J. M. PEARCE

Pump for Oil-Wells.

No. 212,109. Patented Feb. 11, 1879.

Fig. 1.

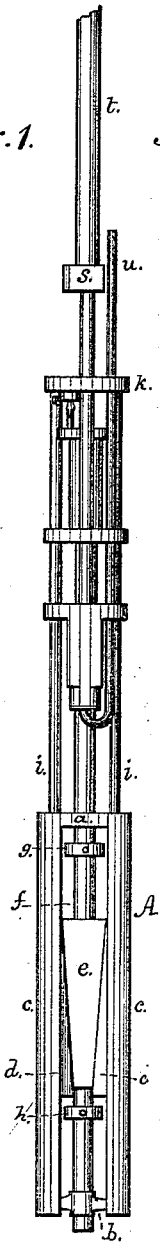


Fig. 2.

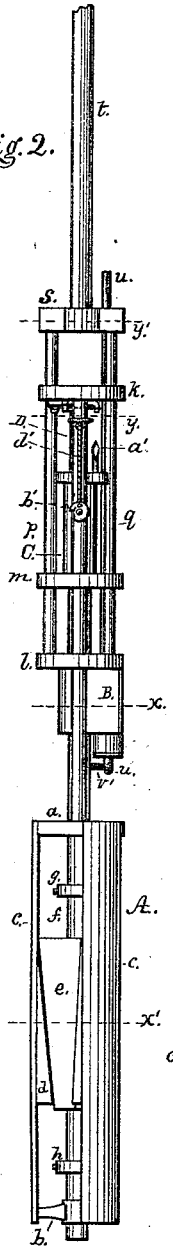


Fig. 4.

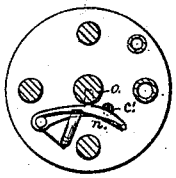


Fig. 5.

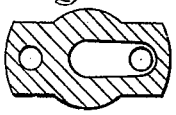


Fig. 6.

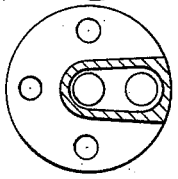


Fig. 7.

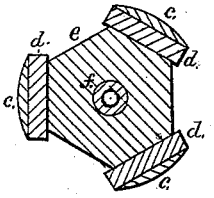
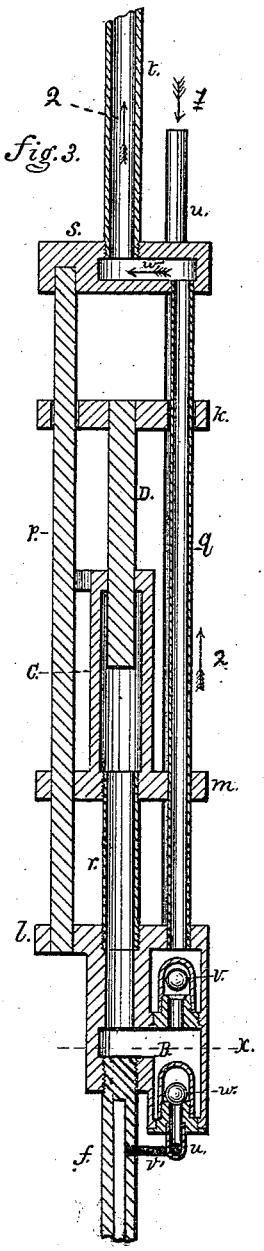


Fig. 3.



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IMPROVEMENT IN PUMPS FOR OIL-WELLS.

Specification forming part of Letters Patent No. **212,109**, dated February 11, 1879; application filed November 21, 1878.

To all whom it may concern:

Be it known that I, JAMES M. PEARCE, of Parker City, in the county of Armstrong, State of Pennsylvania, have invented a new and useful Improvement in Pumps for Oil-Wells; and I do hereby declare that the following is a full and exact description thereof, reference being had to the accompanying drawings.

My invention consists in so constructing pumps for oil-wells that the plunger-barrel moves over a fixed but detachable plunger, the valve-chambers following the motion of the plunger-barrel, the pump-tube serving the double purpose of pump-tube and sucker-rod, and, in combination with the above parts, a holder for securing the pump at any desired point in the bore of the well, the rod upon which the holder is placed being hollow and communicating with the valve-chambers of the pump, whereby the water which accumulates at the bottom of the well and in its oil-bearing crevices is removed while pumping the oil, thereby securing the full production of oil of the well.

Figures 1 and 2 are side elevations of my improvement, looking at it from two different points. Fig. 3 is a longitudinal and vertical section of the pump with the holder removed. Fig. 4 is a transverse section at line *y* of Fig. 2, looking at the disk *k* on the under side. Fig. 5 is a transverse section at line *y'* of Fig. 2. Figs. 6 and 7 are transverse views at lines *x x'* of Fig. 2.

