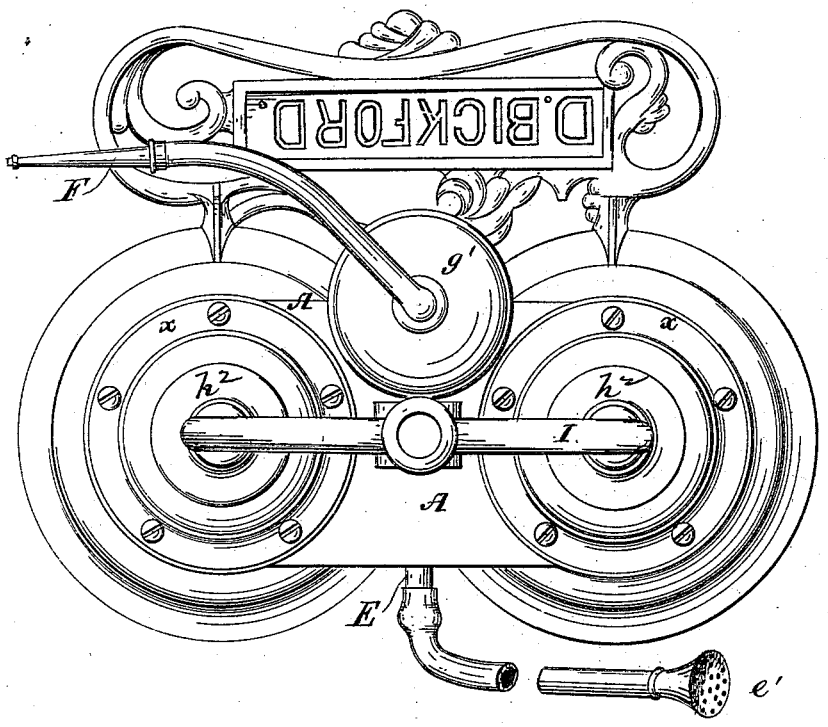


FIG. 5.

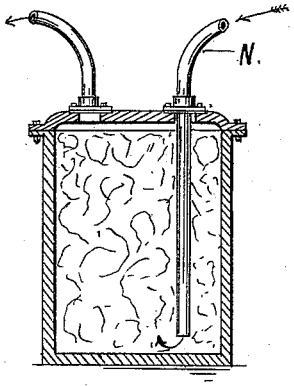
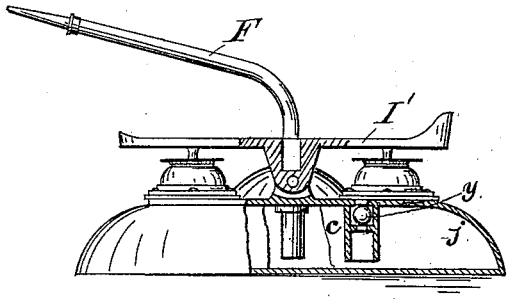


FIG. 4.



WITNESSES

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UNITED STATES PATENT OFFICE.

DANA BICKFORD, OF NEW YORK, N. Y.

IMPROVEMENT IN PORTABLE PUMPS OR ENGINES.

Specification forming part of Letters Patent No. **213,276**, dated March 18, 1879; application filed March 30, 1878.

To all whom it may concern:

Be it known that I, DANA BICKFORD, of New York, in the county of New York and State of New York, have invented certain new and useful Improvements in Portable Pumps or Engines; and I do hereby declare that the following is a full, clear, and exact description of the invention, which will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to letters of reference marked thereon, which form a part of this specification.

My invention relates to a novel construction of portable pump or engine suitable for garden uses, conservatories, &c., or for a fire-pump for throwing either water or fire-extinguishing compounds, as well as for numerous other purposes where suction or force pumps are needed for either liquids or air, the construction being such that pistons and stuffing-boxes are dispensed with, and all friction, leakage, and other objections incident thereto are avoided, while at the same time it may be made small, and readily worked by a child to throw a steady stream a very considerable distance, and is simple and cheap in construction.

Figure 1 shows, in elevation, a form of pump embodying my invention complete for action; Fig. 2, a vertical section through one of the elastic vacuum cups or caps, and through the air-chamber and a portion of the box, showing the position of the valves; Fig. 2*, a view from the under side of the inside of the box or tank; Fig. 3, a plan; Fig. 4, an elevation, partly in section, of the same apparatus, but with the rocker adapted to be worked either by the foot or by hand, and with the air-bulb omitted, the exhaust-chamber being sufficiently capacious of itself to serve as an air-chamber to form an air-cushion to give the steady stream.

Referring to the drawings, A is a box, tank, or chest, adapted for containing water or other liquid, and it is divided by a partition, *b*, into two independent compartments, *c* and *d*, and may be placed upon the ground or floor, and is to be supplied with the water or other liquid used through a suction-mouth or through a suction-pipe or a flexible tube, E, from any convenient source of supply, either near by—as, for instance, from a bucket, tank, or stream—or by drawing it, by the action of the pump itself, through such tube a distance of as much as one or two hundred feet, as circumstances may require. The extremity of this tube may in some cases be provided with a strainer or filter, as shown at *e'*.

F is the discharging-tube; G, a rocking handle or lever, for operating the pump; and *g'*, an air-compressing chamber, to insure a steady throw or discharge of the stream or shower of liquid, air, or gas, as the case may be. H H' are two elastic vacuum caps or cups, made of rubber, rubber compound, or other equivalent flexible and elastic material, preferably made to bulge outward, as shown, and each adapted to be alternately compressed and expanded, or, rather, collapsed and distended, by the action of the rocker I, worked by the hand-lever G, or by the action of a foot-worked rocker or treadle, I', as shown in Fig. 4, the respective ends of the rocker being appropriately fastened to the respective caps H H', so as positively to act upon them alternately to create a vacuum and to suck in and then expel the liquid, air, or gas, as will presently be more fully described. The fastenings shown for this purpose are seen in dotted lines in Fig. 1, in which h^2 is an upper plate, and h^3 an under plate, between which the central part of the cap is clamped, a screw, h^4, serving to hold them together, and to connect them to the arm of the lever or rocker.

