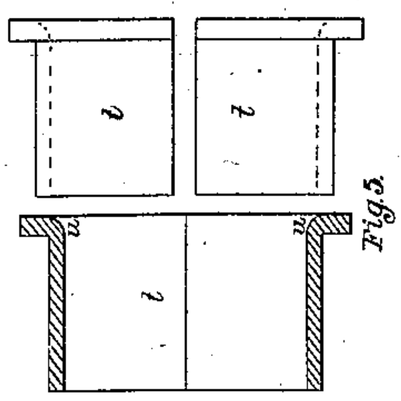
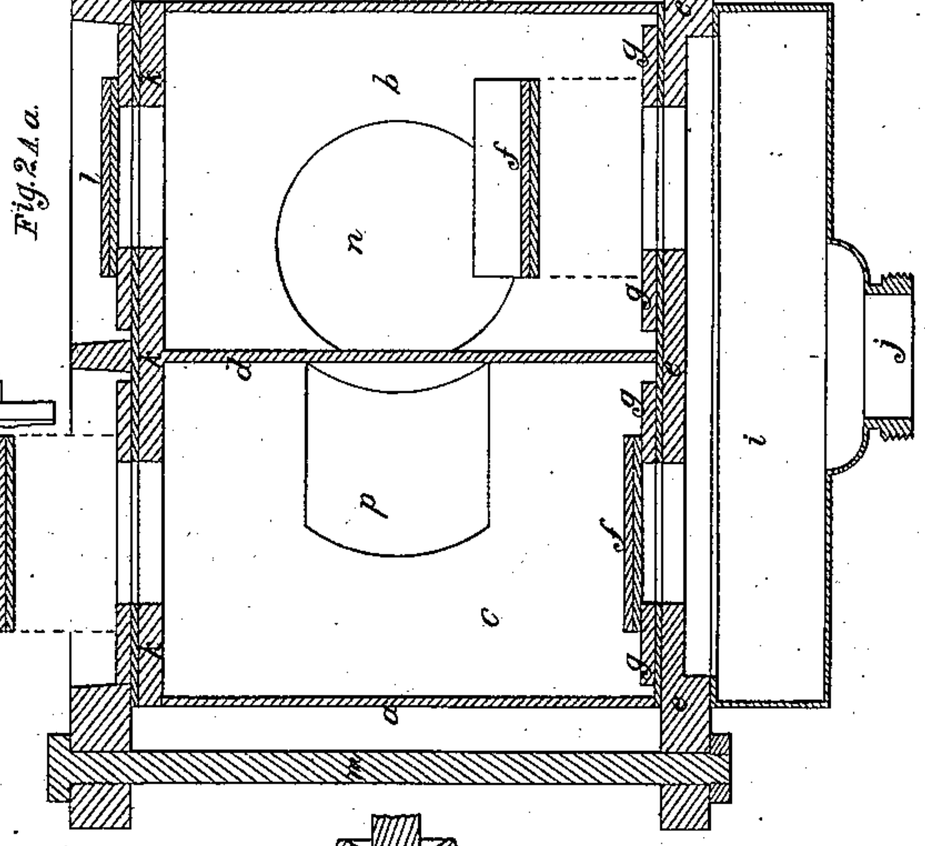
