# N. Dodge,

## Oil Pump.

No. 48,378. Patented June 27, 1865.

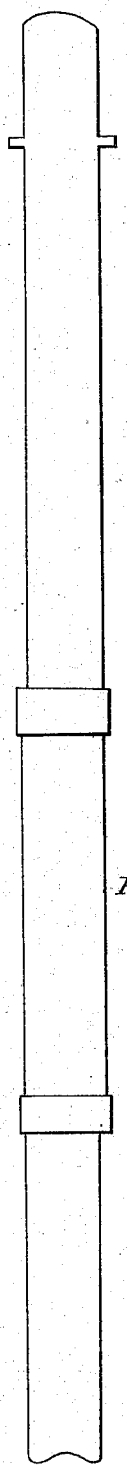


Fig. 1

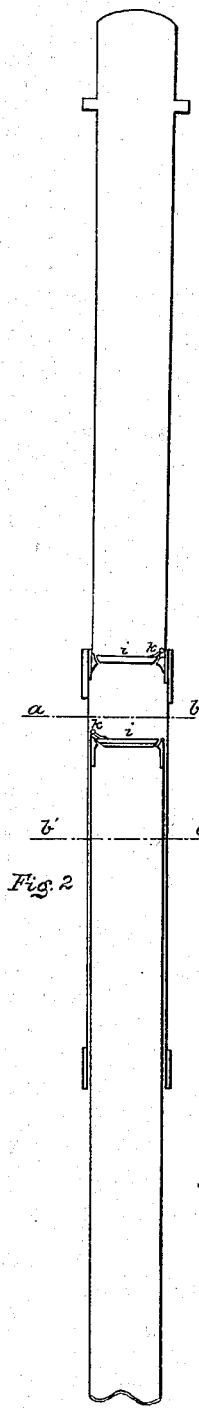
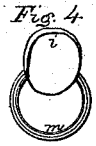



Fig. 2

Fig. 5.


Fig. 3.


Fig. 4.




Witnesses
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# UNITED STATES PATENT OFFICE.

NEHEMIAH DODGE, OF NEW YORK, N. Y.

## IMPROVEMENT IN DEEP-WELL PUMPS.

Specification forming part of Letters Patent No. **48,378**, dated June 27, 1865.

*To all whom it may concern:*

Be it known that I, NEHEMIAH DODGE, of the city, county, and State of New York, have invented a new and Improved Construction of Pump for Deep Borings; and I hereby declare that the following is a full and sufficient description thereof, reference being had to the accompanying drawings and the letters and figures marked thereon.

Figure 1 represents an elevation of said pump. Fig. 2 represents a vertical section through the axis of the pump; Fig. 3, a horizontal section through the line *a b* of Fig. 2, with an edge view of the open valve; Fig. 4, a horizontal section through line *a b* of Fig. 2, showing the valve in perspective—*i* is the valve, *k* the hinge, *n* the hinge-pin, *m* the ring that holds the valve; Fig. 5, horizontal section through *b' c* of Fig. 2, showing the two concentric tubes.

My present invention has the same general design as that patented to me on the 12th March, 1850, but which has already expired.

The design consists in being adapted to deep borings. The former patent being adapted to deep wells, where there is a plenty of room for surrounding the pump-barrel with an enlarged valve-chamber, while the present device is designed for deep borings in rock formations, where a very small bore, on account of economy of room within the barrel growing out of the construction of the valves, is made to answer the purpose of a larger bore with valves of the ordinary construction.

The prominent features to be set forth in the present devices are the construction of the valves to prevent obstructing the current through the barrel, and thus increase the amount of liquid pumped without increasing the size of the bore; and, second, the devices used to prevent injuring the lower part of the pump-barrel by its striking against a rock bottom and so battering up the end of the metallic tube from the working of the instrument, and at the same time preserve the valve-chamber air-tight during the rising and falling of the pump-barrel by a slip-joint.