Experience has demonstrated that in the operation of pumping oil from deep wells, as found in the oil-producing districts in this country, it is essential to agitate the oil in or about the point where the oil enters the pump-chambers. By agitating the oil the oil-bearing crevices in the well at the point where the greatest draft is upon them are prevented from clogging with sand, paraffine, and other matter that would be liable to clog up said crevices. The agitation of the oil washes out the crevices by an inward and outward action of the oil, caused, in this case, by the peculiarity of the construction of the pump and the parts therewith connected, the upward movement of the pump causing an inward draft upon the oil in the crevices, and the downward movement of the pump causing the oil to be forced back into the crevices, thus producing an outward and inward flow of the oil in the oil-bearing crevices of the well, keeping them at all times thoroughly cleansed of the paraffine, sand, and other matter which would, in the absence of the agitation of the oil, as described, settle in the crevices, and thereby clog them up.

The agitation of the oil in the manner herein indicated will cause the oil to hold the paraffine and fine particles of sand and other matter in suspension, to be carried off in the process of pumping.

I will proceed to describe in detail the construction of one form of device which I employ for the purpose of securing the pump at any desired point in the bore of the well, and for pumping and agitating the oil during the operation of pumping.

In the accompanying drawings, A represents the device used in combination with the pump for holding the latter in the desired position in the well. The holder A consists of a disk, *a*, spider *b*, and three flexible pieces, *c c c*, on the inner faces of which are inclines *d*. The pieces *c c c* are connected at their upper ends to the disk *a*, and at their lower ends to the arms of the spider *b*. On a hollow rod, *f*, which is connected to the under end of the casing of the valve-chambers B of the pump, and passing down through the disk *a* and spider *b*, is placed a coniformed wedge, *e*, the contour of which is indicated in Figs. 1, 2, and 7. On the hollow rod *f*, above the wedge *e*, is secured a collar, *g*, and below the wedge is a collar, *h*. The function of the collar *g* is to drive down the wedge *e*, and thereby force out the pieces *c c c*, so as to cause them to impinge against the walls of the well, and thereby secure the pump at the point desired in the well. The office of the collar *h* is to loosen up the wedge *e* when it is desired to change the position of the pump or the removal of it from the well. The holder A is connected by rods *i i* to the disk *k*, on the under side of which is a spring-pawl, *n*, having an inward-projecting pin, *o*, (indicated by dotted lines in Fig. 4,) which pin enters an opening in the pump-plunger D, thereby holding the plunger D in a fixed position in the disk *k*.

The purpose of having the pump-plunger D susceptible of detachment from the disk *k* will be hereinafter explained.

The casing of the valve-chambers B is connected to a disk, *l*, to which is attached a rod, *p*, and a tube, *q*, the upper ends of which are attached to a hollow head-piece, *s*, having a chamber, *w*. To the upper side of the head-piece *s* is attached the pump-tubing *t*, which serves the double purpose of pumping-tube and sucker-rod. To the upper side of the disk *l* is attached a tube, *r*, which is connected to the under side of the base *m* of the plunger barrel or chamber C, which moves over the plunger D. The base *m* is permanently attached to the rod *p* and tube *q*. The disk *l* and base *m* move upon rods *i i*, attached to the disks *k* and *a*, and the rod *p* and tube *q*, attached in the disk *l* and base *m* and to the head-piece *s*, move in openings in the disk *k*.

The valve-chambers B for the valves *v* and *w* are of ordinary construction, the valve being the ordinary ball-valve arranged in what is known among mechanics as a "cage," placed over the valve-seat. To the under end of the casing of the valve-chambers B is attached a tube, *u*, which passes up through openings in the disk *l*, base *m*, and through an opening in the disk *k*, and is permanently secured in the openings of the disk *l*, base *m*, and head-piece *s*.

On the upper end of the pump-barrel C is a projection, *a'*, the point of which is spear-shaped, which enters an opening, *c'*, in the disk *k*. The office of this spear-pointed projection is to force back the spring-pawl *n*, thereby removing the point *o* out of the opening in the plunger D, whereby the plunger becomes detached from the disk.

To one of the rods *i* is secured, by a cord or chain, *d'*, a cap-piece, *b'*, which cap-piece is placed over the opening *c'*, in such manner as to hold back the pawl *n*, and the point of the projection *a'* enters a recess in the cap-piece *b'*, holding the cap-piece up firmly against the under side of the disk *k* until the pump is secured at the desired point in the well; then, by a downward movement of the pump, the projection *a'*, moving from under the cap-piece *b'*, allows it to drop, whereby the spring-pawl *n* throws the projecting point *o* into the opening in the plunger, thereby attaching it in the disk *k*.

