A. B. LATTA.

COMPULSORY AIR PASSAGE.

No. 11,165. Patented June 27, 1854.

Fig. 2

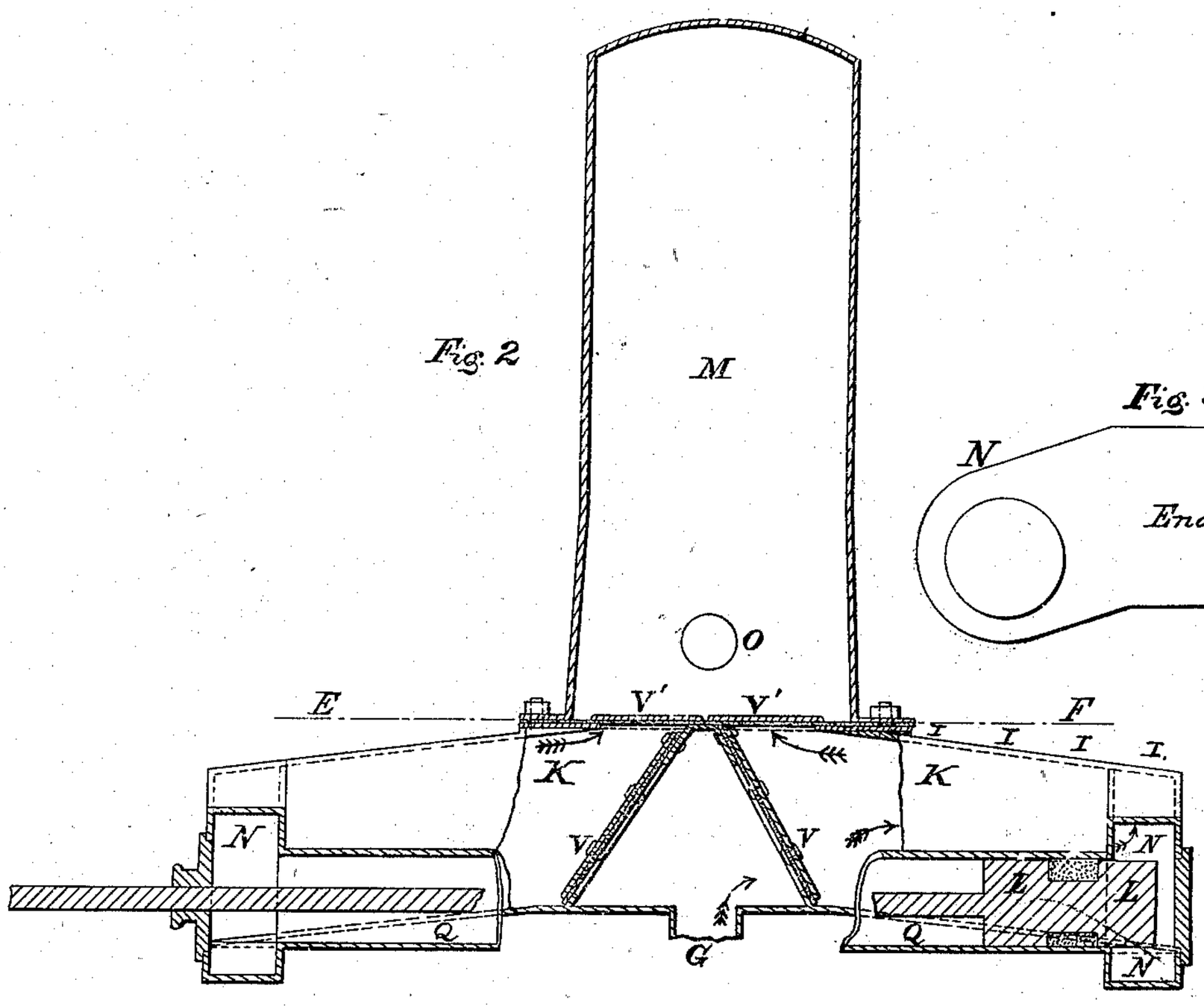
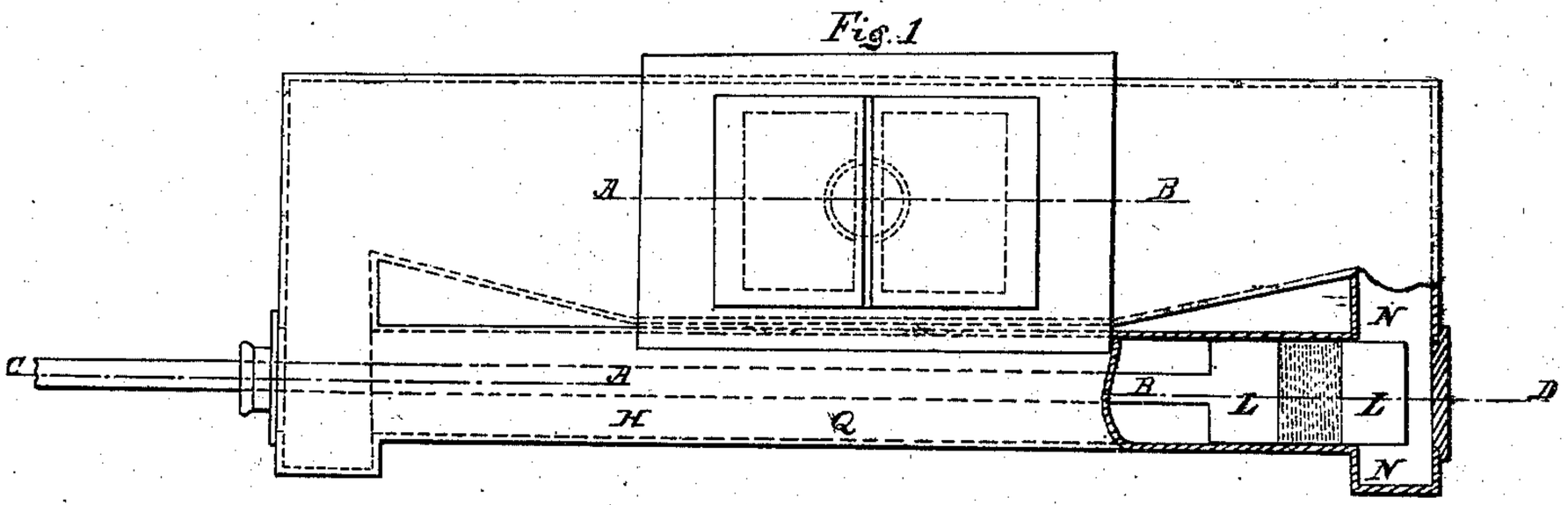