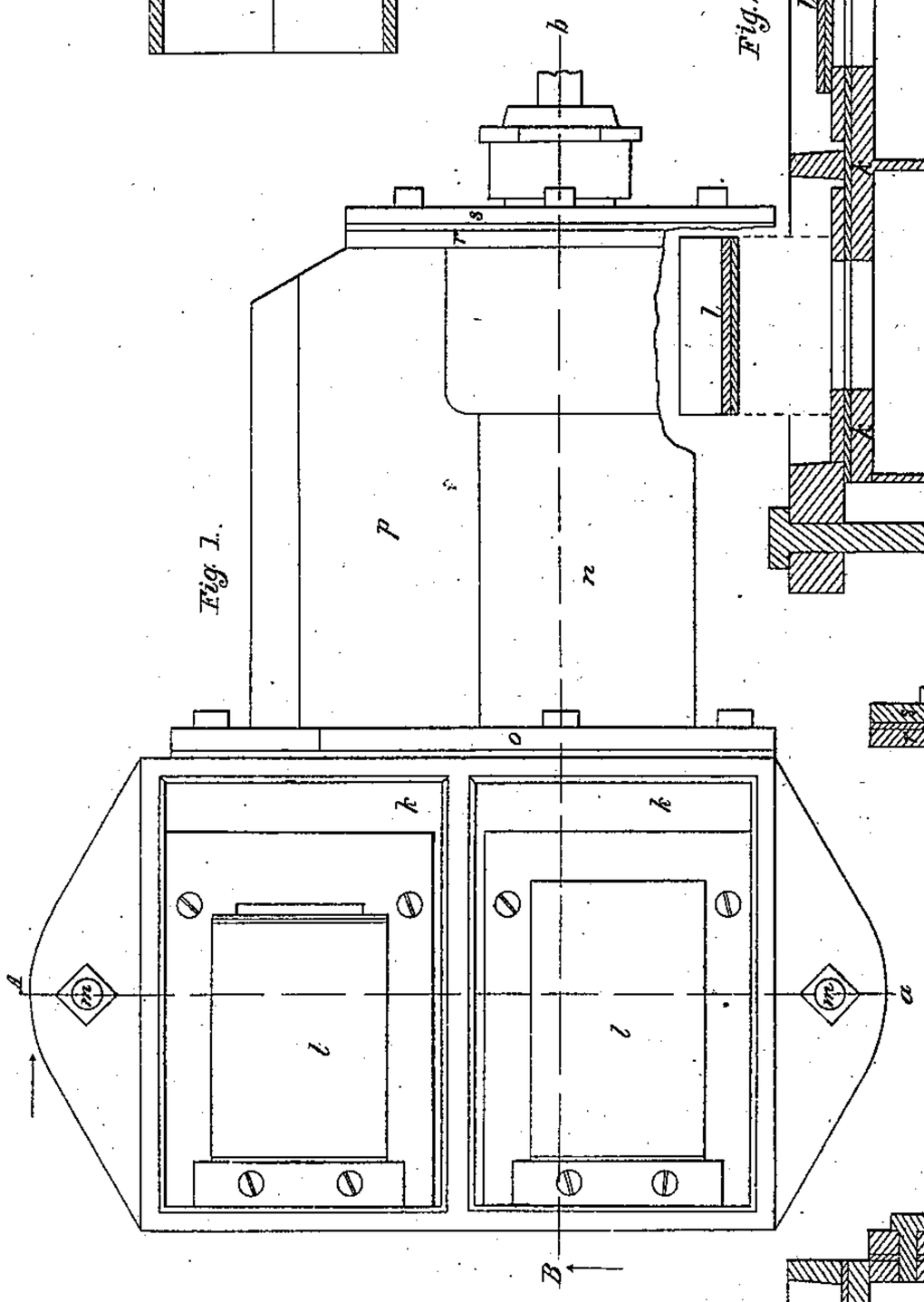
G. B. Farnam,

