H. K. Kenyon,

Oil Pump.

No. 104,855. Patented June 28. 1870.

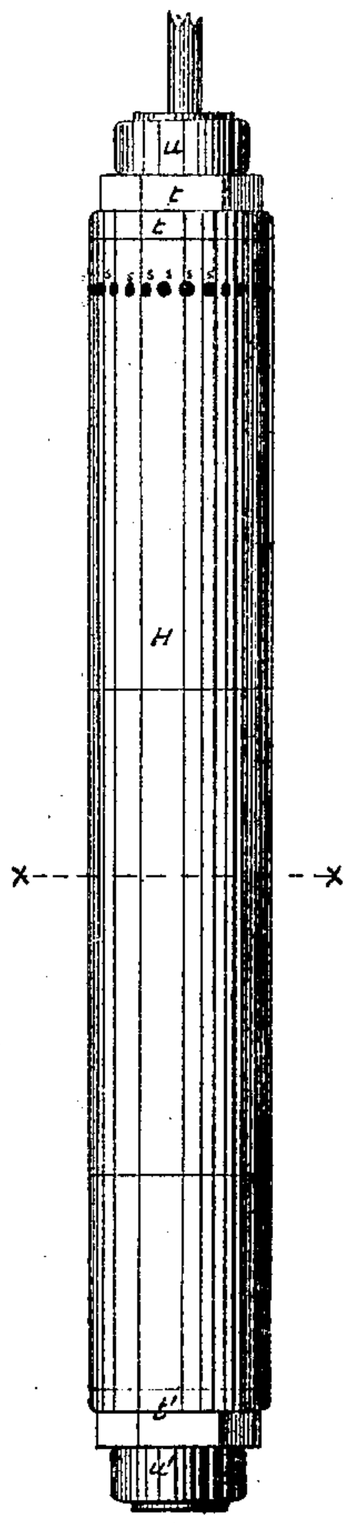

FIG. 1.

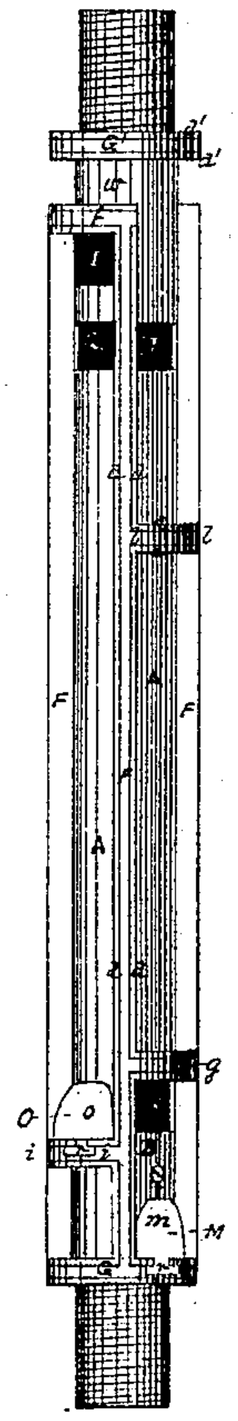

FIG. 2.

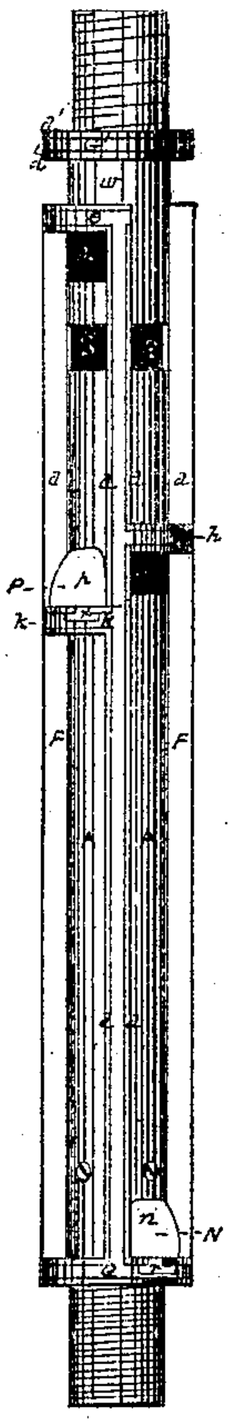

FIG. 3.