Fig. 3

Fig. 1



Inventor

A. B. Latta

UNITED STATES PATENT OFFICE.

ALEXANDER B. LATTA, OF CINCINNATI, OHIO.

HYDROPNEUMATIC FORCE-PUMP.

Specification of Letters Patent No. 11,165, dated June 27, 1854.

To all whom it may concern:

Be it known that I, ALEXANDER B. LATTA, of Cincinnati, in the county of Hamilton and State of Ohio, have invented new and useful Improvements in Pumps, and that the following is a full and clear description thereof, reference being had to the annexed drawings, making part of the same.

Figure 2 presents sections of the same taken vertically through the lines C A, A B, and B D, of Fig. 1, showing the interior of the pump. A part of the cylinder in which the piston works is broken away for the purpose of better showing some of the parts. Fig. 1 is a plan with the air chamber removed, and one end of the cylinder and piston shown in section, with an enlarged chamber at the end of the cylinder into which said cylinder opens. The parts generally are of ordinary construction and need no particular description.

G is the induction opening to which the hose or suction pipe is attached.

V V are the induction valves.

K K are the chambers into which the water is received and through which it is forced into the air chamber through the valves V′ V′, as indicated by the arrows.

N, is an enlaregd chamber at the end of the cylinder into which the cylinder opens and which has free communication with the chamber K.

M is the air chamber, O the discharge opening, Q the cylinder, and L the piston. As the piston reciprocates from end to end of the cylinder the water will alternately rush into and be discharged from the chambers K and N and the cylinder and will pass into the air chamber, and thence to the eduction passage. These are the common operations of pumps and need not be further dwelt upon.

The piston is made much longer than ordinary pistons, and is packed at a considerable distance from the ends, and the top of the chamber K is made to incline upward from the ends toward the center where the valves V′, V′, are placed. It will also be perceived that the piston at the end of its stroke, extends beyond the cylinder, and a considerable distance into the enlargement N, see the Figs. 1 and 2.

When the pump is in operation, especially if used as a fire engine, much air will often be drawn into it and if permitted to accumulate between the end of the piston and the valve V′ will to a considerable extent prevent the water from being drawn in or forced out, and thus greatly impair the efficiency of the pump. It therefore becomes of great importance to discharge the air entirely at each stroke. If the piston were to end its stroke as soon as it reaches the end of the cylinder, the return stroke would cause any air which might be near the end of the cylinder to be drawn or forced into it again; and it is to prevent this, that the piston, after having forced the air entirely out of the cylinder into the chamber N, where it has opportunity to rise to the surface of the water, continues to move in the same direction, forcing the water out of the chamber N, and giving the air time to rise to the top before the commencement of the return stroke, and before the direction of the current of water is changed in the chambers K and N, by the rushing in of the water. Again, when the air has arisen, before the commencement of the return stroke, to the upper side of the chamber or passage K, if that be horizontal, it will lie against it with no tendency to move toward the valve V′, but will be at rest or governed by the currents, and liable by the return stroke to be drawn back into the chamber N, or even into the cylinder, but when the upper side of the chamber is inclined upward, as represented at *i*, *i*, &c., the air will move rapidly toward the point or exit, or valve V′, and be out of the reach of the incoming current during the return stroke. The upper surface of the chamber N inclines upward toward the chamber K as seen at N′, Fig. 3. With this construction it is easily seen that when the return stroke is finished, and the forward stroke commences, the air will be at the point of discharge, and will escape before the water into the air chamber and the pump will be kept free from air.

If the pump be vertical the peculiar arrangements described will only be necessary at the lower end of the cylinder. The greater the distance from the end of the cylinder to the valve V′ the further should the piston be carried into the chamber N to give time for the rising of the air to the valve V′. The chamber N is enlarged below the piston for the reception of sand, dirt, &c., when any is drawn into the pump, to prevent it from injuring the piston and cylinder.

The packing is placed at such a distance

from the ends of the cylinder as to allow it to remain, at the ends of the strokes, entirely within the cylinder, to prevent its being injured by the ends thereof.

What I claim as my invention, and desire to secure by Letters Patent, is—

1. Discharging the air from the cylinder before the end of the stroke of the piston, by causing the piston to move beyond the end of the cylinder and into the enlarged chamber as described.

2. Inclining the top of the water chambers upward from the end of the cylinder to the discharge valve V′ in the manner and for the purpose set forth.

3. I claim the protrusion of the piston from the end of the cylinder at the end of each stroke, in combination with the upward inclination of the top of the chamber leading to the discharge valve V′, for the purpose set forth.

A. B. LATTA.

Witnesses:
W. CHIDSEY,
JOS. SIRODION.