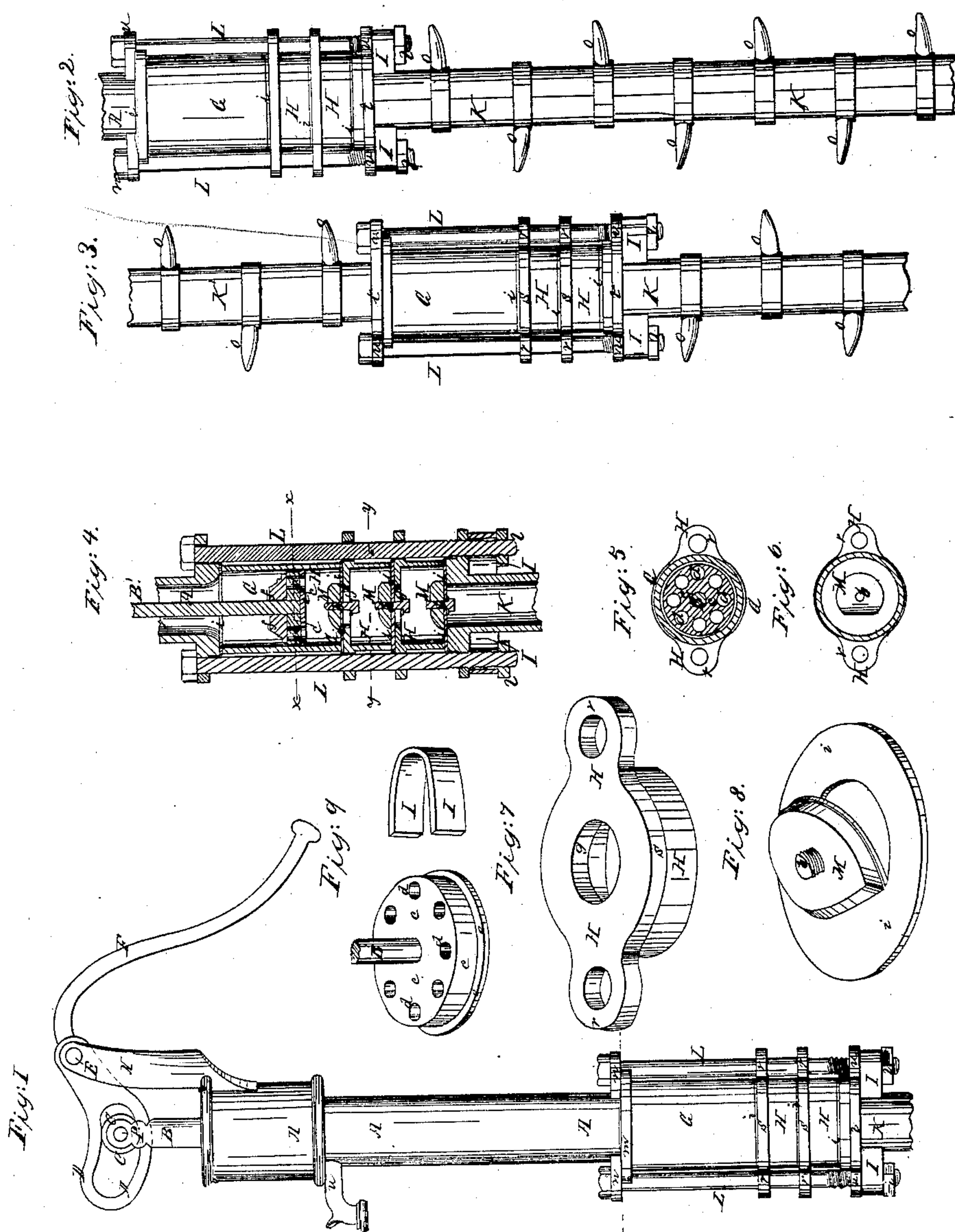


F. Henshaw,

Pump Lift,

N^o 21,561.

Patented Sep. 21, 1858.



UNITED STATES PATENT OFFICE.

F. HENSHAW, OF WASHINGTON, DISTRICT OF COLUMBIA.

PUMP.

Specification of Letters Patent No. 21,561, dated September 21, 1858.

To all whom it may concern:

Be it known that I, F. HENSHAW, of Washington, county of Washington, in the District of Columbia, have invented certain
5 new and useful Improvements in Pumps; and I do hereby declare that the following is a full and exact description thereof, reference being had to the accompanying drawings and to the letters of reference marked
10 thereon.

The nature of my invention consists in certain improvements in pumps as herein-after more fully described.