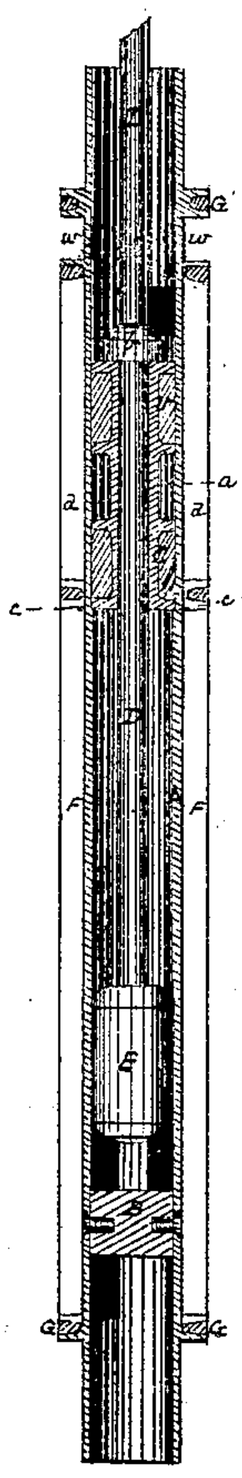

FIG. 5.

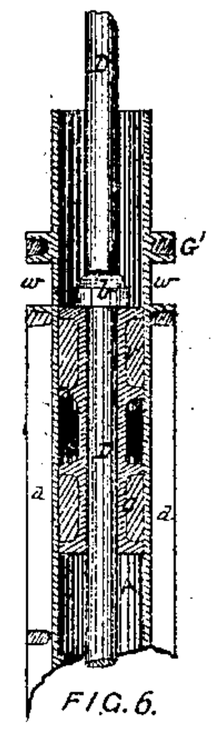

FIG. 6.

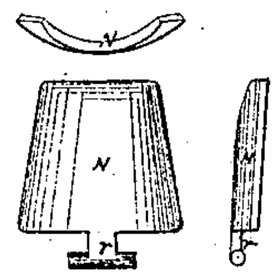

FIG. 7.

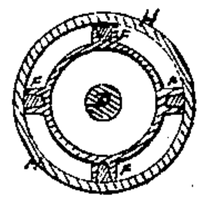

FIG 4.

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Letters Patent No. 104,855, *dated June* 28, 1870.

IMPROVEMENT IN DEEP-WELL PUMPS.

The Schedule referred to in these Letters Patent and making part of the same

To all whom it may concern:

Be it known that I, HENRY K. KENYON, of Steubenville, in the county of Jefferson and State of Ohio, have invented a new and useful Improvement in Pump for Artesian or Deep Wells; and I do hereby declare the following to be a full, clear, and exact description thereof, reference being had to the accompanying drawing, in which—

Figure 1 is an exterior view of my improved pump;

Figure 2 is an exterior view of one side of the working barrel of the pump, the outer casing being removed.

Figure 3 is an exterior view of the other side of the working barrel.

Figure 4 is a cross-section of the pump and outer casing through *x x* of fig. 1.

Figure 5 is a longitudinal section of the pump, with the piston and upper head in position for pumping;

Figure 6 is a longitudinal section of the upper part of the pump, with the upper head raised, so as to return the oil into the well; and

Figure 7 represents one of the valves detached.

In the several figures like letters denote similar parts.

My improvement is designed for use in artesian or deep wells, especially in oil-wells.