The purpose of having the plunger detached, as described, is to relieve it from any undue strain or force due to the weight of the several parts while lowering the pump and holder down into the well. The plunger is detached in the act of removing the pump and holder out of the well by the spear-pointed projection *a'* entering the opening *c'* in the disk *k*, thereby throwing back the spring-pawl *n* and removing its pin *o* out of the opening in the plunger D, so that in any upward movement of the parts no undue force or strain will come on the under end of the plunger.

The hollow rod *f* communicates with the tube *u* and valve-chambers of the pump through the medium of a small pipe, *v'*.

The operation is as follows: The plunger D being detached by placing the cap-piece *b'* on the under side of the disk *k*, with the point *a'* in the recess of the cap-piece *b'*, the pump and holder are lowered into the well, and when they have reached the desired point the pump is forced downward by quick motion, causing the collar *g* to strike on the upper end of the wedge *e*, thereby forcing outward the pieces *c c c* against the walls of the well, securing the holder in a fixed position. The pump is then ready for the operation of pumping.

The downward movement of the pump and plunger barrel C causes the oil to flow down through the tube *u* (indicated by the arrow 1) into the chambers B, and the upward movement of the pump and plunger barrel C over the plunger D causes the valve *w* to close, as is shown in Fig. 3, forcing down the oil which is in the plunger-barrel C, tube *r*, and chamber B, raising the valve *v*, and forcing said oil up through tube *q*, through chamber *w'*, and up through the pumping-tube *t*, as indicated by arrows 2. The pump-tubing *t* is suitably attached to the ordinary walking-beam or other device used for imparting a reciprocating motion to the pump.

All accumulation of water in the bottom of the well is removed by the action of the pump, which draws it up through the hollow rod *f*, and from it through pipe *v'* into the lower end of the tube *u*, from which, with the inflowing oil, it enters the valve-chambers of the pump and is forced up through the tube *q* and tubing *t*, and discharged with the oil.

The chamber *w'* in the head-piece *s* may be furnished with a check-valve, if so desired.

When it is found necessary to remove the pump and holder from the well for repairs or other purposes, the pump is drawn upward, causing the spear-pointed projection *a* to enter the opening *c'*, for the purpose of detaching the plunger D from the disk *k*. The collar *h* on the rod *f* will strike the under end of the wedge *e*, thereby loosening it up, so that the pieces *c c c* will release their hold on the walls of the well, allowing the holder and pump to be withdrawn.

Having thus described my improvement, what I claim as of my invention is—

1. In a pump for oil-wells in which a stationary plunger and a reciprocating plunger-barrel operated by the tube which serves both as a sucker-rod and as a means for conducting the oil from the well are employed, the herein-described stationary plunger D, tube *t*, for operating the plunger-barrel, and the said plunger-barrel connecting with valves, substantially as set forth, the said plunger-barrel and valves being arranged to cause an inflow of water and oil into the pump during the downward stroke of the plunger-barrel, and an upward flow of the same through the tube *t* during the upward stroke of the plunger-barrel, substantially as herein shown and set forth.

2. In combination with the stationary plunger D, the tube *t*, adapted to operate the reciprocating plunger-barrel, and the herein-described valve-chambers and inlet-orifice for oil and water, connected with the said reciprocating plunger-barrel at or near its lower extremity, whereby, by imparting to the pump-chambers and plunger-barrel a reciprocating motion, the oil in the well will be agitated at and about the point where they enter the pump, substantially as shown and described.

3. In an oil-pump having a reciprocating motion with relation to a stationary plunger, the chambers B, having valves *v w*, plunger D, and plunger-barrel C, in combination with the tubes *u q*, head-piece *s*, and pump-tubing *t*, substantially as herein described, and for the purpose set forth.

4. In an oil-pump having a reciprocating motion with relation to a stationary plunger, the spring-pawl *n*, spear-pointed projection *a'*, and cap-piece *b'*, in combination with the plunger D, plunger-barrel C, and disk *k*, substantially as herein described, and for the purpose set forth.

5. In an oil-pump having a reciprocating motion with relation to a stationary plunger, the combination of the pump-tubing *t*, head-piece *s*, rod *p*, and tubes *q u* with the rods *i i*, disks *k l*, and base *m* of the plunger-barrel C, substantially as herein described, and for the purpose set forth.

6. In an oil-pump, the hollow rod *f*, pipe *v'*, and tube *u*, in combination with the pump, substantially as herein described, and for the purpose set forth.

7. The holder A, consisting of the disk *a*, spider *b*, pieces *c c c*, having inclines *d d d*, and wedge *e*, in combination with the rod *f*, provided with collars *g* and *h*, rods *i i i*, and disk *k*, substantially as herein described, and for the purpose set forth.

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Witnesses:
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F. BLOCHER.