The ball-valve to pump the liquid from oil-wells, to which my present invention is designed to be applied, has some valuable properties which have decided the public to adopt it in preference to all other valves, the principal reason for which is that it can be used without any packing whatever, and from its peculiar construction it can scarcely get out of order; and if it should become deranged no valve is more easily repaired; but notwithstanding all this there is a very serious objection to the use of the ball-valve. In the first place the ball-valve lies necessarily in the axis of the pump-barrel and greatly obstructs the upward current of the liquid, and never can be carried to one side of the current nor out of it. It is always in the way, a mass of obstructing matter equal to its own diameter, to obviate which there is no available remedy without substituting some other valve. The butterfly-valve and all leaf-valves, when fully open, allow a free passage to the fluid after passing the valve-seat; but from the form of the said valve-seat and the necessary contraction of space about it there never can be an unobstructed current through such valves.

To obviate the objections and secure the excellencies of the ball-valve I have adopted a valve-seat like that of the ball-valve, having the valve part conformable thereto in all that part which comes in contact with the said valve-seat; but the lower face of the said valve being planed out in the form of a concave of a cylinder, so that when the valve is fully open the concavity of the under side of the valve-face shall coincide, or nearly coincide, with the cylindrical concavity of the pump-barrel, or at least shall be parallel with the same, or so nearly that the deviation from it shall only be sufficient to keep the surface of the valve clean by washing it, and along which cylindrical concave of the valve the stream glides smoothly.

In the second place, the device used to preserve the valve-chamber air-tight, and at the same time allow the pump-barrel to rise and fall in the act of pumping, is arranged as follows: The lower section of the tube is made double, with a slip-joint like that of the telescopic tube, in which the smaller tube, designed to rest on the bottom of the well, is received into the larger tube, while the larger tube plays up and down in the act of pumping. The lower valve is placed on the upper extremity of the inside tube, while the upper valve is fastened to the outside tube a short space above the lower valve. The space between the two valves is a constantly-varying

space, made so by the act of pumping. This combination of the inner and outer tube of the barrel to form a slip-joint enables the inventor to use pump-valves without packing, which is of great importance where the barrel is of great length, requiring extra time and expense to elevate the valves from the bottom of the well.

The above construction of the slip-joint and the cylindrical concave of the under face of the valves, together with the contact part of the valve and valve-seat (being a section of a sphere) so accurately turned and ground as to require no packing, and still form an accurate and perfect joint for the oil of petroleum wells, destroys in a little time every kind of packing hitherto invented, which is a serious embarrassment to the business; but the ball-valve, requiring no packing, is the best hitherto used. There is still another feature of the valve which is exceedingly important, preventing derangement of the working parts—namely, the method of securing the joint-pin in its place. This device consists in making the pin of the hinge-joint of the valve so long that its ends touch the sides of the concave of the cylinder, so that it is impossible for the pin to get loose and come out. The device is shown at *n*, Fig. 4, where *i* represents the open valve, *k* the hinge, and *n* the pin of the joint, the ends of which touch against the sides of the pump-barrel. The valve is set into its place in the pump-barrel by first attaching it to the upper part of an inside ring, *m*, which is received into its place by accurately turning or by grinding the surfaces together, so that the ends of the joint-pin will be received against the inside of the barrel, or the inner face of the ring, which is equivalent thereto.

*m* represents the ring to which the valve is attached, and is easily removed for repairs, &c.

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

1. The slip-joint of the lower part of the barrel, in combination with a hollow piston-rod, made in the manner and for the purposes herein described.

2. The making of the contact part of the valve and valve-seat of the section of a sphere, in combination with the cylindrical concave of the under surface of said valve, substantially in the manner and for the purpose set forth.

3. In combination with the said valve, the hinge-pin, substantially in the manner and for the purpose set forth, so that the bearing of the pin against the cylindrical concave of the pump shall hold it firmly in place.

NEHEMIAH DODGE. [L. S.]

Witnesses:
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