One of the leading features of my pump is that it not only produces a continuous flow of oil or other fluid, but that it creates and sustains a constant and powerful suction, by means of which the seams or veins of the well are, in a great measure, cleared of paraffine and other obstructions, and the oil in the veins is drawn toward the well, so that I have ascertained, by actual test, the use of my pump causes a gradually-increasing flow of oil.

To enable others skilled in the art to make and use my improved pump, I will proceed to describe its construction and operation.

My pump has a working-barrel, A, which is placed in the same axial line as the well-tubing above and suction-pipe below the pump.

This working-barrel A is closed near the lower end by a head or plug, B, securely fastened in place and immovable, and at the upper end by a removable head, C, which, however, remains stationary during the operation of the pump, and through which the piston-rod D works.

The piston E is solid, that is, has no valve in it, and works in the working-barrel between the upper and lower heads C and B.

The piston may be packed in any desired manner, as with rings of leather, or cup-leather, as may be preferred.

In order to make an air-tight connection between the upper head C and the working-barrel, the head is packed with leather, wood, or Babbitt's metal, or other suitable packing.

The recess *a* in the upper head C is not required for ordinary purposes of pumping, and may be dispensed with, in which case the head need not be so long as shown in the drawing. The use of the recess *a* will be explained hereafter.

The piston-rod D, above the upper head G, is furnished with a collar, *b*, at such a distance from the piston E, as that, when the piston reaches nearly to the lower head B, the collar will rest on top of the upper head C.

The object of this collar *b* is to force the upper head C down to its place in the working-barrel A.

The lower end of the upper head C rests on a slight projection, *c*, in the working-barrel, caused by enlarging its bore slightly above that point.

If preferred, when the upper head is in one piece, that is, without the recess *a*, it may be seated in the upper end of the working-barrel A, by tapering the barrel at that point, and giving the upper head C a corresponding taper.

The working-barrel has four external flanged partitions F, extending parallel with the axis of the working-barrel from the lower end, nearly, but not quite, to the upper end.

Each of these partitions is made by a pair of flanges, *d*, extending outward from the barrel, either cast in one piece with it, or riveted, brazed, or soldered to it.

The flanges of each partition are placed with their inner faces a uniform distance apart, and forming a gutter slightly widening outward.

Between these flanges is inserted a strip of wood, (basswood serves a good purpose, although Babbitt's metal or other suitable packing may be employed,) which is held tightly in place by the flanges, and projects a little beyond the edges of the flanges.

The purpose of making the space between the flanges flaring outward is to cause the wood, when wet, to be forced outward against the casing, thus securing a perfectly tight joint.

At the lower end of the working-barrel is a circular collar, G, connecting with the longitudinal partitions F, and formed similarly by flanges *d'*, with pieces of wood between them, to make a tight joint.

At the top of the working-barrel is a similar collar, G, constructed in the same manner, and extending all around the barrel.

Similarly-constructed transverse-flanged partitions *e*, *f*, *g*, *h*, *i*, *k*, and *l*, are placed between the longitudinal partitions F, in connection with the valve-ports and open ports of the working-barrel, as will be hereinafter explained.

H is a cylindrical outer casing of metal, which may be made in one piece or in two or more pieces, as may be desired, and as shown in the drawing.

This casing extends from the upper flanged collar G to the lower flanged collar G′, which fit perfectly air-tight in the casing, by means of the wood or other packing between the flanges of these collars.

The flanged longitudinal partitions F and the transverse flanged partitions *e*, *f*, *g*, *h*, *i*, *k* also fits closely against the inside of the outer casing H, so as to divide the annular space between the outer casing H and working-barrel A into separate chambers, marked Nos. 1, 2, 3, and 4, which have no openings through the outer casing, but communicate, by valved ports and open ports, with the interior of the working-barrel A.

The outer casing H has no openings, excepting the perforations *s s*, near its upper end, which are situate immediately below the upper flanged collar G, and above the two transverse partitions *e* and *f*, which connect the upper ends of the longitudinal flanged partitions F.