To enable those skilled in the art to make
15 and use my invention I will proceed to describe its construction and operation reference being had to the accompanying drawings and to the letters of reference marked thereon.

20 Figure 1, represents a side elevation of my improved pump; Fig. 2, a side view of boxes and pipe descending into well; Fig. 3, side view of boxes and pipe, showing a central location of boxes; Fig. 4, a vertical section through the center of boxes and cylinders; Fig. 5, horizontal section at *x, x*; Fig.
25 6, horizontal section at *y, y*; Fig. 7, perspective view of one of valve boxes, with valve off; Fig. 8, perspective view of valve, and
30 Fig. 9, perspective views of suckers or plungers, and V washer.

Similar letters denoting the same parts in the different views, A represents the pump barrel, which is somewhat enlarged at its
35 upper end as seen at A'.

a is the exit pipe or spout.

From the enlarged portion A', of the barrel there extends upward a stand, or arm, N, the upper end of which is slotted out to
40 accommodate the handle, F, which is pivoted therein by the pin, E; the short end of this handle is flattened out in a plate form as seen at, D, in which is cut a peculiarly
45 curved slot (which will be more minutely described hereinafter) in which fits and rolls a friction roll, C, pivoted by a pin, *p*, in the upper ends of the bifurcated arm, or strap, B, which latter straddles the plate, or flattened portion D, of the handle. G, is the
50 cylinder in which the sucker or piston works. H, H, are the "valve boxes" around the upper sides of which are small flanges *s, s*, projecting out at each side so as to form ears, *r, r*, &c.

K, is the well pipe, or stock, which may 55 be made of sections bolted together, at the top of which is a flange, V, projecting out at either side and forming ears, *u, u*.

I, I, are U-shaped washers, (the object of which will be presently explained) and 60 L, L, are long bolts passing through the ears, *n, n*, of flange *m* (in bottom of pump barrel) *r, r*, &c., and also through those marked *u, u*, and furnished with nuts, *l, l*, whereby the pipe K, boxes, H, H, cylinder, G, and, 65 barrel A, are all coupled together, as seen in Figs. 1, 2, 3 and 4.

M, are the valve blocks secured by bolts or screws *b*, to their respective leathers, *i*, which leathers also form the packings be- 70 tween the boxes H, H, and between box H, and cylinder G, being located relatively to said boxes and cylinder as seen at Fig. 4. Said valves all open upward and are constructed in the usual way, as represented. 75

c, c, is the sucker or piston head which has a lower packing rim, *e*, and is perforated by a series of holes *d, d*, said piston head is screwed or otherwise fastened to the lower end of rod, B', on which rod, immediately 80 above said piston head, is a sliding collar or lifter plate *f, f*, which moves vertically on the rod, B, as the said rod ascends and descends, for purposes to be described.

g, g, are the valve openings in the boxes H 85 and are made about the same capacity as the bore of pipe K.

o, o, are projections formed on the "well pipe," at convenient distances apart each, alternately projecting in a direction con- 90 trary, or directly opposite to that of the last; the object of said projections, *o*, being to render the pipe easy of ascent or descent, as a ladder.

The characteristic feature of the curved 95 slot in the handle (D) is:—that in any position in which the said handle may be placed, or at every point, in the stroke of the piston, the point of contact, of the friction roll C, with the curved line of the said slot, 100 is in the vertical line of motion of the center of the piston and also in the point of contact of a horizontal tangent to said curved line, or in plain terms, the peculiarity of this curved slot (which operates the piston) 105 is: that at every point in the stroke of the piston the roll, G, lies in the lowest point, of the said slot, and the said roll moves in a

perfectly vertical line, while the handle F, moves in the arc of a circle as an ordinary pump handle.

The lifter plate, on valve *f*, rises when the piston descends (by the pressure of the column of water) and allows the water below the piston, *c*, to flow up through the holes *d*, *d*, and fill the space above said piston; and descends immediately the piston begins to rise; covering the holes *d*, *d*, and lifting the column of water above it.

The red line, Fig. 1, represents the surface of the earth, or the top surface of an iron, or other, platform or floor upon which the flange, *m*, of the barrel A rests, and from which is suspended the remaining portions of the apparatus, (the well pipe K, does not rest on the bottom of the well). When the well into which the pump is placed is not more than twenty five feet deep the valves, boxes, and cylinders may be placed adjacent to the bottom of pump barrel and the well pipe extended from the bottom box downward, as seen at Fig. 1, but when the well is deeper, I propose to place the valves, boxes &c. the same distance from the bottom of the well, uniting them to the bottom of pump barrel by an upper pipe K', as seen at Fig. 3.