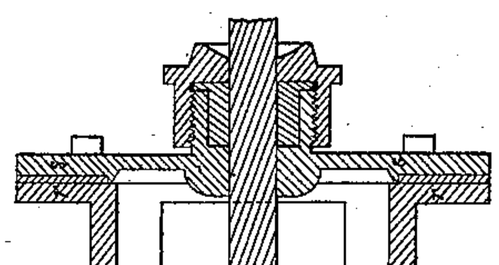
Force Pump,

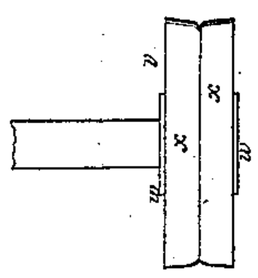
No. 12,199. Patented Jan. 9, 1855.

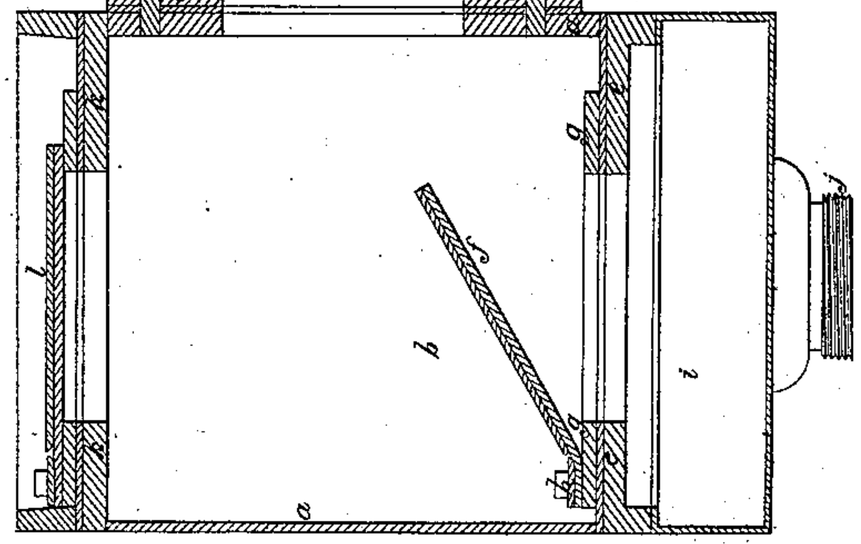












UNITED STATES PATENT OFFICE.

GILBERT B. FARNAM, OF NEW YORK, N. Y.

FORCING-PUMP.

Specification of Letters Patent No. 12,199, dated January 9, 1855.

To all whom it may concern:

Be it known that I, GILBERT B. FARNAM, of the city, county, and State of New York, have invented certain new and useful Improvements in Horizontal Pumps, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, making part of this specification, in which—

Figure 1, is a plan view with the cap, containing the eduction valve and air vessel, removed; Fig. 2, a cross section taken at the line A, *a*, of Fig. 1; Fig. 3, a longitudinal section taken at the line B, *b*, of Fig. 1; Fig. 4, a separate view of the piston; and Fig. 5, a separate view of the two part ring used in introducing the piston.

The first part of my invention consists in arranging the two sets of induction and eduction valves of double acting horizontal pumps on two plates, one set at the top and the other at the bottom of a water box divided into two compartments by means of a vertical partition, one end of the horizontal cylinder being secured to one side of the said water box opposite one of the compartments, when this is combined with the arrangement of a side pipe which connects the other compartment of the water box with the opposite end of the cylinder, by means of which arrangement ready access can be had to the valves for repairs while at the same time direct passages are provided for the water to pass from the induction to and through the eduction valves, instead of the circuitous passages found in horizontal pumps as heretofore constructed.

The importance of this arrangement will be manifest when the fact is considered that, as horizontal pumps have been heretofore constructed, the water must pass from the induction valve to one end, and move toward the other end of the cylinder, and then move back before it can escape through the eduction valves, so that the momentum of the whole column of water must be stopped and restarted, at every stroke of the pump, which circumstance limits the velocity of the piston. But by my improved arrangement the column of water set in motion is not all suddenly arrested by the change of motion of the piston, for the reason that the column may continue to move directly through the water box and valves until arrested by its own weight notwithstanding the change of motion of the piston. In this way I am enabled to work the piston at a much higher velocity than in pumps as heretofore constructed, and without the sudden jars and shocks heretofore experienced.

The second part of my invention which relates to the method of inserting the leather packed piston into the cylinder without injury to the packing, consists in forming the bore of the cylinder with an enlargement at the end which receives the piston, and where one of the water ways enter the side of the cylinder, to which enlargement is fitted a ring of the same bore as the cylinder, and with the outer edge flaring out or trumpet shaped, when this is used in combination with, and as a means of inserting, the leather packed piston.