These apertures *s s*, at the top of the casing H, are not necessary for ordinary purposes of pumping, and are of use only in connection with the recess *a* in the upper head C, the function of which will be explained hereafter.

The outer casing H is kept in place by the jam-nuts *t t*, at each end of the pump-barrel, which are screwed down against the collars G and G′, and against the ends of the casing in the coupling-screws *u u′*, at the end of the barrel.

The open ports in the working-barrel used in ordinary pumping are four, marked I J K L. Two of these, I and J, are situate near the top of the working-barrel A, above the upper head C, and on diametrically opposite sides of the working-barrel.

Each of these open ports I and J has a transverse flanged partition, *e* and *f*, immediately above the opening.

The third open port, K, is placed immediately above the lower head B, (but not between the same longitudinal partitions as the ports I and J,) and has a transverse flanged partition, *g*, immediately above it.

The fourth open port, L, is situate on the opposite side of the working-barrel A, from the third open port K, but not at the same level, but is just below the upper head C, and has a transverse flanged partition, *h*, immediately over it.

There are also four valved ports or openings in the working-barrel, marked M, N, O, and P.

One, M, is situate near the bottom of the working-barrel, immediately below the lower head B, and below the open port K, and another, N, diametrically opposite to it, and also below the lower head B, but in the same vertical line as and below the open port L.

Another valved port, O, is placed immediately above the lower head B, and in the same vertical line as and below the open port I, and the fourth valved port P is placed immediately below the upper head C, and below the open port J.

The valves used to close the valved ports are clap-valves, placed outside of the working-barrel A in the chambers formed by the flanged partitions, and are attached by means of a T-head, *r*, at the bottom of the valve, which enters a notch made in the flange of the transverse flanged partitions placed below the valves.

Below the valves *o* and *p*, which cover the ports O and P, are placed transverse flanged partitions, *i* and *k*, similar to those placed above the open ports I J K L, the flanged collar G at the lower end of the working barrel being immediately below the valves *m* and *n*.

All these valves open outwardly, and naturally incline to close when the pump is in a vertical position.

The operation of my pump, constructed as above described, is as follows:

Suppose the piston to be at the end of its down-stroke, and the space between the top of the piston and the under side of the upper head to be filled with oil or other fluid to be pumped; now, on raising the piston E by means of the piston-rod D, a vacuum is created in the space below the piston and above the lower head B, and in the chamber No. 1 inclosed between the working-barrel A and outer casing H, by the collar G′, the transverse flanged partition *g*, and two of the longitudinal partitions. The valve *m* then opens, and the oil from the well flows through the suction-pipe attached to the working-barrel, and through the valved port M into chamber No. 1, and thence through the open port K into the working-barrel of the pump, below the piston, and flanged partitions forming the sides of the chamber No. 1, preventing its taking any other direction.

At the same time as the piston rises, the oil above the piston, not being able to pass through the working-barrel above the upper head C, opens the valve *p*, and passes out into chamber No. 2, formed by the transverse flanged partitions *e* and *k*, and the longitudinal partitions, and thence up through chamber No. 2, and through the open port J back into the working-barrel above the upper head, and thence into the tubing above the pump.

On the descent of the piston, a vacuum is created between the piston and the upper head C, which vacuum, extending to chamber No. 3, formed by the transverse partition *h* and the longitudinal partitions, opens valve *n* near the bottom of the working-barrel below the lower head B, and causes the oil to flow up through chamber No. 3 into and through the open port L, into the working-barrel, above the piston E. At the same time, by the descent of the piston, the oil in the working-barrel below the piston and above the lower head B, forces open the valve *o* and passes into chamber No. 4, formed by the transverse partitions *i* and *f* and the longitudinal partitions, and thence up through chamber No. 4, and through the open port I into the working barrel, above the upper head C, whence it rises into the well-tubing above the pump.