Having described the construction of the several parts, I will now, to make more clear the arrangement of my apparatus, briefly explain the manner in which the several parts are connected and arranged relatively with each other. Having decided the position of the valves &c. (dependent upon the depth of the well) I place the required length of pipe K, in the well and temporarily support and brace the same. I then adjust in position on top of said pipe the lower one of the valves (as seen at Fig. 4,) over said valve I adjust the lower box H, with its valve and over said box the upper box H, with its valve M, over which I adjust the cylinder G, and having placed in its upper edge the packing, *i*, I finally place over it the pump *p*, barrel A,—having first arranged in the cylinder, the piston, C, with its rod, B'. I then pass the long bolts L, L, through the ears *n*, *r*, *r*, *u*, &c., place around their lower ends the "V shaped" washers I, and screw on the nuts *z*, *z*, when the whole arrangement is complete with the exception of the attachment of the handle, which I now accomplish by placing and pivoting said handle in the arm N, by the pin E, and placing in the curved slot (in D,) the friction roll C, around which I pass the strap B, and pivot the latter to said roller by the pin *p*. The pump is now ready for operation (the support at bottom may now be removed) which is as follows, viz: As the plunger *c*, is raised by the downward stroke of the handle F, the air in the cylinder G, is extracted and the column of water

ascends (following the piston) by atmospheric pressure, passing through the valves M, M, M. When the piston reverses its motion and begins to descend the valve *f*, is raised from the piston C, the valves M, are closed by the column of water, through which the piston, C, now descends allowing the water to flow through the holes, *d*, *d*. When the piston ascends again the valves *f*, are held down on the piston, *c*, by the columns of water above it, which latter is by said piston elevated and discharged, while another vacuum is created, and instantly filled, in the cylinder G, by another column of water; and so on, as long as the piston is kept moving up and down.

Every time the column of water ceases to rise, and partially drops down, its whole weight, or momentum comes on the valve and suddenly closes it, with a slam by which (being often repeated) the leather is hammered out, and the valve begins to leak rendering the pump inoperative; this shocking of the valve is in my pump sustained by the upper one of my valves. Every time the column of water descends the valve is caused to slam by another existing circumstance, viz: the suction, upon it by the column of water in the lower section of pipe; since there is almost always small portions of air in the tube, this, shocking of the valve is sustained wholly by the lower one, of my valves; it will then, be understood that no matter to what extent the shocking of the valves, from the causes mentioned, may exist; such shocks are sustained, by the upper, and lower ones, of my series of valves, and that therefore, the middle valve will always remain perfect and insure the perfect operation of the pump, while, the upper and lower valves may become leaky, but yet serve to receive the shocks from the water, it does not therefore matter how deep the well may be (the deeper the well the higher the column of water resting on the valve) since the intermediate valve can never have any weight but that of the small quantity of water lying between it and the valve above it. It will be observed that by the, peculiarly constructed, slotted handle the piston is moved up and down in a perfectly vertical line; which is a great object, in any pump.

As before remarked the pump barrel is supported by an iron plate (or in any other desirable way) and the boxes and well pipe are all suspended thereto; since however the valve boxes and cylinder are not placed more than twenty or twenty five feet above the bottom of the well, there is never more than that number of feet of pipe hanging upon the bolts L, L.

In order to extricate the boxes or cylinders, for examination or repairs it is only necessary to slightly turn the nuts, *z*, *z*,

(unscrew them) and extricate the washers I, when the pipe K, will descend onto nuts l, l, (by its own weight) leaving sufficient space to extricate the cylinder and valves; 5 which may be, when desired, replaced and adjusted and the pipe K, lifted to its original position by two screw clamps extended from flange, m, to flange t. In order that this operation may be conveniently and readily 10 performed I cast projections or steps o, o, upon the pipe—as before described—upon which the operation easily descends; and stands while at work.

Having fully described the construction 15 and operation of my improved pump and disclaiming any such device as represented in the patent granted to John Tapley Sept. 19, 1858.

What I claim therein as new and useful 20 is:—

1. Operating the piston by a curved slot,

possessing the characteristic features described, and arranged, or formed in a vibrating handle substantially as set forth.

2. In the construction of lifting pumps, 25 the combination of three, or more valves arranged and operating as hereinbefore described.

3. The arrangement of washers I I formed as specified—with the series of 30 valves substantially as and for the purpose set forth.

4. Casting on the well pipe a series of steps, essentially as described.

In testimony whereof I have hereunto 35 set my hand and seal this fourteenth day of June 1858.

FOSTER HENSHAW.

Witnesses:

THOS. H. UPPERMAN,
HENRY W. TURPIN.