In the accompanying drawings *a* represents a four sided metal box, divided into two chambers *b*, *c*, by a vertical partition *d*, cast therewith. To the bottom of this box is fitted a plate *e*, with the induction parts governed by valves *f*, *f*. The surface of this plate is covered with a sheet of leather that forms packing for the joint. On the top of this sheet of leather, there are two metal plates *g*, *g*, secured thereto by screws, which constitute the seats for the induction valves made of metal and attached to leather, the leather of one end being made to project sufficiently to be secured by a plate *h*, and screws to constitute the hinge. To the lower edge of the plate *e*, is secured or cast with the enlarged part *i*, of the induction pipe *j*. At the top of the water box *a*, is fitted another plate *k*, with the eduction valves *l*, *l*, in all particulars made and fitted like the lower plate with the induction valves. These two plates at each end project beyond the box *a*, and are secured and bound together and to the box by screw bolts *m*, *m*, so that by simply unscrewing these bolts the valves can be examined, repaired and replaced.

The cylinder *n* of the pump is cast with a flanch *o* at one end by which it is secured to the side of the valve box *a* that end of the cylinder opening directly into the chamber *b*, of the water box *a*, on one side of the partition; and the other chamber *c*, communicates with the other end of the cylinder by means of a water way *p*, cast on one side of, and running the whole length of the cylinder. This water way opens into the cylinder by a port *q*, extending up to the flanch *r*, at the end of the cylinder to which the head *s*, is secured in the usual way.

The bore of the outer end of the cylinder as far as the port *q* extends, is of greater diameter than the general bore which the piston fits. And to this enlarged part is fitted a ring *t*, made in two parts, the inner bore of which is of the same diameter as the cylinder except at the outer end where it is flared or rounded as at *u*.

The piston *v*, is formed in the usual manner with two metal disks *w*, *w*, secured to the end of the piston rod, and embracing the inner edges of the two leather packings *x*, *x*, the said packings being crimped so as to be slightly conical that the edges may bear against the inner surface of the cylinder and insure a tight joint.

Before the piston is inserted in the cylinder the two part ring *t*, is first put into the enlarged part of the cylinder, and as this makes a continuation of the bore of the piston, and the outer end of the bore of the ring is trumpet shaped, the piston with its leather packing rings can be inserted without injury to the leather rings which are thus gradually compressed to the bore of the cylinder. In this way it will be seen that I effectually avoid cutting the leather rings by the edge of the water port *q*. This had heretofore been a source of great inconvenience in pumps in which conical leather packing rings are used, for the rings must be made so that when out of the cylinder the open ends shall be of greater diameter than the bore of the cylinder to insure a water tight joint when inserted, and as the water port forms a break in the cylinder, and in inserting the piston the open end of one of the packing rings must first enter, it catches on the edge of the port, and is either cut or so crimped up as to be materially injured. But by means of my improvement this is entirely avoided.

I do not wish to limit myself to the making of the ring for inserting the piston, in two parts, as it can be made in one or more parts to extend all around the cylinder, or only a segment, but prefer to make it in two or more parts for the convenience of removing it after the piston has been inserted.

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

1. Arranging the two sets of induction and eduction valves of a double acting horizontal pump on two plates secured one to the top and the other to the bottom of a water box divided by a vertical partition into two compartments, one end of the horizontal cylinder being secured to one side of the said water box opposite one of the compartments, when this is combined with the connection of the other compartment of the said water box with the opposite end of the cylinder by means of a side pipe, substantially as and for the purpose specified.

2. And I also claim making the outer end of the bore of the cylinder of an enlarged diameter with a ring fitted thereto having a bore of the same diameter as the cylinder, and flaring or trumpet formed at the outer end, substantially as specified, in combination with, and as a means of inserting the piston made with conical leather packing rings substantially as specified.

GILBERT B. FARNAM.

Witnesses:
WM. H. BISHOP,
CHAS. N. BAMBURGH.