Thus, not only is a continual flow of oil kept up, but the sucking action of the pump is unintermitted, and there is no opportunity for oil which is being drawn through the seams and veins of the well to stop its flow or run back, as long as the pump is kept at work.

I will now proceed to explain the use of the recess *a* in the upper head C, and the perforations *s s* at the upper end of the outer casing H.

In cleansing wells from paraffine it is usual to pour down into the well several barrels of benzine, which, being allowed to remain in the well for some time, cuts or dissolves the paraffine, after which it is pumped out of the well. To avoid this delay I propose to pour into the well a much smaller quantity of benzine, and cause it to be pumped up and immediately returned to the well, thus causing a continuous agitation of the contents of the well, and circulation of benzine.

In order to effect this, my pump may be so constructed as, by a very slight adjustment of the upper head C, to cause the benzine, when pumped out of the well, to pass out through the perforations *s s* in the outer casing H, in jets, with considerable force, and thus flow back outside of the casing into the well, without reaching the well-tubing above the pump-barrel.

For this purpose there are made four openings, Q R S T, in the pump-barrel A, one in each of the spaces between the four longitudinal flanged partitions F. These openings are situate below the level of the open ports I and J, near the top of the pump-barrel A, so that, when the upper head C is in its place, when the pump is used for ordinary pumping, the upper piece *v* of the head C closes these openings Q R S T. But,

by raising the upper head C by means of the piston-rod D until the upper piece *v* of the head C closes the ports I and J, the recessed part *a* of the head C coincides with the openings Q R S T.

When the upper head C is thus adjusted, and the pump is operated, the fluid raised by the pump is shut off, by the closing of the ports I and J, from all access to the well-tubing above the pump-barrel, finding its only exit through the openings Q and S into the space formed by the recess *a*, and thence out through the openings R and T, and being prevented from descending below the transverse partitions *l* and *h*, rises to the space *w* under the upper collar G′, and thence out through the perforations *s s* in the outer casing H.

On the down-stroke of the piston the fluid under the piston passes out at the valve *o* into chamber No. 4, and, passing up that chamber, enters the pump-barrel at the opening Q into the recess *a*, and thence out through the openings T and R into the space *w* under the collar G′, and, on the up-stroke of the piston, the fluid above the piston passes out of the valve *p* into the chamber No. 2, and thence through the opening S into the recess *a*, and out through the openings T and R into the space *w*.

When the operation of "benzining" the well is finished, it is only necessary to force down the upper head to its seat, when the operation of pumping through the well-tube is resumed and continued, as before described.

Having thus described my improved pump for artesian wells.

What I claim therein as new, and desire to secure by Letters Patent, is—

1. The working-barrel, having exterior recessed chambers formed by partitions extending from the exterior of the working-barrel to the outer casing, and suitable open and valved ports, in combination with the outer casing, substantially as hereinbefore described.

2. The flanged partitions, inlaid with strips of wood for forming chambers in the space between the working-barrel and outer casing, substantially as described.

3. The working pump-barrel, closed at one end with a stationary, and at the other end with a removable head, and communicating, by ports and valves, with exterior chambers or passages, substantially as and for the purposes hereinbefore described.

4. The adjustable recessed stuffing-box forming the upper head of the working-barrel, in combination with the working-barrel and outer chambered casing having apertures for the exit of the fluid, constructed and arranged substantially as described, for the purposes hereinbefore set forth.

5. The combination of the working-barrel, closed at both ends, and furnished with ports and valves, the solid or valveless piston, and the exterior chambered casing, constructed and arranged substantially as described, so as to lift and force both on the up-stroke and down-stroke of the piston.

6. Wood-packing for pump-chambers, so arranged as to form air and water-tight joints, substantially as hereinbefore described.

In testimony whereof, I, the said HENRY K. KENYON, have hereunto set my hand.

HENRY K. KENYON.

Witnesses:

A. S. NICHOLSON,

A. MOORE.