These vacuum-caps are preferably made with a rim, whereby they may the better be secured to their places by means of rings or washers *x*, and each cap, as will be seen, covers the valve-openings, thus becoming of itself a vacuum-chamber.

The bottom of the box or chest may be constructed as follows: The chamber *c* being provided with two similar ball inlet-valves, *j*, and the chamber *d* with two exhaust or outlet valves, *k*, it being, of course, understood that when two elastic vacuum-caps are used in the construction each is provided with its own valves *j* and *k*, the box or chest may be made water or air tight in any way desired, or by

rubber or other packing; or its lower base-plate may be soldered, or in any way permanently secured to the box.

L is an outlet-tube leading from the compartment *d*, and communicating with the discharge pipe or tube F, the air-chamber *g'* also communicating with this compartment *d*, as seen in Fig. 2.

Instead of the air-chamber *g'*, the box may be made somewhat deeper or higher relatively, so as to permit sufficient air-space above the liquid (when liquids are used) to insure the throwing of a steady stream, the resultant action of the air thus compressed being the same as when the elevated air-chamber is employed.

The form and size of the apparatus, as also of its different parts, it will be evident, may be varied as convenience or taste may demand, and other valves may be substituted for ball-valves, so long as the essential features of the invention be preserved.

When throwing liquids, the action is as follows: The end of the tube E being inserted in the body of the liquid to be used, or connected with a hydrant, and the handle G placed in its socket or holder and rocked to one side, or the foot-rocker I' being operated, it compresses one of the vacuum-caps, and lifts the other to create a vacuum beneath or within it, and which at once causes an in-rushing stream, through its valve *j*, into this vacuum-chamber, and upon reversing the movement of the rocker, I or I', the reverse of these movements takes place, and the liquid just drawn in is driven through the outlet-valve *k* into chamber *d*, and thence into and out through the discharging-tube F, this latter movement also creating at the same time a vacuum in the other cup, the air-chamber serving to make the discharging stream steady and continuous.

M is a foot-piece projecting laterally from the box, and on which the operator may press or stand with his foot, to hold the pump firmly when using it.

It will be evident that my apparatus may be employed to force air or gas, as well as liquids, and by attaching it by its discharging tube or outlet to the inlet-pipe N of a carbureter (see Fig. 5) it may be used in many branches of art where a blow-pipe or heater is required—as, for instance, for jewelers' or dentists' use, or for tinsmiths, or for soldering purposes, or for heating soldering-irons, &c.

It may also be used to compress air or gases, or to drive by air or water small dental or other implements.

It may also be used in connection with a tank or vessel, either on wheels or not, containing any fire-extinguishing liquid which it may be desirable, by means of my pump, to discharge upon the burning house or material; the pump, while always ready for use for any or all the purposes for which it is adapted, being from its construction capable of being instantly connected with such tank, and thus brought into use by any child or inexperienced person as an efficient fire-extinguisher, and having the further great advantage that it can be readily carried by any child to any part of the building where it is most needed, or where such tank or tanks or any water-supply may be.

It may be made not only of metal, but also of glass, pottery-ware, &c., or of metal covered with enamel, tin, zinc, hard rubber, or any appropriate material suitable to prevent corrosion or rust, or injury from the fire-extinguishing compound.

The whole apparatus, except the working-lever and the discharging-pipe, may be immersed in the liquid to be pumped, and in such case, of course, no suction hose or pipe would be needed.

In some cases I can have but a single vacuum-cup, instead of the two above described, placing it in connection with a larger air-chamber, and thereby secure a steady stream, though dispensing with one of these caps or cups.

The apparatus is also very useful for bathing purposes, either for bathing the whole body, or for directing a stream or spray upon any desired part of the person, or for a shower-bath; and it may be placed directly in the water of a bath-tub or other vessel for such purpose, and used in connection with a portable frame or covering. A private bath-room may be improvised at once.

I claim—

1. The base-piece made substantially as described, and provided with a bottom for the chambers *c* and *d*, and with the valve-openings passing from these chambers into the elastic cups, which cups are held by clamps or screws to the top of the base, and worked by a rocker or lever.

2. The rocker I, connected at its opposite arms or extremities directly and rigidly to the rubber caps or cups H H', and provided at its center with a single vertical arm having a socket to receive an operating handle or lever, G, substantially as shown and described.

3. The tank or box A, divided into the compartments *c* and *d*, and having inlet and outlet valves communicating with elastic chambers, substantially as shown and described.

4. The base piece or frame having the chambers *c* and *d*, the openings for the valve-seats, the projection or foot-piece M, and the bearing for the rocker or lever, all cast or formed integral therewith.

5. In combination with the base-piece provided with the chambers *c* and *d*, and with the openings for valve-seats, as described, the elastic vacuum-cup, the rocker, and an air-chamber, substantially as set forth.

6. The bed or base constructed with chambers and valve-seats extending downward to

near the bottom, thus leaving a space above for the air to collect and form an elastic cushion therein.

7. The lifting or suction and force pump, substantially as described, consisting of the base-piece with its box, chambers, and valves, the elastic caps, air-chamber, double-acting rocker, and discharging-tube, as shown and set forth.

DANA BICKFORD.

Witnesses:
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S. F. AUSTIN.